ABSTRACT

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This study examines the persistent effects of social class on educational attainment in graduate school. Existing research suggests that the influence of parental education on educational outcomes declines in significance after undergraduate study. However these conclusions largely rest on examinations of graduate enrollment, not attainment once enrolled. This study aims to address this gap, comparing odds of graduate program completion among students with bachelor's degrees whose parents differ in their educational attainment. Using the Baccalaureate and Beyond Longitudinal Study (B&B), multinomial logistic regression models reveal that first-generation students and students whose parents received minimal college education experience significantly lower odds of completing master's, professional, and doctoral degrees by 2003, compared to students from parents with advanced degrees. Results highlight the potential for a sustained impact of class-based cultural capital on educational performance in graduate school.

Against the Grain: Lingering Parental Education Effects in Graduate Student Attainment

by
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DEDICATION

For my parents

BIOGRAPHY

Joshua Lambert was born on 1982 in Rhinelander, Wisconsin. He is currently a graduate student pursuing a doctoral degree in Sociology at North Carolina State University. He graduated from the University of Wisconsin – River Falls in 2009 with a bachelor's degree in Sociology. His research interests include analysis of various forms of social stratification, and specifically the role of social and cultural capital in the reproduction of inequality.

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Introduction

Social reproduction theories suggest that the education system remains a central battleground in the preservation of privilege (Bourdieu and Passeron 1977, Bowles and Gintis 1976, and Collins 1971). As credential inflation continues, dominant social groups rely more heavily on advanced degrees as a key sorting mechanism into the "best" jobs. Forecasting United States educational inequality into the 21st century, Gamoran (2001: 144-145) estimates, "by 2125, postsecondary schooling will be as nearly universal as secondary schooling is today, encompassing about 90 percent of the age cohort." According to Walters (2000), state policies widening educational opportunities for traditionally underrepresented groups operate as a "safety valve" in maintaining superior educational credentials, while Raftery and Hout (1993) use the term *maximally maintained inequality* to describe this process of educational saturation and subsequent elite flight to more advanced degrees. In other words, although more individuals are getting college degrees, relative credential stratification remains the same. Through this process, first-generation college students (students whose parents have no or limited college education) have become a sizable proportion among undergraduates. However, the extent to which the impact of parental education extends beyond undergraduate study and into graduate programs largely remains a mystery.

Within the study of higher education, the attributes of students, as well as the educational structure and processes contributing to differing outcomes have been of interest to educational researchers for some time. Most studies have centered on undergraduate experiences and outcomes, yet the transition with the largest reduction in student population

is the bridge between undergraduate and graduate programs. Of the total bachelor's degree recipients of 1992-93, fewer than half (40 percent) enrolled in a graduate degree program by 2003. Of those graduates, 31 percent entered master's programs, 5 percent entered first-professional degree programs, and only 4 percent chose to pursue a PhD (Nevill and Chen 2007).

One explanation for the lack of research on graduate students is they are such a small proportion of the student body as not to be strategically important to universities (Cooke, Sims and Peyrefitte 1995). However, this explanation does not consider the economic advantages of encouraging graduate student attainment. The investment made by graduate departments in graduate students through assistantships, fellowships, and other avenues rest on the assumption that they will in fact complete the degree in a timely manner, attract prestige through publishing good work, and possibly bring funding into the department through grants.

From the perspective of the student, the pursuit of a graduate education allows access to careers of significant income and prestige including work in medicine, law, and education. Specifically, compared to college graduates, those with graduate degrees can expect higher median weekly earnings, lower unemployment rates, and greater year-round, full-time employment (BLS 2011; Julian and Kominiski 2011). Aside from specific career outcomes, nonmonetary benefits of education include: positive health effects, human capital produced in the home, lifelong adaptation and continued learning, and motivational attributes (McMahon 1998). Therefore, the benefits of acquiring these advanced degrees should not be overlooked.

A variety of factors have been shown to be significantly correlated with enrollment and attainment, including race/ethnicity, age, undergraduate major and GPA, and parents' educational attainment (Nevill and Chen 2007). This study examines the role of parental education in influencing graduate school completion. The following analysis aims to investigate graduate program attainment by utilizing a national sample of graduate students, while focusing specifically on the effect of first-generation college student status.

Existing research has been interpreted suggesting that parental education does not affect educational attainment after graduating college. Results indicate past factors such as undergraduate experiences, as well as attitudes and expectations shaped though college largely eliminate the influence of family educational background on enrollment in graduate school. However, enrollment does not equal attainment. Do previous undergraduate experiences and expectations continue to mediate parental education effects *after* enrollment or does first-generation status linger as a direct predictor of graduate attainment?

Before assessing the effect parental education has on graduate attainment, the following review of literature will provide an empirical foundation in three parts: 1) analyses of first-generation undergraduates, 2) research concerning graduate program attainment, and 3) debate surrounding the lingering presence of parental education effects among college graduates.

Parental Education Effects among Undergraduates

Bourdieu's (1984) concepts of cultural capital and habitus are useful tools in examining parental education effects in higher education. Habitus includes a wide range of

adaptive behaviors, beliefs, and values passed down to offspring through socialization that reproduce inequality. Other terms used by Bourdieu to describe habitus include "cultural unconscious", "habit-forming force" or "mental habits" (Swartz 1997 pp. 100-102).

If children of college educated parents absorb a "college graduate habitus," theoretically they possess a more useful set of cultural tools applicable to college success than first-generation students. Therefore, the case can be made that when compared to other students, first-generation students lack vital social and cultural characteristics that help facilitate attainment regardless of academic ability, which helps explain motivational and integrative factors being more prominent factors among first-generation students than nonfirst-generation students (Prospero & Vohra-Gupta 2007).

Because first-generation students make up a considerable proportion of undergraduate students, existing literature examining first-generation students concentrates on experiences and outcomes in relation to undergraduate education. Therefore, in order to get a better understanding of how first-generation students and nonfirst-generation students differ educationally a concerted exploration of these studies is warranted. Prior studies on first-generation college students fall into three categories: 1) comparisons between first-generation students and nonfirst-generation students in terms of demographic characteristics, secondary school preparation, the college choice process, and college expectations, 2) attempts to describe and understand the transition from high school to postsecondary education, 3) examinations of persistence in college, degree attainment, and early labor market outcomes (Pascarella, Pierson, Wolniak, & Terenzini 2004).

Throughout these different analyses one fact becomes clear; that first-generation status is a distinct and significant factor in understanding postsecondary education outcomes in the United States. For instance, studies conducted by the National Center for Education Studies conclude that first-generation students are at a distinct disadvantage, even when controlling for educational expectations, academic preparation, support from parents and schools in planning and preparing for college, and family income (Choy 2001). A Bourdieuian framework helps contextualize these differences in a variety of ways.

First, family cultural capital plays a significant role in the chosen institutions and the experiences that follow (Pascarella et al. 2004). First-generation students perceive their peers as better able than family members to provide instrumental support needed to perform well in college (Dennis, Phinney and Chuateco 2005). It is also important to note that one cannot assume that schools compensate for parents' lack of knowledge. First-generation students are not more likely than others to receive help from their schools in applying for colleges (Choy 2001).

Second, family cultural capital may also influence educational expectations and a sense of belonging. Students with college educated parents tend to interpret being admitted into a college or university as evidence in and of itself that they "belong" primarily because it falls in line with family traditions and expectations. On the other hand, first-generation students are forced to break out of the mold set by family history, thus creating additional cultural and social transitions, increasing feelings of environmental dissonance (Terenzini, Rendon, Upcraft, Miller, Allison, Gregg and Jolomo 1994; Orbe 2004).

Third, "college graduate habitus" may be reflected in the way first-generation students approach postsecondary education, helping to explain why students with highly educated parents choose to approach higher education in an immersive fashion, fully integrating themselves academically, socially, and geographically, whereas first-generation students do not. Descriptive inquiry distinguishes between group differences by parental education, indicating that first-generation students place greater importance on financial constraints, geographical limitations (needing to remain close to home), and needing night courses, creating an attraction to community colleges rather than large research institutions (Inman & Mayes 1999). First-generation students also tend to enroll at less academically selective institutions, even when controlling for academic ability and motivation. When enrolled, first-generation students take significantly fewer credit hours and work significantly more hours per week, and are less likely to live on campus compared to other students. In light of a lighter academic workload, it remains even more troubling that first-generation students still have significantly lower cumulative grades. Priority of work over classes and relatively low extracurricular involvement and non-course interaction with peers, is also highly correlated with decreased intellectual and personal development in college (Pascarella et al. 2004).

These differences are not without consequence. Parental education has also been associated with undergraduate persistence. Ishitani (2003; 2006) further divided the first-generation group of students in order to get a better idea of the varying effects of parental education on college attrition, introducing a middle group of students whose parents had 'some college', but had not received a bachelor's degree (a technique replicated here).

Results indicate first-generation students are 1.3 times more likely than children of college graduates to leave their institutions, and students with parents who have 'some' college education are about twice as likely to quit. He also notes after controlling for a host of other factors, first-generation student persistence varies by time, the risk of dropping out being highest in the first year.

Graduate Program Attainment

First-generation students are generally less integrated in pursuit of bachelor's degrees, resulting in lower attainment. Student integration likely remains important in graduate programs, however analyses of parental education effects--and first-generation student experiences specifically--are largely missing from the literature. Social reproduction theory provides a lens through which to see the usefulness of cultural capital in being familiar with the unwritten rules of graduate student conduct. In other words, parental education might facilitate a useful "college graduate habitus" that plays a significant role in providing a key avenue for acquiring critical advice and guidance. If this is true, then one would expect to see less graduate program attainment for first-generation college students compared to nonfirst-generation college students.

Most research on graduate program attainment employs small-scale nonrandom sampling of one or just a few institutions and often (but not always) prefer qualitative data to better understand why students choose to leave (Decker 1973; Golde 1998; Golde 2005; Lovitts 2001; Gardner 2008), or why it take some longer than others to complete (Seagram, Gould, and Pyke 1998; Ehrenberg and Mavros 1995; Valero 2001).

Studies focusing on departmental characteristics have concluded that factors such as financial support, poor fit of expectations between student and department, structures and cultures of departments, and student-advisor relationships affect time to completion and rates of success (Valero 2001; Golde 2005). However, this does not necessarily translate to other institutional levels, for persistence has not been found to be specific to discipline or the overall culture of a given university (Lovitts and Nelson 2000). Importantly, these studies reveal how higher education faculty members blame attrition on student incompetence, while unsuccessful students cite departmental factors in their decision to leave.

Another important consideration is unsuccessful graduate student integration relating to age, race, family status, and part-time enrollment (Gardner 2008). Seagram et al. (1998) found that gender and financial support had little to do with time to completion, which rather was a result of collaboration and quality of supervision. This reinforces emphasis on access to vital information including dominant cultural messages, program requirements, and both formal and informal guidance (Golde 2005; Lovitts 2001). Taken together, these studies indicate reasons for leaving generally depend on who is asked, and departmental differences largely rest on integration facilitating information flow. Cultural capital acquired through parental education may very well provide grounds for facilitating these mentoring relationships and other integrative processes.

In a rare case considering first-generation graduate students, Gardner and Holly (2011) argue that deficits in valued social and cultural capital result in challenges unique to this population. While these students often took pride in becoming educational trailblazers, interviews shed light on three commonly reported obstacles in pursuit of doctoral degrees.

First, students expressed frustration with the sole responsibility of learning to navigate graduate program structures and expectations, while perceiving other students as already being familiar with the "rules if the game." Second, becoming further removed from family background forced these students to straddle the worlds of a working-class upbringing and academia. Some parents who had previously been encouraging during college became less supportive and anxious at the amount of time their daughter or son was spending in a graduate classroom, and not out finding a job. Suddenly feeling like an imposter at home and away at school, negotiating and balancing these disparate environments proved draining for many interviewees. Lastly, students reported developing a "second family" consisting of faculty, peers, and other mentors. Since they could not rely on instrumental support from parents, the importance for developing a support network became increasingly salient if they hoped to succeed (Gardner and Holly 2011).

The Persistence of Parental Education Effects

Leaving home to attend college introduces students to a whole new set of relationships and influences. These experiences hold the potential to shape an individual in ways that may contradict family background. Pascarella et al. (2004) found that despite various disadvantages, first-generation students appear to be rather resilient during undergrad, for lack of parental education did not significantly lower cognitive and noncognitive outcomes. This, coupled with a greater educational benefit from academic engagement versus nonfirst-generation students, suggest that once enrolled, college experiences have the potential to compensate for parental education deficits.

Existing research utilizing nationally representative samples tends to examine parental education effects in relation to graduate program enrollment, not necessarily attainment once enrolled. Using several large datasets, Mare (1980) witnessed a declining significance of family background in school enrollment. While parental education levels strongly affected early educational progression, it virtually disappeared when predicting transitions beyond college. Stolzenberg (1994) updated these findings using the NLS-72 dataset to examine parental SES effects on educational continuation among college graduates. Finding similar declines in parental education effects, results provide support for the Wisconsin status attainment model, designating educational aspirations as the central mediator through which parental SES is associated with enrollment in MBA programs.

These studies often show that when examined on its own, parental education does appear associated with graduate enrollment, however these findings do not hold up when controlling for other factors. For instance, Mullen, Goyette, and Soares (2003) used the larger and more recent Baccalaureate and Beyond (B&B) dataset to examine enrollment separately by doctoral, professional, MBA, and Master's program. Initial descriptive results appear to refute previous conclusions, indicating that parents' education does have an impact on graduate program enrollment; however the extent varies by the graduate program entered. MBA's showed a modest significant enrollment difference between first-generation and nonfirst-generation students (18% compared to 22%), however the gap between first-generation and nonfirst-generation students became considerably larger for first-professional and doctoral degrees (2.2% and 7.1% respectively). Each year increases one's odds of enrolling in a master's by 6 percent, in a MBA by 16 percent, and in a first-professional or

doctoral by over 20 percent. However, when considered in conjunction with other variables, parental education became largely mediated by student's academic performance, undergraduate institution, attitudes and expectations (Mullen et al. 2003).

Parental education and graduate attainment has been explored using the same B&B dataset, however in a limited fashion. Zhang (2005) set out to observe the effect of college quality and undergraduate major on graduate enrollment, yet results included one model examining institutional, demographic, family, and academic variables predicting degree attainment. Similar to enrollment, undergraduate institution and (undergraduate) academic performance were strong predictive factors of receiving a degree, however first-generation status was not significantly associated with attainment. This further reinforces the argument that parental education ceases to matter in this life stage, however this analysis only followed respondents four to five years after graduating college. Research considering a longer time frame would allow more variation in the attainment variable and provide a more reliable measure of graduate student attainment. In order to extend Mullen et al.'s (2003) and Zhang's (2005) findings, the following analysis uses the same dataset with a subsequent wave to retest potential mediating effects on who actually completes graduate programs once enrolled. Specifically, undergraduate experiences, attitudes and expectations, and graduate program field are investigated as potential mediating factors in the relationship between parental education and degree attainment over a ten-year period.

In summary, existing research on parental education and post-secondary attainment present an interesting problem. Parental education clearly plays a central role in academic and social integration for both undergraduate and graduate students. Lack of integration

among first-generation students is associated with lower college attainment. Qualitative reports suggest first-generation graduate students are similarly less integrated, yet attainment has largely been overlooked, with graduate enrollment research concluding parental education differences no longer exist after completion of a bachelor's degree. But what happens after enrollment? Even if certain factors supplant family background in the decision to enroll in graduate school, does that necessarily mean first-generation status is no longer salient among graduate students? Since first-generation students bring distinct family cultural capital into both undergraduate and graduate programs, perhaps enrollment measures provide premature conclusions regarding lingering parental education effects. Thus, the analysis here will examine the persistence of parental education on attainment over a decade's time, examining only those who enrolled in graduate school.

Methods

Data

The Baccalaureate and Beyond Longitudinal Study (B&B) is a nationally representative longitudinal study of students who earned a bachelor's degree during the 1992-93 academic year. The general student response rate for the study is 83 percent, with approximately 74 percent of the B&B study population represented by the respondents (NCES 2005). It draws its initial cohorts from the National Postsecondary Student Aid Study or NPSAS, which uses a national sample of postsecondary students and institutions to examine how students pay for postsecondary education. Initial B&B cohorts are a representative sample of graduating seniors in all majors. The first B&B cohort (about

11,000 students) was drawn from the 1993 NPSAS and followed-up by survey in 1994, 1997, and 2003 (NCES 2009). The working sample consists of respondents who indicated enrollment in a graduate program at any time between 1993 and 2003 and did not have missing values on any other predictor (N=2630)[1].

[Insert Table 1 about here]

Dependent Variables

The dependent variable indicates graduate student enrollment and attainment status as of 2003. The variable has three categories: attained terminal master's degree, attained professional/doctoral degree, and no degree attainment. The no degree attainment category includes both those with no degree and those still enrolled as of 2003, for when coded separately in similar models (not shown here), these two groups showed no statistically significant difference. Additionally, univariate statistics for graduate program start date indicates over 90% of the working sample began prior to 2000, indicating most had considerable time to complete. In the following analysis, no degree is used as the reference category. Attainment of first professional and doctoral degrees is also collapsed for several reasons. First, when coded separately in similar models (not shown here) they illustrated similar effects compared to the reference category. Second, apart from terminal master's

[1] Paired-sample t-tests indicate that, compared to the overall sample, the analytic sample is slightly younger and respondents report lower average GPAs, lower educational expectations, and fewer professional or doctoral degrees. However, I ran subsequent models excluding the three attitude variables (which account for most of the missing cases), and results did not substantively differ from those reported here. These analyses suggest that bias due to sample selection is likely to be minimal. Nonetheless, in future analyses I intend to run Heckman selection models to further address concerns about potential selection bias due to listwise deletion.

degrees, professional and doctoral degrees share many similarities in terms of professional development, time and financial commitments.

Independent Variable

The main independent variable reports the highest level of education by either parent. I include four categories; "no college", "some college", "college graduate", and "post graduate". No college represents parental education at, or less than, a high school degree. 'Some college' represents any parental education in college less than a bachelor's degree. 'Bachelors' represents parental education of a bachelor's degree by either parent. 'Advanced degree' represents parental education of a graduate degree by either parent. Parents with advanced degrees serve as the reference category, as they are the largest category among those at one time enrolled in graduate school and they should have the most useful cultural capital for navigating graduate programs.

Control variables

I control for the demographic characteristics of respondents, including race (white as reference), gender (male as reference), and age.

Undergraduate Experience Characteristics

Cumulative undergraduate grade point averages are used as a measure of prior academic performance.[2] It is also important to measure undergraduate institution characteristics (Mullen, Goyette and Soares 2003). As a measure of institution mission, I created dummy variables using the revised 2000 Carnegie classification scheme,

[2] This indicator is preferred over SAT/ACT scores for three reasons: 1) not all postsecondary institutions require SAT/ACT scores, 2) these tests often contain significant gender, race and class bias (Lemann 1999), and 3) to capture the largest sample – (GRE scores as an alternate standardized assessment were only collected in the 1997 questionnaire).

distinguishing between doctoral 1, doctoral 2, masters 1, masters 2, baccalaureate, and specialized institutions. Research-oriented undergraduate institutions may help socialize students to the expectations of graduate programs, as well as provide a setting for current and potential graduate students to interact. On the other hand, students who attended colleges and Universities with few or no graduate programs may not be familiar with how graduate programs work, or have participated in lectures and labs utilizing graduate assistants. A contradictory process should be considered as well, as it complicates a complete interpretation of undergraduate institution effects. Undergraduate institutions with graduate programs may focus less on undergraduate students, thus leaving less of an imprint facilitating graduate attainment. Also included is a dummy variable for institutional control, with 'private' the reference category.

Attitudes & Expectations

Educational expectations are measured by a survey question on highest degree expected. This variable was recoded to represent the estimated number of years for each degree type. Thus baccalaureate was coded as 16, post-baccalaureate certificate 17, master's degree 18, first-professional degree 19.5, and finally doctoral degree 21 (for this coding scheme, see Mullen et al. 2003). This not only allowed inclusion of educational expectations without needing multiple dummy variables, but also took into consideration nonlinear time investment between graduate programs.

I also include three dichotomous indicators of attitudes about careers before entering graduate school in 1993, specifically whether or not respondents rated as important: 1) being

successful in one's line of work, 2) being very well-off financially, and 3) influencing the political structure.

Graduate Program Characteristics

Previous research involving smaller samples indicated graduate program characteristics can be a significant factor explaining attrition rates. Unfortunately, the B&B dataset does not include measurements of program characteristics such as propensity for social and academic integration. Even so, the experience of graduate students likely differ a great deal based on what field they enter. Thus, I include dummy variables for a host of different graduate program types. These groupings include the following majors: arts/humanities, social sciences, life/physical sciences, engineering/math/computer sciences, business, medicine, law, other major, with the largest category of education used as reference.

Analytic Strategy

The following analysis focuses on the effect of parental education on graduate attainment. It then explores three groups of potential mediating factors, undergraduate characteristics, attitudes and expectations, and graduate program field. Demographic controls are included in all models, with each set of additional variables added on their own to assess independent effects. Finally, the last model examines cumulative effects of all covariates.

Results

Table 2 shows the odds ratios from the multinomial logistic regression analyses. Values that exceed 1 indicate positive relationships, whereas values below 1 are negative. Model 1 includes only parental education measures and demographic controls. Although all levels of parental education exhibit lower odds of completing a graduate degree compared to students whose parents attained advanced degrees, these differences are only significant for first-generation students and students with parents having only limited college experience. Thus, upon initial investigation controlling for sex, race, and age, no statistical difference exists between students whose parents have bachelors and those with advanced degrees in terms of attaining a graduate degree within a decade of graduating college.

[Insert Table 2 about here]

In terms of attaining a master's degree, compared to students with graduate educated parents, first-generation students and those with some parental education have 30 percent and 26 percent lower odds of receiving a graduate degree respectively by 2003. Both groups have less than half the odds compared to students with the highest level of parental education to receive professional or doctoral degrees in this same ten year span.

Model 1 also illustrates the impact of both sex and age, a trend continuing throughout all other models (race indicators do not show significant effects in any model). Max-rescaled R^2 statistics - which help compensate for model fit assumptions within logistic regression models - indicate the model explains a modest five percent of the variation in program outcomes. Compared to men, women have higher odds of completing a master's degree, whereas they have lower odds of completing a first-professional or doctoral degree. Being

an older student also has negative consequences, with each additional year of age decreasing one's odds of completing first-professional or doctoral degrees by roughly 10 percent.

In addition to demographic controls, Model 2 adds undergraduate performance and institutional setting measurements. Results indicate these characteristics have a small effect on the relationship between parental education and graduate program attainment. Odds ratios for parental education and demographic controls are similar to Model 1, with the largest shift being an increase in odds for students with some parental education to complete a professional or doctoral degree by 8 percent, with a slight reduction in statistical significance.

Although undergraduate factors do not significantly mediate parental education, GPA and most Carnegie classifications nonetheless maintain significant odd ratios. For each grade point increase, one's odds of completing a master's degree by 2003 increase 32 percent, and more than double for finishing professional and doctoral degrees. While no significant difference exists between graduates of doctoral-1 and doctoral-2 undergraduate institutions, students from primarily master's and baccalaureate granting schools experience less than half the odds of completing professional and doctoral degrees compared to those exiting heavily research-oriented colleges and universities. This suggests exposure to advanced programs may be beneficial for attainment, however the extent to which this effect is attenuated by contradictory institutional effects mentioned in the previous section is unknown. While those from specialized schools face 81 percent lower odds of completing more advanced degrees, the unique and varied emphases among these institutions prevent adequate means for interpretation. Finally, compared to those from private colleges, graduates from public

undergraduate institutions experience 41 percent lower odds of completing professional and doctoral degrees by 2003.

Model 3 introduces attitudes and expectations upon graduating college in 1993. As in Model 2, these measurements do not significantly reduce the effects of parental education, sex, and age on graduate program completion. In fact, odds ratios for any given significant covariate do not change any more than three percentage points, and most less than two. The only significant predictor within the attitudes and expectations module is highest degree expected among professional and doctoral students. On the surface this makes sense, seeing as though degrees requiring the most time and dedication may be more likely planned in advance.

Model 4 introduces graduate program field, which dramatically increase model fit. Whereas Models 1, 2, and 3 each explained 5, 8, and 11 percent of the variance in the graduate outcomes between 1993 and 2003, including program field increases this to 26 percent. However, considering this increase in explanatory power, parental education, sex, and age effects appear robust, most only shifting several percentage points. One exception is the odds ratio for first-generation student attainment of professional and doctoral degrees, with a seven percent increase in the odds of completion. Nonetheless, compared to students with the highest level of parental education, first-generation students remain around half as likely to complete by 2003. This is also the first model to show a slight shift in relative parental education effects, with first-generation students gaining a small (but insignificant) advantage over students with parents of limited college education in the odds of completing a

professional or doctoral degree.[3] In terms of predicting completion of master's degrees, law and life/physical sciences programs are the only fields significantly different from the reference category of medicine majors, having 66 percent and 44 percent lower odds of completing respectively. Given the propensity for law degrees especially to fall into the professional degree category, this is not particularly surprising. This makes even more sense considering one's odds of completing a professional or doctoral degree in law is more than 3 times that of those in medicine, who show the most equal distribution across the three categories. Compared to those in medicine graduate programs, every other statistically significant graduate field has lower odds of completing professional and doctoral degrees. With considerably different odds ratios between them as well, this illustrates the difference field of study can make when it comes to completing a degree ten years from attaining a bachelor's degree.

Whereas previous models explored independent effects of each variable group, Model 5 includes cumulative effects of all independent and control variables. Model fit statistics show this full model accounts for over 30 percent in the variance in graduate outcomes over this ten-year span. With the exception of one undergraduate institution Carnegie classification (Master's 2), all variables which were statistically significant in partial models, remain statistically significant when included together. Of importance here is the continued robustness of parental education effects for both first-generation students and students with limited parental education. Compared to students with highly educated parents, first-generation students continue to experience 32 percent lower odds of completing a Master's

[3] Descriptive results not presented here indicate similar graduate field distribution among the 'no college' and 'some college' categories.

degree, and 46 percent lower odds of completing a professional or doctoral degree. As before, having parents with 'some college' does not appear to improve one's chances of completing. Model 5 predicts these students still face 26 percent lower odds of receiving a Master's, and 53 percent lower odds of attaining a professional or doctorate degree by 2003.

Discussion and Conclusion

Existing research tells us that first-generation students uniquely experience undergraduate programs, often resulting in lower attainment compared to nonfirst-generation students (Pascarella, Pierson, Wolniak, & Terenzini 2004). Qualitative research of first-generation graduate students also highlights unique experiences, yet attainment measures largely remain missing (Gardner and Holly 2010). Using similar controls than those found to be mediating factors in graduate enrollment (Mullen et al. 2003), this analysis tests the persistence of parental education effects following enrollment. Results indicate that these factors in graduate program enrollment do not explain attainment once enrolled. High expectations, academic performance, and undergraduate institution type may help encourage first-generation students to enroll in graduate programs, however parental education effects remain salient once they enter. These robust parental education effects suggest cultural capital may play a role in how integrated students become once they enter graduate school and whether they eventually complete. As expected, parental education effects differ across degree type, reducing the odds of completing to a larger degree in professional and doctoral programs compared to master's programs. This difference problematizes conclusions made when only examining one type of degree, or treating graduate education in aggregate.

Limitations and Directions for Future Research

One limitation in the current sample is right censoring of cases. Since the final wave imposes an end point, some currently enrolled students relegated to the non-attainment category will eventually complete, and are thus not accounted for. In spite of this right-censoring, ten years is useful in assessing the vital post-baccalaureate period in which most individuals attain graduate degrees. Another limitation is a lack of measures in the B&B dataset of graduate department characteristics. With promising small-sample research on student integration between graduate program departments, it would be useful to include various department-level measurements in future nationally representative studies. Finally, mechanisms in this process are not fully specified. Instead of cultural differences, attainment may actually result from unmeasured factors such as intergenerational wealth transfers which play a role in easing graduate student burden.

Conclusion

Some have indicated the limited salience of parental education as one becomes more educated, citing mainly indirect effects on graduate enrollment (Stolzenberg 1994; Mullen et al. 2003). The results here suggest parental education remains a significant direct predictor in who completes graduate degrees once enrolled. Therefore, graduate student retention partially rests on concerted efforts to understand student backgrounds and cultivate norms of inclusiveness.

Graduate faculty must caution against misinterpreting working-class cultural capital as a lack of drive or intelligence, and provide mentoring in such areas as attire, etiquette, and professionalism. They must remain aware of their own middle class biases, and explicitly

convey both intellectual and behavioral expectations. Writing to this audience, Fischer and Zigmond (1998) argue for integrating various survival skills into graduate training, including communication skills, responsible conduct, and networking. As cultural capital indicators, recognizing first-generation status will help create a target audience for this training. In addition to graduate faculty, such federal programs as the McNair Scholars Program have stated goals to help traditionally underrepresented groups including first-generation students, enter and complete graduate school. However, while academic guidance (importance of good letters of recommendation) receives explicit attention, cultural capital remains largely overlooked (*how* to form relationships with faculty to get good letters) (Lambert 2009). It is precisely these aspects of student preparation that may make the difference in graduate attainment.

Researchers have used social reproduction perspectives to illustrate how competition over institutionalized cultural capital emphasizes the need for applicable habitus in higher education especially, stating "If college degrees lose value through saturation, those who rely on educational capital to reproduce privilege will increasingly take the additional step of investing in graduate degrees" (Mullen et al. 2003 p. 144). This analysis is a crucial step in an effort to understand the cultural capital processes within graduate program environments that help to sustain social class disparities in educational attainment. As graduate degrees are increasingly required for substantial upward mobility, further study of graduate student populations are becoming crucial in further testing and developing social reproduction theories. Not only do we need to continue looking at reasons why individuals decide to

leave higher education, but also investigate why some groups enter graduate school running while others struggle to find their place.

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APPENDICES

APPENDIX

Table 1: Descriptive Statistics

Variable	Mean	Std Dev	Minimum	Maximum
Graduate Outcomes				
Masters	0.49	--	0	1
Prof/PhD	0.11	--	0	1
No Degree [ref]	0.39	--	0	1
Parental Education				
No College	0.26	--	0	1
Some College	0.19	--	0	1
Bachelor's Degree	0.24	--	0	1
Advanced Degree [ref]	0.30	--	0	1
Demographic Controls				
Female	0.60	--	0	1
Male [ref]	0.40	--	0	1
Black	0.07	--	0	1
Other Race	0.06	--	0	1
White [ref]	0.87	--	0	1
Age	23.96	5.53	18	59
Undergraduate Experience				
Cumulative GPA	3.24	0.44	0.9	4
Doctoral 2	0.11	--	0	1
Masters 1	0.30	--	0	1
Masters 2	0.04	--	0	1
Baccalaureate	0.17	--	0	1
Specialized	0.03	--	0	1
Doctoral 1 [ref]	0.36	--	0	1
Public	0.62	--	0	1
Private [ref]	0.39	--	0	1
Graduate Program				
Arts/Humanities	0.09	--	0	1
Social Sciences	0.08	--	0	1
Life/Physical Sciences	0.04	--	0	1
Engineering/Math/Comp	0.07	--	0	1
Business	0.18	--	0	1
Medicine [ref]	0.10	--	0	1
Law	0.06	--	0	1
Other Major	0.10	--	0	1
Education	0.28	--	0	1

Table 1 Continued

Attitudes & Expectations				
Highest degree expected	18.99	1.46	16	21
Being successful in line of work	0.97	--	0	1
Being very well off financially	0.54	--	0	1
Influence the political structure	0.43	--	0	1

Table 2: Odds Ratios for Multinomial Logistic Regression on Graduate School Completion

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Masters vs. No Degree	Prof/Phd vs. No Degree	Masters vs. No Degree	Prof/Phd vs. No Degree	Masters vs. No Degree	Prof/Phd vs. No Degree	Masters vs. No Degree	Prof/Phd vs. No Degree	Masters vs. No Degree	Prof/Phd vs. No Degree
Parental Education										
No College	0.693**	0.438***	0.695**	0.494***	0.692**	0.466***	0.676**	0.512**	0.676**	0.538**
Some College	0.736*	0.460***	0.749*	0.543**	0.733*	0.484***	0.728*	0.451***	0.736*	0.466**
Bachelors	0.867	0.834	0.874	0.907	0.866	0.906	0.871	0.800	0.877	0.903
Demographic Controls										
Female	1.288**	0.630***	1.245*	0.615***	1.302**	0.645**	1.253*	0.649**	1.211*	0.698*
Black	0.845	1.076	0.890	1.368	0.800	0.807	0.842	1.126	0.844	1.122
Other Race	0.958	1.360	0.994	1.283	0.941	1.228	0.957	1.322	0.981	1.213
Age	0.999	0.896***	0.997	0.913***	0.999	0.904***	0.999	0.923***	0.996	0.943*
Undergraduate Experience										
Undergraduate GPA			1.315**	2.276***					1.342**	2.065***
Doctoral-2			1.189	0.713					1.192	0.844
Masters-1			1.054	0.421***					1.040	0.509**
Masters-2			0.864	0.422*					0.862	0.788
Baccalaureate			0.950	0.476***					0.949	0.486**
Specialized			0.786	0.186**					0.763	0.166**
Public			0.859	0.587***					0.845	0.659*

Table 2 Continued

Attitudes & Expectations								
Degree Expect			1.021	1.709***			1.023	1.873***
Success			1.061	0.781			1.049	0.635
Well Off			1.148	1.070			1.136	0.876
Pol Structure			1.153	1.233			1.160	0.901
Graduate Program								
Art/Humanities					0.714	0.170***	0.698	0.126**
Social Sciences					0.840	0.192***	0.811	0.114**
Life/Physical Sciences					0.562*	0.428**	0.552*	0.305**
Eng/Math/Comp					0.698	0.168***	0.674	0.155***
Business					1.016	0.020***	0.985	0.022***
Education					0.887	0.030***	0.894	0.030***
Law					0.330**	3.251***	0.308**	3.359***
Other Major					0.713	0.244***	0.723	0.261***
Observations ≈	2630	2630	2630	2630	2630			
Pseudo R2	0.043	0.069	0.096	0.224	0.272			
Max-rescaled R2	0.050	0.081	0.113	0.262	0.318			

NOTE: *p < 0.05. **p < 0.01. ***p < 0.001.