**Title**

Post-9/11 Military Veterans and Higher Education: Factors Associated with College Enrollment and Choice

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**Publication Date**

2015

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UNIVERSITY OF CALIFORNIA

Los Angeles

Post-9/11 Military Veterans and Higher Education:

Factors Associated with College Enrollment and Choice

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Philosophy

in Education

by

Dani Molina

2015

ABSTRACT OF THE DISSERTATION


Post-9/11 Military Veterans and Higher Education:

Factors Associated with College Enrollment and Choice



by



Dani Molina

Doctor of Philosophy in Education

University of California, Los Angeles, 2015

Professor Mitchell J. Chang, Chair

Even though post-9/11 veterans now have access to college funding that increases their

purchasing power and postsecondary access through the Post-9/11 GI Bill, it is unclear what

factors will lead them to pursue a higher education.  Historically a majority of veterans will not

use their VA education benefits.  The U.S. Department of Veterans Affairs' National Survey of

Veterans show that on average only 39 percent of all veterans in the U.S. will use their earned

postsecondary benefits after leaving the military  (U.S. Department of Veterans Affairs, 2001,

2010).  This is troubling given that earning money for college is one of the primary reasons cited

for enlisting in the military (Eighmey, 2006; Woodruff, Kelty, & Segal, 2006; Zinger & Cohen,

2010) and the financial resources are available through various VA education programs.

This study examined key factors that led post-9/11 veterans to enroll in higher education.

A central focus of this study was to identify key factors that explain why a majority of veterans

enter two-year and for-profit institutions instead of four-year institutions after leaving active duty. This study used data from the Education Longitudinal Study (ELS) of 2002, which is publicly available through the U.S. Department of Education's National Center for Education Statistics (NCES). First presented was a descriptive portrait of veterans who did and did not enter college, as well as a description of veterans at two-year, for-profit, and four-year institutions. Second, a logistic regression analysis was used to answer the first research question, which sought to examine factors related to veterans' college enrollment. Finally, a multinomial logistic regression was employed to respond to the second research question, which explored key factors that predict veterans' attendance at two-year and for-profit institutions compared to four-year institutions.

The final logistic regression results showed that veterans' educational expectations and the number of friends who planned to enter four-year institutions during high school (peer plans) were the most significant predictors of college enrollment among veterans, even after accounting for gender, race/ethnicity, socioeconomic status (SES), highest math taken in high school, and high school urbanicity. The multinomial logistic regression found that, once veterans' demographic characteristics, high school context, and other factors are controlled for, the highest math taken and educational expectations are the best predictors of enrollment into two-year colleges. Moreover, the multinomial logistic regression results shows that veterans' enrollment into for-profit colleges compared to four-year institutions is also best explained by the highest math courses taken in high school, even after accounting for gender, race/ethnicity, socioeconomic status (SES), educational expectations, peer plans, and high school urbanicity. These findings have implications for policy development and practice at various levels. Given the lack of empirical research on student veterans, this area also needs further research.

The dissertation of Dani Molina is approved.

Patricia M. McDonough

Michael H. Seltzer

Leobardo F. Estrada

Mitchell J. Chang, Committee Chair

University of California, Los Angeles

2015

DEDICATION

This dissertation is dedicated to all our military veterans, both past and present, who have

defended our great nation and who continue to make sacrifices back home.

"No Mission Too Difficult. No Sacrifice Too Great. Duty First!"

– 1st Infantry Division, Unites States Army

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ACKNOWLEDGMENTS

Achieving this important milestone in life was the result of support from many individuals before and during my time at UCLA. I would like to extend my sincere thanks for the guidance I received from my dissertation committee. Each one of you has provided me with the tools necessary for me to develop this scholarship. Thank you Mitch for advising me along this process even before I started the HEOC program. As an advisor, you have constantly pressed me to think critically about my research on student veterans, for which I am incredibly thankful. I want to thank Pat McDonough, Mike Seltzer, and Leo Estrada for your willingness to serve on my dissertation committee. This study has been strengthened by your thorough feedback and critical lens. I truly appreciate all the advice each one of you provided throughout the process.

There are many others that provided me critical support as a scholar of higher education. José Luis Santos, Hironao Okahana, and Lesley McBain, supported me on this project from beginning to end. My colleagues at the American Council on Education (ACE), Lorelle Espinosa and Christopher Nellum, thank you for the great feedback and support. Andrew Morse at NASPA, I look forward to working with you on student veterans research in the DC space.

I would also like to acknowledge my family: Apa, Ama, Ed, Cindy, Payo, Carmen, and David. To all my tios/as, primos/as, and all the Raza getting it done. Puro pa delante! Thank you to Alani for making me smile and for keeping me grounded. To my partner, Lili. Thanks for being patient during this long process. Can't wait to get back to our Cancun vacations! ☺

Lastly, I want to thank the U.S. Army and my fellow military veterans. My four years in the service were life-changing and I would not have made it through higher education without the perseverance and financial support I gained while in the military. This We'll Defend!

VITA

## EDUCATION

University of California, Los Angeles
MA – Higher Education                                                                                      June 2011

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## PROFESSIONAL EXPERIENCE

*Senior Program and Research Manager*, American Council on Education (ACE), Veterans' Programs, January 2015 – Present.

Oversee programs and research in support of the post-9/11 generation of military-connected college students within Veterans' Programs at the American Council on Education (ACE). We promote access to and success in higher education for the more than 2.8 million service members, veterans, and their families who are eligible for benefits under the Post-9/11 GI Bill and other VA/DoD education programs. The initiative is comprised of grant-funded programs seeking to find, develop and disseminate promising practices in serving military-connected individuals in higher education and promotes awareness of this population's needs. These projects continue an ACE tradition of helping to ensure service member and veteran access and success in higher education.

*Graduate Research Associate*, American Council on Education (ACE), Center for Policy Research and Strategy (CPRS), June 2014 – January 2015.

Conceptualized a comprehensive research agenda focused on examining military-connected college students. Produced an issue brief that highlighted demographic, enrollment, employment, and financial aid differences among military-connected undergraduates. Spearheaded a convening of national experts on student veterans to gain an understanding of the state of practice, research, and policy and to help ACE conceptualize a large-scale study focused on investigating promising efforts in support of their postsecondary success. Designed student veterans infographic using U.S. Department of Education NCES national data. Responded to internal inquiries for data analyses and policy development.

*Veterans and Disability Outreach Officer*, UCLA Campus Human Resources & UCLA Office for Diversity and Faculty Development, September 2013 – June 2014.

Researched best practices across the U.S. in regards to outreaching and recruiting protected veterans and individuals with disabilities given new OFCCP regulations. Developed a strategic plan for the UCLA Diversity and Faculty Development and UCLA Campus Human Resource Offices for designing and implementing an outreach program for faculty and staff. Developed and presented several reports outlining efforts and recommendations to recruit protected veterans and disabled persons to UCLA executive decision-makers. Findings were presented and shared with other University of California campuses.

*Veteran Resource Center Director*, University of California, Santa Cruz, September 2009 – June 2010.

>   Assisted veterans in making successful transition from active duty military service to university life by providing academic advising, transition assistance, and a social network. Outreached to local community colleges and military bases to inform veterans about financial aid and admission services available to them. Fostered a community space for veterans to support academic retention of students and awareness of veteran issues. Educated the campus and community about returning veteran issues and advocated for needed institutional support resulting in considerable expansion and notice of UCSC's newly established Veteran Resource Center. Successfully managed a $100,000 ACE/Wal-Mart "Success for Veterans Grant" and composed reports detailing accomplishments as a result of receiving the grant.

*Radio Operator and Maintainer*, United States Army, Fort Lee, VA, August 2000 – August 2004.

>   Trained 100+ soldiers on Harris Radio technology usage and maintenance: Operation Iraqi Freedom, 3rd United States Army Central Command (USARCENT), Kuwait and Iraq. Operated, troubleshot, and maintained multiple radios, antennas, tracking devices, and communications equipment simultaneously during Operation Iraqi Freedom. Worked with Mantech Corporation, Harris Corporation, and other major defense firms for equipment repair during Operation Iraqi Freedom.

PUBLICATIONS

>   Santos, J. L., Esqueda, M. C., & Molina, D. (2015). Military service and college: An exploratory examination of military-connected Latina/o undergraduates and access to higher education. *The Journal of Latino-Latin American Studies*.

>   Molina, D., Esqueda, M. C., & DeBraber, T. (2014). An introduction to education and vocational benefits for student veterans. Book Chapter for *The Handbook on Military Social Work*.

>   Gándara, P., Oseguera, L., Huber, L. P., Locks, A., Ee, J., & Molina, D. (2013) *Making Education Work for Latinas in the U.S.* Report Commissioned by the Eva Longoria Foundation. The Civil Rights Project: Los Angeles, CA.

PRESENTATIONS

>   Molina, D. (2015, February). *Military-Connected Undergraduates: Differences Between Military Active Duty, Reserve, National Guard, and Veterans in Higher Education*. Paper scheduled to be presented at the Student Affairs Administrators in Higher Education (NASPA) 2015 Veterans Conference, Louisville, KY.

>   Molina, D., & Morse, A. (2015, February). *Examining Student Veteran Racial/Ethnic and Income Differences*. Paper scheduled to be presented at the Student Affairs Administrators in Higher Education (NASPA) 2015 Veterans Conference, Louisville, KY.

>   Molina, D. (2014, October). *Post-9/11 Military-Connected Undergraduates & Higher Education: Using NCES Data to Analyze College-Going Outcomes*. Presentation for the U.S. Department of Education's National Center for Education Studies (NCES), Washington, DC.

Santos, J. L., Molina, D., & Esqueda, M. C. (2013, March). *Exploring Differences in College Entry Characteristics Among Civilian, Active Duty, and Veteran Undergraduates.* Paper presented at the Association for Education Finance and Policy (AEFP) Conference, New Orleans, LA.

Santos, J. L., Molina, D., & Esqueda, M. C. (2013, February). *Exploring Associations Between Civilian, Active Duty, and Veteran Undergraduates.* Paper presented at the Veteran Symposium for Higher Education Conference, Louisville, KY.

Santos, J. L., Molina, D., & Esqueda, M. C. (2012, November). *Comparing the Entry Characteristics of Veteran and Nonveteran Students: A Group Means Analysis.* Paper presented at the Association for the Study of Higher Education (ASHE) Conference, Las Vegas, NV.

Santos, J. L., & Molina, D. (2012, July). *Aspirations of Military Service after High School: Implications for College Attendance.* Paper presented at the Department of Defense (DoD) Worldwide Education Symposium (WW12) Conference, Las Vegas, NV.

Molina, D. (2012, April). *Comparing Entry Characteristics and Academic Self-Concept Between Veteran and Nonveteran Student Groups.* Paper presented at the American Educational Research Association (AERA) Conference, Vancouver, Canada.

Molina, D. (2011, June). *Veterans' Transition from Service to Higher Education: An Exploratory Analysis of Veterans' and Nonveterans' Pre- College Characteristics.* Paper presented at the Student Veterans of America (SVA) Leadership Conference, University of Wisconsin, Madison.

Santos, J. L., & Molina, D. (2011, May). *Veterans' Transition from Service to Higher Education: An Exploratory Analysis of Veterans' and Nonveterans' Pre- College Characteristics.* Paper was hand selected from over 500 proposals to be a concurrent session in the Access Targeted Affinity Group (TAG) for the Association for Institutional Research (AIR) national conference in Toronto, Canada. Paper was well received and featured in *The Chronicle of Higher Education* (link below).

Molina, D. (2010, May). *How to Effectively Write a Funding Grant for Student Veteran Centers.* Paper presented at the Student Veterans of America (SVA) West Regional Conference, Los Angeles, CA.

Molina, D. (2009, June). *Challenges and Opportunities for Latina/o Continuation School Students.* Paper presented at the Faculty Mentor Program (FMP) annual research colloquium, University of California, Santa Cruz (UCSC).

Mosqueda, E., & Molina, D. (2008, February). *What Can We Learn about the Dropout Process from Continuation High School Latino Immigrant and Non-immigrant Students?* Paper presented at the Sociology of Education Association (SEA) national meeting, Pacific Grove, CA.

**Chapter 1**

**Introduction**

**Background of the Study**

Before the end of World War II, President Franklin D. Roosevelt urged Congress to develop comprehensive legislation that would help over 16 million exiting service members transition into postwar society and avoid mass unemployment (Altschuler & Blumin, 2009; Greenberg, 1997; Mettler, 2005). Likewise, Members of Congress and the American Legion proposed that veterans be given a broader set of benefits to honor their military service and ameliorate life disruptions (Greenberg, 1997; Serow, 2004). To institutionalize support for veterans, Congress passed the *Servicemen's Readjustment Act of 1944* (Greenberg, 1997; Mettler, 2005), also known as the GI Bill. Major sections of the law included unemployment benefits, home, farm, and business loans, and generous education benefits (Altschuler & Blumin, 2009).

As a result of the original GI Bill, an unprecedented number of WWII veterans had the opportunity to take advantage of higher education through its education and training provisions. Between 1944 and 1956, approximately 2.2 million, or 14 percent, of the 16 million WWII veterans used the GI Bill to enroll in a postsecondary institution (Altschuler & Blumin, 2009; Mettler, 2005; Olson, 1973; Yoder, 1963). Remarkably, the GI Bill education benefits may have helped broaden higher education access to roughly 450,000, or 20 percent, of the 2.2 million veterans who used this benefit to enter college (Greenberg, 1997; Mettler, 2005; Olson, 1973; Serow, 2004). Additionally, about 5.6 million, or 35 percent, of the 16 million WWII veterans who used the educational provisions of the GI Bill used their benefits to obtain vocational education, on-the-job training, or schooling below the baccalaureate level, especially at

proprietary schools (Altschuler & Blumin, 2009; Cohen & Kisker, 2010; Mettler, 2005).

Proprietary schools, commonly known as for-profit institutions, greatly expanded from 1945 to

1950 as a result of the high number of veterans that entered these institutions (Cohen & Kisker,

2010).

Over the years following WWII, different iterations of the GI Bill were enacted that also

offered postsecondary benefits to veterans (Altschuler & Blumin, 2009; Bennett, 1996; Cohen &

Kisker, 2010; Greenberg, 1997; Mettler, 2005). These included the Korean War GI Bill (1952),

Vietnam War GI Bill (1966), and Montgomery GI Bill (1985). However, these laws were not as

financially generous as the original GI Bill and, as a result, were less successful in providing

veterans access and purchasing power to enter higher education. A Congressional Research

Service report (Smole & Loane, 2008) illustrates that these veteran education benefits only

covered a small portion of costs associated with going to college (i.e., tuition, fees, room, board,

and other expenses), particularly for veterans attending four-year public and private institutions.

It would take 65 years after the WWII GI Bill was first passed, and an unexpected attack on the

U.S. in 2001, before another version had the potential to dramatically expand access to higher

education for a new generation of veterans (U.S. Department of Veterans Affairs, 2015a).

The September 11, 2001 (9/11) attacks on the U.S. became the impetus that sent the

nation into two of the longest wars in its history. With the end of Operation Iraqi Freedom (OIF)

in 2011 and Operation Enduring Freedom (OEF) in 2014, and the continuous drawdown of

military personnel (Alexander & Shalal, 2014; National Defense Authorization Act, 2012;

Shanker & Cooper, 2014), many service members have transitioned out of the military and more

are expected in the coming years. To illustrate, approximately five million service members who

served after 9/11 are expected to be out of the military by 2020, effectively becoming veterans[1] (U.S. Government Accountability Office, 2013). The expected waves of post-9/11 veterans prompted the need to fortify support for transitioning service members. With the success of the WWII GI Bill in mind, Congress sought to alleviate any transitional hardships post-9/11 veterans could experience by creating an improved GI Bill (Post-9/11 Veterans Educational Assistance Act, 2007). As a result, Congress passed a robust GI Bill of a magnitude not provided since the WWII GI Bill: the *Post-9/11 Veterans Educational Assistance Act of 2008*, also known as the Post-9/11 GI Bill. This law significantly increased tuition/fee payments and covered more costs associated with going to college, such as housing and book/supply expenses (U.S. Department of Veterans Affairs, 2015b). It is anticipated that this new educational benefit will subsidize the postsecondary education of many post-9/11 veterans.

**Statement of the Problem**

Even though OIF/OEF veterans now have access to college funding that increases their purchasing power and college access through the Post-9/11 GI Bill, it is unclear what factors will lead them to pursue a postsecondary education. Historically a majority of veterans will not use their VA education benefits. To illustrate, the U.S. Department of Veterans Affairs' National Survey of Veterans show that on average only 39 percent of all veterans in the U.S. will use their earned postsecondary benefits after leaving the military (U.S. Department of Veterans Affairs, 2001, 2010). This is troubling given that earning money for college is one of the primary reasons cited for enlisting in the military (Eighmey, 2006; Woodruff, Kelty, & Segal, 2006;

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[1] The term "veteran" is defined in this study to include individuals who were discharged from the active duty, reserve, or National Guard components and who no longer have an obligation to serve (U.S. Department of Veteran Affairs, 2010) or members of the reserve and National Guard who were activated for and completed federal active duty military service (Moulta-Ali, 2014).

Zinger & Cohen, 2010) and the financial resources are available through various VA education programs (U.S. Department of Veterans Affairs, 2015c).  According to the U.S. Department of Veterans Affairs' National Survey of Veterans (2001, 2010), only an estimated 24 percent[2] of veterans had used their VA education benefits towards a postsecondary degree, even though honorably discharged or disabled veterans were entitled to educational aid upon leaving the military.  The low use of VA education benefits is concerning given that most veterans aspire to go to college and earn a baccalaureate degree with financial support from the GI Bill (DiRamio, Ackerman, & Mitchell, 2008; Zinger & Cohen, 2010).  Of those post-9/11 veterans who have enrolled in higher education, most have entered community colleges and for-profit institutions while a minority immediately attended four-year institutions (Field, 2008; Sewall, 2010).

A number of reasons may explain why most veterans enter two-year and for-profit institutions instead of four-year institutions.  First, veterans from disadvantaged demographic backgrounds could be at decreased odds of going to college.  For example, a description of enlisted youth[3] suggests that, once discharged, veterans may be at a disadvantage of entering higher education given their racial/ethnic and socioeconomic backgrounds (Bachman, Segal, Freedman-Doan, & O'Malley, 2000; Elder, Wang, Spence, Adkins, & Brown, 2010).  In addition, some veterans have common demographic factors that make them more likely to enter community colleges rather than four-year institutions.  For instance, researchers (Coley, 2000; Schmid & Abell, 2003) have found that students with specific risk factors decrease their likelihood of persisting in college and attaining a baccalaureate degree.  College student risk

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[2] About 37 percent of veterans surveyed in 2010 (U.S. Department of Veterans Affairs, 2010) indicated having used VA education or training benefits.  Of those veterans, about 65 percent use their benefits for college or university coursework leading to a degree.  That figure is roughly 24 percent of veterans who used VA education benefits for a postsecondary degree.

[3] Youth in this study are defined as high school students and recent high school graduates.

factors include: delayed entry, part-time enrollment, full-time work, financial independence, having dependents, single parenthood, and not having a high school diploma. Community college students are more likely to have these characteristics than students at four-year institutions. Moreover, veterans tend to have a combination of these characteristics upon entering higher education. For example, two reports found that a high number of veterans delay entry into college, enroll part-time, work full-time, have dependents, and/or are married (American Council on Education, 2008; U.S. Department of Education, 2011), all factors that can decrease their likelihood of staying in college and ultimately earning a degree. Finally, veterans could be enticed to attend for-profit institutions given their financial aid packages, flexible schedules, convenience of locations, online coursework offered, and targeted recruitment efforts (Field, 2008; Sewall, 2010; Steele, 2012; U.S. Department of Education, 2011). Although these explanations have yet to be studied in greater depth, they do offer a window into likely reasons why veterans choose to enroll in two-year and for-profit institutions over four-year institutions.

Nevertheless, previous research on post-9/11 military-connected[4] college students (Ackerman & DiRamio, 2009; American Council on Education, 2008, 2009a, 2009b, 2010; DiRamio, Ackerman, & Mitchell, 2008; DiRamio & Jarvis, 2011; Hamrick, Rumann, & Associates, 2013; Livingston, Havice, Cawthon, & Fleming, 2011; Persky & Oliver, 2011; Rumann & Hamrick, 2010; Rumann, Rivera, & Hernandez, 2011; U.S. Department of Education, 2009, 2011; Wheeler, 2012; Zinger & Cohen, 2010) has yet to explicitly examine what factors are associated with veterans' likelihood of entering higher education and choosing

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[4] Military-connected college students include individuals on active duty, reservists, National Guard members, veterans, and their dependents. Previous research has found significant differences among these groups (Molina, 2015; Santos, Esqueda, & Molina, 2015).

an institution. Equally importantly, no nationally-representative longitudinal studies on pre-9/11 military-connected students (Elder, Wang, Spence, Adkins, & Brown, 2010; Wang, Elder, & Spence, 2012) have focused specifically on examining factors associated with post-9/11 veterans' college enrollments and choices. Prior studies have several limitations, such as a lack of generalizability, confounding veterans with other military-connected students, and not accounting for the impact of pre-military characteristics and experiences on how they approach higher education. Although prior studies have contributed to the baseline knowledge of military-connected individuals in higher education, none have solely examined factors that affect post-9/11 veterans' likelihood of entering college or choosing an institution. The dearth of research on post-9/11 veterans' college enrollment and choice calls for a focused investigation that highlights how they enter college and choose an institution. Given that five million post-9/11 service members are expected to leave the military by 2020 (U.S. Government Accountability Office, 2013), it is crucial to understand what factors contribute to their likelihood of going to college, particularly into four-year institutions. We need to know if there are characteristics and experiences that veterans have that may inhibit their likelihood of accessing higher education and, for veterans that are at decreased odds, how we can better target policy, institutional, and programmatic resources to increase their chances of entering college. This study addresses gaps in the research literature on veterans' college enrollments and choices in an effort to better understand the reasons associated with their low college participation and relatively lower attendance at four-year institutions.

**Purpose of the Study**

The purpose of this study is to examine college enrollment and choice among post-9/11 veterans. A central focus is to identify key factors that explain veterans' likelihood of entering

higher education and, for veterans who enroll, what factors best explain their reasons for attendance at two-year or for-profit institutions relative to four-year institutions.

## Research Questions

The primary research questions guiding this study are:

1. What factors best predict whether a veteran enrolls in higher education?

2. For veterans who enroll, what factors best predict whether they enter a two-year or for-profit institution compared to a four-year institution?

The first research question addresses which factors are associated with the likelihood veterans will enter higher education. For the purposes of this study, higher education institutions were classified as follows: public or private not-for-profit two-year institutions as *two-year institutions*, two-year or four-year for-profit institutions as *for-profit institutions*, and public or private not-for-profit four-year institutions as *four-year institutions*. These classifications are based on descriptive information available about veterans' college enrollment patterns (U.S. Department of Education, 2011).

## Research Design

Data for this study were obtained from the Education Longitudinal Study of 2002 (ELS:2002), which is sponsored by the U.S. Department of Education's National Center for Education Statistics (NCES). The publicly available data offer one of the most current, longitudinal national sample of students' post-high school pathways. The ELS:2002 was designed to track the transition of high school sophomores in 2002 into higher education and the workforce by collecting multilevel data from multiple participant populations in 2002, 2004, 2006, and 2012. There are several strengths in using this dataset. The dataset is longitudinal, provides a breadth of information collected from multiple participants, and is publicly accessible

online through the ELS:2002 webpage ([http://nces.ed.gov/surveys/els2002/avail_data.asp](http://nces.ed.gov/surveys/els2002/avail_data.asp)).  Most importantly, the ELS:2002 dataset is ideal for examining how background characteristics, family circumstances, high schools, communities, peer influences, and military experience are associated with postsecondary enrollment among post-9/11 high school youth.  Although the relationship between these factors and veterans have yet to be examined, accounting for these experiences and circumstances may shed light on how they affect veterans' likelihood of attending college and choosing an institution.  These advantages made the ELS:2002 best suited for addressing this study's purpose and research questions.

To answer the study's two research questions, two dependent variables were created. The first variable examined factors related to whether a veteran entered college or not and the second variable examined factors related to whether a veteran entered a two-year or for-profit institution relative to a four-year institution.  The first dependent variable employed logistic regression given the binary outcome, whether veterans entered college or not.  The second dependent variable employed multinomial logistic regression given the multiple-outcome research question, whether a veteran entered a two-year or for-profit institution versus a four-year institution (Hosmer, Lemeshow, & Sturdivant, 2013; Long & Freese, 2006).  Variable selection was also made easier by using the ELS:2002 because of the multiple sources collected in the base year and follow-up surveys (i.e., students, parents, and educational administrators). Additionally, the literature on college enrollment and choice, as well as this study's theoretical framework, guided the selection of independent variables to be included in the analyses.  The dataset was weighted to account for the nonrandom and oversampling of particular students using weights computed by ELS staff in the third (2012) follow-up.  Finally, survey analyses and results only included the subsample of participants who were identified as veterans.  Individuals

who were serving in the active duty, reserve, or National Guard components as of the third follow-up (in 2012) were not included in the analyses and results because of their differing higher education needs and experiences (Molina, 2015; Santos, Esqueda, & Molina, 2015).

**Significance of the Study**

Identifying key factors that influence college enrollment and choice for this unique and growing population is important for shaping future research, policy, and practice. First, this work will add to the knowledge base on college enrollment and choice of post-9/11 veterans, who are largely overlooked and understudied by higher education researchers. Second, the study will contribute to crafting future policy for student veterans by identifying potential barriers and facilitators of the college-going process for this population. Third, the findings will help outreach and transition-support professionals and organizations to better assist veterans who aspire to go to college, and perhaps also provide information that will enhance services for improving their overall enrollment rates into higher education, particularly into four-year institutions.

**Definition of Terms**

*College Access.* College access is defined as the process of overcoming barriers to entry into higher education, which is a problem in particular for youth from low-income, first-generation, and racial/ethnic minority backgrounds who otherwise are at a disadvantage of entering college. In particular, policies that determine college admissions criteria set the parameters for who has "access" to higher education (Anderson, 2002).

*College Choice.* According to McDonough (1997) and Perna (2006), the college choice process is best understood as occurring through three separate phases: predisposition, search, and choice. During the predisposition phase, high school students develop aspirations and plans

about entering college or not.  The search phase is characterized by students' examination of information about college admissions, in addition to which colleges and how many they should apply to.  Finally, the choice phase consists of a student choosing an institution to attend (Hossler, Braxton, & Coopersmith, 1989).

*College Enrollment.* Whether an applicant accepted an offer for admissions, registered for coursework, and attended a postsecondary institution.

*Post-9/11.*  An ongoing period that began after the September 11, 2001 attacks on the U.S. (Crowley, 2013).

*Service Member*.  Individuals who are on active duty with the U.S. Armed Forces and members of the reserve or National Guard components that were activated for federal military service are considered "service members" in this study given their obligation to serve in the U.S. military (Moulta-Ali, 2014) and the likelihood of experiencing disruptions while in college due to potential deployments (Teachman, 2013).

*VA Education Benefits*.  Veteran education benefits administered by the U.S. Department of Veterans Affairs (VA), which typically include the Post-9/11 GI Bill, Montgomery GI Bill (MGIB), and Vocational Rehabilitation and Employment Program (VocRehab) (U.S. Department of Veterans Affairs, 2015c).

*Veteran*.  Individuals who were discharged from the active duty and who no longer have an obligation to serve in the U.S. Armed Forces (U.S. Department of Veteran Affairs, 2010) and members of the reserves or National Guard who were activated for and completed federal active duty service (Moulta-Ali, 2014).

*U.S. Department of Veterans Affairs (VA).* The federal cabinet-level agency that provides benefits and services to service members, veterans, and their dependents (U.S. Department of Veterans Affairs, 2015d).

**Organization of the Study**

This study is organized into five chapters, including this introductory chapter, an appendix, and a references section.  Chapter 2 begins with a review of the literature on post-9/11 military-connected college students and the characteristics of youth who enlist.  The chapter ends with an explanation of the study's theoretical framework.  Chapter 3 describes the population and sampling, definition of variables examined, and specifies the statistical analyses.  The chapter concludes with a review of the study's delimitations, limitations, and assumptions.  Chapter 4 will present the descriptive and regression-based findings.  Chapter 5 will discuss the study's main findings and recommendations for policy, practice, and future research.  The study concludes by providing an appendix with imputed and weighted results, and a list of references.

## Chapter 2

## Review of the Literature

**Introduction**

Even though veterans now have access to increased college funding through the Post-9/11 GI Bill, it is unclear whether most will actually pursue a postsecondary education. According to Eighmey (2006), Woodruff, Kelty, and Segal (2006), and Zinger and Cohen (2010), earning money for college was one of the primary reasons for enlisting in the military for many individuals. Moreover, financial resources are available to veterans through various VA education programs (U.S. Department of Veterans Affairs, 2015c). However, only an average of 24 percent of veterans have used their VA education benefits for a postsecondary degree since WWII (U.S. Department of Veterans Affairs, 2001, 2010), and few enter four-year institutions after leaving the military (Field, 2008; Sewall, 2010). This study sought to better understand veterans' postsecondary enrollments and institutional choices by asking: *what factors best predict whether a veteran enrolls in higher education? For veterans who enroll, what factors best predict whether they enter a two-year or for-profit institution relative to a four-year institution?* The purpose of this study was to identify key factors that help explain how veterans approach higher education.

The goal of this chapter is to critically examine and synthesize the literature relevant to the study's purpose and research focus. Relevant literature sources were identified through select databases, such as ERIC, EbscoHost, ProQuest Education and Dissertations, Education Full Text (H.W. Wilson), and Google Scholar. From these sources, several queries were conducted using key words such as "veteran college access," "veteran college enrollment," "veteran college choice," and "military enlistment." This search produced several scholarly

articles, books, and reports on topics varying from characteristics of youth who enlist to veterans' college enrollment. The most pertinent research was included in this literature review.

The review of the literature is presented within two thematic areas: 1) military service and higher education, and 2) the study's theoretical perspective. The first section of this chapter begins by highlighting the college enrollment and choice patterns for post-9/11 veterans. The objective was to illustrate veterans' college enrollments and to examine how particular student characteristics and institutional mechanisms may make them less likely to earn a baccalaureate degree. The chapter then discusses the characteristics of youth who enlist in the military. The goal of this section was to highlight individual- and school-based factors that may be related to youths' likelihood of going to college after serving in the military. The focus of the chapter then shifts to examining key studies that describe the linkage between college-going and veterans' characteristics and experiences. Within the second thematic area, this study's theoretical framework is discussed and its value in understanding veterans' college enrollments and choices, particularly its usefulness in choosing measures for statistical analyses. The chapter ends with a brief discussion on the rationale for this study and the suitability of the theoretical framework for this research.

**Military Service and Higher Education**

**Veterans in higher education.** The number of post-9/11 veterans entering higher education is expected to significantly increase given the end of combat operations in Iraq and Afghanistan, anticipated reductions of U.S. military personnel (Alexander & Shalal, 2014; National Defense Authorization Act, 2012; Shanker & Cooper, 2014), likelihood of veterans becoming unemployed (U.S. Department of Labor, 2013), and the introduction of the Post-9/11 GI Bill (U.S. Department of Veterans Affairs, 2015b). In fact, recent data suggest that nearly

one million veterans are already enrolled in higher education for vocational training and baccalaureate education (U.S. Government Accountability Office, 2013). However, a detailed analysis of the number of recipients of VA educational benefits and how these data are collected presents concerns about whether the estimates of veterans in higher education are accurate. First, the following section will show that the college enrollment estimates for veterans are likely overestimated. Second, trend data will be presented that illustrates a shift with regards to the type of institutions veterans are increasingly enrolling in and the risks associated with attending those institutions.

*Veterans' college enrollments.* Recent reports suggest that one million veterans were enrolled in higher education in 2013 (Garcia & Meijer, 2013; Jordan, 2013; "One Million Veterans," 2013). The U.S. Government Accountability Office (2013) reported that about 826,000 veterans used the Post-9/11 GI Bill, Montgomery GI Bill-AD (MGIB), and the Vocational Rehabilitation and Employment (VocRehab) programs in fiscal year 2012[5], a difference of roughly 174,000 from the reported one million veterans in college (Garcia & Meijer, 2013; Jordan, 2013; "One Million Veterans," 2013). The number of veterans using VA education benefits represents less than a third of the roughly 2.8 million post-9/11 veterans who have served in Iraq and/or Afghanistan (Iraq and Afghanistan Veterans of America, 2015). Although the above figure (826,000) suggests that a large percentage of veterans are enrolled in higher education, the number should be interpreted with caution. First, Post-9/11 GI Bill beneficiaries include dependents of service members or veterans who are eligible to transfer their education benefits to their spouses and children (U.S. Department of Veterans Affairs, 2015b),

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[5] This number of veterans (826,000) do not include recipients from other VA programs that are not Post-9/11 veteran-specific, such as the MGIB-Reserve, REAP, VEAP, or Survivors' and Dependents' Educational Assistance Program.

which skew the actual number of veterans using the program.  Second, active duty personnel

may also be eligible for VocRehab benefits.  This feature aggregates veteran and service member

recipients into VocRehab data, which also misrepresents the number of actual veterans using

such benefits.  In other words, the transferability and varying eligibility requirements of veteran

education benefits make it difficult to know the precise number of actual veterans who are using

these programs.  The accurate number of post-9/11 veterans in higher education is, therefore,

unclear and available data do not provide the number of actual veterans using GI Bill benefits.

In addition, U.S. Department of Education National Center for Education Statistics

(NCES) data show only small gains in college students who were identified as veterans since

9/11.  For example, in the 2003-04 and 2007-08 academic years, the percentage of undergraduate

students who identified as veterans stood at roughly 3.3 percent[6] each year (U.S. Department of

Education, 2015a, 2015b).  Recently published estimates show that 3.7 percent of undergraduates

during the 2011-12 academic year were veterans (U.S. Department of Education, 2015c).  This is

an increase of only 0.4 percentage points compared to the 2003-04 and 2007-08 academic years,

which suggests that, overall, veterans' growth in higher education has only been proportionally

modest to enrollment levels in the last decade.  On the whole, the persistently small percentage

of veterans enrolled in postsecondary education indicates that there are factors yet to be

examined that may be prohibiting more veterans from entering higher education, particularly

their enrollments into four-year institutions.

*Veterans' college choices.*  Two reports (American Council on Education, 2010; U.S.

Department of Education, 2011) focused on descriptively highlighting post-9/11 veterans'

college choices.  For example, the American Council on Education (ACE) (2010) conducted

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[6] NCES reweighted NPSAS:08 data in Fall 2013 to match weighting procedures used in NPSAS:12.

focus groups (113 participants) and surveyed military-connected college students (230

participants) to investigate the impact the Post-9/11 GI Bill had on their decision to enter higher

education and choose an institution. ACE conducted 22 focus groups at 13 institutions across

Arizona, Ohio, and Virginia. The institutions that participants enrolled in were categorized as

public two-year, public four-year, private non-profits, and private for-profits. Most of the 113

focus group participants were veterans (77 percent), while the rest were reservists (15 percent),

dependents (4 percent), active duty personnel (3 percent), and National Guard members (2

percent). Of online survey respondents, 82 percent were veterans, 7 percent were National

Guard members, 4 percent were reservists, another 4 percent were military or veteran

dependents, and 3 percent were on active duty. Chi-square tests with .05 alpha levels were used

to test the null hypothesis that no differences in college enrollment existed between the four

institution types described above and a number of independent variables.

Although the study does not constitute a nationally-representative sample of post-9/11

military-connected college students in 2010, the ACE (2010) report highlights their college

choice patterns. The authors found that a plurality of group participants (37 percent) were

enrolled in public four-year institutions, while 29 percent were in public two-year institutions, 14

percent were in private for-profit institutions, and 12 percent were in private non-profit

institutions. Among survey respondents, over half (54 percent) were in public four-year

institutions, 21 percent were in for-profit four-year institutions, 13 percent were in private non-

profit four-year institutions, and 10 percent were in public two-year institutions. These

enrollment patters representing three states (ACE, 2010) differ from the national estimates of

veterans enrolled in higher education, which indicate that most veterans (38 percent) were

enrolled in public two-year institutions in academic year 2011-12 (U.S. Department of

Education, 2015c). This discrepancy may be attributed to differences in sampling capabilities between the U.S. Department of Education and ACE. Even though the ACE (2010) report collected demographic information from participants, the authors did not explore any correlations between respondents' background characteristics and type of postsecondary institution they attended. Thus, the report does not shed any light on the relationship that background characteristics, high school context, or military experiences may have had on choosing to enter college or a specific type of postsecondary institution.

A report from the U.S. Department of Education (2011) also highlighted patterns of college choice among military-connected undergraduates by using data from the 2007-08 National Postsecondary Student Aid Study (NPSAS:08) and Beginning Postsecondary Students Longitudinal Study (BPS:04/09). The authors estimated that in academic year 2007-08, 43 percent of military-connected undergraduates were at public two-year institutions, while the rest were in public four-year (21 percent), private non-profit four-year (13 percent), and for-profit (12 percent) institutions. The report also estimated that 74 percent of military-connected undergraduates in 2007-08 were veterans, while 17 percent were on active duty and 10 percent in the reserves (U.S. Department of Education, 2011). Comparisons of table percentages were tested with t-test statistics using .05 alpha levels to measure differences.

Although the U.S. Department of Education (2011) provides a nationally-representative glimpse into college enrollment patterns of veterans and other military-connected college students, like the aforementioned ACE (2010) report, it did not explore correlations between their background characteristics, high school experiences and context, or other life circumstances and their institutional sector choices. Nonetheless, both studies showed that most military-

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connected undergraduates were veterans and that they were more likely to enroll in public institutions.

Even though previous research has yet to examine factors related to veterans' college choice, data from the U.S. Department of Education (2015a, 2015c) show the types of institutions veterans were attending after 9/11 and the shift in enrollment by institution types. Table 2.1 compares sectors of colleges and universities veterans' attended during the 2003-04 and 2011-12 academic years. On one hand, the proportion of veterans' enrollment at public two-year institutions dropped about 12 percentage points from the 2003-04 to the 2011-12 academic years. On the other hand, their proportion of enrollment at for-profit institutions nearly doubled from 12 to 24 percentage points during the same period. The high enrollment percentages of veterans at two-year and for-profit institutions may be of concern because students at these institutions have a greater risk of not completing their college degrees and institutional mechanisms can also attribute to decreasing the likelihood students will earn a bachelor's degree (Clark, 1960; Coley, 2000; Dougherty, 1992; Pascarella & Terenzini, 2005; Schmid & Abell, 2003).

Table 2.1
*Veterans Enrollments in Higher Education by Institutional Sector (percentages)*

|  | Public Two-Year | Public Four-Year | Private Four-Year | For-Profit |
|---|---|---|---|---|
| 2003-04 Academic Year[a] | 50 | 18 | 12 | 12 |
| 2011-12 Academic Year[b] | 38 | 19 | 10 | 23 |

Source: [a]U.S. Department of Education (2015a). [b]U.S. Department of Education (2015c).

*Community college risks.* To compound the concern of veterans' low enrollments in four-year institutions (U.S. Department of Education, 2015c), veterans' high proportional enrollment into two-year versus four-year institutions may place them at greater risk of not

earning a baccalaureate degree. This is particularly problematic for veterans who initially planned to earn an associate's degree and transfer to four-year institutions to earn a bachelor's degree. According to previous research, risk factors (Coley, 2000; Schmid & Abell, 2003) and institutional mechanisms (Clark, 1960; Dougherty, 1992, 2002; Pascarella & Terenzini, 2005) place individuals who enroll in community colleges at greater risk of dropping out, not transferring to a four-year institution, or not attaining a baccalaureate degree. For instance, Coley (2000) and Schmid and Abell (2003) found that students who enter community colleges compared to those that entered four-year institutions were more likely to exhibit risk factors that could impede their persistence and postsecondary attainment. Risk factors included: delayed entry, part-time enrollment, full-time work, financial independence, having dependents, single parenthood, and not having a high school diploma. It is important to note that many veterans who enter college have a combination of these risk factors given their likelihood of having delayed entry into college, part-time enrollment, full-time work, dependents, and/or being married (ACE, 2008; 2009b; U.S. Department of Education, 2011).

Certain institutional mechanisms at community colleges also reduce a student's chance of transferring to a four-year institution and attaining a baccalaureate degree. For instance, studies have shown that community colleges decrease the chances of earning a four-year degree by "cooling out" students from transferring to four-year institutions (Clark, 1960) and by having fewer services in place to academically and socially integrate students into the college lifestyle (Dougherty, 2002). The "cooling out" function encourages students to adjust their expectations based on their academic competencies (Clark, 1960). Moreover, the large school sizes of two-year institutions have been found to diminish the likelihood of transferring to and earning a bachelors' degree at a four-year institution (Calcagno, Bailey, Jenkings, Kienzl, & Leinbach,

2008).  Students at community colleges are less likely to receive personalized advising or "high-touch" advising in large campus settings because of the high number of students and low number of advisors, which lead to decreases in retention and odds of earning a four-year degree.  In summary, the institutional aspects at community colleges may significantly reduce the likelihood a veteran will transfer out and eventually earn a baccalaureate degree.

*For-profit risks.*  It is also important to note that even though a high percentage of veterans attend two-year colleges, veterans are increasingly attending for-profit institutions (U.S. Department of Education, 2015c).  This shift in institutional attendance also places veterans at risk of not earning a bachelor's degree, as originally planned by many.  A PBS Frontline (2011) special titled *Educating Sergeant Pantzke* highlighted the specific problem Iraq and Afghanistan veterans face when seeking to enter higher education.  The television special illustrated the exploitation of veterans and their education benefits by for-profit colleges and the deceptive marketing strategies used to lure them into high-cost programs.  While this PBS report only reflects the practices of a few for-profit colleges, recent reports from the U.S. Senate Health, Education, Labor, and Pension (HELP) Committee (2010, 2011) have found that many for-profit institutions have engaged in improper and unethical recruiting practices while also reporting record profits generated from billions in taxpayer dollars through VA education benefits.

A similar report by the U.S. Senate HELP Committee (2012) shows that once students in general are enrolled in proprietary institutions, they are offered excessive amounts of financial aid in the form of student loans.  The increasing use of loans at for-profit colleges and universities is used to cover the high costs of attendance.  The report also argues that veterans at for-profit schools receive low-quality academic instruction and few paths to quality employment opportunities.  According to the HELP Committee (2010, 2012) reports, proprietary institutions

are among the most expensive colleges to attend and over 95 percent of their students receive

loans due to unmet financial need.  Even a few months of enrollment at proprietary institutions

can leave students saddled with debt in excess of $9,000.  In contrast, only 13 percent of

community college students, 48 percent of four-year public institution students, and 57 percent

of four-year private non-profit institution students acquire loans (HELP Committee, 2010, 2012).

The report also found that over half (54 percent) of students at for-profit college leave without

degrees (HELP Committee, 2012).  Among associate's degree seekers, 63 percent dropped out

and among bachelor's degree seekers 54 percent dropped out within the two years of the study,

according to the report.  Given these startling findings, veterans in proprietary schools may be at

a significant disadvantage of succeeding in college and at marked risk of incurring higher student

debt, earning lower quality degrees, or dropping out of college altogether.

*Reasons for enrollment patterns*.  Recent reports suggest that convenience and cost are

the main reasons many veterans choose to enroll in community colleges and for-profit

institutions (Field, 2008; Sewall, 2010; Steele, 2012; HELP Committee, 2012; U.S. Department

of Education, 2011).  For example, the U.S. Department of Education (2011) found that 79

percent of military-connected undergraduates indicated location as a main reason for choosing

their institution; about 54 percent of military-connected undergraduates cited affordability as

another reason.  Steele (2012) suggests that veterans choose to attend for-profit institutions

because of their flexible schedules, ability to transfer military credits, and the option to attend the

same institution in multiple states.  However, caution should be taken when interpreting these

findings since these reports aggregate active duty personnel, reservists, veterans, and their

dependents into their analyses (U.S. Department of Education, 2011; Steele, 2012).  That

approach may confound individual military-connected college students' reasons for choosing an

institution to attend.  Nevertheless, given this shift in college enrollment among veterans, future research should identify the impact attendance at two-year and for-profit institutions has on veterans' persistence and degree attainment.

Another important aspect that may influence the college enrollment decisions of veterans is rooted within the transition assistance programs offered to service members as they prepare to leave the military.  The Transition Assistance Programs (TAP) provides departing service members with employment, educational, and VA benefit information (Military OneSource, 2015).  After decades of using the TAP to help transitioning service members, the U.S. Department of Defense is redeveloping the program, which largely focused on resume building and entrepreneurship, such as starting a business.  Given the labor market's demand for highly educated workers and the focus of the TAP on immediate employment after discharge from the military, the U.S. Department of Defense is launching the redesign of the TAP as Transition GPS, which stands for Goals, Plans, Success (Transition GPS, 2015).  Feedback from service member participants in March 2014 from the new transition assistance program indicates that the Transition GPS is more effective in teaching service members about their college options and how to manage their VA education benefits (Cronk, 2014).  Before the development of the Transition GPS program, the U.S. Department of Education provided no training modules or guidance on higher education enrollment and choice.  With the new program, service members will be able to participate in additional transition modules specifically focused on providing them with knowledge about higher education and making the most of their VA education benefits (Cronk, 2014).  In the past, veterans received little to no guidance on pursuing a postsecondary education during their transition out of the military, such as information about different institution and degree types.  As a result, it is possible that the decision made by a large

percentage of veterans to enter two-year or for-profit institutions is rooted in the lack of information provided by TAP to transitioning service members interested in pursuing a postsecondary education.

*Summary.* In summary, previous studies illuminate the shortcomings of existing college enrollment and choice data among veterans and other military-connected undergraduates. First, determining the actual number of veterans enrolled in higher education remains elusive. Federal data collection limitations and lack of access to such data make it difficult to know exactly how many veterans enter higher education and whether any increases in the number of veterans in higher education are substantial. Second, federal enrollment figures show that most veterans now attend two-year and for-profit institutions. This is critical given that previous studies argue that risk factors and institutional mechanisms place students at community colleges and for-profit institutions at increased risk of not earning a four-year degree, a problem in particular for the many veterans that expected to earn a bachelor's degree after completing their active duty service. Thus, veterans who attend these types of institutions may face increased odds of not completing their degrees, earning lower quality degrees, and/or incurring large student debt. Empirical research is needed to test the extent of this problem. Third, the decision to enter two-year and for-profit institutions may be rooted in the lack of information about higher education provided to transitioning service members through the previous Transition Assistance Programs (TAP). The existing body of literature does not address how the information given via TAP shape veterans' college choices and eventual baccalaureate attainment.

The next section will examine the background characteristics and high school experiences of veterans before they entered the military in order to identify factors that may explain their likelihood of going to college and choosing a particular institution. This is followed

by a review of previous studies linking veterans and their college enrollments and choices, which will illustrate the literature gap to which the current study intends to address.

**Characteristics of youth who enlist.** The following section highlights key characteristics known to be associated with youths' military enlistment. Factors include: gender, race/ethnicity, parental education, family income and structure, high school GPA, Armed Services Vocational Aptitude Battery/Armed Forces Qualification Test, college aspirations and plans, military propensity, geographic location, and urbanization. An examination of veterans' background characteristics, experiences, and contexts may reveal likely reasons for their historically low postsecondary participation, particularly at four-year institutions. Common characteristics of enlisted youth discussed in the following subsections suggests that veterans may be at a disadvantage for entering higher education given their life circumstances before joining the military. Given this information, it is conceivable that veterans are already at a disadvantaged position to enter higher education, and four-year campuses in particular, even though they have the financial capacity to enroll through the generous Post-9/11 GI Bill.

*Gender.* The military has historically been overrepresented by males and generally consists of a hyper-masculine culture. Several studies have noted that young women indicate being less likely to expect to join the military after high school and even fewer actually join (Segal, Bachman, Freedman-Doan, & O'Malley, 1999; Segal, Segal, Bachman, Freedman-Doan, & O'Malley, 1998). As an illustration, Bachman, Segal, Freedman-Doan, and O'Malley (1998) found that among high school male seniors from the 1980s to the 1990s who "definitely" expected to serve, 70 percent had served or were serving six years after leaving high school. Of females from the same high school cohorts who "definitely" expected to serve, only 40 percent actually entered the military six years later.

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More recently, Spence, Henderson, and Elder (2012) found that female youth were 24 and 27 percent as likely as males to join the military relative to going to college or participating in the labor force, respectively. The authors employed multinomial logistic regressions and used data from the National Longitudinal Study of Adolescent Health[7] (Add Health). Although large gender differences persist in rates of military enlistment, a recent report argues that this trend has begun to change since the beginning of the all-volunteer force in 1973, with more female youth presently entering the enlisted ranks than ever before (U.S. Department of Defense, 2011). To illustrate, roughly eight percent of enlisted accessions in fiscal year 1973 were females. In fiscal year 2010, the percentage had increased to over 20 percent (U.S. Department of Defense, 2011). Regardless, males continue to represent a majority of military enlistments and accessions than their female counterparts.

*Race/Ethnicity.* Race/ethnicity is one of the most common factors found to be associated with joining the military. Studies using responses from high school students and graduates during the 1970s through the 1990s found that, relative to their White and Hispanic counterparts, Black youth had higher average enlistment probabilities and actual enlistment a few years after high school (Bachman, Segal, Freedman-Doan, & O'Malley, 2000; Hosek & Peterson, 1985; Seeborg, 1994; Segal, Bachman, Freedman-Doan, & O'Malley, 1999; Segal, Thanner, & Segal, 2007). For instance, Seeborg's (1994) analysis of the National Longitudinal Survey of Youth (NLSY) of 1979 shows that Blacks had a 20 percent higher probability of enlisting relative to White youth, even after controlling for poverty status, human capital, and background measures.

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[7] The National Longitudinal Study of Adolescent Health is a nationally-representative, longitudinal study of 20,745 high school youth from grades 7-12. Participants were first surveyed in the 1994-95 school year and then followed-up in the 1995-96, 2001-02, and 2008-09 school years. The dataset provides numerous measures related to the transition from high school to college, workforce, and the military.

Seeborg (1994) performed a logistic regression using responses from 3,423 youth who were interviewed annually from 1979 through 1990. Research on youth from the 1970s through the 1990s has consistently found that Blacks were more likely to enlist than their White peers (Bachman et al., 2000; Hosek & Peterson, 1985; Segal et al., 1999, 2007). However, the proportion of Blacks in the military began to steadily decline since the inception of the Global War on Terror (GWOT) in 2001. For instance, Kelty, Kleykamp, and Segal (2010) confirm that from the 1970s through the early 2000s Blacks represented over 22 percent of service members. However, by 2006 Blacks made up less than 20 percent of military personnel (Kelty et al., 2010).

Even though the proportion of Black youth entering the military has declined after 9/11, recent findings show that Blacks are still more likely to join the military relative to their White counterparts. Elder, Wang, Spence, Adkins, and Brown (2010) and Spence, Henderson, and Elder (2012) reported that Black youth were over twice as likely to enlist in the military than their White peers relative to labor force participation, even after controlling for family income, parental education, family structure, and academic performance. Elder et al. (2010) and Spence et al. (2012) employed multinomial logistic regressions using data from Add Health to arrive at their findings.

Contrary to previous research (Elder et al., 2010; Spence et al., 2012), Kleykamp (2006) found that Black youth in Texas were not more likely to enlist relative to their White peers, although their findings are state-specific. Using the Texas Higher Educational Opportunity Project (THEOP) of 2002 survey data of 13,803 high school seniors who were followed up with a year later, Kleykamp (2006) argued that, net of other factors, there were only a few racial differences among Texas youth that enlisted in 2003. For example, Kleykamp (2006) found that Hispanic youth in Texas, when compared to non-Hispanic youth from the same state, were more

than twice as likely to join the labor force relative to enlisting, suggesting that Hispanic youth were more likely to seek other non-military pathways after high school.  No statistically significant results emerged among Black youth in Texas with regards to joining the military.

Kleykamp's (2006) contrasting findings on youths' enlistments into the military may be attributed to the use of different controls and student samples when compared to findings from Elder et al. (2010) and Spence et al. (2012).  For instance, Kleykamp (2006) included educational aspirations, home ownership, military installation presence, citizenship, having military parents, and county-level variables in a multinomial logistic regression.  However, Kleykamp's (2006) study may provide a less accurate national picture of youths' enlistment given that her study sampled only youth from the state of Texas.  Her study is not generalizable to other youth across the nation and more limited in impact because of the small sample size analyzed (n = 2,074, of which only 176 had enlisted), the use of data that are not nationally-representative, and because students were followed up within a year after leaving high school. Moreover, these study limitations may be the reason that few racial/ethnic differences were found among youth who enlisted.

As the representation of Hispanics in the general population continues to rise, the number of Hispanic applicants and accessions[8] into the military is anticipated to significantly increase. According to Segal, Thanner, and Segal (2007), the growing enlistment of Hispanic youth has helped to offset the declining enlistments of Black youth since the beginning of combat operations in Afghanistan and Iraq.  For example, in fiscal year 1987 Hispanics comprised about five percent of accessions and roughly ten percent of the 18 to 24 year-old civilian population.

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[8] Military accessions are the number of individuals entering the U.S. Armed Forces (U.S. Department of Defense, 2011).

In fiscal year 2010, Hispanics made up 17 percent of military accessions whereas they represented roughly 19 percent of comparatively aged civilians (U.S. Department of Defense, 2011). These figures suggest that Hispanics are now proportionally represented in the military and in similarly aged civilian populations. Future research should continue to examine the influence that race/ethnicity has on college enrollments among youth who enlist.

*Parental education.* Prior studies have found that parental education and family income affect the likelihood that youth will enlist in the military (Bachman et al., 2000; Elder et al., 2010; Hosek & Peterson, 1985; Hosek et al., 1986). For instance, Hosek and Peterson (1985) and Hosek et al. (1986) showed that mothers' education had a strong positive association with enlistment for both high school seniors and graduates who did not plan to receive more schooling. They only used the mother's education as a proxy for parental education given the positive correlation between the educational attainment of father and mother. The authors suggested that when a male youth has no plans to continue his education past high school but has a mother who is college educated, the mother may encourage the adolescent to enlist for the experience and/or training offered in the military, as well as the college benefits.

Bachman et al. (2000) and Elder et al. (2010), however, combined mother and father education levels into one parental education measure to study its influence on youths' military enlistments. The authors demonstrated that, in contrast to earlier findings (Hosek & Peterson, 1985; Hosek et al., 1986), higher levels of parental education significantly decreased the likelihood that youth enlisted. In fact, Elder et al. (2010) reported a 25 percent decrease in probability of joining the military relative to going to college for youth with college-educated parents. However, there were two limitations to these studies (Bachman et al., 2000; Elder et al., 2010). First, we do not know if the effect on college enrollment for youth who enter the military

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differs for each parent (i.e., mother vs. father).  Second, using parents' *average* level of

education as a scale limits the interpretability of findings since one cannot point directly to how

much level of education parents must obtain to increase or decrease a youth's likelihood of

entering the service.  Future studies should not aggregate parental education in the analyses and

should separate levels of education instead of using parents' average education levels.

 *Family income.*  Historically, military service has not been representative of every

income tier.  Early reports from the RAND Corporation (Hosek & Peterson, 1985; Hosek et al.,

1986) found that, for high school seniors, there was an overall significant decline in their

probability of joining the military as family income increased.  Using the AFEES-NLS dataset of

1979, Hosek and Peterson (1985) and Hosek et al. (1986) found that for high school seniors who

expected more education, the negative effect of family income on propensity to enlist was

stronger, suggesting less of a likelihood of enlisting as income increased.  More recently, Elder et

al. (2010) and Spence et al. (2012) confirmed that as family income increased, the likelihood of

youth enlisting diminished by roughly 25 percent relative to college-going, further supporting

earlier findings (Hosek & Peterson, 1985; Hosek et al., 1986).  In contrast, Kelly and colleagues

(2010) summarized findings from other studies on the impact social class has had on enlistment

behaviors.  Even though the authors did not analyze data, their examination of prior research led

them to suggest that youth from the lowest and highest socioeconomic backgrounds are

underrepresented in the military.  As a result, military recruiters have had to rely on enlisting

youth volunteers from lower-middle and middle-income backgrounds.  Although studies show

that family income is a significant negative predictor of joining the military among youth (Elder

et al., 2010; Hosek & Peterson, 1985; Hosek et al., 1986; Kelty et al., 2010; Spence et al., 2012),

more evidence is necessary to better understand the impact family income has on college

attendance for youth who enter the military.  Furthermore, future research should disaggregate family income to examine the separate impact low, middle, and high-income backgrounds have on veterans' college enrollment.

*Family structure.*  Adolescent family structure has been found to be associated with youths' likelihood of enlisting in the military (Elder et al., 2010; Spence et al., 2012).  For example, Elder and others (2010) found that male youth from stepparent family structures were twice as likely to enter the military versus college when compared to male youth from two biological parent households.  In a similar study, Spence and others (2012) showed that high school students who were in stepparent or non-biological parent(s) family structures were twice as likely to join the military relative to going to college.  The researchers also found that living in a single-parent family increased the odds of youth joining the military.  However, the effect of enlistment within single-parent families was accounted for by socioeconomic status and social isolation, suggesting that life circumstances and not parental presence may be responsible for enlistment effects within single-parent families (Spence et al., 2012).  In addition, the authors were unable to explain away the effect – through SES, parent-child relationships, social isolation, or background characteristics – that showed that high school students who were in stepparent or non-biological parent(s) family structures were twice as likely to join the military relative to going to college.  Instead, the authors suggested that family stress and family disruptions may lead youth from stepparent and non-biological parent(s) families to enlist in the military in order to become independent from their families and to assume responsible roles as adults.  That adult role is offered through military service and, as a result, may explain the higher likelihood of enlistment among youth from stepparent and non-biological parent families (Spence et al., 2012).  These empirical studies highlight the influence family structure has on youth's enlistment

probabilities, as well as the need for more research.  Future studies should strive to account for veterans' family structure to better understand its impact on their college enrollment and choice.

*ASVAB/AFQT.*  Taking the Armed Services Vocational Aptitude Battery (ASVAB) test is also an indication of enlistment into the military among youth.  The ASVAB is a three-hour, multiple-choice test used to determine enlistment eligibility, assignment to military jobs, and career explorations for high school students (U.S. Department of Defense, 2013).  High school students and graduates who take the exam receive an Armed Forces Qualification Test (AFQT) score, computed using results from ASVAB subject tests.  An AFQT score of 55, for example, indicates that the test-taker scored higher than 55 percent of all other test-takers.  Several studies have demonstrated that having a high AFQT score decreased the likelihood of enlisting, particularly for high school seniors who did not want more education (Hosek & Peterson, 1985; Hosek, Peterson, & Eden, 1986; Seeborg, 1994).

Hosek and Peterson (1985) and Hosek et al. (1986) reported that, for high school youth, the likelihood of enlisting increased as AFQT scores increased and the individual sought education beyond high school.  Their findings may mean that after graduating from high school, individuals may seek to further their education by entering the military, possibly for the college benefits.  The authors used a cross-sectional database of thousands of high school senior and graduate male enlistees created by combining the 1979 National Longitudinal Survey of Youth and the 1979 Department of Defense Survey of Personnel Entering Military Service (AFEES-NLS).  Additionally, the authors used the maximum likelihood estimation and employed logit functions.  As a result, they reported logit regression results to highlight probability patterns of enlistment for high school seniors and graduates.  Although these studies noted that AFQT

scores were important predictors of enlistment among high school seniors and graduates, they did not highlight the impact of taking the ASVAB on their college enrollment and choice.

*High school GPA.* Several studies found that high school grade point average (HS GPA) was a strong negative predictor of military enlistment (Bachman et al., 2000; Elder et al., 2010; Kleykamp, 2006; Spence et al., 2012). Using Add Health data and employing multinomial logistic regressions, Elder et al. (2010) and Spence et al. (2012) found that youth with higher HS GPAs were roughly half as likely to enter the military compared to entering higher education. In contrast, the authors also showed that youth with higher HS GPAs were roughly twice as likely to join the military relative to entering the workforce (in contrast to entering college). In other words, when college was unavailable to young people with high HS GPAs, military service was the next best thing to college. The authors from both studies argued that individuals who are disadvantaged by having lower high school grades are also at a disadvantage of enlisting in the military given the need to pass military aptitude and placement tests. Nevertheless, these prior studies (Elder et al., 2010; Hosek & Peterson, 1985; Hosek, Peterson, & Eden, 1986; Spence et al., 2012) were limited because they did not separate grades earned in high school (i.e., earning an A, B, C, or D) or levels of HS GPA (e.g., 2.5 to 3.0 or 3.5 to 4.0), which could differently affect military enlistment among youth. These findings suggest that youth who are more likely to enlist are the middle group academic achievers who are competent enough to enter college and pass military entrance exams, in contrast to the lowest and highest academic achievers.

Using data from the Monitoring the Future (MTF) project, Bachman et al. (2000) show that, unlike previously discussed research (Elder et al., 2010; Hosek & Peterson, 1985; Hosek, Peterson, & Eden, 1986; Spence et al., 2012), each high school grade has different effects on enlistment. The MTF is a nationally-representative sample of high school seniors from the

classes of 1984 to 1991 and include follow-up responses within two years after leaving high school, between 1985 and 1993. The authors demonstrated that youth who had high school grades of A's and higher or C's and lower were less likely to enlist, even if these groups had youth who indicated an expectation to join the military after high school (Bachman et al., 2000). Similar to previous findings (Elder et al. 2010; Spence et al., 2012), having low grades may hinder youth from enlisting because of the need to pass cognitive aptitude tests. It is also worth noting that past studies (Bachman et al., 2000; Elder et al. 2010; Spence et al., 2012) focus on enlistments prior to 9/11, which do not capture the college selection of post-9/11 youth who would then have to consider the high likelihood of deploying to theater in Iraq and/or Afghanistan.

*Educational expectations.* Since the inception of the all-volunteer force in 1973, college-going costs and the number of high school graduates entering college have increased. As a result, military recruiters have sought to motivate youth to enter the military before going to college by offering VA education benefits to help defray the costs of earning a postsecondary education. However, early research shows that GI Bill benefits may not have been enough to attract youth to join the military, particularly youth with higher educational expectations. For example, using the AFEES-NLS dataset of male high school seniors and graduates in 1979, Hosek and Peterson (1985) found that seniors who expected more education beyond high school were less likely to enlist relative to those who did not. Moreover, Bachman et al. (2001) and Segal et al. (1999) found that male youth who definitely expected to complete college were more likely to have entered college instead of joining the military within a few years after high school. The authors used data from the Monitoring the Future (MTF) study of youth in high school between 1976 and 1999. Unfortunately, the authors failed to provide the methods used for

arriving at their conclusions.  Instead, the studies (Bachman et al., 2001; Segal et al., 1999) relied on descriptive statistics alone to reach their conclusions and did not provide weighting, sample size, or analytic technique details, which limited the reliability of their findings.

Another study by Bachman et al. (2000) confirmed that male youth who definitely expected to graduate from college were less likely to expect to and actually enlist in the military ($\eta = -0.02$), while male youth who did not expect to finish a four-year program were more likely to join the military ($\eta = 0.03$).  The study used multiple classification analysis to draw inferences from bivariate and multivariate regression analyses, which provide more robust evaluation of correlates for enlistment among youth compared to other studies (Bachman et al., 2001; Segal et al., 1999).

Finally, Kleykamp's (2006) study using the Texas Higher Education Opportunity Project (THEOP) survey dataset of Texas high school seniors in 2002 found that students who desired to earn a four-year degree were nearly four times as likely to go to college relative to entering the military.  Additionally, the author found that high school seniors who aspired to earn a two-year degree were over twice as likely to have enrolled in college as to have entered the military a year after leaving high school.  Kleykamp (2006) correlated post-high school pathways of Texas high school seniors in 2002 using a multinomial logistic regression model of 2,074 young men in Texas who were followed up with a year later in 2003. However, findings were weighted and generalizable only to the Texas high school population in 2002.

What is important to highlight is that the definitiveness of college-going aspirations are highly predictive of later college-going patterns.  And yet, there are still some youth who will likely plan to do both: enter college and the military after high school (Bachman et al., 2000; 2001).  Previous studies, however, have not focused on college enrollment after military service

while accounting for veterans' background characteristics (i.e., gender, race/ethnicity, SES, family composition) or other factors that may have an impact. In other words, for high school students who expressed an interest in entering both, the military and college, we need to know what factors account for the persistence or changes in their educational expectations and eventual college enrollment once they leave active duty service.

*Military propensity[9].* Naturally, research suggests that high school students' plans and expectations to join the military is the strongest predictor of military enlistment (Bachman et al., 1998; Bachman et al., 2000). High school students' likelihood of entry into the military is generally solidified by their senior year. By the end of high school, most youth who indicated they will "definitely" join the military are more than likely to do so, usually enlisting within two years after leaving high school (Bachman et al., 1998). Using data from the Monitoring the Future (MTF) survey of high school seniors from 1976 to 1991, Bachman et al. (1998) showed that 70 percent of youth who expected to join the military actually did so within six years after leaving high school. In a follow-up study using the MTF dataset, Bachman et al. (2000) found that high school seniors' correlations between military propensity and actual enlistment within two years after graduation was high among male youth ($\eta = 0.57$). To summarize, military propensity of high school youth is considered the strongest indicator of actually entering the military. However, there is a gap in the literature that accounts for youth's military propensity, which could lead to a better understanding of the relationship between military service and postsecondary enrollment and choice.

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[9] Military propensity represents a high school senior's plans and expectations for entering the military. Generally, a higher military propensity indicated by an individual suggests they are more likely to have enlisted a few years after high school, particularly among males and racial minorities (Bachman et al, 1998, 2000; Segal et al., 1999).

***Geographic location and urbanization.*** Youths' geographic location and urbanicity of their communities are other important factors related to their enlistment probabilities. Bachman et al. (2000) found that young men who serve in the military are more likely to come from the southern region of the nation. The researchers used MTF data, a study of nationally-representative samples of high school seniors – with subsamples averaging 2,400 youth – who were followed up with a year after leaving high school. For their study, Bachman and others (2000) focused on responses from the 1984 to 1991 senior classes with follow-up data obtained from 1985 to 1993. Although those findings used data prior to 9/11, recent data confirm that most military recruits continue to come from the south. The U.S. Department of Defense (2011) *Population Representation in the Military Services* report demonstrated that in fiscal year 2010, over 40 percent of military accessions originated from the southern region of the country.

However, enlistees were found to originate from different communities. On the one hand, Bachman et al. (2000) suggested that young men who served between the 80s and early 90s were more likely to have lived in non-suburban communities, such as rural areas or second cities[10]. The U.S. Department of Defense (2011), on the other hand, reported that most military enlistees originated from town/rural, second city, and suburban communities. In the report, the agency highlighted military enlistment and personnel trends using basic descriptive tables and graphs. Nonetheless, the trend data suggested that recent enlistees were increasingly originating from more populated areas relative to past trends. Accordingly, accounting for region and urbanicity may help clarify how the localities of veterans are related to their likelihood of entering college.

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[10] According to the U.S. Department of Defense (2011, p. 27), "second cities are closer in population density to suburban than urban areas, but are the population center of the surrounding community."

*Summary.* In conclusion, there are a number of characteristics that are associated with youths' enlistment into the military. Previous research suggests that having the following key characteristics increases the likelihood of military enlistment after high school: being male; identifying with a racial/ethnic minority background; having less educated parents; originating from a lower-middle or middle-income family; living with stepparents or non-biological parents; having a high AFQT score and seeking a college education; having a lower HS GPA; planning not to enter college or planning to earn less than a baccalaureate college degree; indicating a high military propensity; coming from the southern region of the U.S.; or originating from town/rural or second-city communities. Furthermore, previous studies indicate that youth who serve in the military are more likely to come from economically and educationally disadvantaged backgrounds, although they are not necessarily from the lowest income quartile. In addition, prior research indicates that many individuals who enlisted in the military also had high college-going aspirations, which means they delayed college entry while earning VA education benefits. Nonetheless, no studies to date have linked the characteristics of youth who enlist and their impact on college attendance and institutional selection once they leave active duty service. Most importantly, no previous study has examined this specifically for post-9/11 veterans.

**Linking Postsecondary Enrollment and Choice with Veterans' Characteristics and Experiences**

Several studies have examined the experiences of military-connected college students (Ackerman & DiRamio, 2009; American Council on Education, 2008, 2009a, 2009b, 2010; DiRamio et al., 2008; DiRamio & Jarvis, 2011; Elder et al., 2010; Hamrick, Rumann, & Associates, 2013; Livingston et al., 2011; Persky & Oliver, 2011; Rumann & Hamrick, 2010; Rumann et al., 2011; U.S. Department of Education, 2009, 2011; Wang et al., 2012; Wheeler,

2012; Zinger & Cohen, 2010).  However, to date no research has specifically examined factors that affect post-9/11 veterans' college enrollments and choices.  Given the timing and focus of previous research, as well as the varying methodological approaches, previous work fit into two distinct temporal areas of research: one group of studies examined military-connected college students post-9/11, while the other group of studies researched military-connected youth pre-9/11.  I highlight these two areas of research and discuss their main findings and study limitations.  I begin with the post-9/11 research because findings from this group of studies are the most limiting in terms of what was found about post-9/11 veterans' college enrollments and choices.  Then, I discuss pre-9/11 studies, which offer the most insight into factors that led military-connected youth to enter higher education and choose an institution.  Finally, I discuss how this study addresses previous limitations and how it will empirically advance the knowledge base on post-9/11 veterans in higher education.

**Post-9/11 military-connected undergraduates.**  Recent research has highlighted the experiences of post-9/11 military-connected individuals in higher education (Ackerman & DiRamio, 2009; American Council on Education, 2008, 2009a, 2009b, 2010; DiRamio et al., 2008; DiRamio & Jarvis, 2011; Hamrick, Rumann, & Associates, 2013; Livingston et al., 2011; Persky & Oliver, 2011; Rumann & Hamrick, 2010; Rumann et al., 2011; U.S. Department of Education, 2009, 2011; Wheeler, 2012; Zinger & Cohen, 2010).  However, this body of work did not link key factors, such as demographic characteristics, educational expectations, peer influences, or high school context with post-9/11 veterans' likelihood of enrolling in and choosing an institution of higher learning.

A number of studies have examined the transition and re-enrollment experiences of veterans into college (DiRamio et al., 2008; Livingston et al., 2011; Rumann & Hamrick, 2010).

Although these studies were not designed to generalize all veterans, their findings suggest that there are important factors associated with veterans' successful transition into college. For instance, Livingston et al. (2011) described the re-enrollment patterns of seven reservists, four National Guard members, and four active duty students at a large, four-year public institution with a rich military history in the southeastern United States. All participants were White/Caucasian and 14 (out of 15) were males. The authors argued that these re-enrolled student veterans sought social support from other veterans at their campus and that they were less likely to seek academic support. Moreover, the authors provided several recommendations for identifying veterans given that many chose not to disclose their military status in college.

Similarly, Rumann and Hamrick (2010) highlighted the transition experiences of three reservists and three National Guard students at one large, four-year public institution in the Midwestern United States. The authors also found that student veterans sought other veterans on campus and disclosed their veteran statuses to individuals with whom they were socially connected. Furthermore, the authors found that veterans had positive experiences with college administrators during their transition and that they employed several transition strategies in order to readjust into college.

DiRamio et al. (2008) interviewed 25 individuals who were veterans, reservists, and members of the National Guard, all of whom were on active duty before participating in the study. The veterans in this study were from three institutions in the nation's northern, southern, and western regions. The authors provided an examination of the transitional experiences of veterans and, from their qualitative analysis, 16 themes emerged. Similar to findings from Livingston et al.'s work (2011), DiRamio et al. (2008) argued that institutions should strive to identify the student veteran population given that so many decide not to disclose their military

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status while in college.  The authors also suggested that institutions should: provide transition coaches, train academic advisors on VA education benefits, educate faculty on student veteran issues, and include institutional researchers in assessing college outcomes for student veterans.

Even though several studies (DiRamio et al., 2008; Livingston et al., 2011; Rumann & Hamrick, 2010) highlight the re-enrollment and transitional experiences of military-connected students, they do not consider earlier life experiences from high school and the impact they may have on their postsecondary enrollments.  Specifically, previous studies on military-connected students have had several limitations.  First, these studies are case studies of single institutions (Livingston, Havice, Cawthon, & Fleming, 2011; Rumann & Hamrick, 2010; Zinger & Cohen, 2010) or three institutions (DiRamio, Ackerman, & Mitchell, 2008).  Thus, their findings cannot be generalized to the broader student veteran population.  Second, these studies make use of convenience samples and do not stratify the student veteran population by gender, race/ethnicity, or income, for instance.  Third, interview participation may introduce author or sampling bias, which could question the validity of qualitative findings if the authors do not carefully control for his or her own biases.  Although previous qualitative studies have proven useful for obtaining much-needed information regarding veterans' transitional experiences and reasons for enlistment, they have yet to account for the impact of high school factors and earlier life circumstances on their college enrollment and institutional choices.

Most importantly, previous research does not disaggregate findings between veterans, active duty personnel, reservists, and National Guard members (American Council on Education, 2010).  Consequently, the findings from previous work may confound the higher education experiences of veterans with those of other military-connected individuals.  As an illustration, a study (McNealy, 2004) of 30 service members incorrectly classified participants as veterans even

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though they were still on active duty. Previous studies highlight a growing pattern of misclassifying individuals on active duty, reservists, National Guard members, and dependents as veterans. Nevertheless, no study to date has highlighted college enrollment and choice patterns for post-9/11 veterans separately, while also accounting for their demographic characteristics, high school experiences and context, educational expectations, or peer influences.

In summary, research has yet to longitudinally examine post-9/11 youth before entering the military and after completion of their active duty service. Previous studies have not controlled for background characteristics, key experiences in high school, and other important factors that may be related to a veteran's decision to enroll in higher education and choose an institution. It is also important to accurately identify and separate each group within the military-connected population (i.e., veterans, active duty personnel, reservists, and National Guard members) given the varying experiences each will have in higher education (Molina, 2015; Santos, Esqueda, & Molina, 2015). On the one hand, active duty personnel, reservists, and National Guard members in college have an obligation to serve if given orders to deploy or train and would need to interrupt their education in order to fulfill their military duties (Carter & Glastris, 2005). Veterans who completed their active duty service, on the other hand, would not need to drop out of college because they would no longer have a commitment to serve or train.

**Pre-9/11 military-connected undergraduates.** In contrast to research on military-connected undergraduates post-9/11, two empirical studies (Elder et al., 2010; Wang et al., 2012) of high school youth pre-9/11 have examined factors related to their college enrollment and choice. Both studies used the Add Health data to follow nationally-representative cohorts of high school students pre-9/11 into the military and, for some, into college. For example, Wang et al. (2012) used Add Health data from the 1994-95, 2001-02, and 2008-09 collection points to

study the combined impact of socioeconomic status (SES), cognitive ability, and academic performance – called *status configurations* – to determine the likelihood of earning a college degree among male youth with military experience.  In the study, SES was a proxy for family income, cognitive ability a proxy for a vocabulary test (standardized scores), and academic performance a proxy for HS GPA.  The authors analyzed responses from a sample of 820 male youth who indicated having served or were currently serving in the military to better understand how certain status configurations impacted military enlistment and degree attainment. Respondents were between 24 to 35 years old at the time of participation in the latest collection point (2008-09).  The authors performed a multinomial logistic regression with high school or less as a reference compared to associate's degree or bachelor's degree attainment.

Findings from Wang et al.'s (2012) study showed that although youth with military experience were more likely to go to college or earn an associate's degree, they were also less likely to earn a bachelor's degree or above.  Specifically, the authors found that youth who had served or were currently serving were 55 percent more likely to obtain some college or an associate's degree relative to just earning a high school diploma.  However, the authors also reported that military service decreased their chances of earning a bachelor's degree or above by 62 percent, even after accounting for race/ethnicity and school grade (to control for age differences) during high school.  Further analyses showed that highly disadvantaged youth (rank low on SES, cognitive ability, and academic performance) were over twice as likely to earn a two-year degree or attend some college.  Among youth with military service, the most privileged (rank high on SES, cognitive ability, and academic performance) and well-off underachievers (rank high on SES and cognitive ability but low on academic achievement) were found to be 86 percent less likely to have obtained a bachelor's degree relative to their civilian counterparts.

Wang et al. (2012) found that military service had a negative impact on enrollment into four-year institutions, particularly for youth who had high family incomes and high cognitive abilities. Despite the authors' findings, there are a few limitations of the study worth highlighting. Wang and colleagues did not investigate the type of institution attended and did not include female youth in their research. More importantly, the study focused on male youth enlistment and degree attainment for individuals who mostly entered the military before 9/11. Lastly, the authors did not identify participants with military experience as veterans, and as a result, it is unclear whether the study's findings apply to veterans or other military-connected individuals. Nonetheless, their results showed that family income, vocabulary tests, and HS GPA are important predictors for degree attainment, findings that could be used as baseline knowledge for future research.

Similar to Wang et al.'s (2012) research, Elder et al.'s (2010) study linked several important factors of high school youth who join the military pre-9/11 with college enrollment. The researchers used Add Health data from 1994-95, 1995-96, and 2001-02. Like other studies that use Add Health data (Spence et al., 2012; Wang et al., 2012), the researchers benefitted from longitudinal student- and school-based measures before and after an individual joined the military. Elder et al. (2010) studied a sample of 595 youth who served on active duty and 96 who were in the reserves and National Guard, for a total of 691 youth who had military experience after leaving high school. The researchers made use of sensitivity analyses that separated college enrollment data among youth with military service. They found that enlisted male youth who had parents with a college degree or higher were twice as likely to have entered college compared to other enlistees. Moreover, they noted that enlistees with higher overall HS GPAs were nearly twice as likely to have enrolled in college relative to other enlistees. Finally,

the authors noted that enlistees who came from "other" family structures – not two biological

parents, stepparents, or single parents – were 70 percent less likely to have gone to college.

These empirical results demonstrated that youth who enlist in the military and came from

advantaged backgrounds, such as having higher educated parents and HS GPAs, were still likely

to have entered college even with military experience.

Elder et al. (2010) extended their findings from Hosek and Peterson (1985) and Hosek et

al. (1986), which showed that highly educated mothers (a proxy for parental education) may

have encouraged her adolescent to enlist in order to obtain a college education with support from

educational benefits offered through military service.  However, like all studies, there were

limitations to the findings.  For youth who entered the military and college, information about

the type of institution enrolled and the military status of respondents remained unclear (i.e.,

active duty, reserve, National Guard, or veteran).  Additionally, the study's findings were mostly

based on youth who entered the military before 9/11 and who most likely did not participate in

the Iraq or Afghanistan theaters.  Given these study limitations, future studies should

disaggregate college enrollment by institutional types and should attempt to include military

experiences in their analyses.

**Summary**.  In conclusion, no study on military-connected students has linked

background characteristics, high school factors, and other life circumstances and educational

expectations with post-9/11 veterans' likelihood of entering college or choosing a particular type

of institution (Ackerman & DiRamio, 2009; American Council on Education, 2008, 2009a,

2009b, 2010; DiRamio et al., 2008; DiRamio & Jarvis, 2011; Elder et al., 2010; Hamrick,

Rumann, & Associates, 2013; Livingston et al., 2011; Persky & Oliver, 2011; Rumann &

Hamrick, 2010; Rumann et al., 2011; U.S. Department of Education, 2009, 2011; Wang et al.,

2012; Wheeler, 2012; Zinger & Cohen, 2010).  Previous literature on military-connected undergraduates, however, demonstrates that high school youth are likely to use the military as a pathway into college after serving on active duty (DiRamio et al., 2008; Zinger & Cohen, 2010) and that, once in higher education, veterans may experience many transitional challenges (DiRamio et al., 2008; Livingston et al., 2011; Rumann & Hamrick, 2010).  Moreover, past reports (American Council on Education, 2010; U.S. Department of Education, 2011) have only descriptively highlighted military-connected undergraduates' enrollment and choice patterns. The most important finding in the literature (Elder et al., 2010; Wang et al., 2012) thus far is that parental education, family income, family structure, standardized tests, and HS GPA are significant predictors of college enrollment among pre-9/11 youth with military service.

With the rising number of post-9/11 veterans who could potentially enter higher education, it is crucial to understand what factors best contribute to their likelihood of going to college, particularly four-year institutions.  However, existing literature has yet to study the experiences of post-9/11 veterans before and after joining the military and their impact on their college enrollment and choice.  Therefore, this study aims to address this research gap by studying a group of youth that were longitudinally followed from high school, into the military, and out of active duty service.  This approach leads to a richer understanding of key factors prior to enlistment that may influence veterans' decision to enter college and choose an institution. This study also addressed the gaps in the literature and their limitations by employing a robust college choice framework, which is also lacking in the post-9/11 student veterans literature.  For the purpose of this study, a college choice model is the most pertinent framework for understanding veterans' college enrollment and choice patterns, which help contextualize key factors that are likely to influence the college-going process before entering the military.

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**Theoretical Perspective**

This study draws from prior research on human/academic capital (Becker, 1993; McDonough & Nuñez, 2007; Paulsen, 2001), social capital (Bourdieu, 1986; Coleman, 1988), and cultural capital (Bourdieu, 1977, 1986, 1990, 1994; McDonough, 1997) to better understand post-9/11 veterans' college attendance. Specifically, this study uses Perna's (2006) model of college choice as a conceptual framework to analyze factors that may be related to veterans' college enrollments and choices. By adopting Perna's (2006) integrated model, this study tests the influence different forms of capital have on veterans' likelihood of going to and choosing a college. To begin, Perna's conceptual model of college choice suggests that an individual's habitus[11], school and community context, higher education context, and social, economic, and policy contexts shape college choices of individual students (see Appendix A for illustration of original model). Consequently, this study's model draws on several human/academic and sociocultural perspectives that may influence veterans' college enrollments and choices. In this section, I describe the forms of capital that help inform Perna's integrated model of student college choice and I discuss the benefits of using Perna's framework for studying veterans' college enrollment and choice.

**Perna's Integrated College Choice Model.** This study draws upon Perna's (2006) conceptual model of college choice with a focus on veterans' habitus and their school context as principal units of analyses. *Habitus* stems from the work of Pierre Bourdieu (1977, 1990, 1994) and refers to an individual's system of values, beliefs, and experiences about the world, which are informed from both their immediate environment (family and close socializing agents) and

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[11] For an explanation of the origins of habitus see Bourdieu (1977, 1990, 1994). For many of its uses and misuses see Mander (1987). In addition, see Lamont & Lareau (1988), Lareau, (1987), Valadez (1993), and Zweigenhaft (1993) for several early research applications of social and cultural capital on social mobility and learning.

the material environments (social class and institutions) (McDonough, 1997; Perna, 2006), such as high schools and the military. Those values, beliefs, and experiences shape the individual's worldviews, perceived opportunities, and aspirations, and most importantly, the decision to enter college and choose an institution. Perna's framework, which was largely designed from Bourdieu's (1977, 1990, 1994) and McDonough's (1997) research on cultural capital, proposes that an individual's habitus is embodied by their demographic characteristics and forms of human/academic, cultural, and social capital. Within the college choice arena, an individual's habitus constantly shapes and constrains an individual's college enrollment and choice (Paulsen & St. John, 2002; McDonough, 1997) through the conversion of each form of capital in contexts where their family, community, and institutions value them. As a result, college opportunities and institutional selection are shaped by habitus as individuals search to maximize their status and opportunities. Habitus provides a foundation through which an individual structures their aspirations and options when considering entering college by converting forms of capital – acquired from early class socialization – to a social class-based set of values, perceptions, and aspirations regarding college enrollment and choice.

While the model was not developed to examine veterans' college enrollments and choices, it nonetheless holds potential for understanding key factors that facilitate or impede enrollment into higher education for this unique and growing population. More importantly, the conceptual model helps to organize those experiences within a multiple-capital design to better understand their relationship to college enrollment and choice. Researchers should continue to examine how demographic characteristics, different forms of capital, and high school context influence how veterans approach higher education. Several empirical studies (Engberg & Wolniak, 2010; McDonough, 1997; Paulsen & St. John, 2002; Perna, 2000, 2006; Perna & Titus,

2005) have used habitus and different forms of capital to explain the college enrollment and choice process among nonveterans. Accordingly, several student-level measures supported by prior research will be used in this study, such as a veteran's demographic characteristics, human/academic capital, social capital, and cultural capital, as well as school context. The following section discusses the influence of different forms of capital on college-going.

Perna's (2006) conceptual model also allows researchers to examine the impact school-level measures, such as control, region, and urbanicity, have on veterans' college-going. School level measures found to affect college choice include high school control and urbanicity (Engberg & Wolniak, 2010). Ultimately, studying veterans through Perna's college choice framework can help researchers deeply understand key factors that are associated with the likelihood of entering college and, if enrolled, the types of institutions chosen. In the next sections, I explain the constructs that form an individual's human/academic, social, and cultural capital, as well as measures within each construct that have played important roles in explaining college enrollment and choice.

*Human/academic capital.* Human capital, or one's knowledge, skills, and personal attributes, implies that the decision to enter higher education is grounded in the idea that by earning a postsecondary education, one's productivity and earnings are enhanced (Becker, 1993). Before considering the benefits and costs of earning a college degree, the decision to invest in higher education is influenced by one's academic preparation and financial resources (Perna, 2006). Research on human/academic capital has shown that academic preparation and prior achievement influence an individual's predisposition to enter college. For example, Adelman (1999, 2006) and Perna and Titus (2005) found that taking higher-level math courses is a positive determinant of college enrollment. Additionally, Advanced Placement (AP) course-taking and

HS GPA have been found to positively influence college enrollment (Engberg & Wolniak, 2010).

Even though human capital theory provides insight into the college-going process, the theory has some limitations worth noting. McDonough and Nuñez (2007) argued that not fully accounting for the influence social and cultural capital has on student academic achievement and earning a college degree led to dissatisfaction among theorists. A human/academic capital construct may better account for one's cost-benefit consideration as well as the social and cultural influences, which may ultimately reveal factors that impact veterans' likelihood of acquiring increased levels of education. The ability to earn a postsecondary education, therefore, reflects the academic performance a student attained in high school and their cultural and social capital gained from parents and other close actors. With this in mind, this study will include measures of human/academic capital to examine its impact on veterans' college enrollment and choice.

*Cultural capital.* Cultural capital refers to an individual's language skills, cultural knowledge, credentials, and other norms derived from their parents' class status (Bourdieu, 1986; McDonough, 1997; Perna, 2006). According to Bourdieu (1986), cultural capital is passed on from parents to their children in order to maintain one's social-class status. According to McDonough and Nuñez (2007), "parents with high cultural capital attempt to secure for their children as prestigious an education as possible because they know it will pay off later in job success and social status" (p. 146). Cultural capital, the authors argue, not only takes the form of capital endowed at birth but is also mediated by individuals and organizations throughout a one's life course. The authors suggest that for cultural and social resources to be converted to cultural and social capital, they must be used and valued within the context where they are converted.

Prior research has empirically demonstrated the effect of cultural capital on college enrollment and choice. For example, Engberg and Wolniak (2010) found that youth who had friends and family that had a desire for them to attend college were more likely to have entered two- and four-year institutions compared to not entering college. The authors used the 2004 and 2006 cohort responses from the ELS:2002 and a hierarchical generalized linear model (HGLM) to identify student and school-level factors related to college enrollment among 2002 high school seniors. Similarly, Perna and Titus (2005) showed that youth who had parents who expected them to receive less than a college education were less likely to enter two-year institutions and even less likely to have entered four-year institutions. The authors used data of youth who were high school seniors in 1992 and were followed-up with two years later in 1994. The authors used data from the NELS:88 and applied hierarchical linear modeling (HLM) on a sample of 9,810 high school graduates at 1,006 high schools. Given these findings, it is important to consider the effect of cultural capital on veterans' college-going prospects.

*Social capital.* Social capital refers to an individual's social networks and support systems and the way they affect information acquisition about the college decision-making process (Bourdieu, 1986; Coleman, 1988). According to Bourdieu (1986), social capital takes on forms of societal hierarchies that can be operationalized as peers, agents of the community, and school members. Members within each societal hierarchy inform and advise students about their educational opportunities and college values, in effect becoming status maximizers for individuals who have access to social capital. As an illustration, Engberg and Wolniak (2010) and Perna and Titus (2005) found that youth with friends who planned to attend two-year institutions significantly decreased their odds of entering four-year institutions. Engberg and Wolniak (2010) also reported that knowing the parents of their children's friends increased their

children's likelihood of attending a four-year institution. The researchers also demonstrated that high school students who sought college entrance information were more likely to enter two-year and four-year institutions (Engberg & Wolniak, 2010). Including measures of social capital in this study may help us understand the impact and magnitude of social capital on veterans' likelihood of going to college.

It is also important to highlight that the meaning of cultural capital and social capital can be conflated. On one hand, cultural capital refers to the skills and knowledge necessary to navigate systems, such as high schools, military branches, and higher education institutions. Social capital, on the other hand, refers to the social networks and relationships that one engages with while seeking the skills and knowledge necessary to navigate a system (McDonough & Nuñez, 2007). It is important to consider the distinctions in meaning between cultural and social capital, particularly when selecting measures that will act as proxies for each form of capital.

*School context.* School context refers to institutional characteristics (e.g., control, urbanicity, and regional location) and has been found to influence students' college enrollment (Engberg & Wolniak, 2010; McDonough, 1991, 1997, 1998; McDonough & McClafferty, 2001; Perna, 2000). Several authors have found that high schools have a significant influence on students' decision to enter college and the type of institution chosen to attend (Engberg & Wolniak, 2010; McDonough, 1991, 1997, 1998; McDonough & McClafferty, 2001; Perna, 2000). For example, Engberg and Wolniak's (2010) analyses of the ELS:2002 dataset found that two years after leaving high school, students who studied at Catholic or suburban high schools were more likely to enter two-year colleges compared to youth who attended public and urban high schools. In addition, McDonough's (1997) study of 24 young women at four public and private high schools showed that high school resources highly influenced the types of colleges

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applied to and attended after leaving high school, even after accounting for academic preparation. Specifically, McDonough (1997) empirically demonstrated that counselor roles, school missions, and school resources differed by school control (i.e., public vs. private), with private schools offering comprehensive and proactive college advising designed to influence the perceptions and opportunities available to their students in the college-decision process. Another study (McDonough & McClafferty, 2001) that analyzed students at 15 rural high schools in the Shasta and Siskiyou Counties of northern California found that limited curricular, counseling, and financial resources in urban schools also afflicted high schools in rural communities. Accordingly, the current study will include school measures to examine their impact on veterans' postsecondary enrollment and choice.

*Summary.* Using a college choice framework to help understand key factors related to how veterans approach higher education is appropriate and necessary. This study intends to explore possible linkages between varying forms of capital and the likelihood of having entered college among post-9/11 veterans, and for those that attend college, the types of institutions they selected. It is important to state that this study did not examine factors that led high school youth to join the military, given that numerous studies already highlight military propensity (Asch, Kilburn, & Klerman, 1999; Bachman et al., 1998, 2000, 2001; Eighmey, 2006; Elder et al., 2010; Hosek & Peterson, 1985; Hosek et al., 1986; Kelty et al., 2010; Kleykamp, 2006; Seeborg, 1994; Segal et al., 1998; 1999, 2007; Spence et al., 2012; Wang et al., 2012; Woodruff, 2006). In contrast, a central focus of this study is to identify key factors that explain veterans' likelihood of enrolling in college and, for those who enroll, whether they entered a two-year or for-profit institution relative to a four-year institution. As a result, this study examined how demographic characteristics, human/academic capital, social capital, cultural capital, and school context

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impact college enrollment among veterans. With this in mind, Perna's model offers several advantages for identifying such factors.

Perna's (2006) integrated conceptual model of college choice provides a comprehensive framework from which to investigate the likelihood veterans will enter college and, if so, the type of college they are more likely to choose. This study tested Perna's model by incorporating human/academic and sociological constructs into its design. By including aspects of Perna's framework, the study explored how each form of capital shaped veterans' decisions to enter higher education. The integrated college choice model has a clear advantage over pure economic/human (Avery & Hoxby, 2004; Becker, 1993; Ellwood & Kane, 2000), sociological (Bourdieu, 1986; Coleman, 1988; Terenzini, Cabrera, & Bernal, 2001), cultural (Bourdieu, 1986; Coleman, 1988), three-stage (Hossler & Gallagher, 1987), or status-attainment (Hossler, Schmit, & Vesper, 1999) models because Perna's model integrates different forms of capital and contexts that have been shown in the literature to be associated with postsecondary attendance, an area that has yet to be examined among post-9/11 veterans.

Perna (2006) also discussed the benefits of applying the integrated conceptual model to large-scale, quantitative studies on non-traditional student populations. According to Perna, "quantitative methodologies are especially useful for testing and confirming theoretical propositions about college choice for a particular population" (p. 120). The integrated conceptual framework allows researchers to isolate key factors related to how veterans may be influenced as they consider going to college. Given this suggestion, the use of the ELS:2002 and quantitative techniques may help us better understand veterans' postsecondary enrollments and choices. Even though no research has tested the appropriateness of Perna's (2006) model for studying veterans' postsecondary experiences, she explicitly recommended that her conceptual

model be used to understand college enrollment among non-traditional students.  Perna argued
that,

> little is known about the experiences of students who delay entry into college beyond one
>
> or two years of graduating from high school, or the decision of students to enroll in less
>
> than four-year institutions, including community colleges and proprietary schools. (2006,
>
> p. 146)

By using Perna's conceptual model of college choice as a guiding framework, we stand to gain

an understanding of how veterans' non-traditional trajectories inform college choice theory.

**Conceptual Model of College Enrollment and Choice**

This study seeks to build upon the strengths of Perna's (2006) integrated college student

choice model by adapting a range of human/academic, cultural, and social capital measures.  As

Figure 2.1 shows, the conceptual model illustrates how each form of capital, as well as

demographic characteristics and high school context, is related to college enrollment and choice

among post-9/11 veterans.  Previous findings from studies highlighted earlier in this chapter

showed that several factors within each form of capital have had an influence on nonveterans'

college enrollments and choices.  However, research has yet to empirically investigate how

factors from Perna's model intersect with veterans' habitus.  By focusing on measures related to

each form of capital, the study hopes to establish the foundation for future research that could

confirm or extend findings from studies that have shown factors related to nonveterans' college

enrollment and choice.  Most importantly, before other layers of Perna's model (higher

education, policy, economic, or social contexts) are researched for this unique population, a basic

understanding of the college-going process among veterans will help future researchers have a

basic understanding of how demographic characteristics and ones' life experiences shape their

higher education prospects.

Figure 2.1 Adapted Conceptual Model of College Enrollment and Choice
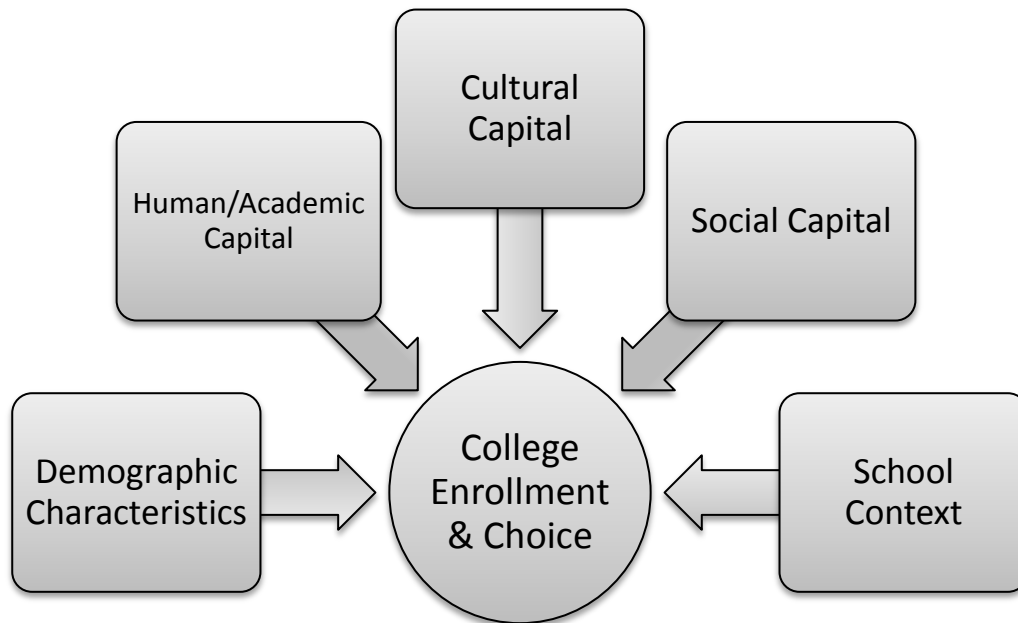


**Chapter Summary**

Previous research on post-9/11 veterans in higher education have yet to identify factors

that are associated with their college enrollments and choices.  Descriptive information on

veterans' college enrollments suggests that a substantial number are already in higher education,

although the exact number of student veterans is unknown.  Reports suggest that a large

percentage of veterans are attending community colleges and for-profit schools rather than four-

year institutions.  Perhaps what the literature most importantly reveals are the characteristics of

youth who enlist in the military.  The backgrounds of youth who enlist could adversely affect

their prospects of entering higher education, particularly four-year institutions.  However,

previous research has yet to test the influence veterans' backgrounds have on college-going.

Furthermore, while there is a small body of research on post-9/11 military-connected undergraduates, these studies have several limitations, which include a lack of generalizability, not disaggregating veterans from other military-connected college students, and not accounting for the impact early life circumstances and experiences may have on their college enrollment and choice.

Although factors that affect the college-going for traditional and other non-traditional students have been thoroughly investigated, no study to date has examined factors that influence post-9/11 veterans' postsecondary experiences. As a result, the purpose of this study is to identify key factors that influence their college enrollment and choice. The quantitative research design of this study will allow for a thorough understanding of the influence by which demographic characteristics, various forms of capital, and high school context help shape veterans' likelihood of going to college. The objective of this study is to account for key factors that are likely to be associated with college-going for this unique population using an integrated college choice model. Using Perna's (2006) conceptual model may prove to be a valuable framework to study veterans' college enrollment and choice. By applying this model, I examined how various forms of capital and high school context are associated with post-9/11 veterans' college enrollments and choices.

## Chapter 3

## Methods

**Introduction**

Even though earning money for college is one of the primary reasons cited for joining the

military (Eighmey, 2006, Woodruff et al., 2006; Zinger & Cohen, 2010) and financial resources

are available through various VA education programs (U.S. Department of Veterans Affairs,

2015c), only 24 percent of veterans have historically used their benefits in higher education (U.S.

Department of Veterans Affairs, 2001, 2010). Equally important, few enter four-year institutions

(Field, 2008; Sewall, 2010) even though they have more total financial aid compared to

nonveterans (GAO, 2002, 2008), aid that could be used to better access four-year institutions.

This study seeks to better understand veterans' college enrollments and choices by asking: What

factors best predict whether a veteran enrolls in higher education? For veterans who enroll, what

factors best predict whether they enter a two-year or for-profit institution relative to a four-year

institution? The purpose of this study is to identify key factors that influence college enrollment

and choice of this unique population.

The aim of this chapter is to describe the methods used to address the study's purpose and

research questions. The chapter begins by restating the research questions and introducing

several hypotheses to be tested by the analyses. Following, the chapter provides the research

design, dataset, and rationale for selection. The chapter then provides in-depth information about

the sampling strategy, followed by a description of the sample used in the study. This chapter

also provides information about the survey instrumentation and data collection procedures. The

following section then discusses the dependent variables and selection of independent variables,

which were based on prior college enrollment research that examined college-going among

nonveterans and enlisted youth. A summary of the analytic methods used to answer the research questions are provided, followed by a brief description of the statistical software. Finally, the concluding section of this chapter summarizes the limitations, delimitations, and assumptions of the study.

**Hypotheses**

This section describes the study's hypotheses and rationales addressing each of the research questions. Hypotheses were developed based on findings from both 1) prior research on college enrollment and choice that consider the role of human capital, cultural capital, social capital, and school context (Engberg & Wolniak, 2010; McDonough, 1997; Perna, 2000, 2006; Perna & Titus, 2005), and 2) findings from studies on college-going among youth who entered the military (Elder et al., 2010; Wang et al., 2012). The primary factors considered were: demographic characteristics, academic preparation, educational expectations, peer influences, and high school context. Two main hypotheses were developed to address each research question and to test the relationship of factors in the adapted conceptual framework to veterans' college enrollment and choice.

**What factors best predict whether a veteran enrolls in higher education?** This study's hypotheses for the first research question are as follows:

- Veterans from racial/ethnic minority backgrounds will be more likely to enter higher education than their white counterparts.

- Veterans from lower SES statuses will be less likely to enter higher education than those from higher SES backgrounds.

- Veterans with lower levels of academic preparation will be less likely to enter higher education than those with higher levels of academic preparation.

In terms of background characteristics, I hypothesize that veterans from racial/ethnic minority backgrounds will be more likely to have entered college. The rationale for this positive predictive relationship stems from findings by Elder et al. (2010). The authors showed that enlisted youth who identified as Hispanic and Black were 23 and 35 percent more likely to have gone to college, respectively, relative to their White counterparts, although their findings were not statistically significant. As a result, I expect racial/ethnic minority veterans to have higher odds of going to college relative to White veterans.

Moreover, I hypothesize those veterans who come from lower socioeconomic status (SES) backgrounds will be less likely to have enrolled in college. Socioeconomic status is typically defined as a component variable that includes parental education, parental occupation, and family income. My rationale for this hypothesis comes from findings in Elder and colleagues' (2010) study. Using nationally-representative longitudinal data, the authors showed that youth with military experience who had college-educated parents were twice as likely to have entered college compared to those with high school educated parents, even after accounting for race/ethnicity, family income, parental education, academic performance, social connections, and behavioral problems. However, the authors also noted that youth with military service were less likely to have entered college as household income increased, although the finding was not statistically significant. Thus, I expect to find veterans from lower SES backgrounds to be less likely to enroll in higher education.

With regards to academic achievement, I hypothesize that lower levels of math course-taking is a significant negative predictor of enrollment among veterans. Specifically, I suspect that veterans with lower levels of math taken in high school will decrease their likelihood of entering higher education relative to veterans with higher math courses taken. Elder et al. (2010)

showed that increases in high school GPA, a proxy for academic achievement, were related to a higher likelihood of enrolling in postsecondary education among youth who enlisted. Therefore, even after controlling for gender, race/ethnicity, and SES, I expect to find decreasing levels of math courses taken to be related to a lower probability of enrolling in college among veterans.

**For veterans who enroll, what factors best predict whether they enter a two-year or for-profit institution relative to a four-year institution?** This study's hypotheses for the second research question are as follows:

- Female veterans will be more likely, compared to their male veteran counterparts, to have higher odds of enrolling into two-year institutions.

- Racial/ethnic minority veterans will be less likely to enter two-year colleges and more likely to attend for-profit colleges.

- Veterans from low SES backgrounds will have lower odds of entering a two-year college and a higher likelihood of entering a for-profit institution.

- Veterans with lower levels of math will have lower levels of enrollment into two-year institutions relative to veterans who took higher levels of math.

- Veterans will have higher odds of entering two-year institutions if they desired to earn a bachelor's degree while in high school.

- Veterans whose friends in high school planned to enter a four-year institution will have higher odds of entering a two-year institution relative to a four-year institution.

- Veterans who attended suburban high schools will be more likely to attend two-year institutions compared to veterans who did not.

In terms of background characteristics, I hypothesize that female veterans will be more likely compared to their male veteran counterparts to have higher odds of enrolling into two-year

institutions.  Perna and Titus (2005) and Engberg and Wolniak (2010) found that female high school students, compared to their male counterparts, had higher odds of enrolling into two-year institutions relative to not entering any college or university.  Therefore, I expect to find female veterans to have higher odds of enrolling into two-year institutions as opposed to four-year institutions relative to male veterans.

I also hypothesize that racial/ethnic minority veterans will be less likely to enter two-year colleges and more likely to attend for-profit colleges.  Engberg and Wolniak (2010) found that youth from racial/ethnic minority backgrounds were less likely to have enrolled in two-year institutions relative to their White counterparts, even after accounting for gender and SES.  For instance, the authors found that Black and Hispanic youth were 11 and 19 percent less likely to have enrolled in a two-year institution, respectively, relative to not enrolling.  In contrast, the U.S. Department of Education (Aud, Fox, & KewalRamani, 2010) reported that a higher percentage of Black (15 percent), Hispanic (8 percent), and Native American (8 percent) college students were enrolled in for-profit institutions in the 2008-09 academic year compared to White (6 percent) and Asian (6 percent) college students.  Therefore, I hypothesize that racial/ethnic minority veterans will be less likely to choose a two-year college and more likely to enter a for-profit institution compared to their White counterparts.

Family income and parental education, two proxies for socioeconomic status (SES), have been found to be related to college enrollment into two-year and for-profit institutions (Engberg & Wolniak, 2010; Institute for Higher Education Policy [IHEP], 2011; Perna & Titus, 2005). For example, Perna and Titus (2005) showed that, among 1992 high school graduates, increases in family income and parental education increased their odds of going to a two-year college by 13 and 21 percent, respectively.  Furthermore, Engberg and Wolniak (2010) reported that as SES

increased, the odds of attending a two-year college increased by 40 percent (OR = 1.40) versus not attending college. In terms of enrollment into for-profit colleges, an Institute for Higher Education Policy (IHEP, 2011) report showed that students from low-income backgrounds were overrepresented at for-profit institutions. The authors noted that, of students living at, near, or below poverty, 19 percent were attending for-profit colleges. In contrasts, the report (IHEP, 2011) showed that only 5 percent of students who were not living in poverty were attending for-profit institutions. Consequently, I hypothesize that veterans from low SES backgrounds will have lower odds of entering a two-year college and a higher likelihood of entering a for-profit institution.

With regards to the influence human/academic capital has on college enrollment, I hypothesize that veterans with lower levels of math will have lower odds of entering a two-year institution. Engberg and Wolniak (2010) and Perna and Titus (2005) showed that youth who took higher levels of math had greater odds of enrolling into two-year institutions. Thus, I expect to discover that veterans with lower levels of math will have lower levels of enrollment into two-year institutions relative to veterans who took higher levels of math.

In terms of the relationship between cultural capital and college choice, I hypothesize veterans will have higher odds of entering two-year institutions if they desired to earn a bachelor's degree while in high school. Engberg and Wolniak (2010) found that youth who had their friends, family, and schools desire for them to attend college were more likely to have entered two-year institutions compared to not entering college at all. Furthermore, Perna and Titus (2005) show that youth who had parents who expected them to receive a college education or less were less likely to enter two-year institutions. Thus, I hypothesize that veterans' with low education expectations will have decreased chances of entering a two-year college.

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Measures of social capital have been found to be significantly related to enrollment into two-year institutions. For example, high school youth with friends who planned on attending four-year institutions significantly increased their odds of entering two-year institutions (Perna & Titus, 2005). Therefore, I hypothesize that veterans whose friends in high school planned to enter a four-year institution will have higher odds of entering a two-year institution relative to a four-year institution.

Finally, I hypothesize that veterans who attended suburban high schools will be more likely to attend two-year institutions compared to veterans who did not. Engberg and Wolniak (2010) found that youth who went to suburban high schools had higher odds of entering two-year institutions compared to students who did not.

## Research Design

To answer the research questions, this study used a non-experimental, correlational research design. Specifically, the study analyzed data collected from a longitudinal survey of nationally-representative high school sophomores in 2002, with follow-up surveys in 2004, 2006, and 2012. This study's research design and use of a longitudinal, large-scale dataset provides an efficient and reliable method of obtaining data (Creswell, 2009). By collecting several responses over time from a random, national sample of high school students and a wide range of other participants, this study allowed for the exploration of possible factors related to the process of college-going for high school students who completed active duty service. The research design is also appropriate because it collected longitudinal responses from youth after 9/11, which was a limitation of previous research on enlisted youth and their higher education experiences (Elder et al., 2010; Wang et al., 2012). Furthermore, previous studies on post-9/11 military-connected college students did not control for the impact background characteristics and school context had

on veterans' college enrollments (Ackerman & DiRamio, 2009; American Council on Education, 2008, 2009a, 2009b, 2010; DiRamio et al., 2008; DiRamio & Jarvis, 2011; Hamrick, Rumann, & Associates, 2013; Livingston et al., 2011; Persky & Oliver, 2011; Rumann & Hamrick, 2010; Rumann et al., 2011; U.S. Department of Education, 2009, 2011; Wheeler, 2012; Zinger & Cohen, 2010).  As a result, this study matched a large-scale quantitative dataset to a correlational research design in order to isolate the relationship between veterans' college enrollment and choice with key explanatory factors found in the literature to have an impact on college-going.

**Data Source**

Data for this study were obtained from the Education Longitudinal Study (ELS:2002) of 2002, a database sponsored by the U.S. Department of Education's National Center for Education Statistics (NCES).  The publicly available data offer one of the most current national sample of students' post-high school pathways.  The ELS:2002 is the fourth in a series of high school-based longitudinal studies centered on studying the transition of American youth from secondary schooling to college and the labor force.  The three prior longitudinal studies include the National Longitudinal Study of the High School Class of 1972 (NLS-72), High School and Beyond (HS&B), and the National Education Longitudinal Study of 1988 (NELS:88) (U.S. Department of Education, 2015d).  Together, these four longitudinal studies highlight the post-high school pathways of youth from the 1970s, 1980s, 1990s, and 2000s.  With four decades of information from youth during and after high school, researchers and policymakers are better equipped to assess the state of postsecondary enrollment, persistence, and attainment in the United States.

Similar to previous national, longitudinal studies, such as the NLS-71, HS&B, and NELS:88, the ELS:2002 was designed to track the transition of a nationally-representative

sample of high school youth in 2002 into postsecondary education and the workforce by collecting multilevel data from multiple participant populations in 2002, 2004, 2006, and 2012. The base year survey was administered in 2002 to high school sophomores, as well as their parents, teachers, school administrators, and librarians (Ingels, Pratt, Alexander, Jewell, Lauff, Mattox, & Wilson, 2014). The sample of student participants was followed up in 2004, when respondents were likely in their senior year of high school, and again in 2006, which was likely two years after graduating from high school. The third and final follow-up occurred eight years after leaving high school, in 2012, when most respondents were roughly 26 years old (Ingels et al., 2014). The veteran statuses of youth who enlisted immediately upon high school graduation and completed their active duty service would most likely be reflected in the third follow-up (2012). The final follow-up also allowed enough time for most youth who completed active duty service to have also entered postsecondary education.

The ELS:2002 response rates remained above acceptable levels throughout the four collection points. The response rates were calculated by dividing the number of participants who responded to a study component by the number of eligible participants who were fielded (Ingels et al., 2014). Because of the complex and multistage sampling procedure of the ELS:2002, the data and response rates were base-weighted to address oversampling of students and schools, as well as to correct for nonresponse bias and sampling errors (Ingels et al., 2014). The following Table 3.1 shows the summary of weighted response rates for the base-year and follow-up years.

Table 3.1

*Summary of ELS:2002 Student Response Rates*

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

Note. Adapted from Ingels et al. (2014).

**Rationale for Using the ELS:2002**

There are several advantages and strengths for using the ELS:2002. First, the data are longitudinal, which allows for the exploration of time-specific factors that may have influenced the decision of veterans to enroll in college and, if enrolled, the type of institution chosen. The longitudinal dataset includes data collected at four different points beginning with respondents' sophomore year in high school (2002), in 2004 when students were likely seniors, in 2006, and a final follow-up in 2012. The longitudinal nature of this dataset allows one to specify and distinguish between order of events and account for various factors that could be related to later-life outcomes (Teachman, 2013). Second, the collection of multiple responses from several sources (students, parents, teachers, administrators, and librarians) allowed for the robust examination of factors that best predict veterans' college enrollment and choice. Specifically, this dataset allowed for the analysis of multiple aspects of Perna's (2006) conceptual model of college choice because of the wide range of data available from factors within and between multiple layers. The dataset includes a broad range of measures that allow for the robust exploration of information that could be related to veterans' college-going. Third, the dataset is

publicly available to download online on the NCES ELS:2002 website[12]. This allowed for an efficient, reliable, and cost-effective means of obtaining contemporary data on veterans. Having these data publicly available is important as it allows researchers to confirm findings from this study and to expand this understudied area of inquiry. Finally, one of the most important features is that the ELS:2002 included information on post-9/11 veterans, a population that has yet to be longitudinally examined in and out of high school. Since no other publically-available, large-scale datasets collect information on post-9/11 veterans from high school and beyond, the ELS:2002 is ideal for empirical analyses.

The above stated advantages made the ELS:2002 best suited for this study's purpose and for answering the research questions. Teachman (2013) offered several recommendations about ideal data characteristics that can help researchers gain a better understanding of military service's impact on individuals. The author suggested that data that are longitudinal, provide contextual information, include participants' social networks, and identify youth with military service are key characteristics that can enable researchers to better understand linkages between military service and later-life outcomes. The only other dataset that longitudinally collects military service information from a nationally representative sample of high school youth is the National Longitudinal Study of Adolescent to Adult Health (Add Health).

The Add Health dataset is a longitudinal study of a nationally representative sample of adolescents in grades seven through 12 during the 1994-95 school year (Carolina Population Center, 2015). Although the study captured data on youth who enlisted from the mid-1990s to the late-2000s, a majority joined the military before 9/11. Findings resulting from analyses of Add Health data more likely reflect high school students' decision-making processes before they

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[12] High school and college transcript data require a restricted-use license.

had to consider the post-9/11 risks involved with joining the military and the ensuing wars in Iraq and Afghanistan. Aside from the ELS:2002, no other national, longitudinal dataset exists that collects student and school-based information for post-9/11 military veterans before joining and after leaving active duty service.

**Sampling Procedure**

ELS:2002 staff used a nationally representative, two-stage stratified probability design in selecting the ELS:2002 base-year sample. The first stage consisted of identifying schools from a stratified probability proportional to their size (PPS) sample. Thereafter, the sample of schools was stratified by region and then metropolitan status. Of roughly 27,000 high schools, about 1,221 were eligible and invited to participate in the ELS:2002. Of participant high schools, private high schools were oversampled. The second stage consisted of sampling students within participating schools. Participating high schools provided a roster of $10^{th}$ grade students who were then stratified by race/ethnicity. Of all students included in the study, Asian students were oversampled. The final base-year sample was comprised of 752 high schools and 15,362 sophomore participants (Lauff & Ingels, 2014). The first follow-up (2004) sample included participants from the base-year schools, regardless of whether they were at the same school or had transferred. Moreover, participating base-year schools provided a "freshening" sample of senior students who did not have an opportunity to be selected during their sophomore year (2002) because they were out of the country, enrolled in a grade other than $10^{th}$ grade, ill, institutionalized, homeschooled, or dropped out. Of the 752 eligible high schools from the base-year (2002) study, only 698 high schools participated in the first follow-up (2004). Nearly 15,000 students participated in the first follow-up in 2004 (Ingels et al., 2014). The second (2006) and third (2012) follow-up samples consisted of both the 2002 base-year sophomores and

the 2004 freshened sample of students in the 12th grade. In the third and final follow-up (2012) a total of 13,250 individuals participated out of an eligible pool of 15,724 (Ingels et al., 2014).

Most importantly, this study defined the sample to include only veterans and not other military-connected subpopulations (i.e., active duty, reserve, and National Guard). Specifically, an identifying measure (VETERAN) was created using military-related measures provided in the ELS data. Veterans in this study were defined as youth who indicated having ever served in the military (F3B01 = 1) or on active duty (F3B07 = 1). Veterans were identified through several steps. First, a tabulation for the F3B01 measure was run to highlight the number of individuals who indicated having served in the military. The measure asked, "have you ever been in the military" (Ingels et al., 2014). This generated a sample of 242, who indicated having served in the military. Second, individuals who indicated they were currently serving (F3A01H = 404) or were serving in the military as of 2012 (F3A03H = 369) were excluded. However, before they were excluded, I examined their military service start and end dates to ensure they were not veterans. Measures F3B04 and F3B05 provided the month and year in which respondents indicated they had served. Lastly, I ensured only veterans were included in the sample by examining the F3B03 measure, which indicated whether a respondent is currently serving on active duty (n = 205), in the reserves (n = 87), or in the National Guard (n = 55). Following these steps led to a total veterans subsample of 371, which represents over 100,000 post-9/11 veterans once the sample is weighted. Over 2 percent of the total sample of respondents was identified as veterans. Table 3.2 shows the weighted and unweighted sample size for participants identified as veterans in this study.

Table 3.2

*Sample Size of Veterans and Nonveterans in ELS:2002 (weighted and unweighted)*

|  | Weighted | Unweighted |
|---|---|---|
| Nonveterans | 3,148,773 | 15,826 |
| Veterans | 100,047 | 371 |
| Total | 3,248,820 | 16,197 |

Note. Veterans were defined as all respondents who have ever served in the military or on active duty. Data were weighted by the normalized F3BYPNLWT panel weight.

**Survey Instrumentation**

In designing the ELS:2002 survey instruments, ELS:2002 staff set two main research goals (Ingels et al., 2014). One of the primary goals was to ensure that measures included in all surveys could be used for their intra-cohort value. That is, measures were chosen based on their predictive relation to earlier collected measures. Another goal was to have inter-cohort value. Questionnaires had to include items that were comparable to past studies of longitudinal high school youth. These earlier studies included the NLS-72, HS&B, and the NELS:88 (Ingels et al., 2014). ELS:2002 staff also designed their surveys to ensure score linkages with the Program for International Student Assessment (for the reading and mathematics instruments) and the National Assessment of Educational Progress (for the mathematics instrument). Moreover, instrument development went through several review processes to ensure the reliability and validity of questionnaires. Review process steps included: sharing of draft with other government agencies; a technical review panel review; an NCES interdivisional review; questionnaire revisions based on feedback; justification for measures to be included; an Office of Management and Budget review; another questionnaire revision based on feedback; and a field testing and final revision (Ingels et al., 2014).

**Data Collection**

The longitudinal survey design allowed for collection of several responses from multiple participants at four different time points. During the base year (2002), responses were collected from high school students, parents, teachers, administrators, and library media center staff. Additionally, an ELS:2002 survey administrator completed a school facilities checklist. Most importantly, the baseline survey asked high school sophomores about their plans to enter college and the military. Furthermore, measures of academic competence collected included: background characteristics, career plans, and cognitive tests in reading and mathematics. The first follow-up (2004) collected information from students and school administrators. In addition, high school transcripts were collected and courses completed, grades, attendance, and SAT/ACT scores were analyzed, even if participants had changed high schools. In the second follow-up (2006), data were collected from students selected in the base year and combined with the sample of new students from the first follow-up (Ingels et al., 2014). The second follow-up responses were collected when participants were in college, employed, or had dropped out of high school. The final follow-up (2012) collected information on individuals' postsecondary enrollment and attainment, employment history, marital status, family formation, and community participation (Ingels et al., 2014).

For this study, responses from the base-year (2002), first follow-up (2004) and third follow-up (2012) were used in the analyses. Responses from the second follow-up (2006) were not included or analyzed given that this study's research design sought to only account for demographic characteristics and high school experiences from measures included only in the base year and first follow-up. Base year and first follow-up responses were used to illustrate students' background characteristics and high school context. Factors associated with high

school students' math course-taking, educational expectations, and peer influences were examined in this study. These measures were collected in the base-year and first follow-up. Finally, responses examined in this study were also collected in the third follow-up (2012), such as college enrollment and institutional choice. Following up with respondents eight years after leaving high school allowed enough time for most participants to complete their initial active duty service and decide whether or not to enter college. Thus, information from high school youths' third follow-up was also examined.

**Variables**

This section provides an overview of the dependent and independent variables included in the analyses. Each variable was selected based on the conceptual model literature and college-going among high school students who later enlisted, which were highlighted in Chapter 2 of this study. The section begins with a description of the dependent and independent variables and how they were operationalized. The conceptual model shown in Figure 2.1 illustrates where each measure is situated within the framework adapted from Perna's (2006) conceptual model. The final section of this chapter provides a description of the variable construction and coding scheme.

**Dependent variables.** This study used two dependent variables to answer the research questions for the subsample of veterans in the ELS:2002. No imputations were performed on the dependent variables. The first dependent variable, which addresses Research Question 1, was collected in the third follow-up (2012) participant questionnaire. It is a binomial variable operationalized according to whether a veteran had attended any college, university, or vocational, technical, or trade school for college credit since leaving high school (Ingels et al.,

2014).  This was a categorical measure (F3EVERATT) coded as "No = 0" and "Yes = 1".  No

postsecondary enrollment was the reference category.

The second dependent variable addresses Research Question 2.  The measure

(F3PSLAST) consists of a trinomial outcome that identifies the participant's most recent

postsecondary institution attended by sector.  The last institution attended was chosen in contrast

to the first to identify veterans that eventually transferred to a four-year institution by the third

follow-up.  The sector is a composite measure identified by the Integrated Postsecondary

Education Data System (IPEDS) or, if the institution has no IPEDS code, the respondent

provided the information (Ingels et al., 2014).  The measure is a trinomial variable categorized

according to whether an institution was public/private, for-profit/ not-for-profit, less than two-

year/two-year, or a four-year.  The variable was recoded as follows: Four-Year Institution

(public, 4-year or above; private not-for-profit, 4-year or above) = 0; Two-Year Institution

(public 2-year; private not-for-profit, 2-year; public, less than 2-year; private not-for-profit, less

than 2-year) = 1, and For-Profit Institution (private for-profit, 4-year or above; private for-profit,

2-year; private for-profit, less than 2-year) = 2.  Four-year institutions were used as the reference

group.  A fourth category of this dependent variable was coded as "3" and accounted for

individuals in the sample who did not respond, were logically skipped (had not attended college),

or were missing.  This category was omitted from the overall analyses.  Table 3.3 shows the non-

weighted number and percentage of nonveterans and veterans who did and did not enter college.

The table shows that a large percentage of veterans (87 percent) had attended a postsecondary

institution by 2012, a figure that was significantly larger than their nonveteran counterparts (69

percent).  However, no national statistics exist to benchmark veterans' college enrollment rates.

Table 3.3
*Veterans Status by Postsecondary Enrollment (unweighted)*

|  | No Postsecondary Enrollment (%) | Has Postsecondary Enrollment (%) |
|---|---|---|
| Nonveteran | 4,641 (31%) | 11,185 (69%) |
| Veteran | 50 (13%) | 321 (87%) |

For those respondents who did enter college, Table 3.4 shows the number and percentage of nonveterans and veterans by higher education sector attended. Table 3.4 shows that the percentage of veterans by higher education sector are nearly identical to data from the U.S. Department of Education (2015c), which estimated that 38 percent of veterans were attending public two-year institutions in the 2011-12 academic year and 23 percent were enrolled in for-profit institutions. The table also shows that, compared to nonveterans, more post-9/11 veterans were enrolled in community colleges and for-profit colleges than at four-year institutions.

Table 3.4
*Veterans Status by Sector of Last/Current Enrolled Postsecondary Institution (unweighted)*

|  | Two-Year | For-Profit | Four-Year |
|---|---|---|---|
| Nonveteran | 3,114 (28%) | 1,369 (13%) | 6,502 (59%) |
| Veteran | 115 (37%) | 71 (23%) | 125 (40%) |

**Independent variables.** As found in existing literature on college enrollment and choice described in Chapter 2 of this study, a number of independent variables were included that significantly affect college enrollment and choice. These measures were grouped within distinctive constructs included in Perna's (2006) model (see Figure 2.1 for an illustration). Table 3.5 illustrates in detail the variable coding and sources. Given the small sample size, an effort was made to achieve parsimonious models using measures that best predict college enrollment and choice and, therefore, only measures that were found to affect college enrollment and choice were examined.

***Demographic characteristics***.  Three student demographic characteristic measures were used in the analyses to understand how they affect veterans' college-going.  Demographic measures included: gender, race/ethnicity, and socioeconomic status (SES).  Several findings point to the importance of examining the impact these measures have on college-going.  Perna and Titus (2005) found that females were 15 percent more likely to enter two-year institutions than their male counterparts.  Therefore, this study included gender as a measure, with males serving as the reference group.  The authors also found that African American youth were nearly 30 percent less likely to enter a two-year institution compared to White youth, all else equal.  Moreover, Engberg and Wolniak (2010) found that biracial high school seniors were over 40 percent less likely to enter a two-year institution relative to White students.  Race/ethnicity was thus included in the study and White was used as a reference category.  Finally, the same authors found that as SES increased, so did their chances of entering higher education.  Students from the highest SES level were used as the reference category.

***Human/Academic capital***.  Measures included under the human/academic capital construct were designed to reflect the investment decision to enroll in college and the academic profile of veterans as they considered the benefits and costs of going to college based on their academic preparation.  A measure that captured the notion of human/academic capital and its influence on college-going for this study included highest level of math taken in high school.  Engberg and Wolniak (2010) and Perna and Titus (2005) found that enrolling in higher-level mathematics courses was a strong determinant of college enrollment.  Given these findings, this study included highest level of math taken as a proxy for human/academic capital to examine its impact on veterans' postsecondary enrollments.  Further, veterans who took the highest levels of math (i.e., Trigonometry, Pre-Calculus, or Calculus) were used for reference.

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*Cultural capital.* Cultural capital refers to an individual's values, cultural knowledge, and other norms derived in part from their parents' class status (Bourdieu, 1986). Veterans' educational expectations served as a proxy for cultural capital. Specifically, veterans who expected to graduate from college or obtain a graduate/professional degree were used as the reference group. Engberg and Wolniak (2010) found that youth who had friends and family who had a desire for them to attend college were more likely to have entered two-year institutions compared to not entering college. Perna and Titus (2005) showed that youth who had parents who expected them to receive less than a college education were less likely to enter two-year institutions. Given these findings, it was important to consider how cultural capital derived from one's parents and how peers influenced veterans' college-going prospects.

*Social capital.* Social capital refers to an individual's social networks and support systems and the way they affect information acquisition about the college decision-making process (Coleman, 1988; Bourdieu, 1986). The number of high school friends planning to attend a four-year institution served as a substitute for veterans' social capital. Veterans who had most or all of their friends planning to attend a four-year institution were used for reference. Perna and Titus (2005) found that youth with friends who planned to attend four-year institutions significantly increased their odds of entering two-year institutions. Including measures of social capital in this study may help us understand the impact and magnitude of veterans' peers on their postsecondary enrollments.

*School context.* A central part of Perna's (2006) model is the inclusion of high school context, which shapes an individual's college choice. As a result, high school urbanicity was examined in this study. Urban high schools were used in reference to suburban or rural high schools. High school urbanicity has been shown to influence students' college enrollment

(Engberg & Wolniak, 2010; McDonough & McClafferty, 2001; Perna, 2000). For example, Engberg and Wolniak's (2010) found that two years after leaving high school, students who studied at suburban high schools were significantly more likely to enter two-year colleges compared to youth who attended urban high schools. Following the example of previous findings, this study included high school urbanicity to examine if previous findings hold for post-9/11 veterans.

Table 3.5

| Variable | Coding | Source |
|---|---|---|
| *Dependent Variables* | | |
| Ever Attended College | No = 0, Yes = 1 | F3EVERATT |
| Current/Last College Attending/Attended | Four-year = 0, Two-year = 1, For-profit = 2 | F3PSLAST* |
| *Student Measures* | | |
| Demographic Characteristics | | |
| Gender | Male = 0, Female = 1 | F1SEX |
| Race/Ethnicity | White = 0, Racial minority = 1, More than one race = 2 | F1RACE* |
| SES | Low SES = 0, Middle SES = 1, High SES = 2 | F1SES* |
| Human/Academic Capital | | |
| Highest math course taken in HS | No math course or math course is other, pre-Algebra, General or Consumer Math, Algebra I, or Geometry = 0, Algebra II = 1, Trigonometry, Pre-Calculus, or Calculus = 2 | F1HIMATH* |
| Cultural Capital | | |
| Educational expectations | Don't know, HS graduation, or GED only = 0, Attend some college or complete a 2-year degree = 1; Graduate from college, obtain graduate or advanced degree = 2 | F1STEXP* |
| Social Capital | | |
| Number of high school friends planning to attend 4-year college/university | None/A few = 0, Some = 1, Most/All = 2 | F1S65D* |
| *School Measure* | | |
| School urbanicity | Urban = 0, Suburban = 1, Rural = 2 | BYURBAN |

Note: *Indicates variable created by author.

## Data Analyses

**Weighting.** Large datasets such as the ELS:2002 include sampling weights that allow researchers to generalize findings to the entire population under study. Weighting cases corrects

for oversampling from smaller subsamples, such as Asian students and non-public schools. Weighting those cases correct for their oversampling, as well as sampling errors and nonresponse bias. Sampling weights also allow for generalization to the national high school student populations in 2002. The *Education Longitudinal Study (ELS:2002) Third-Follow-Up Data File Documentation* (Ingels et al., 2014) was consulted to identify the correct weight variable to use. The documentation reports that six sets of weights were computed in the third-follow-up (2012). As reported by the authors (Lauff & Ingels, 2014), the weights included:

(1) "a current-round weight for sample members who responded in the third follow-up (F3QWT);

(2) a current-round high school transcript weight for sample members who responded in the third follow-up and for whom a high school transcript was collected in the first follow-up transcript study (F3QTSCWT);

(3) a third follow-up cross-round or panel weight for all sample members who responded in the third follow-up and responded in the base year (F3BYPNLWT);

(4) a third follow-up high school transcript panel weight for sample members who responded in the third follow-up and responded in the base year and for whom a high school transcript was collected in the first follow-up transcript study (F3BYTSCWT);

(5) a third follow-up panel weight for all sample members who responded in the third follow-up and responded in the first follow-up (F3F1PNLWT); and

(6) a third follow-up high school transcript panel weight for sample members who responded in the third follow-up and responded in the first follow-up and for whom a high school transcript was collected in the first follow-up transcript study (F3F1TSCWT)" (p. A-5 - A-6).

For this study, the sampling weight used in the analyses consisted of the third follow-up panel weight for all sample members who responded to the base year and third follow-up (F3BYPNLWT). This weight was applied to both the logistic and multinomial logistic regression analyses, which address RQ1 and RQ2 respectively. This weight was appropriate given that measures used in the analyses were collected from participants who responded in the base year (2002), as well as first (2004) and third (2012) follow-ups (Ingels et al., 2014). Analyses of the ELS:2002 dataset were weighted to account for the nonrandom and oversampling of certain students using the F3BYPNLWT weight computed in the third follow-up. Because the ELS:2002 dataset was designed using complex probability sampling schemes, a sampling weight (F3BYPNLWT), strata weight (STRAT_ID), and primary sampling unit weight (PSU) were used. All weighted results are included in the Appendix section of this study.

**Missing data.** As is the case in most large-scale datasets with multiple questionnaires, the ELS:2002 has missing data. Missing data can be attributed to a number of reasons, such as random or selective loss of data, not asking the participant for a response, or logical skip patterns. As in any quantitative study, one should consider whether data are concentrated in a few variables and if the percentage of missing data is high. There are generally two approaches to address issues that arise from missing data, such as biased estimates and loss of statistical power. The first solution would be to omit cases with missing values, known as listwise deletion. Another approach is to have missing values substituted through a process called imputation. This study relies on both approaches to address missing data. The listwise deletion method was used for variables with small numbers of missing values during the regression analyses. Moreover, ELS:2002 staff performed several imputations on variables collected. In order to preserve the sampling weights and obtain precise population parameter estimates,

variables with missing values were replaced by ELS:2002 staff with imputed values using a weighted sequential hot deck technique (Ingels et al., 2014). Given that ELS:2002 staff imputed several variables in each wave of data collection, missing data was not a significant issue. It is also important to highlight that missing cases for the dependent variables were not included in any analyses.

**Multicollinearity.** Multicollinearity exists when there are high intercorrelations between predictor variables. Multicollinearity can lead to inaccurate coefficient estimates and large standard errors (O'brien, 2007). Although no formal procedure exists to check for multicollinearity in logistic regression, the "collin" command in Stata 13 was used to determine whether multicollinearity would be an issue before the logistic and multinomial logistic regressions were performed. Variables were examined using the collinearity diagnostics command and inspecting the variance inflation factor (VIF) and tolerance values. According to O'brien (2007), a tolerance of less than 0.20 or 0.10 and a VIF of 5 or 10 and above indicates that multicollinearity is a problem. In other words, the independent variables are highly correlated and may produce inflated standard errors. Measures that were highly correlated were not considered for inclusion in the analyses.

Tables 3.6 and 3.7 show the VIF and tolerance statistics. The tables illustrate that the measures included for analyses should not produce collinearity issues in the regression analyses. Table 3.6 shows that VIF values ranged from 1.04 to 1.19 while tolerance statistics ranged from 0.84 to 0.97 for the first dependent variable (postsecondary enrollment).

Table 3.6

*Variance Inflation Factors (VIF) and Tolerance Statistics between Independent Variables and Postsecondary Enrollment*

| Variable | VIF | Tolerance |
| --- | --- | --- |
| Gender | 1.04 | 0.97 |
| Race/Ethnicity | 1.15 | 0.87 |
| SES | 1.10 | 0.91 |
| Human/Academic Capital | 1.19 | 0.84 |
| Cultural Capital | 1.16 | 0.87 |
| Social Capital | 1.14 | 0.88 |
| School Context | 1.16 | 0.86 |

Condition Number = 14.31

Table 3.7 reveals that the VIF values for the predictor variables ranged from 1.04 to 1.19 and

tolerance statistics ranged from 0.84 to 0.96 for the second dependent variable (postsecondary

choice).  As mentioned, both tables demonstrate that including the independent measures should

not produce multicollinearity problems.

Table 3.7

*Variance Inflation Factors (VIF) and Tolerance Statistics between Independent Variables and Postsecondary Choice*

| Variable | VIF | Tolerance |
| --- | --- | --- |
| Gender | 1.04 | 0.96 |
| Race/Ethnicity | 1.16 | 0.87 |
| SES | 1.10 | 0.91 |
| Human/Academic Capital | 1.19 | 0.84 |
| Cultural Capital | 1.14 | 0.87 |
| Social Capital | 1.12 | 0.89 |
| School Context | 1.15 | 0.87 |

Condition Number = 13.85

**Correlation matrix between dependent and independent variables**.  A review of the

correlation matrix reveals several relationships between the independent and dependent

variables.  The purpose of producing a correlation matrix was to highlight the bivariate

association between each dependent and independent variable, as well as any relationships

among the independent measures.  The correlation matrix shows that there were many

statistically significant relationships between measures at the .05 level.  Table 3.8 shows the

association between postsecondary enrollment and this study's independent variables, while

Table 3.9 shows the relationship between institutional choice and the independent measures.

Given the small sample size of veterans, it is important to note that there were still significant

associations between measures, which further supports their inclusion into the logistic and

multinomial logistic regression analyses.  The following sections highlight key findings from the

correlation matrices.

Table 3.8 shows that postsecondary enrollment was found to be significantly related to

several of the predictor variables.  Specifically, college enrollment was positively related to

gender (r = .13), racial/ethnic minority (r = .15), SES (r = .11), human/academic capital (r = .20),

cultural capital (r = .15), social capital (r = .23), and urban high schools (r = .12).  In contrast,

identifying as White (r = -.11) and attending a rural high school (r = -.15) were negatively

associated with postsecondary enrollment.  Although identifying as having more than one race

was negatively related to college-going, the relationship was not statistically significant.

Moreover, veterans from suburban high schools had a small and insignificant association with

postsecondary enrollment.  These results indicate that the highest math taken in high school and

the number of friends planning to attend a four-year institution had the strongest association with

veterans' postsecondary enrollments.

A few other key relationships are worth highlighting from Table 3.8.  For instance, the

bivariate correlation between SES and racial/ethnic minority showed a statistically negative

relationship (r = -.11), suggesting that racial/ethnic minorities are associated with low SES

backgrounds.  SES also had a significantly positive relationship with all forms of capital, which

indicates having higher levels of math, educational expectations, and friends planning to enter a four-year institution are associated with higher levels of SES.

In regards to statistically significant relationships between forms of capital and other independent measures, human/academic capital was positively related to SES (r = .17), cultural capital (r = .34), social capital (r = .24), and urban high school (r = .15). These correlations suggest that taking higher levels of math is associated with higher levels of SES, educational expectations, friends who planned to enter a four-year, and attending an urban high school. Human/academic capital was also negatively associated with rural high school (r = -.11), suggesting that the association between attending a rural high school is negatively related to taking high levels of math in high school.

In terms of high school context, urban high schools were positively related to higher education enrollment (r = .12), racial/ethnic minority (r = .27), and human/academic capital (r = .15). In contrast, there was a significant negative relationship between urban high schools and White veterans (r = -.26). In contrast, the rural high school measure had negative associations with postsecondary enrollment (r = -.15), racial/ethnic minority (r = -.23), SES (r = .-12), human/academic capital (r = -.11), and social capital (r = -.12). No statistically significant relationships were identified for the suburban high school measure. Lastly, each form of capital was also statistically and positively related to each other. Human/academic capital was positively related cultural capital (r = .34) and social capital (r = .21) while cultural capital was positively related to social capital (r = .20).

Table 3.8

*Correlation Matrix of Independent Variables and Postsecondary Enrollment*

| | Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Postsecondary Enrollment | | | | | | | | | | | | |
| 2 | Gender | 0.13* | 1.00 | | | | | | | | | | |
| | | 0.02 | | | | | | | | | | | |
| 3 | Race/Ethnicity (White) | -0.11* | -0.08 | 1.00 | | | | | | | | | |
| | | 0.04 | 0.15 | | | | | | | | | | |
| 4 | Race/Ethnicity (Racial/Ethnic Minority) | 0.15* | 0.07 | -0.86* | 1.00 | | | | | | | | |
| | | 0.00 | 0.17 | 0.00 | | | | | | | | | |
| 5 | Race/Ethnicity (More than one race) | -0.08 | 0.01 | -0.33* | -0.20* | 1.00 | | | | | | | |
| | | 0.14 | 0.79 | 0.00 | 0.00 | | | | | | | | |
| 6 | SES | 0.11* | -0.07 | 0.09 | -0.11* | 0.04 | 1.00 | | | | | | |
| | | 0.03 | 0.19 | 0.09 | 0.03 | 0.50 | | | | | | | |
| 7 | Human Capital (Highest Math) | 0.20* | 0.06 | -0.05 | 0.05 | -0.01 | 0.17* | 1.00 | | | | | |
| | | 0.00 | 0.24 | 0.39 | 0.32 | 0.87 | 0.00 | | | | | | |
| 8 | Cultural Capital (Student Expectations) | 0.15* | 0.06 | -0.01 | 0.04 | -0.05 | 0.13* | 0.34* | 1.00 | | | | |
| | | 0.00 | 0.27 | 0.90 | 0.52 | 0.34 | 0.02 | 0.00 | | | | | |
| 9 | Social Capital (Friends Planning to Attend 4-Year) | 0.23* | 0.05 | 0.14* | -0.08 | -0.11* | 0.24* | 0.21* | 0.20* | 1.00 | | | |
| | | 0.00 | 0.36 | 0.01 | 0.14 | 0.04 | 0.00 | 0.00 | 0.00 | | | | |
| 10 | Urban | 0.12* | 0.01 | -0.26* | 0.27* | -0.01 | 0.04 | 0.15* | 0.07 | 0.03 | 1.00 | | |
| | | 0.02 | 0.90 | 0.00 | 0.00 | 0.81 | 0.45 | 0.00 | 0.22 | 0.53 | | | |
| 11 | Suburban | 0.03 | -0.00 | 0.05 | -0.03 | -0.03 | 0.07 | -0.04 | 0.01 | 0.08 | -0.55* | 1.00 | |
| | | 0.57 | 0.96 | 0.35 | 0.50 | 0.57 | 0.16 | 0.48 | 0.88 | 0.15 | 0.00 | | |
| 12 | Rural | -0.15* | -0.00 | 0.20* | -0.23* | 0.05 | -0.12* | -0.11* | -0.07 | -0.12* | -0.35* | -0.58* | 1.00 |
| | | 0.00 | 0.95 | 0.00 | 0.00 | 0.38 | 0.02 | 0.04 | 0.18 | 0.02 | 0.00 | 0.00 | |

Note: * Correlation is significant at the 0.05 level.

Table 3.9 shows the association between institutional choice and independent variables. There were a number of correlations that were statistically significant, particularly with enrollment into for-profit institutions. In terms of demographic characteristics, the racial/ethnic minority measure was positively associated with attendance at for-profit institutions (r = .14). Additionally, SES was positively related to enrollment into four-year institutions (r = 16) and negatively associated with enrollment into two-year institutions (r = -.13). No other demographic characteristics were significantly related to enrollment into two-year, for-profit, or four-year institutions. These results suggest that the bivariate correlation between racial/ethnic minorities and for-profit institutions may be an important factor in veterans' institutional choices.

In regards to the relationship between institutional choice and forms of capital, Table 3.9 illustrates several statistically significant correlations. For example, four-year enrollment was positively associated with human/academic capital (r = .33), cultural capital (r = .26), and social capital (r = .21). Alternatively, two-year college enrollment was negatively associated with human/academic capital (r = -.14), cultural capital (r = -.23), and social capital (r = -.14). Only human/academic capital was significantly and negatively related to for-profit attendance (r = -.22). No high school urbanicity measure (i.e., urban, suburban, or rural high schools) was associated with enrollment into two-year, for-profit, or four-year institutions. These findings indicate that the level of math courses taken in high school may be one of the most important predictors of veterans' enrollment into two-year and for-profit institutions

Table 3.9

*Correlation Matrix of Independent Variables and Postsecondary Choice*

| | Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Four-Year Institution | | | | | | | | | | | | | | |
| 2 | Two-Year Institution | | | | | | | | | | | | | | |
| 3 | For-Profit Institution | | | | | | | | | | | | | | |
| 4 | Gender (Female) | -0.01 | -0.05 | 0.06 | 1.00 | | | | | | | | | | |
| | | 0.93 | 0.41 | 0.29 | | | | | | | | | | | |
| 5 | Race/Ethnicity (White) | 0.05 | 0.04 | -0.11 | -0.08 | 1.00 | | | | | | | | | |
| | | 0.39 | 0.44 | 0.06 | 0.15 | | | | | | | | | | |
| 6 | Race/Ethnicity (Racial/Ethnic Minority) | -0.06 | -0.06 | 0.14* | 0.07 | -0.86* | 1.00 | | | | | | | | |
| | | 0.29 | 0.26 | 0.01 | 0.17 | 0.00 | | | | | | | | | |
| 7 | Race/Ethnicity (More than one race) | 0.02 | 0.04 | -0.07 | 0.01 | -0.33* | -0.20* | 1.00 | | | | | | | |
| | | 0.71 | 0.50 | 0.22 | 0.79 | 0.00 | 0.00 | | | | | | | | |
| 8 | SES | 0.16* | -0.13* | -0.04 | -0.07 | 0.09 | -0.11* | 0.04 | 1.00 | | | | | | |
| | | 0.00 | 0.02 | 0.47 | 0.18 | 0.09 | 0.03 | 0.50 | | | | | | | |
| 9 | Human Capital (Highest Math) | 0.33* | -0.14* | -0.22* | 0.06 | -0.05 | 0.05 | -0.01 | 0.17* | 1.00 | | | | | |
| | | 0.00 | 0.02 | 0.00 | 0.24 | 0.39 | 0.32 | 0.87 | 0.00 | | | | | | |
| 10 | Cultural Capital (Student Expectations) | 0.26* | -0.23* | -0.04 | 0.06 | -0.01 | 0.04 | -0.05 | 0.13* | 0.34* | 1.00 | | | | |
| | | 0.00 | 0.00 | 0.48 | 0.27 | 0.90 | 0.52 | 0.34 | 0.02 | 0.00 | | | | | |
| 11 | Social Capital (Friends Planning to Attend 4-Year) | 0.21* | -0.14* | -0.09 | 0.05 | 0.14* | -0.08 | -0.11* | 0.24* | 0.21* | 0.20* | 1.00 | | | |
| | | 0.00 | 0.02 | 0.12 | 0.36 | 0.01 | 0.14 | 0.04 | 0.00 | 0.00 | 0.00 | | | | |
| 12 | Urban | 0.00 | -0.01 | 0.01 | 0.01 | -0.26* | 0.27* | -0.01 | 0.04 | 0.16* | 0.07 | 0.03 | 1.00 | | |
| | | 0.97 | 0.91 | 0.86 | 0.90 | 0.00 | 0.00 | 0.81 | 0.45 | 0.00 | 0.22 | 0.53 | | | |
| 13 | Suburban | 0.06 | -0.06 | 0.01 | 0.00 | 0.05 | -0.03 | -0.03 | 0.07 | -0.04 | 0.01 | 0.08 | -0.55* | 1.00 | |
| | | 0.32 | 0.26 | 0.89 | 0.96 | 0.35 | 0.50 | 0.57 | 0.16 | 0.48 | 0.88 | 0.15 | 0.00 | | |
| 14 | Rural | -0.06 | 0.08 | -0.02 | 0.00 | 0.20* | -0.23* | 0.05 | -0.12* | -0.11* | -0.07 | -0.13* | -0.35* | -0.58* | 1.00 |
| | | 0.26 | 0.15 | 0.72 | 0.95 | 0.00 | 0.00 | 0.38 | 0.02 | 0.04 | 0.18 | 0.02 | 0.00 | 0.00 | |

Note: * Correlation is significant at the 0.05 level.

**Analyses.** Analyses for the study were conducted in three parts. First, descriptive analyses were performed to examine baseline differences between veterans who did and did not enter higher education. Descriptive analyses were also used to examine differences in higher education sector participation. Given that all variables examined were categorical measures, chi-square tests of independence were used to illustrate the relationship between the dependent variables and the independent variables. For all chi-square tests, alpha values of .05 or smaller indicated a significant difference between the dependent variables and the independent variables.

Second, a binary logistic regression was performed to answer Research Question 1. The goal was to examine what factors were associated with veterans' likelihood of entering higher education. Given that the dependent variable is a categorical binomial outcome, a logistic regression was the appropriate technique to use. This method allows researchers to isolate and measure the effects of each explanatory variable on the outcome using maximum likelihood estimation (Cabrera, 1994; Hosmer, Lemeshow, & Sturdivant, 2013; Long & Freese, 2006). Logistic regression coefficients represented the odds ratio of an event occurring and provided the direction and strength of such event occurring. All analyses used an alpha cut-off value of .05 to indicate statistical significance. In order to better address the research questions, conceptual blocks of explanatory variables were temporally entered in the regressions. Given that the temporal sequence measures were entered did not matter, the blocks were represented and entered as follows:

- Model I – Background Characteristics
- Model II – Human/Academic Capital
- Model III – Cultural Capital
- Model IV – Social Capital

- Model V – School Context

By entering variables in this format, the study tested the contribution each construct had on the outcome and assessed how well factors in Perna's (2006) college choice framework explained college-going among post-9/11 veterans. Previous literature on college enrollment and choice (Engberg & Wolniak, 2010; Kim, 2004; Kim & Gasman, 2011; Nora, 2004; Nuñez & Kim, 2012; Perna, 2000; Perna & Titus, 2004; Perna & Titus, 2005), as well as studies on military-connected college students (Ackerman & DiRamio, 2009; American Council on Education, 2008, 2009a, 2009b, 2010; DiRamio et al., 2008; DiRamio & Jarvis, 2011; Hamrick, Rumann, & Associates, 2013; Livingston et al., 2011; Persky & Oliver, 2011; Rumann & Hamrick, 2010; Rumann et al., 2011; U.S. Department of Education, 2009, 2011; Wheeler, 2012; Zinger & Cohen, 2010), did not apply this approach in their research.

Third, a multinomial logistic regression was conducted to examine the relationship between key independent variables and institutional choice, which addressed Research Question 2. Since the dependent variable is a three-category nominal variable, this study employed multinomial logistic regression, which is appropriate for identifying the probability of participation in each category of the dependent variable relative to a reference category in the dependent variable (Hosmer, Lemeshow, & Sturdivant, 2013; Long & Freese, 2006). For instance, in the three-category dependent variable, the central outcome was based on what the probability was of having entered a two-year or for-profit institution relative to participation in a four-year institution. The third analysis consisted of examining all the measures of interest on the likelihood of enrolling in higher education by sector. Regression results are presented in relative risk ratios (RRR). The relative risk ratios represent the change in the odds of entering a two-year or for-profit institution compared to a four-year institution, after accounting for other

predictor variables in the final model.  Specifically, a ratio of 1 represents a 50/50 chance of occurring, while ratios greater than 1 represents a positive association between the independent variable and entering a two-year or for-profit institution relative to a four-year institution.  A ratio less than 1 represents a negative association between the independent variable and going to a two-year or for-profit institution compared to a four-year institution.  To identify significant net effects among factors, all variables were entered together in the final model.

**Statistical software.**  Stata 13 statistical software was used throughout the study's analyses.  This software package was used because it supports all aspects of the descriptive statistics and logistic regressions using survey data, including model fit assessment, model diagnostic statistics, and multinomial outcomes.  In addition, Stata fits binary and multinomial logistic models on survey data with the "svy" command, which corrects for the ELS:2002 complex research design.  Finally, the "subpop" estimation command and the "if VETERAN" qualifier within () were used to focus on the veteran sample within the entire ELS:2002 dataset. The subpopulation command produced the variance estimates for the veteran subpopulation within the dataset, which is not the same as filtering or otherwise restricting the sample to include only veterans.

**Delimitations**

Several delimitations set the boundaries for this study.  First, the analyses included only respondents who were identified as veterans.  Members of the active duty, reserve, and National Guard components were deliberately left out given their differing experiences in higher education (Molina, 2015; Santos, Esqueda, & Molina, 2015).  Second, the study only investigated veterans' higher education enrollments and choices, not persistence or degree

attainment.  Lastly, only undergraduate student data were used in the study, which excluded the experiences of veterans in graduate or professional school.

**Limitations**

A few limitations were identified in this study.  First, the ELS:2002 dataset did not collect the type of VA education benefit used, if any, by veterans.  Therefore, the study cannot provide information on the impact of VA educational benefits, such as the Post-9/11 GI Bill, on veterans' college enrollments and choices.  Second, the longitudinal design of the study did not allow researchers to investigate the persistence, transfer patterns, stopping out, postsecondary attainment, and workforce outcomes of student veterans.  Future research will be necessary to address this gap in the research literature, as well as how veterans perform in those areas.  Third, the small sample size of veterans in the ELS:2002 dataset and the study's research focus did not lend itself for application of higher-level statistical analysis, such as Multilevel Modeling, Path Analysis, or Structural Equation Modeling.  These techniques allow researchers to study differences within and between schools, test theories of causal relationships among a set of variables, or study factor constructs that cannot be fully observed (Agresti & Finlay, 2009; Kim & Bentler, 2006; Raudenbush & Bryk, 2002; Savalei & Bentler, 2006).  Moreover, the small sample size limits the inclusion of measures to examine to only a handful that stood out in the college enrollment and choice literature, as well as its relation to the adapted college choice framework.  Larger sample sizes of veterans will be needed to include more variables using regression-based techniques.  Fourth, the study did not establish whether the participant was an Iraq (OIF), Afghanistan (OEF), or other war veteran.  In a similar manner, the study purposely examined only post-9/11 veterans and not active duty, reserve, or National Guard undergraduates because of the likelihood that they approached higher education with different needs and

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expectations (Molina, 2015; Santos, Esqueda, & Molina, 2015).  Finally, the study relied on

respondents' self-reported data and not on actual DoD or VA records.  Consequently, results

should be interpreted with caution, as official government records did not verify veterans'

responses.  In light of these limitations, this study is the first of its kind that highlights factors

that best predict post-9/11 veterans' college enrollments and choices, which is completely

missing from the research literature.  Moreover, no study to date has used longitudinal, national-

level data to better understand factors that influence their college-going, which is another

significant strength to this study.   Finally, this study begins to provide a college enrollment and

choice framework for future analyses by including measures that lay the foundation for future

work.

**Assumptions**

Several assumptions regarding veterans' enrollment and choice patterns guided the

development of this study.  The study assumed respondents honestly and accurately answered all

interview and survey questions when collected from ELS staff.  An additional assumption was

that there were differences between veterans that did and did not enter college, as well as

differences between the types of institution veterans chose to attend.  Finally, this study made the

critical assumption that factors included in the study were the best predictors of college

enrollment and choice among veterans.

**Chapter Summary**

The purpose of this study was to examine key factors that influence post-9/11 veterans'

college enrollments and choices.  This chapter provided the methods used to address the study's

purpose and research questions.  The chapter began by addressing the research design and the

rationale for using the Education Longitudinal Study of 2002 (ELS:2002).  The chapter then

provided in-depth information about the ELS:2002 sampling strategy, followed by a description

of the sample used in the study and information about how the data were collected and a

discussion of variable selection, which was based on prior college enrollment and choice

research.  A summary of the analytic methods used to answer the research questions was

followed by a brief description of the statistical software.  Finally, this chapter summarized the

delimitations, limitations, and assumptions of this study.

**Chapter 4**

**Results**

**Introduction**

With the rising number of post-9/11 veterans who could potentially enter higher

education, it is crucial to understand what factors contribute to their likelihood of going to

college, particularly into four-year institutions.  Therefore, the purpose of this study is to identify

key factors that explain veterans' likelihood of enrolling in higher education and, for those who

enroll, what factors best explain their enrollment into a two-year or for-profit college relative to a

four-year institution.  The first research question asks: What factors best predict whether a

veteran enters higher education?  The second research question asks: For veterans who do go to

college, what factors best predict whether they enter a two-year or for-profit institution relative

to a four-year institution?

To address the study's research questions, data were analyzed from one of the most

recent, longitudinal datasets on post-9/11 veterans: the Education Longitudinal Study of 2002

(ELS:2002).  In this chapter, the results from the analyses are presented.  The first part of the

chapter provides descriptive statistics that highlight baseline differences between veterans that

did and did not enter higher education, and the type of institution they enrolled in.  Chi-square

tests of independence were used to determine the association between the outcome and

explanatory measures.  The second part of the chapter addresses the first research question

through logistic regression analyses.  Finally, the third section of this chapter presents findings

from multinomial logistic regressions addressing the second research question.  The second and

third sections of this chapter also include an examination of the model fitness between each

measure and in the final aggregate models. The chapter concludes with a summary of the study's key findings.

**Descriptive Statistics**

Before addressing the study's two research questions, descriptive statistics were computed between all dependent and independent variables. The goal was to describe the sample of veterans in the study and to explore relationships among measures of interest. Student descriptive statistics included veterans' demographic characteristics, as well as measures that served as proxies for human/academic capital, cultural capital, social capital, and school context. Given that all independent variables were categorical, chi-square tests for independence was the appropriate technique to use (Franke, Ho, & Christie, 2012). All descriptive statistics included frequencies, percentages, and chi-square statistics (i.e., chi-square value, *p*, Cramer's V, and Fisher's exact test).

Chi-square analyses were performed to examine baseline differences between veterans that did and did not enter college, and the type of institution they were enrolled in. In order to provide an accurate picture of the relationship between measures, the Cramer's V statistic and Fisher's exact test were presented. The Cramer's V is an effect size statistic used to determine the strength of the relationship between categorical variables when one of the predictor or outcome measures has two or more categories (Field, 2009; Pallant, 2010). Most measures in this study have more than two categories. For the few 2-x-2 contingency tables in the study, the Cramer's V value reflects the Phi statistic, which is a commonly used effect size statistic. Therefore, for ease of translation, only Cramer's V value was presented. In addition, the Fisher's exact test was included in the analyses given the small sample size of veterans in the study. It was anticipated that one or more cells presented in the chi-square analyses would have expected

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frequencies of five or less across a number of cross-tabulations. Therefore, Fisher's exact test

was produced (Field, 2009; Pallant, 2010). The "exact" option after the "tabulate" command in

Stata 13 was used to produce the Fisher's exact statistic. The results of all chi-square tests are

presented in the following sections.

**Demographic characteristics.** Demographic characteristics included: gender,

race/ethnicity, and socioeconomic status.

*Gender.* Table 4.1 shows the chi-square results between college enrollment/choice and

gender among veterans. The first set of findings show that there were significant differences in

postsecondary enrollment between males and females. Specifically, a higher percentage of

females (95 percent) had enrolled in college than their male counterparts (84 percent). The

results are statistically significant $\chi^2$ (1, $n$ = 371) = 5.90, $p$ = .02. Results remain significant even

after accounting for Fisher's exact test and the small number of female veterans (n = 4) in the

cell of no postsecondary enrollment, indicating that the differences between gender and college-

going were not due to chance. In addition, the Cramer's V value suggests the strength of this

relationship lies between a small and medium effect.

Table 4.1
*Chi-square Analysis of Postsecondary Enrollment and Gender*

| Gender | Postsecondary Enrollment | | $\chi^2$ | $p$ | Cramer's V | Fisher's Exact Test |
|---|---|---|---|---|---|---|
| | No (%) | Yes (%) | | | | |
| Male | 46 (16) | 247 (84) | | | | |
| Female | 4 (5) | 74 (95) | | | | |
| Total | 50 (13) | 321 (87) | 5.90 | 0.02 | 0.13 | 0.02 |

The second chi-square examined the relationship between gender and institutional choice.

Table 4.2 reveals no statistically significant difference between male and female veterans and

their institutional choice, $\chi^2$ (2, $n$ = 311) = 1.31, $p$ = .52. Forty percent of male and female

veterans indicated having entered a four-year institution by the third follow-up. Although not

statistically different, a slightly larger percentage of females were enrolled in for-profit

institutions relative to their male counterparts.

Table 4
*Chi-square Analysis of Postsecondary Choice and Gender*

| Gender | Postsecondary Choice | | | $\chi^2$ | $p$ | Cramer's V | Fisher's Exact Test |
|---|---|---|---|---|---|---|---|
| | Two Year (%) | For-Profit (%) | Four Year (%) | | | | |
| Male | 91 (38) | 51 (21) | 96 (40) | | | | |
| Female | 24 (33) | 20 (27) | 29 (40) | | | | |
| Total | 115 (37) | 71 (23) | 125 (40) | 1.31 | 0.52 | 0.07 | 0.53 |

***Race/Ethnicity.*** The second set of chi-square results show the association between

college enrollment/choice and race/ethnicity (see Table 4.3). The first chi-square in this analyses

reveals a statistically significant difference between a veteran's race/ethnicity and their

enrollment into college, $\chi^2$ (6, $n$ = 371) = 15.50, $p$ = .02. A lower percentage of veterans who

indicated having a Hispanic (race specified), multiracial, or White background had entered

college compared to veterans who indicated being American Indian/Alaska Native,

Asian/Hawaiian/Pacific Islander, or Black or African American. A Cramer's V value of 0.20

suggests that this relationship is of moderate strength, suggesting that veterans' institutional

enrollment differences by race/ethnicity were substantially important.

Table 4.3
*Chi-square Analysis of Postsecondary Enrollment and Race/Ethnicity*

| Race/Ethnicity | Postsecondary Enrollment | | $\chi^2$ | $p$ | Cramer's V | Fisher's Exact Test |
|---|---|---|---|---|---|---|
| | No (%) | Yes (%) | | | | |
| American Indian/Alaska Native | 0 (0) | 2 (100) | | | | |
| Asian/Hawaiian/Pacific Islander | 1 (5) | 21 (95) | | | | |
| Black or African American | 0 (0) | 52 (100) | | | | |
| Hispanic, no race specified | 1 (5) | 18 (95) | | | | |
| Hispanic, race specified | 6 (18) | 27 (82) | | | | |
| More than one race | 6 (23) | 20 (77) | | | | |
| White | 36 (17) | 181 (83) | | | | |
| Total | 50 (13) | 321 (87) | 15.50 | 0.02 | 0.20 | 0.00 |

The second set of chi-square results show the link between race/ethnicity and college choice. As illustrated in Table 4.4, race/ethnicity is significantly related to where veterans chose to attend higher education, $\chi^2$ (12, $n = 311$) = 21.50, $p = .04$. After accounting for the small cell sizes through Fisher's exact test, however, the findings become statistically insignificant at the .05 alpha level. Nonetheless, results show that a large percentage of Black or African American, Hispanic (race specified), and multiracial veterans enrolled in two-year institution. A higher percentage of American Indian/Alaska Native, and Hispanic (no race specified) were enrolled in for-profit institutions compared to other race/ethnicities. Finally, the chi-square test demonstrates that, compared to other race/ethnicities, a high percentage of Asian/Hawaiian/Pacific Islander, multiracial, and White veterans enrolled in four-year institutions. Results from Cramer's V value of 0.19 shows that the relationship is of moderate effect, indicating that a veteran's race/ethnicity is substantially associated with the institution type in which they chose to enroll.

Table 4.4

*Chi-square Analysis of Postsecondary Choice and Race/Ethnicity*

| Race/Ethnicity | Postsecondary Choice | | | $\chi^2$ | $p$ | Cramer's | Fisher's Exact |
|---|---|---|---|---|---|---|---|
| | Two Year | For-Profit | Four Year | | | | |
| American Indian/Alaska Native | 0 (0) | 2 (100) | 0 (0) | | | | |
| Asian/Hawaiian/Pacific Islander | 6 (29) | 3 (14) | 12 (57) | | | | |
| Black or African American | 18 (36) | 17 (34) | 25 (30) | | | | |
| Hispanic, no race specified | 4 (22) | 8 (44) | 6 (33) | | | | |
| Hispanic, race specified | 11 (41) | 6 (22) | 10 (37) | | | | |
| More than one race | 8 (44) | 2 (11) | 8 (44) | | | | |
| White | 68 (39) | 33 (19) | 74 (42) | | | | |
| Total | 115 (37) | 71 (23) | 125 (40) | 21.50 | 0.04 | 0.19 | 0.09 |

***Socioeconomic Status.*** The third set of chi-square tests examined the association between postsecondary enrollment/choice and socioeconomic status (SES) (see Table 4.5 and Table 4.6).

Results show that the relationship between postsecondary enrollment and SES is not statistically significant, $\chi^2$ (3, $n = 348$) = 4.89, $p = .18$, although the percentage of veterans who entered college increased as their SES increased.

Table 4.5

*Chi-square Analysis of Postsecondary Enrollment and Socioeconomic Status (SES)*

| SES | Postsecondary Enrollment | | $\chi^2$ | $p$ | Cramer's V | Fisher's Exact Test |
|---|---|---|---|---|---|---|
| | No (%) | Yes (%) | | | | |
| Lowest | 15 (20) | 60 (80) | | | | |
| Second | 17 (15) | 100 (85) | | | | |
| Third | 11 (12) | 78 (88) | | | | |
| Highest | 5 (7) | 62 (93) | | | | |
| Total | 48 (14) | 300 (86) | 4.89 | 0.18 | 0.12 | 0.18 |

The second chi-square test of independence shows that the relationship between institutional choice and SES is also not statistically significant at the p = .05 level, $\chi^2$ (6, $n = 290$) = 10.64, $p = .10$. However, Table 4.6 reveals that as SES increased, so did the percentage of veterans who attended four-year institutions. A higher percentage of veterans who came from the lowest and second SES groups were enrolled in for-profit institutions compared to veterans from the third and highest SES groups, although findings are not statistically significant at the .05 alpha level. In terms of attendance at two-year colleges, a higher percentage of veterans from the lowest and third SES groups were enrolled in two-year colleges relative to veterans from the second and highest SES groups. A Cramer's V of 0.14 suggests that this relationship lies between a small to moderate strength size.

Table 4.6

*Chi-square Analysis of Postsecondary Choice and Socioeconomic Status (SES)*

| | Postsecondary Choice | | | | | | |
|---|---|---|---|---|---|---|---|
| SES | Two Year (%) | For-Profit (%) | Four Year (%) | $\chi^2$ | $p$ | Cramer's V | Fisher's Exact Test |
| Lowest | 27 (45) | 15 (25) | 18 (30) | | | | |
| Second | 33 (35) | 26 (27) | 36 (38) | | | | |
| Third | 31 (41) | 13 (17) | 31 (41) | | | | |
| Highest | 17 (28) | 10 (17) | 33 (55) | | | | |
| Total | 108 (37) | 64 (22) | 118 (41) | 10.64 | 0.10 | 0.14 | 0.11 |

**Human/Academic Capital.** The fourth set of chi-square tests examined the association between postsecondary enrollment/choice and the highest math a veteran took while in high school. Table 4.7 shows that the relationship between higher education enrollment and math taken in high school was statistically significant, $\chi^2$ (3, $n$ = 335) = 14.78, $p$ = .00. The chi-square test of independence illustrates that a higher percentage of veterans entered college as increasing levels of math were taken. A Cramer's V of 0.21 suggests that the relationship between veterans' highest level of math taken in high school and postsecondary enrollment is of moderate strength and has substantive implications.

Table 4.7

*Chi-square Analysis of Postsecondary Enrollment and Highest Math Taken in High School*

| | Postsecondary Enrollment | | | | | |
|---|---|---|---|---|---|---|
| Highest Math | No (%) | Yes (%) | $\chi^2$ | $p$ | Cramer's V | Fisher's Exact Test |
| No math course or math course is other, pre-Algebra, General or Consumer Math, or Algebra I | 11 (28) | 29 (72) | | | | |
| Geometry | 14 (21) | 54 (79) | | | | |
| Algebra II | 12 (11) | 98 (89) | | | | |
| Trigonometry, Pre-Calculus, or Calculus | 8 (7) | 109 (93) | | | | |
| Total | 45 (13) | 290 (87) | 14.78 | 0.00 | 0.21 | 0.00 |

Table 4.8 shows that the relationship between veterans' highest math taken in high school and institutional choice is statistically significant, $\chi^2$ (6, $n$ = 283) = 41.20, $p$ = .00, indicating differences were not due to chance. The chi-square test shows that the percentage of veterans

who were enrolled in four-year institutions increased as the level of math taken in high school

increased.  Moreover, the positive relationship between four-year institution attendance and the

level of math course taken is strong.  A Cramer's V value of 0.27 shows that the relationship is

between a medium and large effect size, which is one of the largest effect sizes in this study.

Table 4.8
*Chi-square Analysis of Postsecondary Choice and Highest Math Taken in High School*

| Highest Math | Postsecondary Choice | | | $\chi^2$ | $p$ | Cramer's V | Fisher's Exact Test |
|---|---|---|---|---|---|---|---|
| | Two Year (%) | For-Profit (%) | Four Year (%) | | | | |
| No math course or math course is other, Pre-Algebra, General or Consumer Math, or Algebra I | 10 (37) | 15 (56) | 2 (7) | | | | |
| Geometry | 25 (48) | 14 (27) | 13 (25) | | | | |
| Algebra II | 38 (39) | 20 (21) | 39 (40) | | | | |
| Trigonometry, Pre-Calculus, or Calculus | 30 (28) | 14 (13) | 63 (59) | | | | |
| Total | 103 (37) | 63 (22) | 117 (41) | 41.20 | 0.00 | 0.27 | 0.00 |

**Cultural Capital.** The fifth set of chi-square tests highlighted in Tables 4.9 and 4.10

examined the association between postsecondary enrollment/choice and how much education

veterans expected to get after high school.  Table 4.9 shows that the relationship between

postsecondary enrollment and educational expectations was statistically significant, $\chi^2$ (3, $n$ =

339) = 15.39, $p$ = .00.  A higher percent of veterans who indicated expecting to graduate from

college or obtain a higher-level degree were enrolled in higher education compared to veterans

who indicated they did not know, expected only to graduate HS, earn a GED only, attend some

college, or complete a two-year degree.  A Cramer's V of 0.21 suggests that this relationship is

of small to medium in strength.

Table 4.9

*Chi-square Analysis of Postsecondary Enrollment and How Far in School Student Plans to Get*

| Educational Expectations | Postsecondary Enrollment | | $\chi^2$ | $p$ | Cramer's V | Fisher's Exact Test |
|---|---|---|---|---|---|---|
| | No (%) | Yes (%) | | | | |
| Don't know, HS graduation, or GED only | 15 (18) | 70 (82) | | | | |
| Attend some college or complete 2-year degree | 18 (25) | 55 (75) | | | | |
| Graduate from college | 6 (6) | 93 (94) | | | | |
| Obtain graduate or other advanced degree | 7 (9) | 75 (92) | | | | |
| Total | 46 (14) | 293 (86) | 15.39 | 0.00 | 0.21 | 0.00 |

Table 4.10 reveals that the association between institutional choice and educational expectations is statistically significant, $\chi^2$ (6, $n = 286$) = 26.46, $p = .00$. A higher percentage of veterans who indicated expecting to graduate from college or obtain an advanced degree were in attendance at a four-year institution compared to veterans with lower educational expectations. The strength of this relationship is between small to medium in strength given the Cramer's V value of 0.22. Furthermore, veterans who indicated not knowing or had lower educational expectations in high school were enrolled in higher percentages in two-year institutions relative to veterans who indicated having higher educational plans.

Table 4.10

*Chi-square Analysis of Postsecondary Choice and How Far in School Student Plans to Get*

| Educational Expectations | Postsecondary Choice | | | $\chi^2$ | $p$ | Cramer's V | Fisher's Exact Test |
|---|---|---|---|---|---|---|---|
| | Two Year (%) | For-Profit (%) | Four Year (%) | | | | |
| Don't know, HS graduation, or GED only | 34 (49) | 18 (26) | 17 (25) | | | | |
| Attend some college or complete 2-year degree | 28 (54) | 10 (19) | 14 (27) | | | | |
| Graduate from college | 27 (29) | 19 (21) | 46 (50) | | | | |
| Obtain graduate or other advanced degree | 16 (22) | 16 (22) | 41 (56) | | | | |
| Total | 105 (37) | 63 (22) | 118 (41) | 26.46 | 0.00 | 0.22 | 0.00 |

**Social Capital.** The sixth set of tables highlight the chi-square analyses between postsecondary enrollment/choice and veterans' number of friends who planned to enter a four-year institution. Table 4.11 shows findings were statistically significant, $\chi^2$ (3, $n$ = 333) = 19.28, $p$ = .00, suggesting that differences between college enrollment and the number of friends who planned to enter four-year institutions was not due to chance. The percentage of veterans who enrolled in higher education increased as their number of friends who planned to enter a four-year institution after high school increased. Fisher's exact probability test shows that the relationship holds even after accounting for the zero cell count found in this contingency table. Additionally, the positive relationship illustrated in the cross-tabulation is of moderate strength, as indicated by the Cramer's V of 0.24, which means the relationship has substantive meaning.

Table 4.11

*Chi-square Analysis of Postsecondary Enrollment and Number of Friends Who Plan to Attend a Four-Year College or University*

| Friends' Plans | Postsecondary Enrollment | | $\chi^2$ | $p$ | Cramer's V | Fisher's Exact Test |
|---|---|---|---|---|---|---|
| | No (%) | Yes (%) | | | | |
| None | 7 (29) | 17 (71) | | | | |
| A few | 16 (23) | 53 (77) | | | | |
| Some | 14 (13) | 93 (87) | | | | |
| Most | 7 (6) | 104 (94) | | | | |
| All | 0 (0) | 22 (100) | | | | |
| Total | 44 (13) | 289 (87) | 19.28 | 0.00 | 0.24 | 0.00 |

Table 4.12 shows the chi-square cross-tabulation between institutional choice and veterans' number of friends who planned to enter a four-year institution. The analysis shows that the relationship is not statistically significant at the .05 alpha level, $\chi^2$ (8, $n$ = 282) = 14.94, $p$ = .06. Nonetheless, the analysis illustrates that a higher percentage of veterans were enrolled in four-year institutions if they had "most" or "all" of their friends planning to enter a four-year institution, relative to veterans who had "some" or "fewer" who planned to do so. The Cramer's V of 0.16 indicates that the effect size between institutional choice and number of friends planning to enter a four-year institution is roughly moderate.

Table 4.12

*Chi-square Analysis of Postsecondary Choice and Number of Friends Who Plan to Attend a Four-Year College or University*

| Friends' Plans | Postsecondary Choice | | | $\chi^2$ | $p$ | Cramer's V | Fisher's Exact Test |
|---|---|---|---|---|---|---|---|
| | Two Year (%) | For-Profit (%) | Four Year (%) | | | | |
| None | 8 (50) | 3 (19) | 5 (31) | | | | |
| A few | 22 (43) | 15 (29) | 14 (28) | | | | |
| Some | 37 (41) | 23 (25) | 31 (34) | | | | |
| Most | 30 (29) | 19 (19) | 54 (52) | | | | |
| All | 6 (29) | 3 (14) | 12 (57) | | | | |
| Total | 103 (37) | 63 (22) | 116 (41) | 14.94 | 0.06 | 0.16 | 0.06 |

**School Context.** The seventh and final set of tables (see Tables 4.13 and 4.14) examined the association between postsecondary enrollment/choice and high school urbanicity. Findings

from Table 4.13 show that postsecondary enrollment and school urbanicity are significantly related, $\chi^2$ (2, $n$ = 371) = 10.08, $p$ = .01. Specifically, a higher percentage of veterans from urban high schools had entered college compared to veterans from rural and suburban high schools. In contrast, a higher percentage of veterans from rural high schools had no postsecondary enrollment relative to veterans from urban and suburban high schools. The effect size of 0.17, as indicated by the Cramer's V value, demonstrates that this relationship lies between a small and medium effect.

Table 4.13
*Chi-square Analysis of Postsecondary Enrollment and School Urbanicity*

| Urbanicity | Postsecondary Enrollment | | $\chi^2$ | $p$ | Cramer's V | Fisher's Exact Test |
|---|---|---|---|---|---|---|
| | No (%) | Yes (%) | | | | |
| Urban | 6 (6) | 87 (94) | | | | |
| Suburban | 22 (12) | 155 (88) | | | | |
| Rural | 22 (22) | 79 (78) | | | | |
| Total | 50 (13) | 321 (87) | 10.08 | 0.01 | 0.17 | 0.01 |

The last chi-square analysis illustrates the relationship between veterans' institutional choice and high school urbanicity. The findings of this chi-square analysis shows that there is no statistically significant association between both measures, $\chi^2$ (4, $n$ = 311) = 2.40, $p$ = .66. Although not statistically significant, Table 4.14 shows that a higher percentage of veterans who attended urban and suburban high schools had later enrolled in four-year institutions compared to veterans who went to rural high schools. On the contrary, a higher percentage of veterans who went to rural high schools were enrolled in two-year institutions relative to veterans who went to urban or suburban high schools.

Table 4.14

*Chi-square Analysis of Postsecondary Choice and School Urbanicity*

| Urbanicity | Postsecondary Choice | | | $\chi^2$ | *p* | Cramer's V | Fisher's Exact Test |
|---|---|---|---|---|---|---|---|
| | Two Year (%) | For-Profit (%) | Four Year (%) | | | | |
| Urban | 31 (37) | 20 (24) | 34 (40) | | | | |
| Suburban | 51 (34) | 35 (23) | 65 (43) | | | | |
| Rural | 33 (44) | 16 (21) | 26 (35) | | | | |
| Total | 115 (37) | 71 (23) | 125 (40) | 2.40 | 0.66 | 0.06 | 0.67 |

## Presentation of Logistic Regression Results

The following logistic regression results show the association between postsecondary enrollment and demographic characteristics, human/academic capital, cultural capital, social capital, and school context among post-9/11 veterans. Findings are presented through conceptual blocks specific to each demographic characteristic, form of capital, and school context. The goal of entering variables throughout several models was to test the contribution of each factor on college enrollment independent of other predictor measures. Each results table included the predictor variable, odds ratio, standard error, z-value, p-value, and 95 percent confidence interval for the odds ratio. The results presented in this chapter were not imputed nor weighted. The imputed and weighted results are presented in the Appendix section. The sampling weight used in the weighted analyses includes the third follow-up panel weight for all sample members who responded to the base year and third follow-up (F3BYPNLWT).

## Interpretation of Odds Ratios

Findings for the first research question were reported as odds ratios. Hosmer, Lemeshow, and Sturdivant specified that,

> the odds ratio is widely used as a measure of association as it approximates how much more likely or unlikely (in terms of odds) it is for the outcome to be present among those subjects with $x = 1$ as compared to those subjects with $x = 0$. (2013, p. 52)

The odds ratios throughout the following models represented the change in the odds of going to college relative to not going that is related to a one-unit change in an independent variable of interest, while holding all other variables constant (Tabachnick & Fidell, 2007). An odds ratio of 1 represents an equal chance of occurring for both outcomes (i.e., postsecondary enrollment and non-enrollment), while an odds ratio greater than 1 increases the likelihood of college enrollment and an odds ratio less than 1 decreases the likelihood of college enrollment.

To further illustrate, an odds ratio greater than 1 can be better understood by subtracting the odds ratio by 1 and then multiplying by 100. For instance, if the odds ratio of going to college for females is 1.30, then the odds of going to college increases by 30 percent for female veterans [(1.30 – 1) x 100 = 30 percent]. As another example, an odds ratio of .30 for veterans' college enrollment among those who identified as Latino means that there is a 70 percent decrease in the odds of going to college among Latino veterans [(1 – .30) x 100 = 70 percent]. In addition to highlighting the odds ratios, the following results also noted if the odds ratios are statistically significant at a .05 alpha level.

**Logistic Regression Results**

A logistic regression was performed to assess the impact demographic characteristics had on veterans' likelihood of entering higher education. The demographic variables examined for this study included: gender, race/ethnicity, and socioeconomic status (SES). As shown in Table 4.15, all the demographic measures in the study were statistically significant and contributed to the model as strong predictors of college enrollment. For example, female veterans were nearly four times (OR = 3.67) as likely to have enrolled in higher education than their male counterparts, even after accounting for race/ethnicity and SES. Similarly, veterans from racial/ethnic minority backgrounds were over three times (OR = 3.28) as likely to have entered

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higher education as their White counterparts, after holding all other demographics constant.

Although veterans who identified as multiracial had 36 percent lower odds of going to college,

the findings were not statistically significant at a .05 alpha level.  Finally, even though veterans

from low and middle SES backgrounds were less likely to have gone to college, the likelihood

for low SES veterans was more pronounced and significant.  Low SES veterans were 75 percent

less likely to have entered college compared to high SES veterans after controlling for the other

demographic measures in the model.

Table 4.15
*Summary of Logistic Regression Analysis with Demographic Characteristics Predicting Postsecondary Enrollment*

| Variable (Reference) | Odds Ratio | S.E. | z | p | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| *Demographic Characteristics* | | | | | | |
| Gender (Female) | 3.67 | 2.02 | 2.37 | 0.02 | 1.25 | 10.78 |
| Race/Ethnicity (White) | | | | | | |
| Racial Minority | 3.28 | 1.37 | 2.84 | 0.01 | 1.44 | 7.45 |
| Multiracial | 0.64 | 0.33 | -0.85 | 0.40 | 0.23 | 1.78 |
| SES (High) | | | | | | |
| Low | 0.25 | 0.14 | -2.50 | 0.01 | 0.08 | 0.74 |
| Middle | 0.49 | 0.25 | -1.37 | 0.17 | 0.18 | 1.35 |
| Constant | 2.42 | 1.85 | 1.16 | 0.25 | 0.54 | 10.80 |

The second block of variables examined the impact human/academic capital had on

college enrollment among veterans.  The highest level of math taken in high school served as a

proxy for human/academic capital.  The logistic regression (Table 4.16) shows that veterans who

took no math courses or the lowest levels of math decreased their odds of going to college by 76

percent, a statistically significant finding.  Veterans who took Algebra II in high school increased

their odds of going to college but the results were not significant.  Nonetheless, veterans who

took Algebra II were still less likely to go to college compared to veterans who took higher

levels of math courses in high school.

Table 4.16
*Summary of Logistic Regression Analysis with Highest Math Taken Predicting Postsecondary Enrollment*

| Variable (Reference) | Odds Ratio | S.E. | z | p | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| *Human/Academic Capital* | | | | | | |
| Highest Math (Trigonometry, Pre-Calculus, or Calculus) | | | | | | |
| No math course or math course is other, pre-Algebra, General or Consumer Math, Algebra I, or Geometry | 0.24 | 0.11 | -3.27 | 0.00 | 0.10 | 0.57 |
| Algebra II | 0.60 | 0.29 | -1.07 | 0.28 | 0.24 | 1.53 |
| Constant | 13.63 | 4.99 | 7.13 | 0.00 | 6.65 | 27.93 |

The impact of cultural capital, or educational expectations, on veterans' postsecondary enrollment was assessed in the third block. Findings show that a veteran's educational expectations were significantly related to their likelihood of attending college, as shown in Table 4.17. Compared to veterans expecting to graduate from college or earn an advanced degree, veterans who did not know about their future educational expectations or only sought to earn a high school diploma or GED were 64 percent less likely to attend college. Notably, veterans who indicated expecting to attend some college or earn a two-year degree were even less likely (OR = 0.24) to go to college.

Table 4.17
*Summary of Logistic Regression Analysis with Student Expectations Predicting Postsecondary Enrollment*

| Variable (Reference) | Odds Ratio | S.E. | z | p | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| *Cultural Capital* | | | | | | |
| Student Expectations (Graduate from college, obtain graduate, or other advanced degree) | | | | | | |
| Don't know, HS graduation, or GED only | 0.36 | 0.15 | -2.52 | 0.01 | 0.16 | 0.80 |
| Attend some college or complete 2-year degree | 0.24 | 0.09 | -3.64 | 0.00 | 0.11 | 0.51 |
| Constant | 12.92 | 3.72 | 8.89 | 0.00 | 7.35 | 22.72 |

The fourth block of variables focused on examining the impact social capital had on veterans' postsecondary enrollment. The number of friends planning to attend a four-year

institution served as a substitute for social capital. Results from the logistic regression indicates that having "none" or "a few friends" planning to enter a four-year institution after high school decreased veterans' odds of entering higher education by 83 percent (OR = 0.17). Veterans who had "some" friends planning to enter a four-year institution had a 63 percent decrease (OR = 0.37) in odds of enrolling in higher education, compared to veterans who had "most" or "all" of their friends who planned to enter a four-year institution after high school.

Table 4.18
*Summary of Logistic Regression Analysis with Peer Plans Predicting Postsecondary Enrollment*

| Variable (Reference) | Odds Ratio | S.E. | z | *p* | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| *Social Capital* | | | | | | |
| Friends Planning to Attend 4-Year (Most/All) | | | | | | |
| None/A Few | 0.17 | 0.08 | -3.89 | 0.00 | 0.07 | 0.41 |
| Some | 0.37 | 0.18 | -2.07 | 0.04 | 0.14 | 0.95 |
| Constant | 18.00 | 6.99 | 7.44 | 0.00 | 8.41 | 38.53 |

The final block in the logistic regression specified the impact high school urbanicity had on veterans' odds of entering higher education. Compared to veterans who attended urban high schools, veterans who enrolled in rural high schools were less likely to have enrolled in a postsecondary institution (see Table 4.19). Specifically, findings demonstrate that veterans from rural high schools were 75 percent (OR = 0.25) less likely to enroll in higher education than veterans who went to an urban high school.

Table 4.19
*Summary of Logistic Regression Analysis High School Urbanicity Predicting Postsecondary Enrollment*

| Variable (Reference) | Odds Ratio | S.E. | z | *p* | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| *School Context* | | | | | | |
| HS Urbanicity (Urban) | | | | | | |
| Suburban | 0.49 | 0.23 | -1.50 | 0.13 | 0.19 | 1.24 |
| Rural | 0.25 | 0.12 | -2.87 | 0.00 | 0.10 | 0.64 |
| Constant | 14.50 | 6.12 | 6.34 | 0.00 | 6.34 | 33.16 |

**Factors that Predict Veterans' Postsecondary Enrollment**

Research Question 1: What factors best predict whether a veteran enrolls in higher education?

To address the study's first research question, I used a logistic regression to analyze all the predictor variables on postsecondary enrollment for post-9/11 veterans. I controlled for a number of factors from the research literature that were related to college enrollment and that were also statistically associated with this study's outcome of interests (i.e. postsecondary enrollment and institutional choice). Factors included in the final aggregate logistic regression analyses were: gender, race/ethnicity, socioeconomic status (demographic characteristics), highest level of math taken by the end of high school (human/academic capital), educational expectations (cultural capital), number of friends planning to enter a four-year institution (social capital), and high school urbanicity (school context).

Table 4.20 presents the odds ratio from the logistic regression. The first block of measures highlights the demographic characteristics of veterans in the sample, which include gender, race/ethnicity, and SES. After controlling for human/academic, cultural, and social capital, as well as high school context, no demographic characteristics were found to be statistically significant factors of college enrollment among veterans. Although female veterans had a 2.2 increase in the odds of entering a postsecondary school, the findings were not significant at the .05 alpha level. Racial/ethnic minority veterans (Asian, Black, Hispanic, and Native American) were 1.8 times more likely to enter college than their White counterparts, yet findings were also not significant. While multiracial veterans were almost 30 percent less likely to have had any postsecondary education, the findings were not significant when compared to their White counterparts. In addition, there were no significant SES findings as it relates to having entered any postsecondary institution once other factors are accounted for.

The second block included veterans' human/academic capital factor: the highest level of math taken during their senior year of high school. Remarkably, this measure was not a significant factor once other forms of capital, demographic characteristics, and high school context were controlled for. Nonetheless, results show that veterans with no math or low levels of math taken in high school had lower odds of enrolling in a postsecondary institution relative to other veterans who had taken Trigonometry, Pre-Calculus, or Calculus in high school.

Cultural capital was measured in the third block of the logistic regression. The measure, higher education expectations, was a significant predictor of postsecondary enrollment once all the other measures were controlled for. For veterans who expected to enroll in some college or earn a two-year degree, their likelihood of going to college decreased by 60 percent (OR = 0.40) compared to veterans who expected to graduate from college or earn an advanced degree, even after accounting for other measures in the aggregate model. Not knowing about future education plans, planning on graduating from high school, or earning a GED decreased veterans' odds of enrolling in higher education, but findings were not significant.

The fourth block in the logistic regression highlights the impact social capital had on veterans' college attendance. The number of friends planning to attend a four-year institution served as a proxy for social capital. Veterans who had "none" or "a few" friends who planned to attend a four-year institution had over a 70 percent decrease in odds (OR = 0.27) of going to college after high school compared to veterans who had "most" or "all" friends planning to enter a four-year institution. Veterans who had "some" friends in high school who were planning to attend a four-year institution were also less likely (OR = 0.60) to have postsecondary enrollment, although the finding was not significantly different relative to those that had "most" or "all" friends planning to enter a four-year institution.

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Finally, the last block in the logistic regression analysis showed the effect high school urbanicity had on veterans' postsecondary enrollment. Even though high school urbanicity alone is a significant factor that predicts college enrollment among veterans, the measure loses significance once other factors are accounted for.

Table 4.20
*Summary of Full Logistic Regression Analysis Predicting Postsecondary Enrollment*

| Variable (Reference) | Odds Ratio | S.E. | z | p | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| *Demographic Characteristics* | | | | | | |
| Gender (Female) | 2.20 | 1.28 | 1.36 | 0.18 | 0.70 | 6.88 |
| Race/Ethnicity (White) | | | | | | |
| Racial Minority | 1.81 | 0.88 | 1.23 | 0.22 | 0.70 | 4.68 |
| Multiracial | 0.73 | 0.44 | -0.51 | 0.61 | 0.22 | 2.41 |
| SES (High) | | | | | | |
| Low | 0.59 | 0.39 | -0.80 | 0.43 | 0.16 | 2.15 |
| Middle | 0.70 | 0.42 | -0.59 | 0.56 | 0.22 | 2.28 |
| | | | | | | |
| *Human/Academic Capital* | | | | | | |
| Highest Math (Trigonometry, Pre-Calculus, or Calculus) | | | | | | |
| No math course or math course is other, Pre-Algebra, General or Consumer Math, Algebra I, or Geometry | 0.49 | 0.25 | -1.42 | 0.16 | 0.18 | 1.31 |
| Algebra II | 0.70 | 0.37 | -0.68 | 0.50 | 0.25 | 1.95 |
| | | | | | | |
| *Cultural Capital* | | | | | | |
| Student Expectations (Graduate from college, obtain graduate, or other advanced degree) | | | | | | |
| Don't know, HS graduation, or GED only | 0.60 | 0.28 | -1.07 | 0.29 | 0.24 | 1.52 |
| Attend some college or complete 2-year degree | 0.40 | 0.18 | -2.01 | 0.04 | 0.17 | 0.98 |
| | | | | | | |
| *Social Capital* | | | | | | |
| Friends Planning to Attend 4-Year (Most/All) | | | | | | |
| None/A Few | 0.27 | 0.13 | -2.63 | 0.01 | 0.10 | 0.72 |
| Some | 0.60 | 0.31 | -0.97 | 0.33 | 0.22 | 1.68 |
| | | | | | | |
| *School Context* | | | | | | |
| HS Urbanicity (Urban) | | | | | | |
| Suburban | 0.92 | 0.50 | -0.16 | 0.87 | 0.31 | 2.67 |
| Rural | 0.52 | 0.30 | -1.14 | 0.25 | 0.17 | 1.60 |
| Constant | 18.90 | 20.01 | 2.78 | 0.01 | 2.37 | 150.54 |

**Assessing and Comparing Model Fitness for Postsecondary Enrollment**

In order to assess the overall fit of each model to other models (non-nested) and to the final aggregate model (nested), McFadden's $R^2$, Akaike's Information Criterion (AIC), and Bayesian Information Criterion (BIC) were examined. It is important to note that several pseudo $R^2$ statistics exist for logistic regressions, which are also produced in Stata. However, pseudo $R^2$ measures are not interpreted in the same way that the $R^2$ measures are in OLS regression, where $R^2$ is the percentage of observed responses that is explained by a linear model. This is the case because logistic regression models are fitted using the maximum likelihood method, or estimating parameters that are most likely to generate the observed data for categorical outcome measures (Hosmer, Lemeshow, & Sturdivant, 2013). Instead, McFadden's pseudo $R^2$, also known as the likelihood-ratio index, served as a useful measure to compare this study's nested and non-nested models.

Since pseudo $R^2$ measures are only suitable for comparing nested models, other information indices must be used to assess model fit among independent, non-nested models. Therefore, the model information measures Akaike's Information Criterion (AIC) and Bayesian Information Criterion (BIC), two measures commonly used to compare non-nested, maximum likelihood models, showed how well the data fit each model independently (Long & Freese, 2006). The comparison of each non-nested model using AIC and BIC allowed for the comparison between demographic characteristics, different forms of capital, and school context, whereas McFadden's $R^2$ allowed for comparison between each model independently against the final aggregate model. As suggested by Long and Freese (2006), a smaller AIC or BIC statistic denotes that, all else being equal, the model is a better fit and would more likely have generated the observed data.

The five models and final aggregate model shown in Table 4.21 indicate how well each set of measures fit the data on postsecondary enrollment among veterans. The table includes McFadden's $R^2$, as well as the AIC and BIC values, for each nested and non-nested comparison. Results demonstrate that the full model had a McFadden's $R^2$ value of 0.16, which would be expected given the addition of more parameters in the final model. In comparison to each of the other nested models, the final aggregate model seems to better maximize the likelihood of the observed data once all parameters are included.

The goodness of fit indices AIC and BIC show which non-nested models fit the data better. The lower AIC value in the final aggregate model shows that the inclusion of demographic characteristics, human/academic capital, cultural capital, social capital, and school context fit the data significantly better than each model separately. Specifically, the AIC value of 242.45 in the final aggregate model suggests that, while comparing each non-nested models, the inclusion of all the variables best point to the data being more likely to be the true model. With regards to model selection using BIC as a criterion, the social capital construct (BIC = 259.34) fit the data much better than the other models, including the final aggregate model. The difference in agreement between AIC and BIC values may be attributed to the fact that BIC penalizes model complexity more than AIC. However, the five-point difference in AIC values between the social capital factor and the final model is not large, which provides additional support for the social capital model. Using AIC and BIC as measures to compare maximum likelihood models, the results indicate that social capital is one of the best predictors for postsecondary enrollment.

Table 4.21

*Summary of Goodness of Fit Indices for Postsecondary Enrollment*

| Model | Measure of Fit | | |
|---|---|---|---|
| | McFadden's $R^2$ | AIC | BIC |
| Demographic Characteristics | 0.08 | 280.73 | 304.21 |
| Human/Academic Capital | 0.05 | 257.04 | 268.48 |
| Cultural Capital | 0.06 | 260.28 | 271.76 |
| Social Capital | 0.07 | 247.91 | 259.34 |
| School Context | 0.03 | 289.25 | 301.01 |
| Full Logistic Regression | 0.16 | 242.45 | 295.59 |

When highlighted independently from other models, the social capital model suggests that veterans who had few friends planning to enter a four-year institution decreased their likelihood of entering higher education. For example, veterans who had "none" or "a few" friends planning to enter a four-year institution experienced over an 80 percent decrease in odds of going to college while veterans who had "some" friends planning to enter a four-year institution had over a 60 percent decrease in likelihood of enrolling in higher education. These odds ratios are in comparison to veterans who had "most" or "all" of their friends who planned to enter a four-year institution after high school.

**Presentation of Multinomial Logistic Regression Results**

The following multinomial logistic regression analyses show the association between college choice and demographic characteristics, human/academic capital, cultural capital, social capital, and school context among post-9/11 veterans. Findings are presented through several conceptual blocks based on an adaptation of Perna's (2006) college choice framework. Variables were entered through independent constructs with the goal of examining the contribution of each measure on veterans' college choices. Each results table included the predictor variable, relative risk ratio (RRR), standard error, z-value, p-value, and 95 percent confidence interval for the RRR. The results presented in this chapter were not imputed nor

weighted. The imputed and weighted results are presented in the Appendix section. The

sampling weight used in the weighted analyses includes the third follow-up panel weight for all

sample members who responded to the base year and third follow-up (F3BYPNLWT).

**Interpretation of Relative Risk Ratios**

Findings for the second research question are reported as relative risk ratios (RRR).

Similar to an odds ratio, the RRR measures the probability that an individual experienced the

outcome relative to the probability that another person experienced the outcome, which in this

section of the study, specifies the probability of choosing one institution type relative to another.

The RRR throughout each of the following models demonstrated whether an association exists

between enrolling in a two-year or for-profit institution relative to a four-year institution. A

relative risk ratio of 1 suggests that there was no difference between veterans who chose a two-

year or for-profit institution relative to veterans that chose to attend a four-year institution.

Relative risk ratios greater than 1 indicate a positive association, while relative risk ratios less

than 1 indicate a negative association.

**Multinomial Logistic Regression Results**

The first multinomial logistic regression examined the association between veterans'

demographic characteristics and their institutional choice. Demographic characteristics included

gender, race/ethnicity, and SES. As illustrated in Table 4.22, only SES was found to be

statistically significant. Specifically, veterans from low SES compared to those from high SES

were 3.5 times (RRR = 3.48) more likely to have entered a two-year relative to a four-year

institution. Similarly, veterans from middle SES backgrounds, compared to veterans from high

SES backgrounds, were over twice (RRR = 2.15) as likely to have enrolled in a two-year college

relative to a four-year institution. Although the results were not statistically significant at the

0.05 alpha level, racial/ethnic minorities were at increased risk (RRR = 1.75) of entering a for-

profit relative to entering a four-year institution at a .10 alpha level.

Table 4.22
*Summary of Multinomial Logistic Regression Analysis with Demographic Characteristics Predicting Postsecondary*
*Choice Relative to Enrollment at Four-Year Institution*

| | Variable | RRR | S.E. | z | p | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|
| Two-Year Institution | *Demographic Characteristics* | | | | | Lower | Upper |
| | Gender (Female) | 0.81 | 0.26 | -0.66 | 0.51 | 0.43 | 1.51 |
| | Race/Ethnicity (White) | | | | | | |
| | Racial Minority | 0.91 | 0.26 | -0.33 | 0.74 | 0.52 | 1.59 |
| | Multiracial | 1.17 | 0.63 | 0.29 | 0.77 | 0.41 | 3.35 |
| | SES (High) | | | | | | |
| | Low | 3.48 | 1.50 | 2.89 | 0.00 | 1.50 | 8.12 |
| | Middle | 2.15 | 0.77 | 2.16 | 0.03 | 1.07 | 4.32 |
| | Constant | 0.48 | 0.16 | -2.25 | 0.02 | 0.25 | 0.91 |
| For-Profit Institution | *Demographic Characteristics* | | | | | | |
| | Gender (Female) | 1.20 | 0.41 | 0.52 | 0.60 | 0.61 | 2.35 |
| | Race/Ethnicity (White) | | | | | | |
| | Racial Minority | 1.76 | 0.55 | 1.81 | 0.07 | 0.95 | 3.24 |
| | Multiracial | 0.58 | 0.47 | -0.67 | 0.50 | 0.12 | 2.88 |
| | SES (High) | | | | | | |
| | Low | 1.99 | 0.96 | 1.43 | 0.15 | 0.77 | 5.10 |
| | Middle | 1.49 | 0.59 | 1.01 | 0.31 | 0.69 | 3.22 |
| | Constant | 0.30 | 0.11 | -3.25 | 0.00 | 0.15 | 0.62 |

The second block of measures investigated whether human/academic capital had an

impact on veterans' college choice. This analysis examined the highest level of math taken in

high school. Table 4.23 shows that taking lower levels of math in high school increased the risk

of entering a two-year or for-profit institution compared to enrolling in a four-year institution.

To illustrate, veterans who took no math course or math courses below Geometry were nearly 5

times (RRR = 4.90) more likely to have entered a two-year institution compared to veterans who

took Trigonometry courses or higher.   Veterans had a nearly 800 percent (RRR = 8.70)

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increased risk of entering a for-profit institution relative to a four-year institution if they took no math or low math courses in high school compared to veterans who took the highest levels of math. Lastly, veterans who took Algebra II compared to those that took higher levels of math were twice as likely to have attended a two-year (RRR = 2.05) or for-profit (RRR = 2.31) institution relative to entering a four-year institution.

Table 4.23

*Summary of Multinomial Logistic Regression Analysis with Highest Math Taken Predicting Postsecondary Choice Relative to Enrollment at Four-Year Institution*

| | Variable | RRR | S.E. | z | *p* | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|
| | | | | | | Lower | Upper |
| Two-Year Institution | *Human/Academic Capital* | | | | | | |
| | Highest Math (Trigonometry, Pre-Calculus, or Calculus) No math course or math course is other, Pre-Algebra, General or Consumer Math, Algebra I, or Geometry | 4.90 | 1.86 | 4.18 | 0.00 | 2.33 | 10.32 |
| | Algebra II | 2.05 | 0.65 | 2.25 | 0.02 | 1.10 | 3.82 |
| | Constant | 0.48 | 0.11 | -3.34 | 0.00 | 0.31 | 0.74 |
| For-Profit Institution | *Human/Academic Capital* | | | | | | |
| | Highest Math (Trigonometry, Pre-Calculus, or Calculus) No math course or math course is other, Pre-Algebra, General or Consumer Math, Algebra I, or Geometry | 8.70 | 3.78 | 4.98 | 0.00 | 3.72 | 20.37 |
| | Algebra II | 2.31 | 0.93 | 2.07 | 0.04 | 1.05 | 5.09 |
| | Constant | 0.22 | 0.07 | -5.09 | 0.00 | 0.12 | 0.40 |

The impact of cultural capital on postsecondary choice was examined in the third multinomial logistic regression. Student educational expectations after high school served as a proxy for cultural capital and the analysis shows that the factor was related to college choice. As illustrated in Table 4.24, veterans who expected to graduate high school (RRR = 4.05) or complete a two-year degree or less (RRR = 4.05), compared to veterans who expected to

graduate from college or earn a higher degree, were at four times increased risk of entering a

two-year institution compared to going to a four-year institution.  In addition, veterans who had

the lowest educational expectations, compared to those with the highest, were over 160 percent

(RRR = 2.63) more likely to have entered a for-profit institution versus a four-year institution.

Table 4.24
*Summary of Multinomial Logistic Regression Analysis with Student Expectations Predicting Postsecondary Choice Relative to Enrollment at Four-Year Institution*

| | Variable | RRR | S.E. | z | p | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|
| Two-Year Institution | *Cultural Capital* | | | | | Lower | Upper |
| | Student Expectations (Graduate from college, obtain graduate, or other advanced degree) | | | | | | |
| | Don't know, HS graduation, or GED only | 4.05 | 1.42 | 3.99 | 0.00 | 2.04 | 8.05 |
| | Attend some college or complete 2-year degree | 4.05 | 1.52 | 3.71 | 0.00 | 1.93 | 8.47 |
| | Constant | 0.49 | 0.09 | -3.78 | 0.00 | 0.34 | 0.71 |
| For-Profit Institution | *Cultural Capital* | | | | | | |
| | Student Expectations (Graduate from college, obtain graduate, or other advanced degree) | | | | | | |
| | Don't know, HS graduation, or GED only | 2.63 | 1.03 | 2.46 | 0.01 | 1.22 | 5.69 |
| | Attend some college or complete 2-year degree | 1.78 | 0.82 | 1.25 | 0.21 | 0.72 | 4.37 |
| | Constant | 0.40 | 0.08 | -4.55 | 0.00 | 0.27 | 0.60 |

The fourth multinomial logistic regression analysis examined the effect of social capital

on veterans' institutional choice.  Social capital was defined as the proportion of veterans'

friends who planned to attend a four-year institution.  All comparisons were statistically

significant in this analysis.  First, veterans who had "none" or a "few," compared to veterans

who had "most" or "all" friends planning to attend a four-year institution, were nearly three

times at increased risk of enrolling in a two-year (RRR = 2.89) or for-profit (RRR = 2.84)

institution relative to a four-year institution.  Second, veterans who had "some" friends who

expected to enter a four-year institution, compared to veterans who had "most" or "all" friends,

were about 120 percent at increased risk of enrolling in a two-year (RRR = 2.19) or for-profit

(RRR = 2.23) institution relative to a four-year institution.

Table 4.25
*Summary of Multinomial Logistic Regression Analysis with Peer Plans Predicting Postsecondary Choice Relative to Enrollment at Four-Year Institution*

| | Variable | RRR | S.E. | z | p | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|
| | | | | | | Lower | Upper |
| Two-Year Institution | *Social Capital* | | | | | | |
| | Friends Planning to Attend 4-Year (Most/All) | | | | | | |
| | None/A Few | 2.89 | 1.04 | 2.96 | 0.00 | 1.43 | 5.85 |
| | Some | 2.19 | 0.70 | 2.45 | 0.01 | 1.17 | 4.09 |
| | Constant | 0.55 | 0.11 | -2.93 | 0.00 | 0.36 | 0.82 |
| For-Profit Institution | *Social Capital* | | | | | | |
| | Friends Planning to Attend 4-Year (Most/All) | | | | | | |
| | None/A Few | 2.84 | 1.17 | 2.54 | 0.01 | 1.27 | 6.36 |
| | Some | 2.23 | 0.82 | 2.17 | 0.03 | 1.08 | 4.59 |
| | Constant | 0.33 | 0.08 | -4.46 | 0.00 | 0.21 | 0.54 |

The final multinomial logistic regression explored the relationship between school

context and postsecondary choice. High school urbanicity represented school context and was

found to not be statistically significant. Nonetheless, veterans from suburban high schools,

compared to veterans from urban high schools, were at slightly less risk of entering a two-year

(RRR = 0.86) or for-profit (RRR = 0.92) institution relative to attending a four-year institution.

In contrast, veterans from rural high schools, compared to those from urban high schools, were at

39 percent (RRR = 1.39) and 5 percent (RRR = 0.05) increased risk of enrolling in a two-year

and for-profit institution, respectively, relative to attending a four-year institution.

Table 4.26
*Summary of Multinomial Logistic Regression Analysis with High School Urbanicity Predicting Postsecondary*
*Choice Relative to Enrollment at Four-Year Institution*

|  | Variable | RRR | S.E. | z | *p* | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  | Lower | Upper |
| Two-Year Institution | *School Context* |  |  |  |  |  |  |
|  | HS Urbanicity (Urban) |  |  |  |  |  |  |
|  | Suburban | 0.86 | 0.27 | -0.48 | 0.63 | 0.47 | 1.58 |
|  | Rural | 1.39 | 0.50 | 0.92 | 0.36 | 0.69 | 2.83 |
|  | Constant | 0.91 | 0.23 | -0.37 | 0.71 | 0.56 | 1.48 |
| For-Profit Institution | *School Context* |  |  |  |  |  |  |
|  | HS Urbanicity (Urban) |  |  |  |  |  |  |
|  | Suburban | 0.92 | 0.32 | -0.25 | 0.80 | 0.46 | 1.82 |
|  | Rural | 1.05 | 0.44 | 0.11 | 0.92 | 0.46 | 2.40 |
|  | Constant | 0.59 | 0.17 | -1.88 | 0.06 | 0.34 | 1.02 |

## Factors That Predict Veterans' Postsecondary Choice

Research Question 2: For veterans who enroll, what factors best predict whether they enter a

two-year or for-profit institution compared to a four-year institution?

In the final analysis, I conducted a multinomial logistic regression to answer the study's

second research question, which sought to assess factors that significantly predicted the type of

institution veterans chose to attend. Similar to the logistic regression analyses in the earlier

section, the results presented in this chapter are not weighted or imputed. The weighted and

imputed results are presented in this study's Appendix. Out of the total number of veterans (n =

371) in the ELS:2002 study, a total of 311 veterans had entered a postsecondary institution by

the third follow-up (2012). However, because of missing responses, only 279 were analyzed in

the final model. In addition to dividing the results by veterans' demographics, forms of capital,

and high school context, Table 4.26 also divides the results into two groups by institution

enrolled, that is, two-year or for-profit institutions. Furthermore, the relative risk ratios, standard

errors, z-value, p-value, and 95 percent confidence interval for the RRR are presented by each type of institution attended.

**Two-year vs. four-year institutional choice.**  The first block in the first comparison group – two-year versus four-year institutions – shows the findings for demographic characteristics, human/academic capital, cultural capital, social capital, and school context. Table 4.27 shows that female veterans, when compared to male veterans, did not show differences in enrollment into two-year institutions.  Moreover, racial/ethnic minorities or multiracial veterans compared to White veterans did not differ with regards to enrollment into two-year versus four-year institutions.  Lastly, SES is no longer a significant factor when choosing a college to attend among veterans.

Human/academic capital was measured as the highest level of math achieved in high school.  Even after accounting for other factors in the final aggregate model, highest math taken continued to be a strong predictor of enrollment into a two-year institution relative to enrollment into a four-year institution.  The risk of going to a two-year institution, relative to a four-year institution, among veterans who had no math course, math course is other, pre-Algebra, general math, Algebra I, or Geometry as the highest level of math during high school significantly increased (RRR = 2.61), compared to veterans who had taken higher levels of math (i.e., Trigonometry, Pre-Calculus, or Calculus).  Even though veterans who took Algebra II as the highest level of math in high school had a 50 percent higher risk (RRR = 1.48) of entering a two-year college relative to a four-year institution, the differences were not significantly different compared to veterans who took higher levels of math.

Table 4.27 shows that veterans' cultural capital, or educational expectations, was one of the strongest predictors of two-year college attendance.  Veterans who did not know how far they

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would get in school, planned to graduate high school, or earn a GED were nearly three times (RRR = 2.65) as likely to enter a two-year institution compared to veterans who expected to graduate from college or get a higher-level degree. Additionally, veterans who planned to attend college or complete a one- or two-year program at a community college or vocational school also had a nearly three times increase in their risk (RRR = 2.71) of entering a two-year college relative to enrollment at a four-year institution.

Social capital was a measure of the proportion of a veteran's friends who planned to attend a four-year institution. Respondents who had "none" or "a few" friends planning to enter a four-year institution were more likely (RRR = 1.79) to enter a two-year college compared to those with "most" or "all" friends who wanted to enter a four-year institution. However, those veterans were not found to be significantly different in comparison with veterans who had "most" or "all" friends planning to attend a four-year institution.

Finally, high school urbanicity was found to not have a significant influence on type of institution veterans enrolled. Veterans who went to rural high schools were not more or less likely to have entered a two-year college compared to veterans who attended urban high schools. However, veterans from suburban high schools had a roughly 35 percent (RRR = 0.64) decrease in risk of entering a two-year college compared to veterans from urban high schools, although the difference was not statistically significant.

**For-profit vs. four-year institutional choice.** The second block compared veterans' choices between for-profit and four-year institutions. No demographic characteristics were found to be significant predictors between veterans' choice of attending a for-profit relative to a four-year institution. Nonetheless, veterans from racial/ethnic minority backgrounds, compared

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to White veterans, were at twice the risk (RRR = 2.06) of enrolling in a for-profit institution, although findings were only significant at a 0.10 alpha level.

Table 4.27 shows the affect human/academic capital had on veterans' college enrollment choices. Specifically, the risk of attending a for-profit institution significantly increased (RRR = 7.65) for veterans who had no math course, math course was other, pre-Algebra, general math, Algebra I, or Geometry as the highest level of math in high school, compared to veterans who had taken higher levels of math (i.e., Trigonometry, Pre-Calculus, or Calculus). In other words, veterans with low math coursework completion in high school had a 665 percent higher risk of going into a for-profit institution versus a four-year institution compared to veterans who took Trigonometry, Pre-Calculus, or Calculus. Although the finding was not statistically significant, veterans who had taken Algebra II as the highest level of math in high school were twice (RRR = 1.95) as likely to have entered a for-profit institution compared to veterans who had taken higher levels of math, controlling for other factors in the final model. In the final analysis, the inclusion of cultural and social capital, as well as school context, in the second comparison group showed no other significant factors related to choosing a for-profit institution relative to a four-year institution.

Table 4.27

*Summary of Full Multinomial Logistic Regression Analysis Predicting Postsecondary Choice Relative to Enrollment at Four-Year Institution*

| | Variable | RRR | S.E. | z | p | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|
| Two-Year Institution | *Demographic Characteristics* | | | | | Lower | Upper |
| | Gender (Female) | 0.90 | 0.34 | -0.27 | 0.79 | 0.43 | 1.88 |
| | Race/Ethnicity (White) | | | | | | |
| |   Racial Minority | 1.02 | 0.36 | 0.04 | 0.97 | 0.51 | 2.02 |
| |   Multiracial | 0.91 | 0.56 | -0.15 | 0.88 | 0.27 | 3.03 |
| | SES (High) | | | | | | |
| |   Low | 1.89 | 0.91 | 1.31 | 0.19 | 0.73 | 4.87 |
| |   Middle | 1.43 | 0.56 | 0.91 | 0.36 | 0.66 | 3.08 |
| | *Human/Academic Capital* | | | | | | |
| | Highest Math (Trigonometry, Pre-Calculus, or Calculus) | | | | | | |
| |   No math course or math course is other, Pre-Algebra, General or Consumer Math, Algebra I, or Geometry | 2.61 | 1.11 | 2.26 | 0.02 | 1.14 | 6.00 |
| |   Algebra II | 1.48 | 0.51 | 1.14 | 0.25 | 0.75 | 2.91 |
| | *Cultural Capital* | | | | | | |
| | Student Expectations (Graduate from college, obtain graduate, or other advanced degree) | | | | | | |
| |   Don't know, HS graduation, or GED only | 2.65 | 1.02 | 2.54 | 0.01 | 1.25 | 5.62 |
| |   Attend some college or complete 2-year degree | 2.71 | 1.11 | 2.43 | 0.02 | 1.21 | 6.06 |
| | *Social Capital* | | | | | | |
| | Friends Planning to Attend 4-Year (Most/All) | | | | | | |
| |   None/A Few | 1.80 | 0.72 | 1.46 | 0.15 | 0.82 | 3.95 |
| |   Some | 1.50 | 0.54 | 1.14 | 0.25 | 0.75 | 3.03 |
| | *School Context* | | | | | | |
| | HS Urbanicity (Urban) | | | | | | |
| |   Suburban | 0.64 | 0.23 | -1.21 | 0.23 | 0.32 | 1.31 |
| |   Rural | 1.03 | 0.46 | 0.06 | 0.95 | 0.43 | 2.47 |
| | Constant | 0.28 | 0.14 | -2.61 | 0.01 | 0.11 | 0.73 |
| For-Profit Institution | *Demographic Characteristics* | | | | | | |
| | Gender (Female) | 1.74 | 0.71 | 1.36 | 0.17 | 0.78 | 3.87 |
| | Race/Ethnicity (White) | | | | | | |
| |   Racial Minority | 2.06 | 0.79 | 1.87 | 0.06 | 0.97 | 4.38 |

Table 4.27 (continued)

*Summary of Multinomial Logistic Regression Analysis Predicting Postsecondary Choice Relative to Enrollment at Four-Year Institution*

| Variable | RRR | S.E. | z | p | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| Multiracial | 0.50 | 0.44 | -0.79 | 0.43 | 0.09 | 2.79 |
| SES (High) | | | | | | |
| Low | 1.16 | 0.65 | 0.27 | 0.79 | 0.39 | 3.49 |
| Middle | 1.03 | 0.47 | 0.05 | 0.96 | 0.42 | 2.53 |
| *Human/Academic Capital* | | | | | | |
| Highest Math (Trigonometry, Pre-Calculus, or Calculus) | | | | | | |
| No math course or math course is other, Pre-Algebra, General or Consumer Math, Algebra I, or Geometry | 7.65 | 3.67 | 4.24 | 0.00 | 2.99 | 19.59 |
| Algebra II | 1.96 | 0.84 | 1.57 | 0.12 | 0.85 | 4.53 |
| *Cultural Capital* | | | | | | |
| Student Expectations (Graduate from college, obtain graduate, or other advanced degree) | | | | | | |
| Don't know, HS graduation, or GED only | 1.58 | 0.70 | 1.04 | 0.30 | 0.67 | 3.77 |
| Attend some college or complete 2-year degree | 1.19 | 0.61 | 0.35 | 0.73 | 0.44 | 3.26 |
| *Social Capital* | | | | | | |
| Friends Planning to Attend 4-Year (Most/All) | | | | | | |
| None/A Few | 1.90 | 0.87 | 1.39 | 0.16 | 0.77 | 4.67 |
| Some | 1.68 | 0.69 | 1.26 | 0.21 | 0.75 | 3.76 |
| *School Context* | | | | | | |
| HS Urbanicity (Urban) | | | | | | |
| Suburban | 0.77 | 0.32 | -0.63 | 0.53 | 0.34 | 1.75 |
| Rural | 0.97 | 0.51 | -0.06 | 0.95 | 0.34 | 2.73 |
| Constant | 0.12 | 0.07 | -3.56 | 0.00 | 0.04 | 0.38 |

## Assessing and Comparing Model Fitness for Postsecondary Choice

In order to assess the overall fit of each model to other models (non-nested) and to the

final aggregate model (nested), McFadden's $R^2$, Akaike's Information Criterion (AIC), and

Bayesian Information Criterion (BIC) were examined. It is important to note that several pseudo $R^2$ statistics exists for logistic regressions and are produced in Stata. However, pseudo $R^2$ measures are not interpreted in the same way that the $R^2$ is in OLS regression, where $R^2$ is the percentage of observed responses that is explained by a linear model. This is the case because logistic regression models are fitted using the maximum likelihood method, or estimating parameters that are most likely to generate the observed data for categorical outcome measures (Hosmer, Lemeshow, & Sturdivant, 2013). Instead, McFadden's pseudo $R^2$, also known as the likelihood-ratio index, is a useful measure was used to compare this study's nested and non-nested models. A McFadden's $R^2$ value between 0.2 and 0.4 indicates good model fit.

Since pseudo $R^2$ measures are only suitable for comparing nested models, other information indices must be used to assess model fit among independent, non-nested models. Therefore, the model information measures Akaike's Information Criterion (AIC) and Bayesian Information Criterion (BIC), two measures commonly used to compare non-nested, maximum likelihood models, showed how well the data fit each model independently (Long & Freese, 2006). The comparison of each non-nested model using AIC and BIC allowed for the comparison between the demographic characteristics, different forms of capital, and school context models, whereas McFadden's $R^2$ allowed for comparison between each non-nested model against the final aggregate model. As suggested by Long and Freese (2006), smaller AIC and BIC statistics denote that, all else being equal, the model is a better fit and would more likely have generated the observed data.

Table 4.28 shows how well the five models and final aggregate model fit the data on veterans' postsecondary choice. The table presents McFadden's $R^2$, as well as the AIC and BIC values, for each nested and non-nested comparison. Results demonstrate that the full model had

a McFadden's $R^2$ value of 0.11, which would be expected given the addition of more parameters in the final model. In comparison to each of the other nested models, the final aggregate model seems to better maximize the likelihood of the observed data once all parameters are included.

The goodness of fit indices AIC and BIC show which non-nested models better fit the data. The AIC value in the human/academic capital model shows that this factor fit the data significantly better than each model separately, including the final aggregate model. Specifically, the AIC value of 582.39 in the human/academic capital model suggest that, while comparing each non-nested models, the inclusion of highest math course taken best point to the data being more likely to be the true model. With regards to model selection using BIC as a criterion, human/academic capital (BIC = 604.26) continues to fit the data much better than the other models, including the final collective model. Using AIC and BIC as measures to compare maximum likelihood models, findings indicate the level of math courses taken in high school provided one of the best fits for postsecondary choice.

Table 4.28

*Summary of Goodness of Fit Indices for Postsecondary Choice*

| Model | Measure of Fit | | |
| --- | --- | --- | --- |
| | McFadden's $R^2$ | AIC | BIC |
| Demographic Characteristics | 0.03 | 671.47 | 716.31 |
| Human/Academic Capital | 0.06 | 582.39 | 604.26 |
| Cultural Capital | 0.04 | 596.07 | 618.01 |
| Social Capital | 0.02 | 600.42 | 622.27 |
| School Context | 0.00 | 676.06 | 698.50 |
| Full Logistic Regression | 0.11 | 587.40 | 689.07 |

When highlighted independently from other models, the human/academic capital model suggests that veterans who took the lowest levels of math in high school were at greater risk of entering a two-year or for-profit institution than veterans who took the highest levels of math. For example, veterans were nearly three times at increased risk of entering a two-year institution

if they took Geometry or less compared to veterans who took Trigonometry or higher.  Likewise, veterans were nearly eight times at increased risk of enrolling in a for-profit institution if they took Geometry or less in high school.

**Diagnostics**

The final process in the analysis phase included identifying observations that may have had an influence on the final fitted models and, as a result, the estimates of the coefficients presented in the results section.  Several diagnostic plots were reviewed that plotted observations with the expected probabilities, which in turn illustrated outliers and influential observations.  These plots include the standardized Pearson residual, deviance residual, and Pregibon residual.  Only residual plots for the logistic regression analysis were performed, given that it is not possible to check such diagnostics for multinomial logistic regression.

According to Long & Freese (2006) and the UCLA Institute for Digital Research and Education (2015), the standardized Pearson residual measures the standardized difference between the observed and fitted frequencies.  Deviance residuals measure the difference between the observed values and the log likelihood function, while the Pregibon residual is a measure of the leverage of an observation.  Each diagnostic residual described above was plotted against the index ID for each observation, which are therefore called index plots.  Although index plots were chosen instead of predicted values plots, the findings relay similar information on outliers and influential cases.  Figures 4.1, 4.2, and 4.3 include the standardized Pearson residual, deviance residual, and Pregibon leverage plotted against the index ID, respectively.  The figures show that observation 268 has higher standardized Pearson and deviance residuals.  However, its leverage value is very small, which means that including it in the final analyses should not bias the regression estimates.

Figure 4.1 Plot of Standardized Pearson Residual by Participant Index



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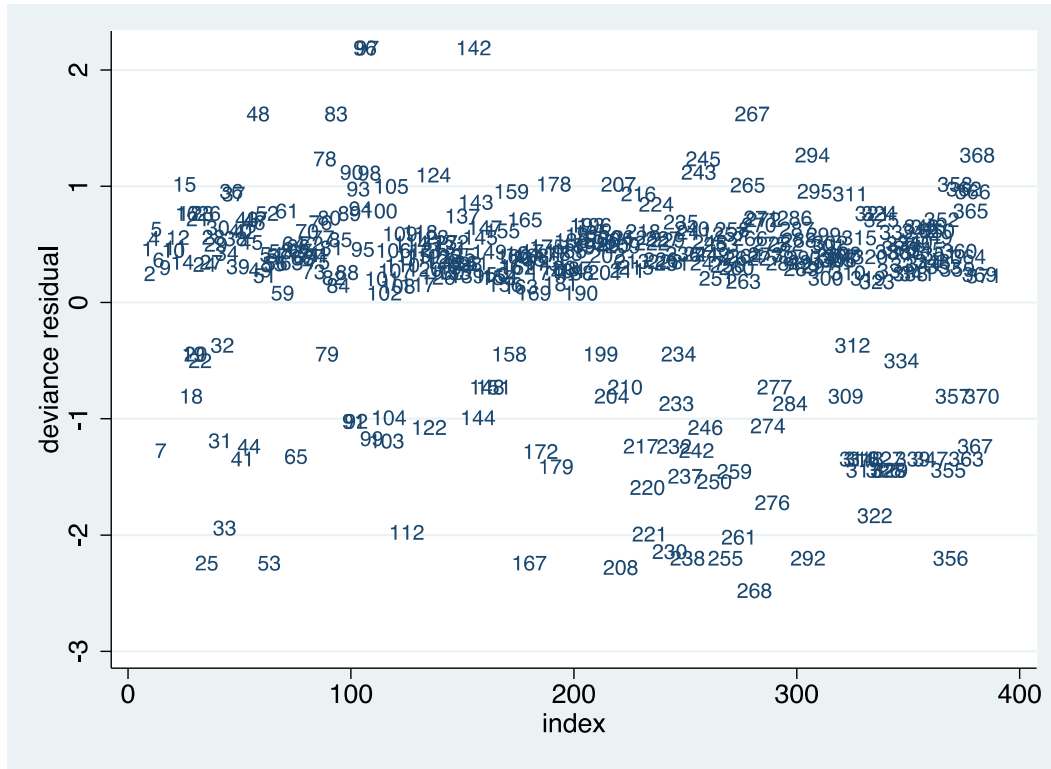Figure 4.2 Plot of Deviance Residual by Participant Index

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Figure 4.3 Plot of Pregibon Leverage by Participant Index
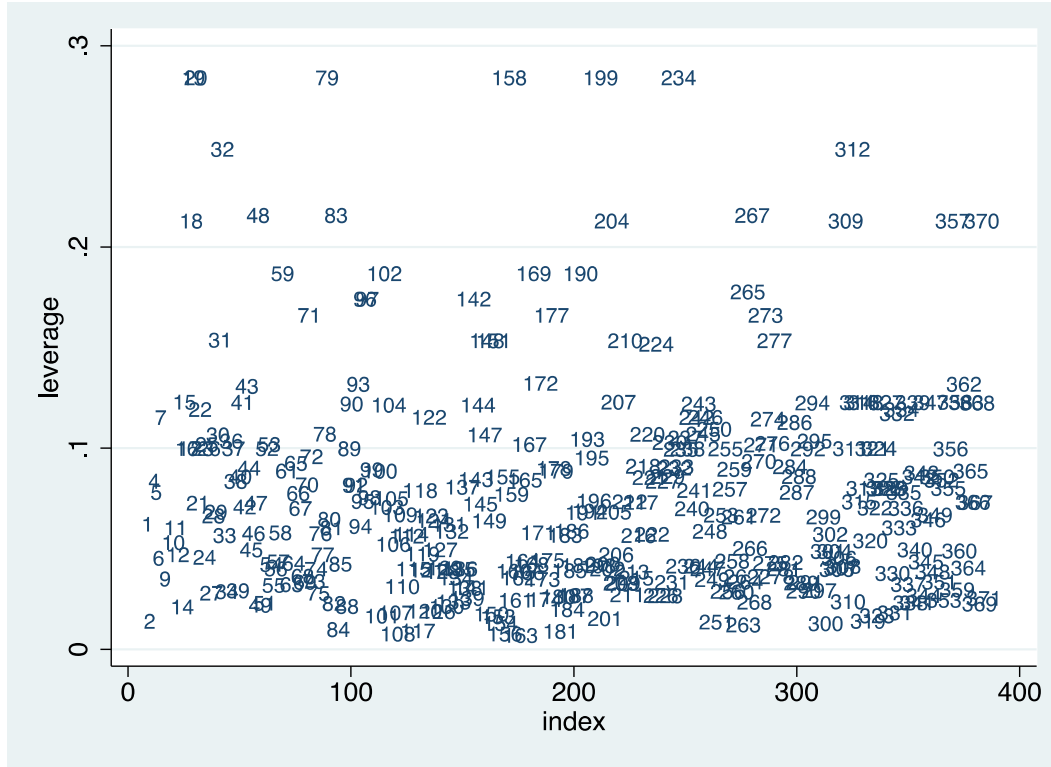
The UCLA Institute for Digital Research and Education (2015) recommends producing

additional diagnostic statistics to check for influential cases, including the differences in chi-

square (dx2) and Pregibon's Delta-Beta (dbeta). The dx2 statistic measures the influence an

observation would have on the chi-square fit statistic, or the discrepancy between an observed

and expected frequency. In addition, Pregibon's dbeta is a statistic that provides key information

of parameter estimate influence from each observation. Figures 4.4 and 4.5 illustrate the chi-

square (dx2) and Pregibon's dbeta plotted against the index ID, respectively. The graphs do not

show any individual observations of concern.

Figure 4.4 Plot of Differences in Chi-Square by Participant Index
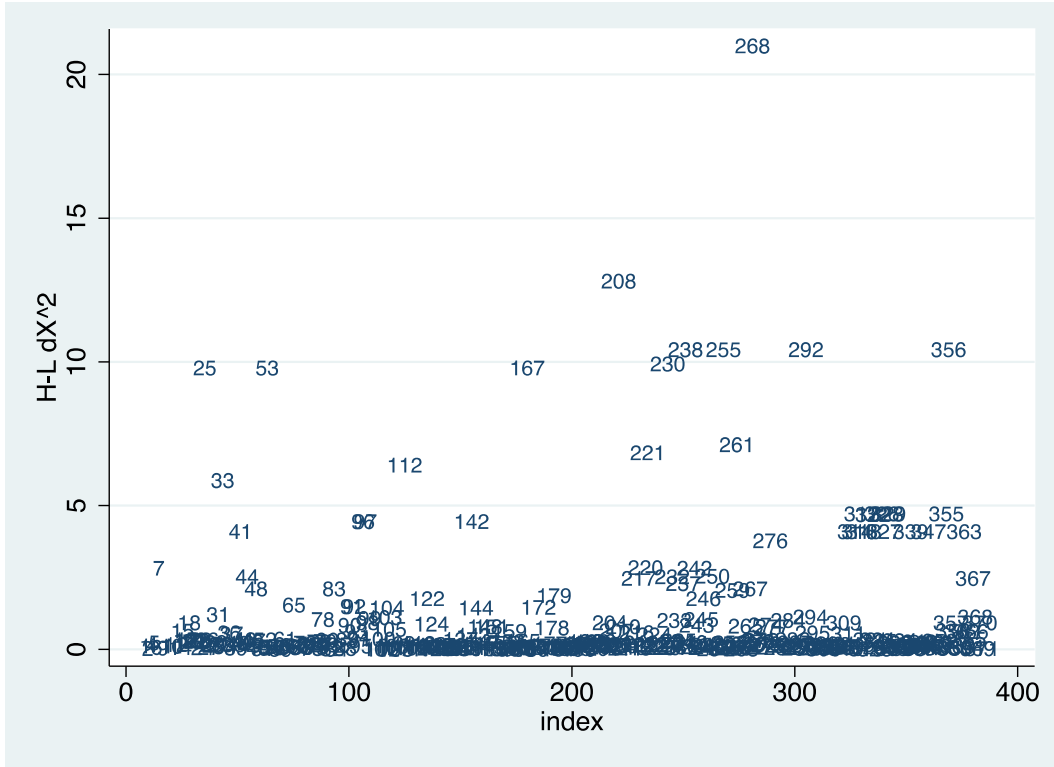
Figure 4.5 Plot of Pregibon's Delta-Beta by Participant Index
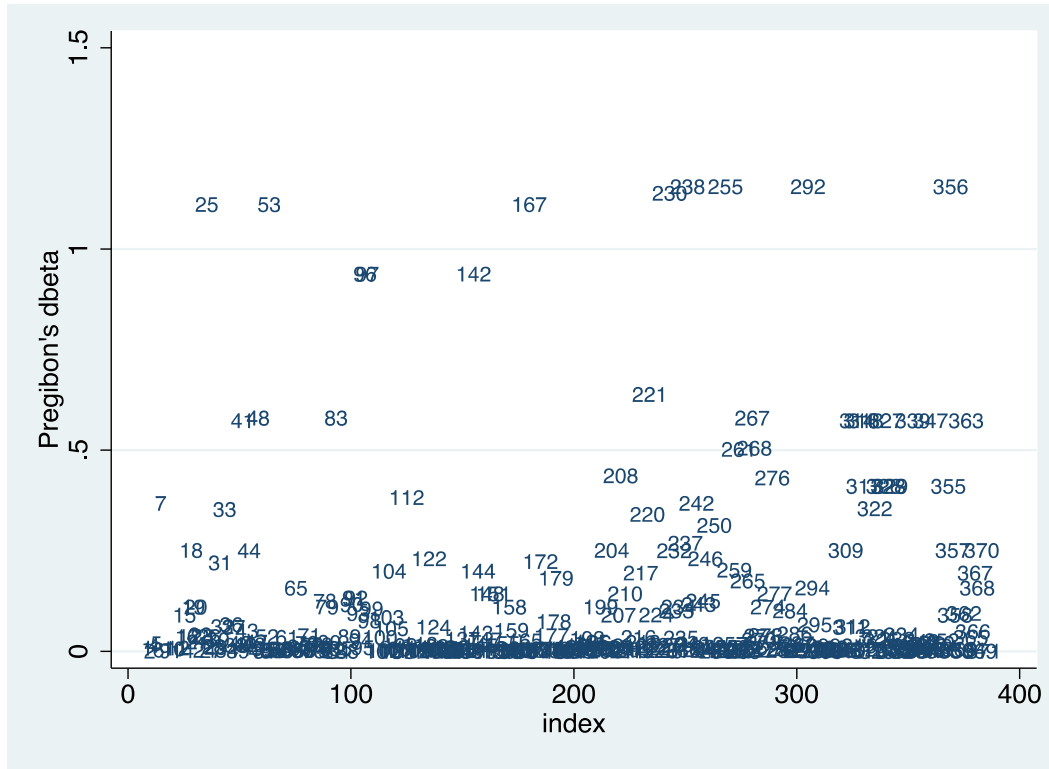
**Chapter Summary**

Results from the descriptive statistics found several key differences between veterans that did and did not enter higher education, as well as the types of institutions they attended. Additionally, the logistic and multinomial logistic regressions illustrate factors that best predict the likelihood of enrolling in higher education and the likelihood of entering a two-year or for-profit institution compared to a four-year institution. At the outset of this study, two research questions were posed to examine factors that best predict college enrollment and choice among veterans. The following summary highlights key findings that address the two research questions.

**What factors best predict whether a veteran enrolls in higher education?**

Demographic characteristics, human/academic capital, cultural capital, social capital, and school context were all significant predictors of postsecondary enrollment and institutional choice when analyzed independently. However, in the final and aggregated model, only cultural capital and social capital remained significant predictors of college enrollment. With regards to cultural capital, veterans who, during high school, expected to enroll in some college or earn a two-year degree were 60 percent less likely to enter college compared to veterans who expected to graduate from college or earn an advanced degree. In terms of social capital, veterans who had "none" or "a few" friends who planned to attend a four-year college or university had over a 70 percent decrease in odds of going to college after high school compared to veterans who had "most" or "all" friends planning to enter a four-year.

With regards to model selection using BIC as a criterion for postsecondary enrollment data, the social capital construct (BIC = 259.34) fit the data much better than the other models, including the final aggregate model. The difference in agreement between AIC and BIC values may be attributed to the fact that BIC penalizes model complexity more than AIC. However, the small difference in AIC values between the social capital factor and the final model is not large, which provides additional support for the social capital model. Using AIC and BIC as measures to compare maximum likelihood models, the results indicate that social capital is one of the best predictors for postsecondary enrollment. When highlighted independently from other models, the social capital model suggest that veterans who had few friends planning to enter a four-year institution decreased their likelihood of entering higher education.

**For veterans who enroll, what factors best predict whether they enter a two-year or for-profit institution relative to a four-year institution?** When examining factors that best

predict the types of institutions veterans enrolled in, most measures were no longer significant after accounting for all the factors in the study.  For instance, gender and race/ethnicity were not important factors for entering a two-year or for-profit institution compared to entering a four-year institution when examining demographic characteristics independent of other models.  Moreover, school context was also not an important factor that predicted college choice when analyzed independent of other models in the study.

The analysis of the full aggregate model shows that human/academic capital and cultural capital remain significant predictors of enrollment into two-year and for-profit institution relative to four-year institutions.  For example, the level of math taken in high school continued to be a strong predictor of enrollment into a two-year institution relative to a four-year institution even after accounting for other factors among veterans.  Results from this analysis shows that veterans with the lowest math courses taken in high school, compared to veterans with the highest math courses, are significantly more likely to enter a two-year institution.  Moreover, veterans' cultural capital, or educational expectations after high school, held its predictive power even after including other factors in the study.  On the whole, veterans with lower educational expectations after high school were significantly more likely to enter a two-year college compared to a veteran with the highest educational expectations.

With regards to enrollment into for-profit institutions relative to four-year institutions, only human/academic capital remained a statistically significant predicting factor for veterans.  Specifically, veterans with low math coursework completion in high school had a significantly higher risk of going into a for-profit institution compared to veterans who took Trigonometry, Pre-Calculus, or Calculus. Other forms of capital, demographic characteristics, or school context were no longer found to be significantly related to enrollment in for-profit institutions.

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With regards to the model that best fits the data on institutional choice, human/academic capital had the lowest AIC (582.39) and BIC (604.26) values compared to the other models and the final aggregate model. This suggests that the level of math taken in high school fits the data much better than other models tested. This comparison also shows that veterans who took lower levels of math were significantly more at risk of entering a two-year or for-profit institution compared to veterans who took the highest levels of math in high school. In the absence of theories that highlight best factors that predict college choice among veterans, this finding demonstrates that math courses taken in high school could have a significant impact on the institutional choices of veterans several years after leaving high school.

## Chapter 5

## Discussion, Implications, and Conclusion

This chapter begins by providing a summary of the study and conclusions drawn from the results presented in Chapter 4.  In particular, attention is given to findings that address the study's two research questions and how findings relate to previous literature.  Then, the chapter discusses the adapted conceptual model and how the results help inform Perna's (2006) college choice model as it relates to student veterans.  Thereafter, the chapter includes a discussion on the implications for policy and practice.  Recommendations for future research are also discussed.  The study ends with concluding remarks.

### Summary of the Study

Although veterans now have access to greater education benefits through the Post-9/11 GI Bill, it is unclear whether most will actually pursue a postsecondary education.  Historically only an estimated 24 percent of veterans have used their VA education benefits towards a college degree (U.S. Department of Veterans Affairs, 2001, 2010), even though earning money for college is one of their primary reasons for enlisting in the military (Eighmey, 2006; Woodruff, Kelty, & Segal, 2006; Zinger & Cohen, 2010) and the financial resources were available through various VA education programs (U.S. Department of Veterans Affairs, 2015c).  Of those veterans who did enroll in college, only a minority immediately entered four-year institutions (Field, 2008; Sewall, 2010).  The historically low percentage of veterans who have used their VA education benefits is troubling given that most aspire to go to college and earn a baccalaureate degree with financial support from VA education benefits (DiRamio, Ackerman, & Mitchell, 2008; Zinger & Cohen, 2010).

The purpose of this study was to examine key factors that led post-9/11 veterans to enroll in higher education. A central focus of this study was to identify key factors that explain why a majority of veterans enter two-year and for-profit institutions instead of four-year institutions after leaving active duty. The following research questions were used to address the purpose of this study.

1. What factors best predict whether a veteran enrolls in higher education?

2. For veterans who enroll, what factors best predict whether they enter a two-year or for-profit institution compared to a four-year institution?

This study used data from the Education Longitudinal Study (ELS) of 2002, which is publicly available through the U.S. Department of Education's National Center for Education Statistics (NCES). The ELS was designed to track the transition of high school students beginning in 2002 into higher education and the labor force, which includes military service. Three waves of data – 2002, 2004, and 2012 – were analyzed to examine factors associated with college enrollment and choice among those youth who completed active duty service. Chi-square tests of independence, logistic regressions, and multinomial logistic regressions were performed to answer the study's research questions. First presented was a descriptive portrait of veterans who did and did not enter college, as well as a description of veterans at two-year, for-profit, and four-year institutions. Second, a logistic regression analysis was used to answer the first research question, which sought to examine factors related to veterans' college enrollment. Finally, a multinomial logistic regression was employed to respond to the second research question, which explored key factors that predict veterans' attendance at two-year and for-profit institutions compared to four-year institutions.

The final logistic regression results showed that veterans' educational expectations and the number of friends who planned to enter four-year institutions during high school (peer plans) were the most significant predictors of college enrollment among veterans, even after accounting for gender, race/ethnicity, socioeconomic status (SES), highest math taken in high school, and high school urbanicity. With regards to educational expectations, veterans who, during high school, expected to enroll in some college or earn a two-year degree were 60 percent less likely to enter college compared to veterans who expected to graduate from college or earn an advanced degree. In terms of peer plans, veterans who had "none" or "a few" friends who planned to attend a four-year college or university had over a 70 percent decrease in odds of going to college after high school compared to veterans who had "most" or "all" friends planning to enter a four-year institution.

The multinomial logistic regression found that, once veterans' demographic characteristics, high school context, and other factors are controlled for, the highest math taken and educational expectations are the best predictors of enrollment into two-year colleges. The results of this study demonstrate that veterans with the lowest math courses taken in high school, compared to veterans with the highest math courses, are significantly more likely to enter a two-year college relative to a four-year institution. For example, veterans increased their likelihood of entering a two-year college by over 2.5 times if they had taken the lowest levels of math (i.e., Geometry or less) in high school compared to veterans who had taken higher levels of math (i.e., Trigonometry, Pre-Calculus, or Calculus). The study's results also indicate that veterans with lower educational expectations after high school (i.e., high school graduation, GED, some college, or two-year degree) were more likely to enter a two-year college compared to a veteran with the highest educational expectations (i.e., graduate from college or obtain an advanced

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degree). Veterans who did not know how far they would get after HS, planned to graduate high school, or earn a GED were nearly three times as likely to enter a two-year college relative to veterans who thought they would graduate from college or earn an advanced degree. Equally important, veterans who planned to attend college or complete a two-year program or less at a community college or vocational school had a 2.7 times increase in their risk of entering a two-year college relative to enrollment at a four-year institution. Overall, the study's findings show veterans' highest math courses taken in high school and their early educational expectations are key factors that predict whether they will enter a two-year college.

The multinomial logistic regression results shows that veterans' enrollment into for-profit colleges compared to four-year institutions is also best explained by the highest math courses taken in high school, even after accounting for gender, race/ethnicity, socioeconomic status (SES), educational expectations, peer plans, and high school urbanicity. For instance, veterans with low math coursework completion in high school (i.e., Geometry or less) had a 665 percent higher risk of going into a for-profit institution compared to veterans who took Trigonometry, Pre-Calculus, or Calculus in high school. It is also important to highlight that veterans from racial/ethnic minority backgrounds, compared to White veterans, were at twice the risk of enrolling in a for-profit institution, a finding statistically significant at the 0.10 alpha level.

**Discussion of Findings on Post-9/11 Veterans' Postsecondary Enrollments**

The first research question was designed to explore the relationship between key factors found in the college-going literature and their impact on veterans' college enrollment. The first research question asked: What factors best predict whether a veteran enrolls in higher education? Part of the findings to the present study was similar to research by Elder and colleagues' (2010), which found that two different factors were predictors of college enrollment among military-

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connected[13] individuals.  The authors suggested that military-connected individuals who had

college educated parents and high HS GPAs were twice as likely to enter college as those that

did not.  Similarly, the current study also points to the importance of demographic characteristics

– such as socioeconomic status (SES) – and academic achievement (i.e., highest math taken) on

military-connected individuals' chances of entering postsecondary education.  The present study

found that veterans from lower SES backgrounds and those who took lower-level math courses

in high school were less likely to enter college, although the findings in this study were not

statistically significant.  The present study also found two additional overarching factors that best

predict whether a high school youth enters higher education after serving in the military:

educational expectations and peer plans.  These findings differ from previous findings related to

college enrollment among youth with military service.  This disparity may be a result of

differences in the sample analyzed and measures included in both studies.  For instance, the

present study only examined veterans while Elder and others (2010) did not differentiate

between military-connected individuals, which may mean respondents could have been active

duty, reservists, National Guard, or veterans.  Additionally, most measures included in the

present study were not analyzed in Elder and colleagues' (2010) research, which could also

explain the differences in findings.

It is important to note that veterans' high school peer plans, as shown in this study, mirror

findings from previous literature (DiRamio et al., 2008; Livingston et al., 2011; Perez &

McDonough, 2008; Person & Rosenbaum, 2006; Rumann & Hamrick, 2010; Tierney &

Auerbach, 2006).  For instance, Livingston et al. (2011), Rumann and Hamrick (2010), and

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[13] Military-connected is indicated because the authors do not provide a clear explanation as to the military status of
the youth in their research (i.e., active duty, reserves, or National Guard).

DiRamio et al. (2008) found that veterans actively sought other veterans for social support and information in college. This strengthens the idea that veterans' peers have an important role to play during high school and after leaving active duty service, particularly as it relates to their influence on postsecondary enrollment. Findings from the present study show that the proportion of veterans' friends who planned to enter a four-year institution had a powerful impact on their postsecondary enrollment, which strengthens the argument that peers continue to play a vital role on veterans' college enrollment and transitional experiences.

Finally, not found in previous literature on military-connected undergraduates, or student veterans, is the impact educational expectations have on veterans' likelihood of entering higher education. Previous research from Engberg and Wolniak (2010) and Perna and Titus (2005) found that students' parents, family, and friends had an important impact on their postsecondary enrollment. The authors noted that youth whose parents, family, and friends expected them to attend college were significantly more likely to have entered a two- and four-year institution compared to not entering higher education at all. Findings from the present study show that veterans' educational expectations during high school are one of the best predictors of postsecondary enrollment. Veterans with low educational expectations in high school were less likely to have enrolled in higher education compared to veterans who indicated an expectation to earn a bachelor's or advanced degree. Plainly stated, findings from the current study may break new ground in that veterans' educational expectations during high school have a vital role to play in their likelihood of entering higher education.

**Discussion of Findings on Post-9/11 Veterans Institutional Choices**

The second research question was designed to explore the relationship between key factors found in the college choice literature and their effect on veterans' institutional choices.

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The second research question asked: For veterans who enroll in higher education, what factors best predict whether they enter a two-year or for-profit institution compared to enrolling in a four-year institution? The present study found two key factors that best explain the likelihood a veteran would enter a two-year or for-profit institution versus a four-year institution: highest math course taken and educational expectations. Prior research by Wang et al. (2012) found that military-connected individuals who were privileged (rank high on family income, vocabulary test, and HS GPA) or well-off underachievers (rank high on family income and vocabulary test but low on HS GPA) were 86 percent less likely to have earned a bachelor's degree compared to their civilian counterparts. Most importantly, the study by Wang et al. (2012) found that military-connected individuals who had low household income, low HS GPAs, and vocabulary test scores were 2.2 times as likely to have earned an associate's degree or some college education. Their findings demonstrated that one's family background and academic achievement played a significant role in the type of institution a military-connected individual enters. Closely related to Wang and others' (2012) findings, the current study shows that veterans with lower levels of math taken in high school were over 2.5 times as likely to have entered a two-year institution perhaps to pursue an associate's degree or some college. Both studies showed that having lower academic achievement greatly increased the likelihood of entering a two-year college for youth who later joined the military. Unfortunately, Wang and others (2012) did not control for institutional type so we do not know whether the associate's degree was earned at a two-year or for-profit institution.

A novel finding of the current study is the impact highest math course taken in high school had on the likelihood veterans entered a for-profit institution compared to a four-year institution. Results from this study show that veterans were over 7.5 times as likely to have

entered a for-profit institution if they took the lowest levels of math in high school compared to veterans who took Trigonometry or higher. In other words, veterans with low math coursework completion in high school had a 665 percent higher risk of going into a for-profit institution compared to veterans who took higher levels of math. Similar to findings from Wang et al. (2012), this study shows that youth who served in the military and had the lowest levels of academic achievement (i.e., math courses) were more likely to enter a two-year or for-profit institution. No other study to date has examined key factors associated with veterans' enrollment into for-profit institutions. Therefore, findings from this study shed new light on factors related to the likelihood veterans will choose to attend a for-profit institution compared to a four-year institution.

**Summary Table**

Table 5.1 provides a summary of significant findings from the logistic and trinomial logistic regressions. The purpose of this study was to identify what factors best predict veterans' postsecondary enrollments and choices. As illustrated in Table 5.1, a veteran's educational expectations and peer plans are significant predictors of college enrollment. Having lower educational expectations and having few friends who planned to enter a four-year institution significantly decreased the odds a veteran will enter higher education. In addition, a veteran's highest math taken and educational expectations are significantly related to a veteran's risk of entering a two-year or for-profit institution. Veterans with low levels of math courses and low college expectations increase the risk of choosing a two-year or for-profit institution to attend.

Table 5.1

*Summary of Significant Findings between Independent and Dependent Variables*

| Independent Variables (Reference) | Dependent Variables | |
|---|---|---|
| | College Enrollment (Odds Ratio) | College Choice (Relative Risk Ratio) |
| **Demographic Characteristics** | | |
| Gender (Female) | - | - |
| Race/Ethnicity (White) | | |
|   Racial Minority | - | - |
|   Multiracial | - | - |
| SES (High) | | |
|   Low | - | - |
|   Middle | - | - |
| **Human/Academic Capital** | | |
| Highest Math (Trigonometry, Pre-Calculus, or Calculus) | | |
|   No math course or math course is other, Pre-Algebra, General or Consumer Math, Algebra I, or Geometry | - | 2.61 (two-year) 7.65 (for-profit) |
|   Algebra II | - | - |
| **Cultural Capital** | | |
| Student Expectations (Graduate from college, obtain graduate, or other advanced degree) | | |
|   Don't know, HS graduation, or GED only | - | 2.65 (two-year) |
|   Attend some college or complete 2-year degree | 0.40 | 2.71 (two-year) |
| **Social Capital** | | |
| Friends Planning to Attend 4-Year (Most/All) | | |
|   None/A Few | 0.27 | - |
|   Some | - | - |
| **School Context** | | |
| HS Urbanicity (Urban) | | |
|   Suburban | - | - |
|   Rural | - | - |

Note: Only findings that are statistically significant at the 0.05 level are highlighted.

**Analysis of the Proposed Conceptual Model**

This study adapted Perna's (2006) conceptual model of college choice to better understand factors that are important predictors of college-going for post-9/11 veterans. According to Perna's conceptual model of college choice, an individual's habitus, school and community context, higher education context, and social, economic, and policy context shape how individuals approach higher education. While the model was not developed to examine how these factors are related to veterans' college enrollment and choice, the model was adapted to test the effects of these factors on their enrollment and choice.

In the adapted model shown in Figure 5.1 (see Appendix A for original model), I proposed that habitus, or one's human/academic capital, cultural capital, social capital, as well as school context, have a direct impact on veterans likelihood of going to college and choosing an institution. I included key factors that has been shown in the literature to influence college enrollment and choice, and that would help in better understanding the findings as they relate to Perna's (2006) integrated college choice framework.

Figure 5.1 Veterans Model of College Enrollment and Choice
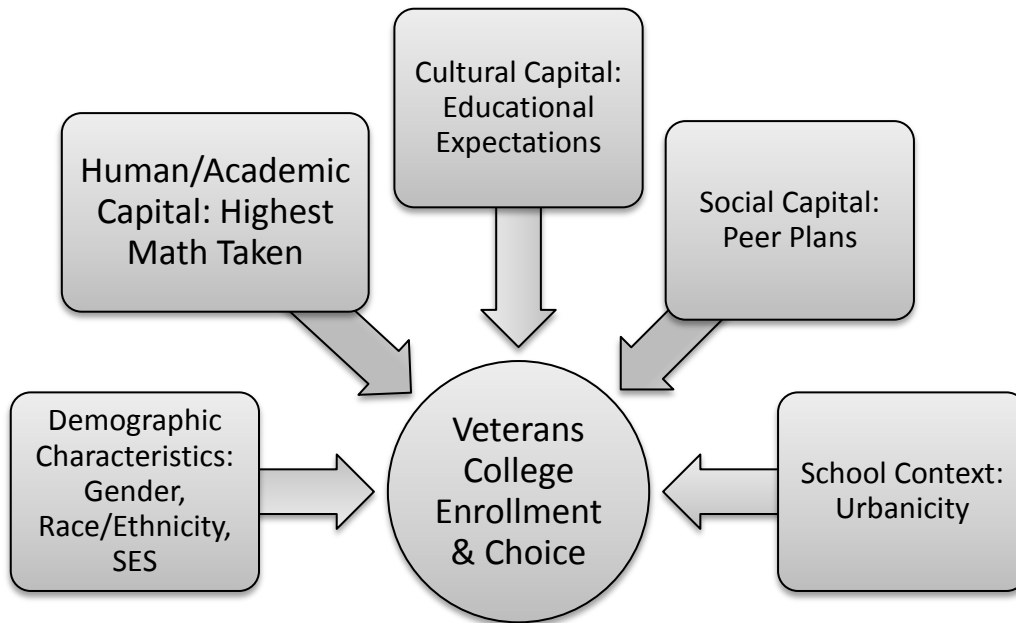


Results of this study show that veterans' social capital and cultural capital are stronger predictors of college enrollment than demographic characteristics, human/academic capital, and school context. When it comes to choosing a two-year institution, however, human/academic and cultural capital were better predictors instead of demographic characteristics, social capital, or high school context. Only human/academic capital stood out as an important predictor of veterans' attendance into for-profit institutions. Most importantly, cultural capital was found to be a significant predictor for both enrolling in higher education and choosing an institution, which supports previous research highlighting the importance of cultural capital (Engberg & Wolniak, 2010; McDonough, 1997; Perna, 2006; Perna & Titus, 2005). These findings are significant given that Perna's (2006) conceptual model of college choice had yet to be applied to understand how veterans enter higher education and choose an institution.

**Implications for Policy, Practice, and Future Research**

The results of this study have several implications for policy development and practice at various levels. In the final analysis, this study shows that veterans' 1) educational expectations and peer plans best explain their chances of going to college, 2) highest math taken and educational expectations are both factors that have an effect on whether veterans are likely to choose a two-year college as opposed to a four-year institution, and 3) highest math taken best predicts the likelihood a veteran will choose a for-profit versus a four-year institution. Although persistence and postsecondary attainment is beyond the scope of this study, the current findings nevertheless highlight key factors associated with veterans' college enrollment and choice. The following section first offers several recommendations for policy and practice. Thereafter, the section concludes with suggestions for future research.

**Recommendations for policy and practice.** This study offers six recommendations for policy and practice based on findings presented in the discussion section of this chapter.

***Inform high school enlistees about higher education and increase expectations***. First, high schools have a critical role to play in veterans' college enrollment and choice before leaving to the military. For instance, high school youth who are known to be leaving to the military after high school should be encouraged to enter college while in the military and, specifically, to take high level math courses, if needed. To their detriment, youth who enlist in the military while in high school may have decided to not participate in college fairs and information workshops. These youth may be losing valuable information that could affect their college knowledge and educational expectations needed to enter higher education after military service. This study provided evidence to suggest that interventions by high school personnel would be helpful in increasing their need to take high levels of math during high school. Probably more important,

yet interrelated, is the notion that students need to be more empowered to take math college prep work while in the military, as suggested above. Critically, then, we need educators to show veterans the path toward success is in math, in both high school and the military. It is possible that once one has lit the spark for success in a veteran, it is likely they will increase their expectations of themselves, which have important implications for campus policy. Therefore, this study recommends that youth that are known to be entering the military after high school be encouraged to receive information about college and the importance of continuing their education, particularly in math, even while on active duty. Therefore, high schools need to identify which students have or are enlisting in the military.

*Raise educational expectations through peer support.* Second, the current study found that veterans who had few high school friends, if any, planning to attend a four-year institution decreased their chances of entering higher education by over 70 percent. Because findings from this study show the importance of peer plans on veterans' likelihood of going to college, this study recommends that the Defense, VA, and Education Departments encourage transitioning service members and veterans to seek out other military-connected individuals to discuss college-going and educational expectations, particularly at military education centers or with former high school colleagues that may have already entered college.

Findings from this study point to the important impact peers have on veterans' postsecondary enrollment. Thus, providing a space while in the military (i.e., within military education centers) where veterans can discuss the importance of having high educational expectations may increase the likelihood they enter higher education. Peers should discuss the need for a four-year degree given future workforce needs within the U.S., particularly within STEM fields, and the need to transition into a four-year institution once out of the military.

Another option would be to have veterans speak to transitioning service members about their experiences entering and succeeding in higher education, either within the TAP or during visits to military installations.

   *Take math courses while in the military.*   Third, taking interactive online classes, such as Massive Open Online Courses (MOOCs), or taking courses while in the military could also play an important role in regards to the postsecondary institutions veterans enter.  MOOCs such as edX, Coursera, Udacity, and Open Education Database (OEDb) offer free, online courses in math to individuals at no cost and without the need to enroll in a college or university for grades. It would also be helpful to take a synchronized set of math courses that begin with pre-Algebra all the way through Calculus.  This study found that having low levels of math taken in high school significantly increased the likelihood of entering a two-year or for-profit institution. Previous research has shown that beginning one's postsecondary career at community colleges or for-profit colleges decrease the likelihood students will earn a baccalaureate degree (Clark, 1960; Coley, 2000; Dougherty, 1992; Pascarella & Terenzini, 2005; Schmid & Abell, 2003). Therefore, it is important that veterans increase their math skillsets while on active duty with the goal of beginning their postsecondary education at a four-year institution if at all possible.  For example, MOOCs would allow active duty personnel to take courses while in the service, particularly courses in math, at their own pace and could theoretically increase their chances of enrolling in a four-year institution after active duty without having to truly start college.

   Additionally, military education centers typically house staff from local community colleges and universities that offer coursework in math.  These institutions, although not free (typically paid with military Tuition Assistance), is another alternative that active duty personnel can use to increase their level of math taking while in the service and before truly starting their

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higher education.  Taking math courses in-person through a local college or university could be a better option for some veterans while in the military given that, although online courses can be taken at a student's own pace, sometimes learners who are left to study by themselves get frustrated and discouraged, thereby choosing to quit before making it through a competency. Learning in-person offers the chance for veterans to get tutored and brought up-to-speed should they find math coursework challenging.  Ultimately, it is recommended that veterans take courses in math while on active duty – if at all possible given their commitment to full-time service – to increase their level of math skills given that this is a significant predictor of where a veteran chooses to pursue higher education.

*Redesign TAP for college readiness.*  Fourth, findings from the current study show that having low college expectations during high school, such as expecting to earn an associate's degree or less, decreases the likelihood of entering higher education by 60 percent compared to veterans who expected to earn a bachelor's degree or higher.  Therefore, this study highlights the importance of supporting, developing, and enhancing effective military Transition Assistance Programs (TAP) and advisors that raise educational expectations among transitioning service members (i.e., active duty, reserve, or National Guard personnel).  As discussed in the literature review of this study, each military branch offers the TAP to discharging military personnel, a program focused on providing them with employment, educational, and VA benefit information (Military OneSource, 2015; Transition GPS, 2015).  Although the TAP has largely focused on providing service members support with resume building and immediate employment after service, the TAP can be used to provide transitioning personnel with information about the benefits of a postsecondary education given the need to increase economic growth and likelihood of earning higher incomes (Carnevale & Rose, 2010).  Discussing the need to earn a

postsecondary education with transitioning military personnel provides an opportunity to increase their educational expectations and helps to address the U.S. need to increase its number of baccalaureate degree holders.  For this to happen, military education centers will need to provide advisors who are competent in future labor market needs, particularly in STEM, and the need to increase U.S. education levels that align with those workforce needs.

*Mandate VA Educational and Career Counseling Services.*  Fifth, findings from the current study show that having low college expectations, such as planning to earn an associate's degree or below, decreased a veteran's likelihood of going to college by 60 percent compared to veterans who expected to earn a bachelor's degree or higher.  Once out of the military, veterans have the option of using VA Educational and Career Counseling Services to discuss an appropriate civilian occupation and develop a training program (U.S. Department of Veterans Affairs, 2015e).  However, little is known about the usage and effectiveness of this service among veterans seeking to pursue higher education.  Ideally, VA or U.S. Department of Education (Ed) staff should educate veterans about the stratification of higher education, types of postsecondary degrees, and the need for advanced education.  Equally important, these VA or Ed counselors should have a fundamental understanding of the U.S. higher education system and be able to inform veterans about future labor market needs.  Because many veterans come from first-generation and low-income backgrounds, policies should be in place at the VA that mandate the use of Educational and Career Counseling Services for increasing veterans' educational and career expectations, which could subsequently enable veterans to make informed institutional choices.

***Expand locations and capacity of Veterans Upward Bound program.*** Finally, once off

of active duty, veterans should be encouraged to participate in the Veterans Upward Bound

(VUB) program. The VUB program,

> …is designed to motivate and assist veterans in the development of academic and
>
> other requisite skills necessary for acceptance and success in a program of
>
> postsecondary education. The program provides assessment and enhancement of
>
> basic skills through counseling, mentoring, tutoring and academic instruction in
>
> the core subject areas. The primary goal of the program is to increase the rate at
>
> which participants enroll in and complete postsecondary education programs.
>
> (U.S. Department of Education, 2015e)

The VUB program offers instruction in mathematics, writing, reading, and other subjects, and

offers tutoring/remedial services, mentoring, and assistance securing help from the VA and other

veteran-support systems. This study found that math course-taking is an important predictor of

college enrollment and choice. A program that offers academic support in math before entering

college, such as the VUB program, may increase the number of veterans who enter higher

education and choose institutions that will best meet their career goals and national education

needs. Similar to the VA Educational and Career Counseling Services, however, not much is

known about the usage and effectiveness of the VUB program. For instance, in FY 2013, only

6,404 veterans participated in one of 50 VUB programs across the nation (U.S. Department of

Education, 2015e). Therefore, this study also recommends the application of a rigorous

evaluation to this program to determine effectiveness, target future needs, and identify

improvement areas.

The VUB could help close veterans' math skillset gaps, particularly among those who took lower levels of math during high school, and ultimately increase the percentage of veterans who enter higher education. Policies should be developed at the federal, state, local, and institutional levels to both increase the number of locations and participants in VUB programs. Alternatively, similar programs should be developed to increase the capacity of support offered, particularly at two-year institutions where veterans are more likely to start their postsecondary education. The VUB program's focus on providing academic support in math and educational counseling aligned with labor market needs could help veterans enter higher education and choose an institution that would increase their likelihood of success. Should the above policies and practices not be considered, the nation runs the risk of having veterans with mostly certificates and two-year degrees while not capitalizing on an investment made by taxpayers.

**Recommendations for future research.** Given the lack of empirical research that examines factors associated with post-9/11 veterans' college enrollment and choice, this area of study is ripe for further examination. The substantial number of service members expected to leave the military in the coming years and the enactment of the Post-9/11 GI Bill also adds to the need for research that highlights how veterans not only pursue a higher education and choose an institution, but how likely they are to persist and earn a postsecondary education. This study provides a framework from which researchers will be able to better understand factors that are related to their college enrollment and choice. Following, I offer five possible directions for future research.

*Account for military experiences.* Future research should examine the impact of factors related to veterans' military experiences on college outcomes (i.e., persistence, postsecondary attainment, graduate or professional school attendance, and workforce outcomes). Factors that

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could be studied include: the VA education program used (i.e., Montgomery GI Bill, Post-9/11 GI Bill, etc.), military branch, time in service, grade/rank, combat exposure, and disability status. Previously, studies on military-connected individuals (Ackerman & DiRamio, 2009; American Council on Education, 2008, 2009a, 2009b, 2010; DiRamio et al., 2008; DiRamio & Jarvis, 2011; Hamrick, Rumann, & Associates, 2013; Livingston et al., 2011; Persky & Oliver, 2011; Rumann & Hamrick, 2010; Rumann et al., 2011; U.S. Department of Education, 2009, 2011; Wheeler, 2012; Zinger & Cohen, 2010) have not accounted for the influence specific military experiences, such as those described above, have had on veterans' college-going. This study could not account for the influence of military experiences on college enrollment and choice because of the lack of literature on the impact these experiences might have on college-going and the absence of factors related to the military in Perna's (2006) conceptual model of college choice. Future research that accounts for military experience could help to highlight whether certain military experiences (i.e., branch, grade/rank, or combat situations) increase or decrease the likelihood that veterans will enter higher education and its impact on how they choose an institution to attend.

*Increase the number of measures.* Future work on veterans' college access and success should strive to include a larger number of measures drawn from the research literature that could impact how they approach higher education. The small sample size of this study did not allow for inclusion of more student and school-level variables known to have an effect on college enrollment and choice (Adelman, 1999, 2006; Engberg & Wolniak, 2010; McDonough, 1991, 1997, 1998; McDonough & McClafferty, 2001; Paulsen & St. John, 2002; Perna, 2000, 2006; Perna & Titus, 2005). This study only included those measures that were both found to predict college enrollment and choice, and were included as part of Perna's (2006) college

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choice model.  Future research should therefore explore more measures that serve as proxies for each form of capital in Perna's model.  It is probable that the inclusion of more variables will identify other experiences and situations that have an impact on veterans' college access and success.

*Examine more college and post-college outcomes.*  Future studies should strive to explore veterans' postsecondary persistence, degree attainment, workforce outcomes, and success in earning an advanced degree, as well as the policies related to these topics.  Scholars should purposely seek to examine factors and the policies that help shape factors that best explain those areas of inquiry given that such a significant investment has been spent on providing educational benefits to individuals who have served in the military.  Over $42 billion has been spent on the Post-9/11 GI Bill program alone since it was first offered to veterans and other beneficiaries in 2009 (Higher Education Today, 2014).  This study attempted to address factors that best explain how veterans enter college and choose an institution, but more research is needed to fully understand their post-enrollment outcomes.  Moreover, future research should examine why veterans do not enroll in higher education, particularly for those that did have high educational expectations and levels of math taken in high school.  Knowing why veterans enroll in college is important, but it is possible that there are separate, unrelated reasons why a veteran would not enter higher education.  In other words, I found that if conditions X, Y, and Z are met, a student is more likely to enroll.  However, we still need to know why students that met conditions X, Y, and Z did not enroll in college. Are there other intervening factors at work?

*Study association between veteran-specific programs/services and veterans' college outcomes.*  Research on the influence of institutional support programs and services on veterans' college enrollment and degree attainment represents a significant gap in the literature that would

add to our understanding of whether those investments are paying off.  Two reports from the

American Council on Education (2009a, 2012) and its association partners have highlighted the

surge in institutional services and programs that are focused on veterans' educational success.

However, no study to date has linked institutional offerings to veterans' college outcomes, such

as college persistence or completion.  Researchers could survey veterans from institutions that

participated in the ACE studies and link institutional responses to understand whether program

usage or non-usage has an impact on their success and later-life outcomes.

   ***Intentionally sample a large number of veterans.***  Finally, previous research on military-

connected college students has used small sample sizes to highlight their transitional experiences

(DiRamio, Ackerman, & Mitchell, 2008; Livingston, Havice, Cawthon, & Fleming, 2011;

Rumann & Hamrick, 2010; Zinger & Cohen, 2010).  Future research should either deliberately

sample a larger number of veterans or make use of national samples of college students from the

U.S. Department of Education's National Center for Education Studies datasets, such as the

National Postsecondary Student Aid Study (NPSAS), Beginning Postsecondary Students (BPS),

and Baccalaureate and Beyond Longitudinal Study (B&B), for example.  This study is the first of

its kind to use a subsample of post-9/11 veterans from a large-scale, nationally-representative

study of high school students to study their college enrollment and choice.  However, the study's

small sample size limited the number of measures that could be included in the analyses, an issue

that can be addressed by purposefully sampling a larger number of veterans in future research.

**Conclusion**

The U.S. Government Accountability Office (2013) reports that five million post-9/11 service members will leave the military by 2020. Given that earning money for college is one of the primary reasons for enlisting in the military (Eighmey, 2006; Woodruff, Kelty, & Segal, 2006; Zinger & Cohen, 2010), many expect transitioning service members to enter higher education in significant numbers. However, only an estimated 24 percent of veterans had used their VA education benefits towards a college degree in 2001 and 2010 (U.S. Department of Veterans Affairs, 2001, 2010). Equally importantly, no study to date has examined factors associated with post-9/11 veterans' college enrollment and choice (Ackerman & DiRamio, 2009; American Council on Education, 2008, 2009a, 2009b, 2010; DiRamio, Ackerman, & Mitchell, 2008; DiRamio & Jarvis, 2011; Elder, Wang, Spence, Adkins, & Brown, 2010; Hamrick, Rumann, & Associates, 2013; Livingston, Havice, Cawthon, & Fleming, 2011; Persky & Oliver, 2011; Rumann & Hamrick, 2010; Rumann, Rivera, & Hernandez, 2011; U.S. Department of Education, 2009, 2011; Wang, Elder, & Spence, 2012; Wheeler, 2012; Zinger & Cohen, 2010).

Findings from this study reveal that veterans' postsecondary enrollment is largely influenced by their educational expectations and peer plans at the time they were in high school. Specifically, veterans who had lower educational expectations and fewer friends planning to attend a four-year institution during high school were less likely to have gone to college compared to veterans with higher education expectations and most friends planning to attend a four-year institution. Findings from this study illustrate that veterans' highest math taken and educational expectations are key factors that influence their decision to choose an institution. Particularly, veterans who had taken the lowest levels of math in high school (i.e., pre-Algebra or general math) were at greater chance of entering either a two-year or for-profit institution relative

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to veterans who had taken higher levels of math (i.e., Trigonometry or Calculus).  Veterans with low educational expectations in high school were at greater risk of entering a two-year college compared to veterans expecting to graduate from college or earn an advanced degree.  Finally, the adaptation of Perna's (2006) conceptual model served as a valuable framework to examine factors related to veterans' college enrollment and choice.  Future researchers should use this conceptual framework to continue to investigate how other factors may be related to their persistence and degree attainment, further addressing the research gaps that exist for this understudied and overlooked student population.

**Appendix A**

Figure A.1 Perna's (2006) Conceptual Model of College Choice
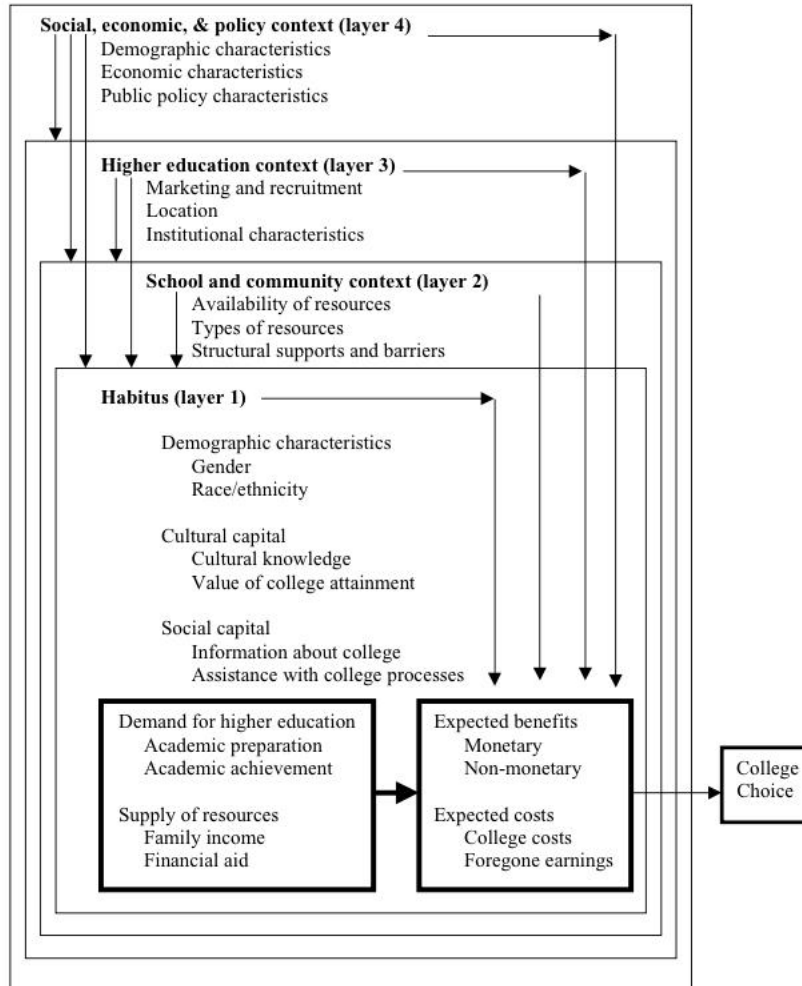
# Appendix B

## Results of Imputed and Weighted Analyses

Table B.1
*Summary of Full Logistic Regression Analysis Predicting Postsecondary Enrollment – Imputed and Weighted*

| Variable (Reference) | Odds Ratio | S.E. | z | p | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| *Demographic Characteristics* | | | | | | |
| Gender (Female) | 2.85 | 1.81 | 1.65 | 0.10 | 0.82 | 9.95 |
| Race/Ethnicity (White) | | | | | | |
| Racial Minority | 2.43 | 1.36 | 1.58 | 0.12 | 0.80 | 7.34 |
| Multiracial | 1.10 | 0.72 | 0.14 | 0.89 | 0.30 | 4.01 |
| SES (High) | | | | | | |
| Low | 0.71 | 0.50 | -0.48 | 0.63 | 0.18 | 2.80 |
| Middle | 1.07 | 0.67 | 0.10 | 0.92 | 0.31 | 3.65 |
| *Human/Academic Capital* | | | | | | |
| Highest Math (Trigonometry, Pre-Calculus, or Calculus) | | | | | | |
| No math course or math course is other, Pre-Algebra, General or Consumer Math, Algebra I, or Geometry | 0.43 | 0.25 | -1.46 | 0.15 | 0.14 | 1.34 |
| Algebra II | 0.66 | 0.37 | -0.76 | 0.45 | 0.22 | 1.97 |
| *Cultural Capital* | | | | | | |
| Student Expectations (Graduate from college, obtain graduate, or other advanced degree) | | | | | | |
| Don't know, HS graduation, or GED only | 0.70 | 0.40 | -0.62 | 0.54 | 0.23 | 2.16 |
| Attend some college or complete 2-year degree | 0.57 | 0.29 | -1.12 | 0.26 | 0.21 | 1.54 |
| *Social Capital* | | | | | | |
| Friends Planning to Attend 4-Year (Most/All) | | | | | | |
| None/A Few | 0.18 | 0.11 | -2.85 | 0.01 | 0.06 | 0.59 |
| Some | 0.55 | 0.35 | -0.94 | 0.35 | 0.16 | 1.94 |
| *School Context* | | | | | | |
| HS Urbanicity (Urban) | | | | | | |
| Suburban | 0.81 | 0.55 | -0.32 | 0.75 | 0.21 | 3.07 |
| Rural | 0.47 | 0.33 | -1.06 | 0.29 | 0.11 | 1.92 |
| Constant | 11.14 | 13.82 | 1.94 | 0.05 | 0.97 | 128.48 |

Table B.2

*Summary of Full Multinomial Logistic Regression Analysis Predicting Postsecondary Choice Relative to Enrollment at Four-Year Institution - Imputed and Weighted*

| | Variable | RRR | S.E. | t | *p* | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|
| Two-Year Institution | *Demographic Characteristics* | | | | | Lower | Upper |
| | Gender (Female) | 0.84 | 0.31 | -0.47 | 0.64 | 0.40 | 1.75 |
| | Race/Ethnicity (White) | | | | | | |
| |   Racial Minority | 1.12 | 0.42 | 0.30 | 0.77 | 0.53 | 2.36 |
| |   Multiracial | 0.69 | 0.48 | -0.53 | 0.60 | 0.18 | 2.71 |
| | SES (High) | | | | | | |
| |   Low | 2.39 | 1.24 | 1.68 | 0.10 | 0.86 | 6.64 |
| |   Middle | 1.11 | 0.51 | 0.24 | 0.81 | 0.45 | 2.75 |
| | *Human/Academic Capital* | | | | | | |
| | Highest Math (Trigonometry, Pre-Calculus, or Calculus) | | | | | | |
| |   No math course or math course is other, Pre-Algebra, General or Consumer Math, Algebra I, or Geometry | 3.30 | 1.72 | 2.28 | 0.02 | 1.17 | 9.25 |
| |   Algebra II | 1.78 | 0.70 | 1.46 | 0.15 | 0.82 | 3.87 |
| | *Cultural Capital* | | | | | | |
| | Student Expectations (Graduate from college, obtain graduate, or other advanced degree) | | | | | | |
| |   Don't know, HS graduation, or GED only | 2.29 | 1.04 | 1.82 | 0.07 | 0.93 | 5.62 |
| |   Attend some college or complete 2-year degree | 2.95 | 1.35 | 2.36 | 0.02 | 1.20 | 7.26 |
| | *Social Capital* | | | | | | |
| | Friends Planning to Attend 4-Year (Most/All) | | | | | | |
| |   None/A Few | 1.92 | 0.97 | 1.29 | 0.20 | 0.71 | 5.20 |
| |   Some | 1.62 | 0.63 | 1.23 | 0.22 | 0.75 | 3.48 |
| | *School Context* | | | | | | |
| | HS Urbanicity (Urban) | | | | | | |
| |   Suburban | 0.71 | 0.29 | -0.83 | 0.41 | 0.32 | 1.58 |
| |   Rural | 0.74 | 0.36 | -0.62 | 0.54 | 0.29 | 1.91 |
| | Constant | 0.39 | 0.28 | -1.29 | 0.20 | 0.09 | 1.65 |

Table B.2 (continued)

*Summary of Full Multinomial Logistic Regression Analysis Predicting Postsecondary Choice Relative to Enrollment at Four-Year Institution - Imputed and Weighted*

| | Variable | RRR | S.E. | t | *p* | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|
| For-Profit Institution | *Demographic Characteristics* | | | | | | |
| | Gender (Female) | 1.16 | 0.49 | 0.36 | 0.72 | 0.50 | 2.68 |
| | Race/Ethnicity (White) | | | | | | |
| |   Racial Minority | 2.77 | 1.22 | 2.31 | 0.02 | 1.16 | 6.59 |
| |   Multiracial | 0.64 | 0.55 | -0.53 | 0.60 | 0.12 | 3.46 |
| | SES (High) | | | | | | |
| |   Low | 1.39 | 0.88 | 0.53 | 0.60 | 0.40 | 4.84 |
| |   Middle | 0.71 | 0.37 | -0.66 | 0.51 | 0.25 | 1.99 |
| | *Human/Academic Capital* | | | | | | |
| | Highest Math (Trigonometry, Pre-Calculus, or Calculus) | | | | | | |
| |   No math course or math course is other, Pre-Algebra, General or Consumer Math, Algebra I, or Geometry | 6.72 | 3.76 | 3.40 | 0.00 | 2.23 | 20.27 |
| |   Algebra II | 1.85 | 0.87 | 1.31 | 0.19 | 0.73 | 4.69 |
| | *Cultural Capital* | | | | | | |
| | Student Expectations (Graduate from college, obtain graduate, or other advanced degree) | | | | | | |
| |   Don't know, HS graduation, or GED only | 1.47 | 0.70 | 0.80 | 0.42 | 0.57 | 3.78 |
| |   Attend some college or complete 2-year degree | 0.98 | 0.58 | -0.04 | 0.97 | 0.30 | 3.16 |
| | *Social Capital* | | | | | | |
| | Friends Planning to Attend 4-Year (Most/All) | | | | | | |
| |   None/A Few | 2.24 | 1.21 | 1.49 | 0.14 | 0.77 | 6.50 |
| |   Some | 1.75 | 0.83 | 1.17 | 0.24 | 0.68 | 4.46 |
| | *School Context* | | | | | | |
| | HS Urbanicity (Urban) | | | | | | |
| |   Suburban | 0.82 | 0.38 | -0.43 | 0.67 | 0.33 | 2.04 |
| |   Rural | 0.99 | 0.59 | -0.02 | 0.99 | 0.31 | 3.20 |
| | Constant | 0.17 | 0.14 | -2.08 | 0.04 | 0.03 | 0.91 |

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