Aspirations and Decisions to Enroll in Graduate Programs: A Literature Review of Contributing Factors

Zackary Harris
Liang Zhang

Department of Administration, Leadership, and Technology
Steinhardt School of Culture, Education, and Human Development
New York University

Zakary Harris is a graduate student in Higher Education and Student Affairs at NYU Steinhardt School of Culture, Education, and Human Development. Liang Zhang is a professor of higher education at NYU Steinhardt. This project is funded by the AccessLex Institute / AIR Research Program; however, all views expressed in this article are those of the author. Address queries to Zhang at 82 Washington Square East, Pless Hall, Rm 779, New York, NY 10003-6674; email: lz65@nyu.edu

Abstract

Enrollment in graduate programs has increased dramatically over the years and continues to grow. Deciding to enroll in graduate school or even aspiring to a graduate degree are outcomes of a complex process influenced by an array of factors ranging from demographic characteristics to undergraduate academic and life experiences to financial variables. In this review, we synthesize recent research on aspirations to pursue graduate education and the enrollment decision process. While some contradictions exist in the literature, several factors consistently influence enrollment in graduate education programs. This review calls for additional theoretical work and reveals several directions for future scholarship in this area of inquiry.

Aspirations and Decisions to Enroll in Graduate Programs:
A Literature Review of Contributing Factors

1. Introduction

Graduate student enrollment has grown at a faster pace than undergraduate student enrollment in recent decades. Post-baccalaureate enrollment in Fall 2016 approached 3 million, a 38% increase from the 2.2 million students who enrolled in Fall 2000. During the same period, undergraduate student enrollment grew by 28%, from 13.2 million in Fall 2000 to 16.9 million in Fall 2016 (National Center for Educational Statistics, 2018). As both the absolute number and relative proportion of students attending and graduating from college have increased, differentiation in educational attainment has shifted beyond the dichotomy of college graduates versus non-college graduates. This reality has encouraged more college graduates to pursue more advanced education. In addition, knowledge growth and technological innovation have made graduate education a prerequisite for an increasing number of occupations (Mullen, Goyette, & Soares, 2003). Recently, the Center on Education and the Workforce at Georgetown University reported that approximately 11% of the estimated 55 million job openings between 2010 and 2020 would require a master's degree or higher (Carnevale, Smith, & Strohl, 2013).

While this growth has spurred an interest in examining antecedents of graduate enrollment, the literature on graduate education has not been developed with the same level of intensity and nuance as research on undergraduate education, which has moved beyond examining factors associated with undergraduate enrollment. Rather, researchers have examined either different college choices (e.g., 2-year vs. 4-year, in-state vs. out-of-state, college majors) or specific factors (e.g., different types of financial aid programs) that improve or impede undergraduate enrollment. The literature on graduate enrollment, while burgeoning, is less substantial. For example, although scholars have examined antecedents to post-baccalaureate

enrollment, few have examined students' decisions among program types and fields of study. Therefore, this literature review is focused primarily on aspirations and decisions to enroll in graduate education programs in general, and the factors that contribute to students' decisions to pursue post-baccalaureate studies. We also include a limited number of studies in which researchers have examined specific post-baccalaureate choices. While aspiring and deciding to enroll are two different actions, their interconnectivity is essential to producing a well-rounded review of the literature, especially given the already limited number of studies focused specifically on graduate enrollment.

2. Theoretical and Organizing Framework

The literature on aspirations and decisions to enroll in graduate education programs is based on conceptual models of relationships among various factors reflecting human, social and cultural capital. Among these, Perna's (2004) integrated college choice model is the most cited (e.g., Bedard & Herman, 2006; English & Umbach, 2016; Hanson, Paulsen, & Pascarella, 2016; Johnson, Kuykendall, & Winkle-Wagner, 2009; Kim & Eyermann, 2006; Malcom & Dowd, 2011; Porter et al., 1991; Xu, 2014). Following prior scholars, we employed this integrated conceptual framework to both organize the literature and test its applicability based on findings related to aspirations and decisions to enroll in graduate education programs.

Perna's (2004) integrated model posits that students make decisions based on a variety of factors associated with a standard human capital framework and influenced by social and cultural capital. A standard human capital framework considers a range of variables that influence the costs and benefits of enrolling in graduate school, such as financial resources or debt, foregone earnings, and academic performance. Perna (2004) contended that this standard model ignores "the role of preferences, tastes and expectations" associated with social and cultural capital (p.

489). Personal and contextual factors such as race, gender, socioeconomic status, parental education, and institutional characteristics may uniquely affect enrollment decisions.

Here, we borrow and apply the integrated model as a framework to organize the literature on aspirations and decisions to enroll in graduate education programs. We examine four groups of factors associated with different sections of the model. A cost-benefit analysis based on human capital theory sits at the center of the model; however, this economic analysis is preceded by a student's academic preparation for graduate school, because any cost-benefit analysis needs to consider the probability of being admitted to a program and successfully obtaining a graduate degree. Therefore, in the first section, we synthesize findings on the influence of academic factors, including academic performance, college major, selectivity, participation in research, and faculty interaction on aspirations and decisions to enroll in graduate school. In the second section, we review literature on the influence of financial factors on graduate school enrollment. A key component of the integrated model is situating the cost-benefit analysis within the individual's habitus, school and community context, the higher education context, and the broader social, economic, and policy context. The literature on graduate education focuses primarily on an individual's habitus, including demographic characteristics and family background. In the third section, we examine differences across two key demographic variables, gender and race/ethnicity. As a source of social and cultural capital, family background strongly influences students' decisions; thus, we include studies on this topic in the last section of the review.

We use this organizing principle to perform a detailed examination of the literature related to each of the factors influencing aspirations and decisions to enroll in graduate education programs. Based on the findings from this literature review, we examine the applicability of this

model to graduate enrollment. Notably, although Perna's (2004) model allows for interactions among these groups of factors, scholars have mainly used additive frameworks in the majority of empirical work on graduate education. We also discuss results from moderation models, especially with regard to group differences by gender and race/ethnicity.

3. Literature Search and Selection

We searched academic databases such as Google Scholar, ERIC, JSTOR, and Project Muse to find peer-reviewed articles of interest using keywords including, but not limited to, combinations of the following words and phrases: graduate, enrollment, decision, factors, aspirations, choice, influence, social characteristics, academics, background, finances, and economy. Once we reached source saturation online, we reviewed cited works within catalogued literature to find relevant studies on the topic of interest. After we reached full source saturation, we read and catalogued all qualifying articles.

All articles selected for inclusion in this review must have produced relevant results related to aspirations or decisions to enroll in graduate education programs and the potential factors that influence students' decisions. We included studies that examined broad range of influencing factors as well as studies that examined just a few. We did not consider theoretical foundations during the selection process, but differences among them informed our decision to use Perna's (2004) integrated framework for this review. We only included peer-reviewed studies published in either academic journals or printed books. Based on these criteria, we selected 40 relevant studies: 38 based on quantitative methods and 2 based on qualitative methods. To contextually situate findings from these studies, we consulted 3 statistical briefs and 12 secondary sources, bringing the total number of references cited to 55.

4. Findings

Academic Performance, Institutional Characteristics, and College Experiences

Both aspirations and decisions to enroll in graduate education programs are overwhelmingly correlated with undergraduate academic factors. These variables include a combination of undergraduate academic performance, major field of study, institutional characteristics, faculty interaction, and research experience. A substantial number of studies have revealed a positive correlation between undergraduate grade point average (GPA) and post-baccalaureate aspirations (Centra, 1980; Davis et al., 2012; English & Umbach, 2016; Hearn, 1987; Isaac et al., 1992; Walpole, 2003; Xu, 2016a, 2016b) and subsequently, graduate school enrollment (English & Umbach, 2015; Heller, 2001; Millet, 2003; Mullen et al., 2003; Walpole, 2003; Zhang, 2005). Although GPA plays a major role in the post-baccalaureate decision making process overall, some student populations are more directly influenced by academic performance. For example, Walpole (2003) found a stronger correlation between GPA and graduate enrollment among students with lower socioeconomic status (SES) than among their higher SES counterparts. Moreover, Isaac et al. (1992) found a correlation between higher GPA and graduate school aspirations among male students, but not among female students. Along with undergraduate GPA, a few researchers used standardized test scores (i.e., SAT, ACT, GRE) as measures of academic performance and correlating factors in post-baccalaureate education (Centra, 1980; Mullen et al., 2003; Walpole, 2003). Just like GPA, these test scores are positively associated with graduate aspirations and enrollment.

From a human capital perspective, undergraduate academic performance and test scores can be viewed as important factors that are associated with the probability of being admitted to

graduate school and successfully completing a graduate degree. While graduate education may yield handsome monetary and non-monetary benefits, students' aspirations and decisions to pursue graduate education critically hinge on their assessments of the likelihood of these benefits materializing. Students with low academic performance can be discouraged by a low probability of being admitted into graduate programs and/or the psychological stress involved in obtaining a graduate degree.

In addition to academic performance, major field of study plays a unique role in students' graduate education decisions. Researchers have focused on differences in enrollment rates across majors (English & Umbach, 2016; Goyette & Mullen, 2006; Hanson et al., 2016; Heller, 2001; Millet, 2003; Mullen et al., 2003). Goyette and Mullen (2006) found that students in arts and science majors are more likely to enroll in graduate school than students in vocational and professional majors. Likewise, English and Umbach (2015) found that students majoring in the "humanities, social sciences, behavioral sciences, mathematics, and life or physical sciences were more likely to aspire to, apply for, and enroll in graduate school" than their counterparts majoring in computer science, business, or health sciences (p. 190).

These findings are consistent with the expanded human capital framework, in that college majors are significantly associated with wage differentials among college graduates (Arcidiacono, 2004; Rumberger & Thomas, 1993). Generally speaking, college graduates who majored in fields such as business, engineering, and science and math enjoy a substantial earnings advantage, while those who majored in humanities and the arts, history, and education are ranked at the lower end of the earnings spectrum (Altonji, Blom, & Meghir, 2012). As such,

students in majors with higher returns are less likely to consider graduate education (Freeman & Hirsch, 2008; Goyette & Mullen, 2006).

Scholars have examined factors that contribute to aspirations and decisions to enroll in graduate education programs across academic disciplines (Centra, 1980; Xu, 2014, 2016a). Centra (1980) examined racial identity in combination with major discipline and found various contributing factors associated with each combination, including differences in weights of test scores and GPA. Examining differences between students in science, technology, engineering and mathematics (STEM) and non-STEM students, Xu (2014, 2016a) found that academic performance is a stronger contributing factor for STEM students, especially women. These differences are important for understanding how certain students may be influenced by factors such as gender, race, and academic performance depending on their field of study.

In addition to academic performance, institutional characteristics and students' college experiences figure prominently in the decision making process. Researchers have examined characteristics such as selectivity/quality and institution type. While selectivity and quality are two different concepts, they have become almost synonymous in empirical research. Scholars have used various measures of institutional selectivity, including average test scores of admitted students (Ethington & Smart, 1996), Barron's *Profiles of American Colleges* (Eide et al., 1998; Millet, 2003; Xu, 2016a; Zhang, 2005), the Carnegie Classification (Hanson et al., 2016; Mullen et al., 2003; Zhang, 2005, 2013), and sticker prices (Zhang, 2005). Regardless of metric, institutional selectivity and quality significantly predict graduate school aspirations or enrollment. Attending a more selective institution positively contributes to these decisions (Eide

et al., 1998; Ethington & Smart, 1996; Millet, 2003; Mullen et al., 2003; Zhang, Liang, 2005; Zhang, Lei, 2013).

In a study on college quality and undergraduate major, Zhang (2005) found that students from "high quality colleges are about 16% (private) and 18% (public) more likely to attend some kind of graduate program within four to five years" after graduation compared to students from middle-quality institutions (p. 322). Along with increased chance of attendance, selectivity plays a role in the type of program pursued. Mullen et al. (2003) found that selectivity has a stronger effect on enrollment in MBA and professional degree programs than other master's degree programs. Although selectivity contributes positively to graduate school enrollment overall, this finding must be qualified. For example, Ethington and Smart (1996) found that the selectivity of the undergraduate institution has a significant positive influence on graduate school enrollment only for men, and Xu (2016a) discovered that it exerts a negative influence for women; moreover, Zhang (2005) noted that with the exception of high-quality public universities, undergraduate institutional quality does not influence decisions to enroll in doctoral programs. Nevertheless, these findings do not negate the general pattern of institutional selectivity and quality having a significant positive effect on students' aspirations and decisions to enroll in graduate education programs.

Along with selectivity, the type of institution can play a role in the decision making process. Researchers have studied institutions with different Carnegie Classifications and statuses, such as Historically Black Colleges and Universities (HBCUs). Similar to selectivity, findings generally demonstrate that the type of undergraduate institution significantly influences graduate school enrollment (Eide, Brewer, & Ehrenberg, 1998; English & Umbach, 2016;

Hanson et al., 2016; Mullen et al., 2003; Schapiro et al., 1992). Some researchers have focused on examining how attending "elite" universities (i.e., the most selective private institutions) affects decisions to pursue graduate education (Eide et al., 1998; Schapiro et al., 1991). Eide et al. (1998) found that attending an elite university positively influences decisions to attend graduate school. Beyond elite universities, English and Umbach (2016) did not find any significant differences between public and private schools in terms of influence on graduate school attendance. Recently, Wang, Lee, and Wickersham (2019) found that attending a community college prior to completing a bachelor's degree has no significant negative effects on graduate enrollment. This is likely due to the fact that community college students who have transferred to and graduated from 4-year institutions excel at similar (if not higher) rates than their peers who pursue their undergraduate studies exclusively at 4-year institutions. English and Umbach (2016) and Hanson et al. (2016) found that students at liberal arts institutions are less likely to pursue graduate degrees than students at research universities, while Mullen et al. (2003) found students at liberal arts schools more likely to enroll in graduate school than those at comprehensive universities. Generally speaking, attending a research, liberal arts, or HBCU significantly and positively affects decisions to attend graduate school, but attending a comprehensive university does not (Mullen et al., 2003). Findings on selectivity/quality and type demonstrate a strong connection between a student's undergraduate institution and the decision to pursue post-baccalaureate education.

While we are not aware of a single theory that can comprehensively explain all of these results, scholars have invoked several theories to explain the relationship between undergraduate institutional characteristics and decisions to pursue graduate education. The signaling model of

education suggests that college selectivity/quality can be viewed as an academic indicator in graduate school admission similar to other academic performance indicators such as GPA and test scores. Alternatively, college characteristics and contexts may be regarded as "organizational habitus" (McDonough, 1997). Under this framework, college selectivity and type reflect institutional structures and resources that may facilitate or impede students' graduate school aspirations and enrollment decisions.

Findings related to the effects of students' college experiences such as research participation and faculty interaction seem to give some credence to the notion of "organizational habitus." Given the emphasis on conducting research in graduate programs, participation in academic research as an undergraduate contributes positively to students' decisions to pursue graduate education (Carter, Mandell, & Maton, 2009; Hanson et al., 2016; Hathaway, Nagda, & Gregerman, 2002; Walpole, 2003). Involvement in academic research, whether led by individual faculty members (Hanson et al., 2016; Walpole, 2003) or in the context of large research programs (Carter et al., 2009; Hathaway et al., 2002), positively contributes to aspirations and decisions to enroll in graduate school, especially for underrepresented or low SES students. Findings related to faculty interaction vary, but show generally positive effects for post-baccalaureate pursuits (Davis et al., 2012; Hanson et al., 2016, Hearn, 1987; Walpole, 2003). Hanson et al. (2016) indicated that students' graduate enrollment decisions could be heavily influenced by good teaching practices including "challenge and effort" required in coursework, "clarity and organization" in teaching style, and overall "integration of ideas, information and experiences." These results suggest that some institutions (e.g., highly selective colleges, research universities, and liberal arts schools) may facilitate students' aspirations and decisions

to enroll in graduate education programs because they offer abundant research opportunities and high-quality teaching.

Undergraduate Debt, Financial Aid, and Economic Cycle

While an economic analysis of graduate education requires detailed information on both costs and benefits of such a decision, scholars who have performed empirical research in this area have focused on the effects of undergraduate debt, financial aid, and broader economic conditions. Studies in which researchers have examined undergraduate debt as a potential financial deterrent with regard to graduate education have produced mixed results, with most revealing no influence (English & Umbach, 2015; Fox, 1992; Schapiro et al., 1991; Xu, 2014) or only minimal economic impacts (Heller, 2001; Kim & Eyermann, 2006; Millet, 2003). Only Malcom and Dowd (2012), Weiler (1994) and Zhang (2013) found a correlation between undergraduate debt and graduate school enrollment. In their examination of STEM undergraduates, Malcolm and Dowd (2012) found that cumulative undergraduate debt has a negative effect on graduate program enrollment in the STEM fields. Kim and Eyermann (2006) identify a significant positive relationship between debt and graduate school enrollment aspirations following the Higher Education Amendments of 1992 (which increased federal student loan limits and spurred an increase in borrowing) but no relationship prior to the amendments. These results indicate the effects of student debt may depend on the laws governing student loans. Although scholars have expected debt to have a negative impact on graduate school enrollment, the data either do not provide a conclusive answer or reveal a limited relationship that depends on other factors such as SES.

Financial aid for graduate education may encourage students to enroll in graduate school despite debts associated with undergraduate education. Even though Porter et al. (1991) did not find financial aid to have a significant influence on graduate school enrollment, Ethington and Smart (1986), Johnson et al. (2009), Millet (2003), and Xu (2016a) all found financial aid—and in the case of Xu (2016a), family contributions—to have a significant effect. As previously mentioned, Johnson et al. (2009) found that financial aid functions as a gatekeeper for students of color who attempt to gain access to graduate education. Similarly, Millet (2003) found that students who receive financial aid from their first choice graduate programs are twice as likely to enroll.

Although Perna's (2004) integrated model includes the influence of the economy, very few scholars have pursued this line of inquiry. Bedard and Herman (2006) and Johnson (2013) examined how changes in the economy and business cycle affect graduate school enrollment and found gender- and/or program-based differences. Bedard and Herman (2006) found that the influence of the economy on enrollment is procyclical for Ph.D. programs and countercyclical for Master's degree programs among males, and countercyclical for professional school programs among females (Bedard & Herman, 2006). In contrast, Johnson (2013) found that the influence of the economy on overall graduate school enrollment is countercyclical for women and acyclical for men.

Although one would expect economic factors to play a significant role in graduate school enrollment decisions, empirical results are surprisingly weak. Findings pertaining to the business cycle and undergraduate debt have not been conclusive. While results consistently show a positive effect of financial aid on graduate school enrollment, the effect tends to be small, and in

some cases insignificant. These results stand in direct contrast to results for undergraduate enrollment, which consistently confirm that financial subsidies improve college participation, although effects may vary across programs (Angrist et al., 2016; Castleman & Long, 2016; Dynarski, 2004; Goldrick-Rab et al., 2016; Long, 2004; Sjoquist & Winters, 2012). On average, an increase of $1,000 in financial aid improves the likelihood of college enrollment by 4 to 6 percentage points (Deming & Dynarski, 2010).

The difference in the effect of financial aid on undergraduate and graduate education may be due to the nature of financial aid available to graduate students. For example, many grant programs (e.g., Pell grants, state-sponsored merit aid) that have been shown to boost undergraduate enrollment are not available to graduate students. Graduate students are not eligible for federal subsidized loans. In other words, financial aid packages for graduate students are very different from those for undergraduate students. Most financial aid programs at the graduate level are provided by institutions or programs at the time of admission. As a result, students' enrollment decisions may be heavily influenced by non-financial factors including institutional and program fit.

Gender and Race/Ethnicity

An individual's habitus is a set of dispositions and preferences that help determine what is possible. Under the integrated model, an individual's habitus includes a variety of demographic characteristics and family background, which we discuss in two separate sections.

Researchers have attempted to understand variations in graduate school enrollment associated with gender and race/ethnicity. Gender has received the most attention in the literature and is a significant moderator of patterns and determinants of graduate school enrollment

(Bedard & Herman, 2006; Ethington & Smart, 1986; Freeman & Hirsch, 2008; Hearn, 1987 Isaac, Malaney, & Karras, 1992). The literature on gender-based differences in graduate education is well developed, and the data definitively show that gender directly and indirectly plays a role in students' aspirations and decisions to enroll in graduate education programs. Ethington and Smart (1986) were among the first to examine students' decisions to attend graduate school. Using Tinto's (1975) persistence/withdrawal model, they examined the influence of social and academic integration during undergraduate education on educational continuation. Although they found these undergraduate experiences to be significant for both men and women, academic integration is "by far more influential for men, whereas for women, social integration has a slightly larger effect" (Ethington & Smart, 1986, p. 301). Along with Ethington and Smart, Freeman and Hirsch (2008) found that women's Ph.D. degree choices are more responsive to "employment induced changes in job knowledge content" which in turn influence their decisions to pursue doctoral degrees in specific fields (p. 533).

Findings also demonstrate that gender has significant additive effects on graduate aspirations and enrollment (Mullen, Goyette, & Soares, 2003; Perna, 2004; Stoecker, 1991). Perna (2004) used her expanded economic model to examine how gender and race directly influence graduate enrollment. An analysis of the 93/97 Baccalaureate and Beyond data revealed gender-based differences in post-baccalaureate decisions: women are more likely to enroll in sub-master's/master's degree programs, whereas men are more likely to pursue professional degrees (Perna, 2004). Mullen et al. (2003) drew similar conclusions, finding that women are more likely to enroll in master's degree programs, whereas men are more likely to pursue MBA, professional or doctoral degrees. Factors such as GPA, undergraduate field salary, and Carnegie

Classification of the undergraduate institution also affect men and women differently, with women being more affected by salary and university classification (Perna, 2004). Despite this evidence, a few studies show no gender-based effects (English & Umbach, 2016; Schapiro, O'Malley, & Litten, 1991; Xu, 2014). English and Umbach (2016) found no significant influence of gender on graduate school aspirations, applications or enrollment, but significant influences of factors such as race, undergraduate major, and GPA. Likewise, Xu (2014) found that gender does not significantly influence graduate school enrollment, but does significantly affect educational attainment, with women being less likely to earn graduate degrees.

In addition to these direct effects, gender has indirect effects on persistence to graduate education, especially when considering a student's undergraduate major. Given gender's potential influence on major choice, scholars have focused their attention on gender differences in graduate enrollment based on major fields, particularly STEM disciplines (Sax, 2000; Xu, 2016a, 2016b). The focus on STEM comes from women's historical lack of participation in fields such as physics, engineering and computer science; although an increasing number of women are pursuing these fields, disparities still exist. Sax (2000) examined different factors contributing to men's and women's decisions to pursue STEM graduate degrees. Decisions of both men and women are positively influenced by college grades, interaction with faculty, and "making a theoretical contribution to science" (Sax, 2001, p. 165). Men are less likely to pursue graduate studies due to "their desires for status and authority and their wish for employment" in occupations they enjoy (Sax, 2001, p. 167), whereas women are less likely to enroll if they have family aspirations or seek to impact society (Sax, 2001). Thus, even when controlling for major, different factors influence men and women when making graduate school enrollment decisions.

Researchers have also sought to examine women's graduate school enrollment decisions (Battle & Wigfield, 2003; Davis et al., 2012). Battle and Wigfield (2003) examined undergraduate women's orientations toward either family or professional careers and found that women with a "stronger commitment to career goals in adult life" see more value in obtaining a future graduate degree (p. 69). Their findings also show that women consistently attempt to find a balance between the family and career orientations (Battle & Wigfield, 2003). While personal values may contribute to women's aspirations, other external influences affect women. Davis et al. (2012) found that academic performance and influential peers are positively associated with graduate degree aspirations.

Just like gender, race/ethnicity is a form of social and cultural capital that may influence post-baccalaureate decisions. Historically, the vast majority students who have pursued higher education have been white, sparking ongoing debate over whether students of color have equal access. Researchers have found that among college graduates, race/ethnicity has both moderating and additive effects on graduate school aspirations and enrollment (Centra, 1980; English & Umbach, 2015; Hanson, Paulsen, & Pascarella, 2016; Millet, 2003; Pascarella et al., 2004; Perna, 2004; Xu, 2014). Centra (1980) examined differences between white, Black, Asian and a combined category of Hispanic and Native American students pursuing degrees in the humanities, social sciences, and natural sciences. Although GRE score, academic performance and gender influence graduate school aspirations and enrollment for all students, these variables are stronger predictors for some groups than others. For example, GRE verbal scores are stronger predictors for Black and Asian students, whereas GPA is a stronger predictor for Hispanic and Native American students. These moderated results indicate clear distinctions across identity

categories and show that certain factors that may have stronger influences on graduate school aspirations and enrollment based on a student's race/ethnicity.

Research in this area continues to confirm the influence of racial identity, even when addressing additive effects. In 2004, Pascarella et al. found that African American and Hispanic students are more likely to aspire to pursue graduate degrees than white students 3 years post-graduation. While students of color aspire to attend graduate school more than their white counterparts, the same cannot always be said for actual enrollment in graduate school. Xu (2014) found that for students of color, the "likelihood of never attending graduate school within 10 years of college graduation was roughly double that of white students" (p. 399), thereby confirming Millet's (2003) findings that students in all racial minority categories (African American, Asian and Hispanic) are significantly less likely to enroll in graduate school when controlling for other variables. Thus, although students of color aspire to graduate school, fewer enroll relative to their white counterparts. Other studies yielded no or limited evidence to support the additive influence of race on graduate enrollment or aspirations (Heller, 2001; Schapiro et al., 1991). In a study of elite university students, Schapiro et al. (1991) only found a positive relationship between Asian identity and graduate school enrollment, and no significant relationships for other categories versus white students.

Johnson, Kuykendall and Winkle-Wagner (2009) interviewed 12 doctoral students in the fields of sociology and education who identified as African American or Hispanic/Latino to investigate how financial aid affects graduate school enrollment decisions for students of color. Financial aid was one of the primary "determinants for whether these students considered obtaining a graduate degree" (Johnson et al., 2009, p. 52). This focus on financial aid is

indicative of the ongoing barriers to higher education faced by students of color; a lack of financial aid negatively impacts their advancement beyond a baccalaureate education.

Finally, scholars have made connections across race and gender identity to establish a more intersectional perspective on the topic of graduate school aspirations and enrollment (Davis et al., 2012; Perna, 2004; Xu, 2016). Xu (2016) found no significant difference between men of color and their white counterparts in terms of likelihood to apply to graduate school, but found that women of color are more likely to apply than white women. In contrast, Perna (2004) found that Black men are more likely to pursue master's degrees, and Black women are more likely to pursue master's and professional degrees than their white peers. The results of these two studies show how intersecting identities can produce varied results depending on the outcome being examined (application vs. enrollment). Although these studies show statistical differences in education outcomes, Davis et al. (2012) highlighted some key factors to consider when examining aspirations to pursue graduate education among women of color. Surprisingly, faculty interaction negatively affects Black women's aspirations, which may be due to threatened stereotypes and feelings "unworthiness after interacting with faculty" (Davis et al., 2012, p. 159).

Perna's (2004) specifically created an integrated model to reveal the differences in enrollment along the axis of gender and racial identity. Each of these identities is a form of social and cultural capital that influences a student's access to and pursuit of post-secondary education. They also moderate a student's overall experience at an institution, and are relevant factors that influence post-baccalaureate aspirations and enrollment. Overall, it is no surprise that the literature on this subject demonstrates a significant correlation between these identities and post-

baccalaureate education. As society continues to be dominated by gendered and racialized discourse, students' educational achievement will continue to be affected.

Family Background

Family background is an important source of social and cultural capital for students. Factors such as parents' education level, immigration status and SES help determine access to resources that could encourage students' advancement to higher education and influence their overall aspirations and success.

Researchers who have examined student graduate aspirations and enrollment have focused extensively on parents' education level, with the vast majority reporting a significant relationship (English & Umbach, 2016; Isaac et al., 1992; Millet 2003; Mullen et al., 2003; Schapiro et al, 1991; Xu, 2016a, 2016b). Mullen et al. (2003) found that parents' education level has a positive influence on enrollment, particularly in professional or doctoral degree programs. Millet (2003) found that students whose parents have a bachelor's degree or higher are "1.2 times more likely to apply to graduate or first professional school" (p. 408). This strong relationship between parents' educational attainment and aspirations to pursue graduate education demonstrates the potential influence of cultural capital in the graduate education decision-making process (English & Umbach, 2016). Similarly, scholars have investigated the effects of being a first generation college student on graduate school aspirations and enrollment (English & Umbach, 2016; McCarron & Inkelas, 2006; Xu 2016a, 2016b; Zhang, 2005). Given the general positive relationship between parents' education level and graduate school enrollment, it is natural to assume that being a first generation college student would negatively impact graduate school aspirations and enrollment; all published evidence supports this

relationship. For example, McCarron and Inkelas (2006) examined first generation students' aspirations to pursue graduate education and attainment of graduate degrees versus their non-first generation counterparts. They found that a majority of "first generation students did not attain their original education aspirations" and only 2.8% of the 25% of first generation students who aspired to pursue graduate degrees attained them (p. 544).

Few scholars have considered immigration status, specifically undocumented students' post-baccalaureate pursuits. Based on interviews and ethnographic data, Lara and Nava (2018) found that the decisions of pre-DACA undocumented students are influenced primarily by their families, peers and mentors, and a desire for social activism. While no researchers have investigated how undocumented status directly affects enrollment in graduate school, Lara and Nava (2018) highlighted the complex decision making process for this student group.

The last factor related to family background is SES. Evidence on the relationship between SES and graduate school aspirations and enrollment is mixed and inconclusive. Several scholars have reported a significant relationship between SES and graduate school aspirations and enrollment (Millet, 2003; Walpole, 2003; Zhang, 2005). Walpole (2003) found that low SES students are less likely to enroll in graduate school overall, but females and students with high math scores on the SAT from this group are significantly more likely to enroll than other low SES students; no additional characteristics increase the already high enrollment potential for high SES students (Walpole, 2003). Other researchers found either mixed results (Kim & Eyermann, 2006) or no significant relationship (Ethington & Smart, 1986; Stolzenberg, 1994) between SES and graduate school enrollment. Stolzenberg (1994) posited an indirect relationship between SES and education continuation, whereby students gain access to resources that positively contribute

to their aspirations and enrollment in graduate school, but found it to be insignificant (Stolzenberg, 1994).

5. Summary and Discussion

The decision to pursue post-baccalaureate education is complex, and research on this topic has yielded a variety of results on the most influential factors for students who seek advanced degrees. Strong predictors of graduate school enrollment include academic performance, undergraduate major, college characteristics, and undergraduate experiences. Among all factors that influence students' aspirations and decisions to enroll in graduate programs, findings demonstrate consistently strong support for academic performance and undergraduate experiences, and the least support for the economy and finances. Findings consistently demonstrate that undergraduate debt has little impact on graduate education decisions, and contradictory conclusions on the relationship between the economy and enrollment in graduate education programs. Only financial aid has a relatively consistent positive impact on students' decisions, but the strength of this relationship remains weak. Finally, evidence consistently shows that social and cultural capital factors such as gender, race, and family background have significant influence in the overall decision making process. Although evidence does not always reveal gender or racial identity as significant factors that influence aspirations or enrollment in graduate education, they are associated with a considerable number of moderated effects. In some instances, racial minority students are more likely to aspire to pursue graduate education than their white counterparts. Along with gender and race, findings show that factors associated with family background, including parents' education level, immigration status and SES, contribute significantly to aspirations and decisions to enroll in

graduate school. SES in particular potentially has both direct and indirect influences on students' post-baccalaureate decisions.

While some findings of this review support Perna's (2004) integrated model when applied in the context of graduate education, other findings do not fit squarely into the main thrust of the framework. In particular, evidence consistently shows that social and cultural capital variables (i.e., race, gender, family background, and prior institutional characteristics and experiences) significantly influence students' aspirations and decisions to enroll in graduate school; even with minor contradictions, copious evidence demonstrates their influence. In contrast, little evidence exists to confirm the influence of standard economic variables (e.g., debt, financial aid, economic conditions). Although findings consistently show that academic factors including GPA, test scores, and undergraduate major significantly influence graduate education decisions, evidence is less consistent for financial factors such as undergraduate debt and the economy, with little demonstrated significance.

These results, at least at their face value, do not seem to support the core component of the integrated model, a cost-benefit analysis of graduate education. Compared with the undergraduate context, financial factors have a much weaker impact on aspirations and decisions to enroll in graduate programs. We contend that the centrality of the cost-benefit analysis to graduate school enrollment decisions needs to be either confirmed or reassessed, which will lead to two very different scenarios. In the first scenario, the centrality of the cost-benefit analysis to graduate school enrollment decisions is confirmed, and the integrated model applies in the context of graduate education. While the existing evidence regarding the effect of financial variables does not seem to support the preponderance of the cost-benefit analysis within the

integrated model, it does not necessarily reject the human capital framework either. For example, under the human capital framework, undergraduate debt can be viewed as a sunk cost, thus it should not be considered when deciding to enroll in graduate school. In addition, the relatively small effect of financial variables could be attributable to the nature of financial aid at the graduate level. Unlike for undergraduate students, the three largest sources of financial aid for graduate students are loans, institution-provided grants and assistance (e.g., tuition discounts and waivers, research or teaching assistantships), and private-sector grants (e.g., tuition reimbursement and financial aid provided by employers and foundations). Typically, the enrollment effect of loans is small, even at the undergraduate level. Most institutional financial aid at the graduate level is offered to doctoral students and students in particular fields (e.g., science and engineering). Private-sector grants are only available to a small proportion of graduate students. Therefore, additional research on the effects of different types of financial aid programs, especially non-loan programs, will help clarify the role of finance and financial aid in graduate school enrollment decisions.

In the second scenario, the centrality of the cost-benefit analysis to graduate school enrollment decisions is rejected. If that is the case, we will need a new framework for the graduate education decision making process. At the undergraduate level, the decision to attend college has been well studied and conceptualized. For example, the well-known three-stage process proposed by Hossler, Braxton, and Coopersmith (1989) includes predisposition, search, and choice. High school students first develop predispositions to attend college, then search for information about college and financial aid, and finally decide to enroll in programs at specific institutions based on admission criteria and financial considerations. Perna's (2004) integrated

model illustrates how various factors exert important influences during each of these stages. However, the decision to attend graduate school could be very different. For example, high school graduates typically are predisposed attend college before choosing a college to attend. The decision process for graduate school enrollment could be very different in that students may begin with a clear sense of which graduate schools and programs they want to attend. In other words, factors such as academic reputation, faculty and research resources, and geographic location may have a disproportionate influence on graduate school enrollment decisions. Understanding the impact of these non-financial factors would help build a conceptual model of graduate education decision making process.

In concluding this review, we suggest that in addition to the conceptual issues discussed above, research on graduate school enrollment can be expanded in two important dimensions: graduate programs and student groups. Graduate programs differ greatly in terms of admission criteria, degree requirements, and job prospects; they also differ in the availability and nature of financial aid. Thus far, most researchers have examined graduate school enrollment in general; however, differentiating between program types (e.g., master's, professional, doctoral) or across different fields of study will improve our understanding of graduate students' enrollment decisions. Similarly, graduate education decisions could differ across student groups. Although scholars have examined potential differences by gender, race/ethnicity, and family background, additional research on students at different stages of career development, veteran students, or students with disabilities will contribute substantially to this line of inquiry.

References:

Altonji, J. G., Blom, E., Meghir, C.(2012). *Heterogeneity in human capital investments: High school curriculum college major and careers*. Cambridge, Mass: National Bureau of Economic Research.

Angrist, J., Autor, D., Hudson, S., & Pallais, A. (2016). *Evaluating Post-Secondary Aid: Enrollment, Persistence, and Projected Completion Effects.* NBER Working Paper No. 23015.

Arcidiacono, P. (2004). Ability sorting and the returns to college major. *Journal of Econometrics*, *121*(1), 343–375.

Battle, A., & Wigfield, A. (2003). College women's value orientations toward family, career, and graduate school. *Journal of Vocational Behavior*, *62*(1), 56–75.

Bedard, K., & Herman, D. A. (2008). Who goes to graduate/professional school? The importance of economic fluctuations, undergraduate field, and ability. *Economics of Education Review*, *27*(2), 197–210.

Belasco, A. S., Trivette, M. J., & Webber, K. L. (2014). Advanced Degrees of Debt: Analyzing the Patterns and Determinants of Graduate Student Borrowing. *The Review of Higher Education*, *37*(4), 469–497.

Carter, F. D., Mandell, M., & Maton, K. I. (2009). The Influence of On-Campus, Academic Year Undergraduate Research on STEM Ph.D. Outcomes: Evidence From the Meyerhoff Scholarship Program. *Educational Evaluation and Policy Analysis*,*31*(4), 441–462.

Carnevale, A., Smith, N., & Strohl, J. (2013). The Road to Recovery: Projecting U.S. Job Growth and Higher Education Demand through 2020. *Community College Journal*, *84*(3).

Castleman, B. L., & Long, B. T. (2016). Looking beyond Enrollment: The Causal Effect of Need-Based Grants on College Access, Persistence, and Graduation. *Journal of Labor Economics*, *34*(4), 1023–1073.

Centra, J. A. (1980). Graduate Degree Aspirations of Ethnic Student Groups. *American Educational Research Journal*, *17*(4), 459–478.

Davis, S. D., Amelink, C., Hirt, J. B., & Miyazaki, Y. (2012). Women's Educational Opportunities: Factors that Influence Their Graduate School Aspirations. *NASPA Journal About Women in Higher Education*, *5*(2), 141–165.

Dynarski, S. (2004). The New Merit Aid. In Caroline M. Hoxby (Ed.), *College Choices: The Economics of Where to Go, When to Go, and How to Pay For It.*(pp. 63–100). University of Chicago Press.

Eide, E., Brewer, D. J., & Ehrenberg, R. G. (1998). Does it pay to attend an elite private college? Evidence on the effects of undergraduate college quality on graduate school attendance. *Economics of Education Review*, *17*(4), 371–376.

English, D., & Umbach, P. D. (2016). Graduate School Choice: An Examination of Individual and Institutional Effects. *The Review of Higher Education*, *39*(2), 173–211.

Ethington, C. A., & Smart, J. C. (1986). Persistence to graduate education. *Research in Higher Education*, *24*(3), 287–303.

Fox, M. (1992). Student debt and enrollment in graduate and professional school. *Applied Economics*, *24*(7), 669–677.

Freeman, J. A., & Hirsch, B. T. (2008). College majors and the knowledge content of jobs. *Economics of Education Review*, *27*(5), 517–535.

Goldrick-Rab, S., Kelchen, R., Harris, D. N., & Benson, J. (2016). Reducing Income Inequality in Educational Attainment: Experimental Evidence on the Impact of Financial Aid on College Completion. *American Journal of Sociology*, *121*(6), 1762–1817.

Goyette, K. A., & Mullen, A. L. (2006). Who Studies the Arts and Sciences? Social Background and the Choice and Consequences of Undergraduate Field of Study. *The Journal of Higher Education*, *77*(3), 497–538.

Hanson, J. M., Paulsen, M. B., & Pascarella, E. T. (2016). Understanding graduate school aspirations: the effect of good teaching practices. *Higher Education*,*71*(5), 735–752.

Hathaway, R. S., Nagda, B. (Ratnesh) A., & Gregerman, S. R. (2002). The Relationship of Undergraduate Research Participation to Graduate and Professional Education Pursuit: An Empirical Study. *Journal of College Student Development*, *43*(5), 614–631.

Hearn, J. C. (1987). Impacts of undergraduate experiences on aspirations and plans for graduate and professional education. *Research in Higher Education*, *27*(2), 119–141.

Heller, D. E. (2001). Debts and Decisions: Student Loans and Their Relationship to Graduate School and Career Choice.

Hossler, D., Braxton, J., & Coopersmith, G. (1989). Understanding student college choice. *Higher education: Handbook of theory and research*, *5*, 231-288.

Isaac, P. D., Malaney, G. D., & Karras, J. E. (1992). Parental educational level, gender differences, and seniors' aspirations for advanced study. *Research in Higher Education*, *33*(5), 595–606.

Johnson, M. T. (2013). The impact of business cycle fluctuations on graduate school enrollment. *Economics of Education Review*, *34*, 122–134.

Johnson, S. D., Kuykendall, J. A., & Winkle-Wagner, R. (2009). Financing the Dream: The Impact of Financial Aid on Underrepresented Minority Students. In M. F. Howard-Hamilton (Ed.), *Standing on the outside looking in: underrepresented students' experiences in advanced-degree programs*(1st ed, pp. 45–62). Sterling, Va: Stylus.

Kim, D., & Eyermann, T. S. (2006). Undergraduate Borrowing and Its Effects on Plans to Attend Graduate School Prior to and After the 1992 Higher Education Act Amendments. *Journal of Student Financial Aid*, *36*(2), 18.

Lara, A., & Nava, P. E. (2018). Achieving the Dream, Uncertain Futures: The Postbaccalaureate Decision-Making Process of Latinx Undocumented Students. *Journal of Hispanic Higher Education*, *17*(2), 112–131.

Long, B. T. (2004). Does the Format of a Financial Aid Program Matter? The Effect of State In-Kind Tuition Subsidies. *Review of Economics and Statistics*, *86*(3), 767–782.

Malcom, L. E., & Dowd, A. C. (2011). The Impact of Undergraduate Debt on the Graduate School Enrollment of STEM Baccalaureates. *The Review of Higher Education*, *35*(2), 265–305.

McCarron, G. P., & Inkelas, K. K. (2006). The Gap between Educational Aspirations and Attainment for First-Generation College Students and the Role of Parental Involvement. *Journal of College Student Development*, *47*(5), 534–549.

McDonough, P. M. (1997). *Choosing Colleges. How Social Class and Schools Structure Opportunity*. State University of New York Press.

Millett, C. M. (2003). How Undergraduate Loan Debt Affects Application and Enrollment in Graduate or First Professional School. *The Journal of Higher Education*, *74*(4), 386–427.

Mullen, A. L., Goyette, K. A., & Soares, J. A. (2003). Who Goes to Graduate School? Social and Academic Correlates of Educational Continuation after College. *Sociology of Education*, *76*(2), 143–169.

National Center for Education Statistics, U.S. Department of Education. (2018). *Postbaccalaureate Enrollment* (Digest of Education Statistics 2017) (pp. 1–6).

Pascarella, E. T., Wolniak, G. C., Pierson, C. T., & Flowers, L. A. (2004). The Role of Race in the Development of Plans for a Graduate Degree. *The Review of Higher Education*, *27*(3), 299–320.

Perna, L. W. (2004). Understanding the Decision to Enroll in Graduate School: Sex and Racial/Ethnic Group Differences. *The Journal of Higher Education*, *75*(5), 487–527.

Porter, A., Yang, R., Hwang, J., McMaken, J., & Rorison, J. (2014). The Effects of Scholarship Amount on Yield and Success for Master's Students in Education. *Journal of Research on Educational Effectiveness*, *7*(2), 166–182.

Radford, A. W. (2011). *Military Service Members and Veterans: A Profile of Those Enrolled in Undergraduate and Graduate Education in 2007-08. Stats in Brief. NCES 2011-163*. National Center for Education Statistics, U.S. Department of Education.

Radford, A. W. (2016). *After the Post-9/11 GI Bill: A Profile of Military Service Members and Veterans Enrolled in Undergraduate and Graduate Education*. National Center for Education Statistics, U.S. Department of Education.

Rumberger, R. W., & Thomas, S. L. (1993). The economic returns to college major, quality and performance: A multilevel analysis of recent graduates. *Economics of Education Review*, *12*(1), 1–19.

Sax, L. J. (2000). Undergraduate Science Majors: Gender Differences in Who Goes to Graduate School. *The Review of Higher Education*, *24*(2), 153–172.

Schapiro, M. O., O'Malley, M. P., & Litten, L. H. (1991). Progression to graduate school from the "Elite" colleges and universities. *Economics of Education Review*, *10*(3), 227–244.

Sjoquist, David L. and John V. Winters. (2012) "State Merit-based Financial Aid Programs and College Attainment." IZA Discussion Paper No. 6801.

Stoecker, J. L. (1991). Factors influencing the decision to return to graduate school for professional students. *Research in Higher Education*, *32*(6), 689–701.

Stolzenberg, R. M. (1994). Educational Continuation by College Graduates. *American Journal of Sociology*, *99*(4), 1042–1077.

Walpole, M. (2003). Socioeconomic Status and College: How SES Affects College Experiences and Outcomes. *The Review of Higher Education*, *27*(1), 45–73.

Wang, X., Lee, Y., & Wickersham, K. (2019). The Role of Community College Attendance in Shaping Baccalaureate Recipients' Access to Graduate and Professional Education. *Educational Researcher*, *48*(2), 84–100.

Weiler, W. C. (1994). Expectations, undergraduate debt and the decision to attend graduate school: a simultaneous model of student choice. *Economics of Education Review*, *13*(1), 29–41.

Xu, Y. J. (2014). Advance to and Persistence in Graduate School: Identifying the Influential Factors and Major-Based Differences. *Journal of College Student Retention: Research, Theory & Practice*, *16*(3), 391–417.

Xu, Y. J. (2016a). Advance to Graduate School in the US: How the Path is Different for Women in STEM. *International Journal of Gender, Science and Technology*,*8*(3), 420–441.

Xu, Y. J. (2016b). Aspirations and Application for Graduate Education: Gender Differences in Low-Participation STEM Disciplines. *Research in Higher Education*, *57*(8), 913–942.

Zhang, Liang. (2005). Advance to Graduate Education: The Effect of College Quality and Undergraduate Majors. *The Review of Higher Education*, *28*(3), 313–338.

Zhang, Lei. (2013). Effects of college educational debt on graduate school attendance and early career and lifestyle choices. *Education Economics*, *21*(2), 154–175.