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Reducing enrollment disparities for prospective racially minoritized graduate students through financial aid: evidence from an online survey experiment in the U.S.

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Introduction: Racially minoritized students remain underrepresented in U.S. graduate education despite persistent gaps in enrollment. While academic predictors of success are well documented, less is known about enrollment predictors, particularly the influence of financial aid and learning modalities.
Methods: This study employed a mixed factorial design using a nationally distributed online survey with quota sampling. The sample consisted of bachelor's degree holders who identified as Black, Latin*, or Native American (N = 1,067). Participants were randomly assigned to one of six experimental conditions that varied by aid status (aid vs. no aid) and learning modality (online, hybrid, in-person). Enrollment intentions, beliefs about graduate outcomes, and preferences for full- vs. part-time study were measured.
Results: Financial aid significantly increased the likelihood of enrollment, preference for full-time study, and belief that graduate education improves job prospects. In contrast, learning modality (online, hybrid, in-person) showed no significant effect on enrollment intentions or perceived outcomes. Aid status did not significantly affect expectations of salary improvement or reliance on loans.
Discussion: The findings underscore the pivotal role of financial support in reducing structural barriers to graduate education for racially minoritized students. Expanding need-based aid, simplifying application processes, and increasing transparency about graduate outcomes are recommended policy strategies to improve equity in access to advanced degrees.

KEYWORDS

higher education, bachelor's degree completion, financial aid, enrollment disparities, experiment, learning modalities

Introduction

What role does financial aid play in prospective graduate school enrollment of racially minoritized students in the U.S.? How do learning modalities influence decision-making processes for racially minoritized students in the U.S.? There is substantial research on the academic predictors of graduate school success, but we know less about enrollment predictors. Recent research suggests that business cycles influence enrollment. For example, poor labor conditions result in higher rates of part-time enrollment over full-time enrollment. Though "the effect of a recession on graduate school enrollment is theoretically ambiguous," Johnson (2013, p. 3) postulates that recessions could negatively impact graduate school enrollment because of rising tuition costs of universities and

decreasing funding availability from state governments. This current study tests the degree to which aid impacts the prospective enrollment of racially minoritized students.

Prospective graduate degree students negotiate short-term and long-term costs and benefits of attending graduate degree programs. For example, students who have accumulated higher debts during their undergraduate degree programs may be less likely to attend graduate school (Fos et al., 2017). Additionally, family wealth and support have also been shown to influence graduate enrollment, with students with higher family support being more likely to enroll in graduate degree programs (Declercq and Verboven, 2015; Fain, 2019). Graduate enrollment varies by student group. For example, women may consider family planning and childcare to a greater degree than men (Livingston, 2015; Montgomery, 2023). At the same time, there is a lot of information and statistics about differences in graduate enrollment of students of various racially minoritized groups in official sources such as the National Center for Education Statistics, but not enough discussion about this issue in contemporary scholarly articles.

The purpose of this study is to examine the perceptions, experiences, and beliefs of racially minoritized students regarding graduate school. It fills a critical gap in research, focusing on the unique experiences of racially minoritized students, who historically have been underrepresented in graduate education compared to their White American counterparts and face barriers to accessing and succeeding in graduate school. Despite having some of the lowest rates of graduate school attendance, racially minoritized students together make up a greater proportion of the U.S. population than White American students. The research presented in this study is unique because it is the first experimental study to capture the unique beliefs and attitudes of racially minoritized students regarding graduate school. In this research, human capital and rational choice theories provide a valuable framework for understanding the economic and social factors influencing graduate educational choices and their outcomes.

In a mixed factorial design delivered online via an aggregate survey platform, we manipulated graduate degrees (online vs. hybrid vs. in-person) and aid (no aid vs. aid) to test the extent to which both influenced the decision-making processes associated with attending a prospective graduate program at a local state university. See Table 1 for a breakdown of the experiment.

We found that aid status was a significant predictor of the degree to which a participant agreed they would attend a graduate degree program, the degree to which participants agreed that the graduate program would improve their job prospects, and whether they would attend graduate school full-time over part-time. Learning modalities, in comparison, proved to be insignificant. Study findings point to various factors affecting the decision-making process among racially minoritized students to pursue advanced degrees and to the potential benefits they could receive from having an advanced degree. The study addresses a critical gap in research by experimentally investigating graduate enrollment predictors among racially minoritized students, especially the unique impact of financial aid and learning modalities. This clearly advances knowledge in higher education research, which typically relies more heavily on observational rather than experimental methods. Implications for research, policy, and practice are discussed.

Human capital and rational choice theories

A person's human capital is defined as their labor, skills, and knowledge (OECD, 2024). A human capital theory states that investing in higher education, including the associated costs and the things that one sacrifices in order to study, will result in higher earnings in the future (Becker, 2009; Mincer, 1958; Schultz, 1971). The line of assumptions in human capital theory can be summarized as follows: an individual acquires knowledge and skills through education and training as part of human capital (Marginson, 1989, 1993). As a result of these skills and knowledge, they will be more productive at work. A higher level of productivity will, in turn, result in a higher salary for the individual since, in an ideal labor market, the wage of an individual is determined by their level of productivity. Therefore, people would invest in education to the extent that private benefits from education are equal to private costs. In light of this argument, it can be argued that education and earnings are positively correlated, and therefore education and training should be promoted (Kroch and Sjoblom, 1994).

There is strong empirical support for human capital theory (e.g., Pascarella and Terenzini, 1991). The human capital theory is based on one mesmerizing empirical fact: more education generally leads to greater lifetime income (Sidorkin, 2007). Based on human capital theory, students may be primarily motivated by financial return in the future, although social and cultural capital gained during higher education should not be overlooked (Fényes and Mohácsi, 2020). A student may convert social and cultural capital into economic capital, i.e., even these capital forms may yield a financial return. The human capital theory hypothesis suggests that education increases the productivity and earnings of individuals, thus providing a return on investment. These investments are important not only for individuals but also for a country's economic growth. A population with more human capital is viewed as more innovative, productive, and capable of economic growth.

The human capital theory, however, has been challenged in various ways, including its failure to incorporate social and structural factors (Dobbs et al., 2008). As an example, the theory of human capital does not sufficiently address the fact that some individuals are more socially and culturally prepared in order to enter and succeed in the education system than others (Walters, 2004). Although human capital may be acquired, discrimination will still have economic consequences for members of underprivileged groups such as low-income individuals, workers of color, members of the LGBTQIATS+ community, etc. (Bahn and Cumming, 2022). According to empirical research, individuals of different races, ethnicities, genders, and nationalities receive economic premiums and penalties beyond what economists typically attribute to productivity, despite similar backgrounds and human capital characteristics (Kim, 2009).

Human capital theory provides a strong framework for understanding how educational investment can lead to long-term economic benefits. However, it falls short in explaining the nuanced decision-making processes of prospective graduate students, particularly those from racially minoritized backgrounds. To address this gap, we incorporate Rational Choice Theory (RCT), specifically the model by Breen and Goldthorpe (1997), which

TABLE 1 Frequencies and percentages of demographics by experimental conditions.

Variable	In person/no aid		In person/aid		Hybrid/no aid		Hybrid/aid		Online/no aid		Online/aid		χ^2	p
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%		
Gender													9.88	0.079
Man	57	32.8	64	36.2	71	39.9	56	31.5	44	25.1	62	35.0		
Woman	117	67.2	113	63.8	107	60.1	122	68.5	131	74.9	115	65.0		
Age													2.39	0.992
18–34	67	38.3	63	37.6	67	38.5	70	38.5	65	37.1	61	34.1		
35–54	57	32.6	61	31.5	56	31.5	59	32.4	63	36.0	65	36.3		
55 and over	51	29.1	54	30.9	55	30.9	53	29.1	47	26.9	53	29.6		
Race/ethnicity													16.47	0.352
American Indian or Alaska Native	11	6.3	6	3.4	10	5.6	9	4.9	8	4.6	14	7.8		
Black or African American	123	70.3	130	73	124	69.7	132	72.5	128	73.1	127	70.9		
Hawaiian or Pacific Islander	2	1.1	0	0	0	0	5	2.7	3	1.7	5	2.8		
Hispanic or Latino/a/x	39	22.3	42	23.6	44	24.7	36	19.8	36	20.6	33	18.4		
Bachelor degree type													7.59	0.669
Bachelor of Arts	69	39.4	73	41	73	41	72	39.6	73	41.7	65	36.3		
Bachelor of Science	100	57.1	99	55.6	98	55.1	106	58.2	90	51.4	105	58.7		
Bachelor of Fine Arts	6	3.4	6	3.4	7	3.9	4	2.2	12	6.9	9	5.0		
Parent education													15.24	0.988
Less than a high school degree	12	6.9	14	7.9	10	5.6	18	9.9	14	8.0	18	10.1		
High school degree or equivalent (e.g., GED)	38	21.7	40	22.5	40	22.5	44	24.2	41	23.4	36	20.1		
Some college but no degree	22	12.6	21	11.8	21	11.8	17	9.3	21	12.0	19	10.6		
Associate degree	15	8.6	15	8.4	13	7.3	13	7.1	9	5.1	13	7.3		
Bachelor's degree	67	38.3	68	38.2	71	39.9	75	41.2	75	42.9	72	40.2		
Graduate degree	17	9.7	17	9.6	15	8.4	12	6.6	9	5.1	15	8.4		
Doctorate	4	2.3	3	1.7	8	4.5	3	1.6	6	3.4	6	3.4		

(Continued)

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TABLE 1 (Continued)

Variable	In person/no aid		In person/aid		Hybrid/no aid		Hybrid/aid		Online/no aid		Online/aid		χ^2	p
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%		
Disability													7.01	0.220
Yes	21	12	17	9.6	23	12.9	30	16.5	15	8.6	25	14.0		
No	154	88	161	90.4	155	87.1	152	83.5	160	91.4	154	86.0		
Income													7.09	0.955
Less than $49,999	51	29.1	62	34.8	55	30.9	57	31.3	58	33.1	58	33.1		
$50,000 to 74,999	55	31.4	49	27.5	49	27.5	52	28.6	42	24.0	48	24.0		
$75,000 to 99,999	35	20	29	16.3	27	15.2	32	17.6	34	19.4	35	19.4		
$100,000 or higher	34	19.4	38	21.3	47	26.4	41	22.5	41	23.4	38	23.4		
Political party													11.40	0.327
Democrat	111	63.4	103	57.9	102	57.3	109	59.9	107	61.1	105	58.7		
Independent	48	27.4	47	26.4	54	30.3	40	22	48	27.4	54	30.2		
Republican	16	9.1	28	15.7	22	12.4	33	18.1	20	11.4	20	11.1		
Political identity													17.84	0.598
Strongly conservative	9	5.1	11	6.2	14	7.9	14	7.7	15	8.6	7	3.9		
Moderately conservative	26	14.9	35	19.7	27	15.2	30	16.5	34	19.4	29	16.2		
Neutral	54	30.9	58	32.6	71	39.9	52	28.6	52	29.7	68	38.0		
Moderately liberal	57	32.6	49	27.5	46	25.8	53	29.1	51	29.1	48	26.8		
Strongly liberal	29	16.6	25	14	20	11.2	33	18.1	23	13.1	27	15.1		
Citizenship status													10.68	0.775
US born	163	93.1	165	92.7	159	89.3	166	91.2	164	93.7	167	93.3		
Naturalized US citizen	8	4.6	9	5.1	13	7.3	14	7.7	10	5.7	8	4.5		
Documented resident	4	2.3	3	1.7	5	2.8	2	1.1	1	0.6	4	2.2		
Undocumented resident	0	0	1	0.6	1	0.6	0	0	0	0.0	0	0.0		
Region													22.17	0.103
West	31	17.7	35	19.7	26	14.6	27	14.8	24	13.7	35	19.6		
South	81	46.3	90	50.6	86	48.3	101	55.5	88	50.3	76	42.5		
Northeast	37	21.1	32	18	34	19.1	29	15.9	46	26.3	32	17.9		
Midwest	26	14.9	21	11.8	32	18	25	13.7	17	9.7	36	20.1		

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views educational decisions as utility-maximizing actions shaped by structural constraints.

RCT focuses on three critical factors influencing educational decisions: (1) expected labor market returns, (2) the perceived likelihood of academic success, and (3) the direct and indirect costs of education. These factors are particularly significant for racially minoritized students, who often face unique financial, social, and institutional barriers. For example, limited access to intergenerational wealth and prior experiences of marginalization may lower their perceived chances of success or heighten their perception of risk. Our study highlights the role of financial aid as a key predictor of enrollment intentions, reflecting how students weigh costs and benefits within constrained circumstances.

By integrating RCT, this study moves beyond a purely economic perspective, offering a socially grounded explanation for why racially minoritized students may choose to pursue or forgo graduate education. It underscores that educational decisions are influenced not only by future earnings but also by perceived feasibility, risk aversion, and unequal access to resources. Having laid out the theories that guided this study, we now turn to the relevant literature.

Literature review

The need for an advanced degree

The motivations behind pursuing graduate studies can be classified into two major categories: intrinsic and extrinsic factors (Lepper, 1988). According to Pires (2009), intrinsic motivations include the belief in the value of education, love of learning, reinforcement of social relationships, as well as career-building and skill improvement. Among the extrinsic motivations are economic advantages, ease of employment, and external pressure from the family, parents, friends, or the workplace. In addition, there is the derivative motive, when a person studies in order to avoid boredom or to postpone having to work. Finally, cultural mobility may also be a significant goal when considering the social situation of the parents.

According to the U.S. Bureau of Labor Statistics (2022) master's degree holders earned $10,992 more than employees with bachelor's degrees in 2022. It is important to note that individual experiences may differ depending on a number of factors, such as the occupation or field of study an individual chose and discrimination in hiring and salary practices, but each level of education the individual completes will help to develop the skills to qualify for higher-paying positions. Moreover, some jobs, such as statisticians, urban and regional planners, librarians, educational administrators, lawyers, healthcare social workers, etc., typically require a graduate degree for entry positions (U.S. Bureau of Labor Statistics, 2018). In conclusion, there are various reasons why an advanced degree is beneficial, such as obtaining a desirable position, enhancing earning potential, increasing job security, and satisfying personal interests. While the benefits of graduate education are clear, these advantages are not equally available to all students, especially racially minoritized groups who still face systemic barriers in higher education.

Racially minoritized graduate students

In 2021, over 1.1 million graduate degrees were awarded. Of all graduate degree recipients, 50.6% were White Americans, while only 29.9% were racially minoritized students (American Council on Education, n.d.). Racially and ethnically minoritized students, such as Black, Latin*, and Native American students, face persistent barriers in higher education that lead to lower retention and graduation rates compared to their White and Asian American peers. These barriers are rooted in historical and contemporary systems of inequality that affect access to resources, institutional experiences, and educational outcomes.

One major challenge is the preexisting opportunity gap, including limited academic preparation in under-resourced K—12 schools, restricted access to college preparatory curricula, and disparities in digital literacy, time management, and study skills (Dulabaum, 2016; Toldson, 2019). These early disadvantages are compounded by systemic financial barriers, such as a lack of intergenerational wealth, higher reliance on student loans, and limited access to financial aid guidance (Davidson et al., 2020).

Minoritized students also face a lack of representation in faculty and campus leadership, which limits mentorship opportunities and contributes to cultural isolation. While over 45% of undergraduates are students of color, only 25% of full-time faculty and 5% of university presidents are non-White women (Espinosa and Mitchell, 2020). This underrepresentation correlates with a lack of culturally affirming spaces and curricula.

Additionally, many students of color experience racial discrimination, microaggressions, and implicit bias on campus—particularly at predominantly White institutions. These experiences, combined with a lack of institutional responsiveness, lead to a diminished sense of belonging, lower engagement, and higher dropout rates (Moragne-Patterson and Barnett, 2017; Banks and Dohy, 2019).

To address these challenges, scholars recommend increasing access to culturally responsive curricula, expanding financial aid regardless of academic performance, improving racial representation among faculty and staff, and creating inclusive peer and mentorship structures (Banks and Dohy, 2019; Hussain and Jones, 2021). While the specific barriers vary across groups, these structural interventions are essential to support the long-term success of racially minoritized students. Understanding these ongoing inequities highlights the need to examine not only who enrolls in graduate education but also how different teaching methods may affect access for racially minoritized students.

Differences between learning modalities in graduate school

Online courses and programs have been steadily increasing over the past decade, with a major boom occurring during COVID-19. The market for online education is increasingly dominated by for-profit institutions (Allen and Seaman, 2013; National Center for Education Statistics, 2023a,b). As compared to traditional in-person programs, online programs are conducted in a very different manner and have both advantages and disadvantages.

There are several advantages of distance learning, including rare geographical limitations, limited learning pace restrictions, and reduced living and transportation expenses (Kumar, 2010). There are also a number of disadvantages, including an absence of face-to-face communication with instructors and classmates, a lack of a campus atmosphere, a higher cost associated with computers and internet access, and difficulty evaluating progress and results during a course. Although some researchers find online interaction with instructors disadvantageous, others find it to be an advantage since it facilitates more consistent communication than in a traditional classroom (Buckley and Narang, 2014). Additionally, all online students, regardless of their age or background, are encouraged to interact with each other, which increases the diversity of opinions in the classroom. Online degrees are chosen by students for a variety of reasons, and many of them would not be able to pursue higher education without the flexibility and reduced costs offered by online courses (Deming et al., 2015).

Who are those students who would otherwise not be able to pursue a graduate degree or who would find it extremely challenging to do so? Some researchers highlight that among those nontraditional students are economically disadvantaged individuals, and parents (Oldfield, 2009). Others point out that online students are more likely to be women, first-generation college students, and federal Pell grant recipients than in-person students (Mead et al., 2020). Online instruction, however, produces lower course grades than in-person instruction. At the same time, the grades of African American/Black, Latin*, Native American, and Pacific Islander students, as well as students who qualified for federal Pell grants, were lower than those of White students and non-Pell grant recipients. As can be seen, despite the fact that online degree programs provide access to some student populations, inequities remain and must be addressed in order for online education to meet its inclusive goals. Even though there are problems related to equity in online education, online programs might be the only option for students who live in educational deserts (areas with no or only one public broad-access college) to pursue a university education (Hillman, 2019). Despite living in an educational desert, many students are able to access online education thanks to sufficient internet service (Rosenboom and Blagg, 2018). Another group of students who can greatly benefit from online education is those with severe time constraints, such as caregivers or individuals with full-time employment (Mead et al., 2020).

It seems that online education could be a great option for many people who are currently underrepresented in the traditional educational system. However, it is essential that all students are treated equally throughout their educational journey and after graduation, regardless of their status or background. Without this, there is a large risk of further "institutional classism," when rich, privileged students receive their education in person, while other students are forced to enroll exclusively online. Given these differences in outcomes across learning modes, it is important to explore how financial structures and funding opportunities interact with these modes to influence graduate enrollment decisions.

Funding graduate education

Financial aid has long been a key focus in educational research, as it not only improves access to higher education but also enhances enrollment, retention, and completion rates, particularly for students from low-income and racially minoritized backgrounds (Bettinger, 2004; Castleman and Long, 2016; Deming and Dynarski, 2010). For example, need-based grant programs have been shown to increase both college attendance and degree completion (Dynarski, 2003; Angrist et al., 2020).

The average annual cost of a graduate degree in 2024 is $42,270 (National Center for Education Statistics, 2024a). During the past 33 years, graduate school costs have increased by nearly 180% (National Center for Education Statistics, 2024b). Graduate school funding can be obtained in a variety of ways. One of the options is obtaining a scholarship or grant (Investopedia, 2024). However, graduate students have fewer scholarships and grant opportunities available than undergraduate students. For example, the Federal Pell Grant, a grant awarded to students who display exceptional financial need, is only available to undergraduate students (Federal Student Aid, 2023). This creates a structural disadvantage for low-income students who depended on such aid during their undergraduate studies, making them more likely to rely on loans. Research shows that Black and Latin* students carry disproportionately higher graduate student debt loads compared to their White and Asian peers (Espinosa and Mitchell, 2020).

In contrast, fellowships, assistantships, and research positions are more commonly awarded to students who enter graduate programs directly after earning their bachelor's degrees—often those with more institutional support or greater familiarity with academic culture (Nettles and Millett, 2006). University assistantships are paid positions offered by some institutions. As a result of working a certain number of hours per week, a student is usually entitled to a tuition waiver and a monthly stipend to cover living expenses (Forbes, 2023).

Nowadays, employers often provide tuition assistance to their employees as a fringe benefit to attract and retain higher-quality workers, increasing their human capital (Gilpin and Kofoed, 2020). Further, employer-sponsored education assistance has had the effect of encouraging more people to obtain graduate degrees, who would not otherwise have done so. Additionally, potential graduate students might finance their education by taking student loans. In order to continue their education, about 54% of graduate students take out student loans (Educational Data Initiative, 2024). Lastly, if this option is available, potential graduate students may be able to finance their education using personal funds. To summarize this discussion, a visual overview of the U.S. higher education system and its financial aid mechanisms is provided in Supplementary Appendix C. Since financial support greatly affects access and persistence, it is important to consider how pursuing graduate education also serves as an investment in human capital, with implications for both individuals and society.

Improving human capital through a graduate degree

Fényes and Mohácsi (2020) examined whether students consider the human capital theory's predictions, namely higher wages associated with higher education, in their decision to enroll in higher education. Researchers found that the wage premium associated with further study is not the most important motivation for students; it is only of minor importance even for those from disadvantaged backgrounds, and the most significant motivations were intrinsic in nature. These included a desire for self-fulfillment, intellectual curiosity, personal growth, and the acquisition of knowledge and skills that could open up broader life opportunities, beyond just financial gains. Furthermore, higher education is an effective means of accumulating social and cultural capital, which can then be converted into economic capital.

Several studies have also examined the opportunity cost of obtaining a graduate degree. The opportunity costs of education are defined by Tsang (1997) as the resources used in the production of education; they are calculated as the value of these resources in their best alternative uses. In this definition, opportunity costs are defined more traditionally, and they include not only the direct and more tangible costs associated with pursuing education (i.e., tuition and fees) but also the lost income associated with the process of pursuing education.

When an individual decides to pursue higher education, they will lose immediate earnings, in addition to incurring the cost of education, but will be able to earn more in the future compared to employees with less education. In this regard, human capital theory suggests that individuals act rationally by investing in their own human capital (Bills, 2003).

Another often-overlooked cost of graduate education is the delay in starting retirement savings, particularly through employer-sponsored programs like 401(k)s. Since most people begin contributing to retirement funds through full-time employment, graduate school often postpones these investments. Due to the compounding nature of retirement returns, even a few years of delay can result in a significant lifetime loss in wealth. This is especially critical for students from racially minoritized and low-income backgrounds, who may already face obstacles to wealth accumulation. As a result, a person will consider investing in a college education if the present value of expected social and economic benefits outweighs the present costs (Stafford et al., 1984). Although human capital benefits are not evenly distributed, examining how factors like race, gender, and socioeconomic status combine to create barriers offers a more complete understanding of graduate enrollment dynamics.

Intersectional factors influencing graduate school enrollment

The decision to pursue graduate education among racially minoritized students involves complex interactions of multiple identity dimensions, including gender, socioeconomic status, and disability, each of which uniquely influences access, persistence, and success in higher education (Crenshaw, 1989; Museus and Griffin, 2011). Intersectionality highlights how these overlapping social identities compound experiences of marginalization and create distinct barriers and opportunities for different student populations (Collins, 2019; Collins and Bilge, 2016).

Gender, for instance, critically shapes educational trajectories, particularly among students of color. Research consistently demonstrates that women of color encounter unique barriers, including family responsibilities, caregiving obligations, and systemic gender biases within academic institutions (Espinosa, 2011; Perna, 2004). These gendered barriers often lead to differential rates of enrollment, persistence, and degree completion compared to their male counterparts (Espinosa, 2011). Conversely, men of color frequently experience different but equally significant challenges, including heightened surveillance, lower academic expectations from faculty, and higher rates of disciplinary action, all of which negatively impact their graduate school experiences (Harper and Harris, 2012).

Socioeconomic status (SES) further intersects with race, profoundly affecting graduate enrollment decisions. Financial constraints are consistently cited as a major deterrent for graduate education, disproportionately impacting students from lower SES backgrounds who often must weigh immediate financial responsibilities against the long-term benefits of advanced degrees (Perna, 2004). Additionally, limited family wealth and the burden of undergraduate debt are more prevalent among racially minoritized populations, exacerbating the financial barriers to pursuing graduate education (Fos et al., 2017).

Disability status also presents critical implications for graduate school enrollment among students of color, who often face compounded discrimination due to the intersection of racial and disability biases (Kim and Aquino, 2017). These students frequently encounter structural barriers, including inaccessible educational environments, inadequate institutional support, and discriminatory practices that further limit their academic opportunities and success (Aquino and Bittinger, 2019). By exploring intersectional influences such as gender, socioeconomic status, and disability more comprehensively, researchers and policymakers can develop nuanced and targeted interventions designed to mitigate these barriers, thereby improving access, retention, and success for racially minoritized graduate students. Having reviewed the literature, we now turn to our methodological approach.

Methodology

The data was collected from 6/19/2024 to 7/19/2024 via CloudResearch, a branch of Amazon Prime Panels, an aggregated online survey platform (CloudResearch, n.d.). The study used a non-probability quota sampling approach to ensure adequate representation of racially minoritized groups within the U.S. higher education system. We sampled members of the U.S. public who completed a BA/BS/BFA degree and who self-identified as Black/African American, Native American or Pacific Islander, or Hispanic/Latin* American. The sample is roughly evenly distributed across age groups (with 25–24 years and 55–74 years having nearly the same number of participants), primarily female,

Black or African American, has a Bachelor of Science, has parents with a bachelor's degree, makes less than $50K a year, does not have a disability, is a U.S. born citizen, resides in Southern America, identifies as politically neutral, and as a Democrat. See Table 2 for frequency and percentages of categorical study variables.

The balance tests were conducted and as discussed in Supplementary Appendix A, there were significant differences across the experimental conditions for gender with more women in the online/no aid group compared to the hybrid/no aid group. Due to the lack of significance of the omnibus tests, this covariate was not included in the primary analyses. No other differences existed across covariates.

Screened participants were asked to read a description and answer a few questions about attending a hypothetical graduate school at a nearby state university. They were asked to consider the information carefully, and answer the questions as a potential graduate student, see the six conditions here: say you are admitted into an in-person vs. hybrid vs. online-only graduate school program of your choice. The average total cost of graduate school comes out to roughly $42,270 per year. You are offered aid: $20,000 vs. You are not offered any aid. Hybrid was defined as 60% online and 40% in person. Online was defined as 100% online only. After Okonofua and Eberhardt (2015) as well as Okonofua et al. (2020), each outcome analysis was conducted using a mixed effects analysis of variance (ANOVA) which controls for between-subjects variation (experimental conditions). For more information on the methodology and results, please see Supplementary Appendix A.

TABLE 2 Frequencies and percentages of categorical study variables.

Variables	*n*	%
Gender		
Man	354	33.2
Woman	705	66.1
Missing	8	0.7
Age		
18–24 years	115	10.8
25–34 years	278	26.1
35–44 years	179	16.8
45–54 years	182	17.1
55–74 years	277	26.0
75 and above	36	3.4
Race/ethnicity		
American Indian or Alaska Native	58	5.4
Black or African American	764	71.6
Hawaiian or Pacific Islander	15	1.4
Hispanic or Latina/o/x	230	21.6
Bachelor degree type		
Bachelor of arts	425	39.8
Bachelor of science	598	56.0
Bachelor of fine arts	44	4.1
Parent education		
Less than a high school degree	86	8.1
High School degree or equivalent (e.g. GED)	239	22.4
Some college but no degree	121	11.3
Associate's degree	78	7.3
Bachelor's degree	428	40.1
Graduate degree	85	8.0
Doctorate	30	2.8
Household income		
Less than $49,999	341	32.0
$50,000 to 74,999	295	27.6
$75,000 to 99,999	192	18.0
$100,000 to $124,999	109	10.2
$125,000 to $149,000	65	6.1
$150,000 to $174,999	29	2.7
$175,000 or higher	36	3.4
Disability		
Yes	131	12.3
No	936	87.7
Citizenship status		
US born	984	92.2

(Continued)

Findings

Aid status was a significant predictor of the degree to which a participant agreed they would attend the graduate program. The programs with aid were rated significantly higher than programs without aid. There was no significant difference across delivery modes. Aid status was a significant predictor of the degree to which participants agreed that the graduate program would improve their job prospects. Programs with aid were rated significantly higher than programs without aid. There was no significant difference across delivery modes. Neither aid status nor learning delivery mode was a significant predictor of the degree to which participants agreed that the graduate program would improve their salary. The difference between programs with aid and no aid were not significantly different. The difference between delivery modes was also not significant.

Aid status was a significant predictor of participants saying they would attend full-time vs. part time. The probability of selecting full-time was significantly higher for programs with aid. There was no significant difference in probability across delivery modes. Neither aid status nor learning delivery mode was a significant predictor of the degree to which participants agreed that they would have to take out loans to fund the graduate degree. The difference between programs with aid and no aid were not significantly different. The difference between delivery modes was also not significant. Neither aid status nor learning delivery mode was a significant predictor of the degree to which participants agreed that they would get a return on their investment if they completed the graduate degree. The difference between programs with aid and no

TABLE 2 (Continued)

Variables	*n*	%
Naturalized US citizen	62	5.8
Documented resident	19	1.8
Undocumented resident	2	0.2
Region		
West	178	16.7
South	522	48.9
Northeast	210	19.7
Midwest	157	14.7
Political party		
Democrat	637	59.7
Independent	291	27.3
Republican	139	13.0
Political identity		
Strongly conservative	70	6.6
Moderately conservative	181	17.0
Neutral	355	33.3
Moderately liberal	304	28.5
Strongly liberal	157	14.7
Experimental condition		
In person/no aid	175	16.4
In person/aid	178	16.7
Hybrid/no aid	178	16.7
Hybrid/aid	182	17.1
Online/no aid	175	16.4
Online/aid	179	16.8
Experimental condition: delivery mode		
In person	353	33.1
Hybrid	360	33.7
Online	354	33.2
Experimental condition: aid status		
Aid	528	49.5
No aid	539	50.5
Experiment question 1: I would attend the graduate program		
Strongly disagree	301	28.2
Disagree	176	16.5
Somewhat disagree	117	11.0
Somewhat agree	209	19.6
Agree	145	13.6
Strongly agree	119	11.2

(Continued)

TABLE 2 (Continued)

Variables	*n*	%
Experiment question 2: the graduate degree program would improve my job prospects		
Strongly disagree	78	7.3
Disagree	69	6.5
Somewhat disagree	59	5.5
Somewhat agree	234	21.9
Agree	314	29.4
Strongly agree	313	29.3
Experiment question 3: the graduate degree program would improve my salary		
Strongly disagree	74	6.9
Disagree	66	6.2
Somewhat disagree	60	5.6
Somewhat agree	224	21.0
Agree	308	28.9
Strongly agree	335	31.4
Experiment question 4: I would attend the graduate program		
Part time	608	57.0
Full time	459	43.0
Experiment question 5: I would have to take out loans to fund this graduate degree		
Strongly disagree	54	5.1
Disagree	55	5.2
Somewhat disagree	55	5.2
Somewhat agree	135	12.7
Agree	252	23.6
Strongly agree	516	48.4
Experiment question 6: I would get a return on my investment if I completed this graduate program		
Strongly disagree	83	7.8
Disagree	83	7.8
Somewhat disagree	136	12.7
Somewhat agree	284	26.6
Agree	269	25.2
Strongly agree	212	19.9
I am interested in obtaining a graduate degree		
Strongly disagree	167	15.7
Disagree	145	13.6
Somewhat disagree	101	9.5
Somewhat agree	199	18.7
Agree	179	16.8
Strongly agree	276	25.9

(Continued)

TABLE 2 (Continued)

Variables	*n*	%
A graduate degree will increase my salary		
Strongly disagree	118	11.1
Disagree	91	8.5
Somewhat disagree	88	8.2
Somewhat agree	214	20.1
Agree	231	21.6
Strongly agree	325	30.5
A graduate degree will increase my job prospects		
Strongly disagree	94	8.8
Disagree	66	6.2
Somewhat disagree	65	6.1
Somewhat agree	204	19.1
Agree	276	25.9
Strongly agree	362	33.9
What is the number one reason you would not attend graduate school?		
I don't have the time	148	13.9
I don't have the funding	528	49.5
I don't see the value	126	11.8
I am content with my current career	166	15.6
I am content with my current salary	55	5.2
I don't like school	44	4.1
What is the number one reason you would attend graduate school?		
Career advancement	305	28.6
Making connections	33	3.1
Learning	155	14.5
Career change	95	8.9
Greater salary	228	21.4
Ideal job requirement	52	4.9
Personal development	199	18.7
I already plan on attending graduate school.		
Strongly disagree	265	24.8
Disagree	177	16.6
Somewhat disagree	161	15.1
Somewhat agree	195	18.3
Agree	123	11.5
Strongly agree	146	13.7
I believe that graduate school will increase my _____ capital the most		
Social	163	15.3
Cultural	185	17.3
Economic	719	67.4
My family would support me going to graduate school		
Strongly disagree	68	34.7
Disagree	58	27.7
Somewhat disagree	81	18.2
Somewhat agree	194	7.6
Agree	296	5.4
Strongly agree	370	6.4

(Continued)

aid were not significantly different. The difference between delivery modes was also not significant.

Participants were also asked general questions related to graduate school. Most students wanted to attend graduate school and believed that graduate school would increase their salary and job prospects. Students also ranked a lack of funding as the number one reason they could not attend graduate school, and they believed graduate school would increase their economic capital over and above their social and cultural capital. Lastly, most agreed that they planned on attending graduate school and that their families would be supportive of their decision.

Discussion

Unlike undergraduate degrees, which require general education courses, graduate programs are specialized. Our data showed that aid status was a significant predictor of the degree to which participants agreed they would attend the graduate program and that the graduate program would improve their job prospects. The programs with aid were rated significantly higher than programs without aid. This finding is similar to the findings of Ecton et al. (2021), who used difference-in-differences and event study analyses to demonstrate that the fellowship has increased the number of applicants overall, as well as the percentage of Black American applicants and enrollees in the impacted cohorts. At the same time, our study showed that there was no significant difference across delivery modes. Neither aid status nor learning delivery mode was a significant predictor of the degree to which participants agreed that the graduate program would improve their salary. The difference between programs with aid and no aid was not significantly different, and the difference between delivery modes was also not significant.

Our other finding suggests that aid status was a significant predictor of participants saying they would attend full-time vs. part-time. The probability of selecting full-time was significantly higher for programs with aid. There was no significant difference in probability across delivery modes. The difference in delivery modes of graduate education, such as being full-time vs. part-time, is almost not discussed in the contemporary literature; the last study that we found regarding this topic was conducted by O'toole et al. (2003).

Finally, we found that neither aid status nor learning delivery mode was a significant predictor of the degree to which participants

agreed that they would get a return on their investment if they completed the graduate degree. The difference between programs with aid and no aid was not significantly different, and the difference between delivery modes was also insignificant. Our study dichotomized aid (e.g., no aid vs. half aid). Future researchers should tease out which level of aid impacts graduate degree enrollment. For example, they could tease out aid percentages. Researchers could consider graduate degree enrollment at elite universities with higher payouts than most public universities.

Currently, the growth of racially minoritized populations such as American Indian, Pacific Islander, Black American, and Latin* American has outpaced the graduate school enrollment of these populations (Cuellar and Gándara, 2021). Federal and state governments should financially incentivize graduate school education to reach marginalized populations, which will increase social mobility at the individual level and economic benefits at the individual and social levels. For example, on the state level, the Minority Teachers of Illinois Scholarship Program offers $7,500 per year to racial minority graduate students who, after graduation, are planning to teach in public schools with the prevalence of racially minoritized students (Illinois Students Assistance Commission, n.d.). At the same time, on the federal level, there is a program called the Basic Needs for Postsecondary Students Program grant opportunity (Highergov, 2024). The program aims to provide funds to higher education institutions to address the basic needs of racially minoritized students and improve their academic outcomes.

At the university level, fellowships, graduate assistantships, or teaching assistantships could be offered to racially minoritized and low-income students in the program. Other organizations outside of universities support racially minoritized students, such as the American Indian Education Fund, Minority Corporate Counsel Association, and Thurgood Marshall College Fund. Additionally, there are organizations that help demystify the graduate school process from enrollment to graduation, such as BLK + in Grad School Podcast, Society for Hispanic Professional Engineers, APAGS Committee for the Advancement of Racial and Ethnic Diversity, and the National Association for Equal Opportunity in Higher Education. Governments and universities should consider ways to incentivize full-time participation over part-time participation because full-time students perform better than part-time students. Additionally, this study finds that if prospective students are given aid, they are more likely to enroll in graduate school.

Graduate school usually requires a costly application fee and costly test requirements. This study is of practical significance because it sheds light on the importance of associated graduate school costs. The researchers recommend that schools lower the associated costs, including more financial aid for applications and high-stakes testing. Another practical recommendation relates to job prospects. For participants, aid was a significant predictor for improving prospective job prospects. To increase transparency, universities might compile economic benefits that provide information on prospective job openings and earnings. For example, Pepperdine University provided detailed employment statistics about their MBA graduates in 2023, including accepting job offers after graduation, accepting job offers three months after graduation, and the median starting salary for graduates (Pepperdine Graziadio Business School, 2023). Most graduate students make decisions based on imperfect information, so the information governments and universities make accessible is critical to their successful enrollment (Perna, 2004). For a full treatment of the limitations of the study, please see Supplementary Appendix A. For additional discussion including alternative theories that could further explain our findings, see Supplementary Appendix B.

Contributions to knowledge

Human capital theory is not without its faults. Currently, it is an acritical theory. The theory could be significantly improved with an equity lens that situates human capital in systems of oppression like feminism, racism, colorism, and nationalism. As a first start, we have leveraged this well-substantiated theory to study the perspectives of racially minorized former college students with BAs, BSs, and BFAs. Our study is a valuable contribution to the field as the decision-making processes associated with graduate degree enrollment have gone unexplored. Still, future researchers should further explore the role systems of oppression have in the decision-making processes of racially minoritized students by, for example, asking about discrimination experiences in undergraduate degree programs.

To our knowledge, this experiment is one of the first to leverage a randomized experiment to test the degree to which aid and learning modalities influence racially minoritized students' decisions to attend graduate school, which is crucial to increasing their academic success and graduate degree attainment. This is not just knowledge for the sake of knowledge; instead, we aim to increase the full participation of racially minoritized students in graduate degree programs to improve their equity and social mobility. In turn, degree gains among these rapidly growing populations will boost the U.S. economy and international competitiveness.

This study is a critical first step to increasing the academic success and employment prospects of racially minorized students in the U.S. However, graduate enrollment is not enough; we also need to retain graduate students. Most racially minoritized graduate students who enroll do not actually graduate. More research is needed on how universities can retain and graduate schools.

Conclusion

This study sheds light on the unique perspectives and attitudes of racially minoritized students toward graduate degrees. The study has also highlighted the unique challenges faced by prospective racially minoritized graduate students in terms of accessing and affording graduate education. The study highlighted a pressing need for policy reforms aimed at improving affordability and promoting equity within graduate school. The following recommendations could be made based on the unique experiences of students of color. Firstly, scholarships

and grants for underrepresented groups of students should be expanded. Secondly, universities should implement transparent tuition and fee structures in order to address the rising costs of graduate education. Lastly, university support programs for students of color should be expanded, such as mentorship programs, professional development resources, and culturally responsive advising. The implementation of these three recommendations will enable universities and policymakers to provide more affordable and accessible graduate education to students of color.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by California Lutheran University. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

DT: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. RK: Writing – review & editing.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2025.1639255/full#supplementary-material

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