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Graduate Students' Perceptions of Their Advisors: Is There Systematic Disadvantage in Mentorship?

> Graduate student relations with members of the faculty is regarded by most graduate students as the single most important aspect of the quality of their graduate experience; unfortunately, many also report that it is the single most disappointing aspect of their graduate experience (Katz & Harnett, 1976, p. 8).

Although graduate student mentorship is noted as central for the transition of doctoral students into faculty members and educators, little is known about the role that race and gender play in influencing how graduate students perceive and interpret their relationships with their advisors. Therefore, it is important to examine how students' perceptions of mentorship may correlate with the "glass ceiling" that women and people of color face in academia (Freeman, 1977; Glazer-Raymo, 2001, 2008; Herzig, 2004; Johnsrud & Heck, 1994; Kolodyny, 2000; McCall et al., 2000; Petrzelka, 2005; Turner & Myers, 2000; Webster, 1989).

Faculty advisors play various instrumental, intellectual, and affective roles in the professional development of students (Bargar & Mayo-

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Chamberlain, 1983; Golde & Dore, 2001; Noy & Ray, forthcoming; Rose, 2005). Faculty advisors write letters of recommendation, network on the behalf of students for jobs, and help graduate students get published, obtain funding, command higher salaries, and be more satisfied with their careers and jobs over time (Van Emmerik, 2004; Zhao, Golde, & McCormick, 2007). Even after graduation, students' faculty advisors continue to be influential power players as they come up for tenure and promotion. Altogether, what faculty advisors think of their students factors tremendously into the success and overall development of graduate students.

Existing research suggests that some faculty members may view certain students more worthy of advisor support than others (Wolf-Wendel & Ruel, 1999). Traditionally, white men have been the dominant group represented in academia. As a result, they are viewed as the default and "ideal student" (Glazer-Raymo 2001, 2008; Turner & Myers, 2000).Their privileged status often comes along with a set of normalized and taken-for-granted benefits. One of these benefits translates into white men being able to stake claims on a majority of spots in graduate departments and have most of their research interests viewed as mainstream. These dynamics contribute to the racial and gender disparities in higher education (COACHE, 2007; Committee, 1992). While many universities and departments are making strides to further diversify the make-up of their faculty and graduate student body, parity is far from apparent. Female faculty in most disciplines are underrepresented (Glazer-Raymo, 2008; Petrzelka, 2005) and faculty of color face difficult hurdles obtaining tenure-track positions and being promoted (Few, Stephens, & Rouse-Arnett, 2003; Thomas & Hollenshead, 2001; Turner & Myers, 2000). Consequently, female and minority students may perceive that certain disciplines will not be supportive of their scholarly endeavors and impact their overall success in graduate school.

The relatively small number of nonwhite and female students in graduate school has been of increasing concern. After all, one of the goals of STEM programs is to increase the representation of underrepresented groups. Understanding the barriers to this goal and factors that facilitate successful matriculation and employment opportunities is critical. Advisor support may function as a key barrier or incentive. The presence of underrepresented groups are not just important for a diverse faculty and student body, but more diversity may be essential for the disciplinary topics viewed as mainstream rather than ostracized by the scholarly community. Some of these topics may include racial differences in genetics testing in the biological sciences, liver-associated serum chemistry tests in the physical sciences, Black and Latino twentieth century

poetry in the humanities, and racial and gender differences in educational attainment in the social sciences. Advisor support is key to understanding the success of female and nonwhite students in graduate school and diversity in faculty may translate into increased support for a diversity of research and teaching topics, including those that may be of more interest for female graduate students and graduate students of color.

Using data from the Survey on Doctoral Education and Career Preparation (Golde & Dore, 2001), our paper aims to address a central question: given that mentorship is so important in graduate school, is there systematic disadvantage in perceived faculty advisor support by women and students of color, in comparison to men and whites? The answer to this question provides critical insights into the role that master statuses like whiteness and maleness play in shaping the experiences of doctoral students in graduate school. We begin the literature review by outlining the functions of advisors and the types of advisors identified to exist in graduate school. We then discuss existing research that draws attention to the systematic disadvantage that may occur along disciplinary, gender, and racial lines. Applying intersectionality theory (Collins, 2000; Crenshaw, 1989, 1991), we highlight how systematic disadvantage in advisor support may be most prevalent among women of color.

The Functions and Types of Advisors

The National Education Association (1993, p. 17) defines mentoring "as a process in which one person, usually of superior rank, achievement and prestige, guides the development of or sponsors another person, who is seen as the protégé." In graduate school, mentors serve the essential functions of helping doctoral students develop into self-sufficient scholars. Some of these functions include counseling, confirming progress, sponsoring, protecting, role modeling, networking, and informing (Green & Bauer, 1995; Rose, 2005; Winston & Polkosnik, 1984). Advisors are important for student training, program completion, career advancement, social networks, research and publication collaborations, and job placement (Bargar & Mayo-Chamberlain, 1983; Beiber & Worley, 2006; Long, 1992; Lyons, 1999). Advisors often engage in candid discussions about developmental issues that students encounter throughout graduate school. Good advisors are genuinely interested in students' work and intellectual welfare. In addition, many students have two or more advisors. While the primary advisor is likely the chair of the student's master's and/or dissertation committees, secondary advisors may be part of their committee or play a more secondary role

throughout the student's graduate career. For example, they may not be in the same research area, but give students advice on professional development.

While the existing literature on graduate mentorship has focused primarily on the functions of advisors, recent research has explored how graduate students systematically categorize their advisors' characteristics (Noy & Ray, forthcoming; Rose, 2005; Zhao, Golde, & McCormick, 2007). Using data from The Ideal Mentor Scale (Rose, 2003), Rose (2005) examines how demographic and academic characteristics determine graduate students' preferences for three styles of mentoring (e.g., integrity, guidance, and relationship). With data from 537 graduate students at two Midwestern universities, Rose (2005) found that women were more likely to prefer mentors who value integrity, and international and younger students were more likely to prefer mentors who establish relationships with their students. While Rose (2005) took into account gender and international status, she did not examine the role of race and focused only on the Midwestern context. Contrary to her expectations, Rose (2005) did not find discipline differences.

Using data from the Survey on Doctoral Education and Career Preparation, Zhao, Golde, and McCormick (2007) found that graduate students perceive advisor attributes as clustering into distinct types, and that these items cluster similarly across primary and secondary advisors.[1] From the same data set, Noy and Ray (forthcoming) come to similar conclusions and identify six distinct advisor types—affective, instrumental, intellectual, available, respectful, and exploitative. Advisors may embody several of these types as students may view an advisor as simultaneously offering high instrumental and intellectual support. In this paper, we build on this research by using the six advisor types identified by Noy and Ray to examine racial, gender, and discipline differences in advisor support. Below, we describe each of these types, which form our dependent variable.

The *affective* advisor can be categorized as a therapist. This type of advisor is perceived to care for students' overall well-being. Characteristics include being sensitive to the needs of students, providing emotional support, and showing concern for students' professional and personal lives. So despite public perception, some professors actually provide just as much psychosocial support, compared to career support, to their students (Waldeck et al., 1997). Cusanovich and Gilliland (1991) argue that personalization is what separates good and average advisors.

The *instrumental* advisor is consonant with classic ideas of a professor as a professional mentor and a graduate student as an apprentice. The instrumental advisor caters more directly to the professional

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demands of graduate training including funding, publishing, networking, conducting research, and teaching. Professors who embody the instrumental advisor type do not view mentoring as a one-way relationship. Rather, instrumental advisors seek input from their students. Instrumental advisors also advocate for students in their department and discipline.

The *intellectual* advisor type provides feedback, assesses students' progress, directs research training, and advises on research matters. The intellectual advisor can be linked with common assumptions of the archetypical, consummate research professor who focuses on publishing and guides students with respect to research. Like the instrumental advisor, intellectual advisors limit their primary involvement to a professional, academic capacity. Distinct from the instrumental advisor, however, the intellectual advisor is less of a guide and more of a monitor: the advisor provides feedback on research and focuses on progress towards degree completion.

The fourth advisor type is labeled as *available* because students' perceive them as being available to help with research and discuss program progress. The available advisor fits with ideas of the professor who always has their door open and responds to emails thoroughly and timely. Bargar and Mayo-Chamberlain (1983) contend that ongoing conversations establish an intellectual and affective advisor/advisee relationship.

While these aforementioned advisor types are beneficial to graduate students in different ways, it does not mean that affective, instrumental, intellectual, and available mentors are perceived as respectful. The *respectful* advisor type taps the interpersonal relations that occur between professors and graduate students by taking into account whether advisors respect their students' ideas, theoretical and substantive perspectives, opinions, and sociopolitical positions in a racialized, gendered, and classed society. This dimension captures, more than anything, students' perceived intellectual standing with their advisors: do their advisors respect their ideas? Respect of ideas is perhaps the most important currency in academia and plays a substantial role in graduate progress, letters of recommendation, and future job prospects.

Finally, everyone has heard "horror stories" about advisors who exploit their power over graduate students. The *exploitative* advisor type encompasses professors who use students as a source of labor, make excessive demands on their time, and treat them as indentured servants. This is in stark contrast to the respectful advisor who treats students with dignity, rather than a lower-tier scholar and person. Unfortunately, as Katz and Harnett (1976) assert, advisors who possess negative characteristics are a part of many students' experiences. Not all students,

however, seem to experience an equal number of positive and negative interactions. Research contends that certain students may have a disproportionate number of negative interactions with faculty and that this disadvantage falls along discipline, racial, and gender lines.

With the exception of an exploitative advisor, each of these advisor types provides different facets that are important for doctoral student training, success, and satisfaction (see Noy & Ray, forthcoming). While affective support may be important for the mental health, well-being, and coping strategies of graduate students, it may be less useful for professional development. Although having an intellectual advisor is clearly important to those seeking a research-intensive position because of these advisors focus on research, a more instrumental advisor is important for helping those students who are deciding how to use their degree. Instrumental advisors discuss a variety of possible career paths and request students' feedback on matters relating to both teaching and research. Since respect of ideas functions as a graduate student's perception of their professor's evaluation of their scholarly worth, this facet may be essential in all institutional contexts and across different types of career aspirations.

Disciplinary Differences in Graduate Student Mentorship

Due to different structural conditions (e.g., the lab setting versus individual meetings) that pattern interactions between faculty and graduate students, advisor support may differ along discipline lines (Austin, 2002; Golde & Walker, 2006). Golde and Walker draw attention to the different expectations of graduate students across disciplines. Austin (2002) notes that disciplinary contexts shape graduate experience and socialization. Specifically, there may be differences between the physical/biological sciences and the social sciences/humanities (Zhao, Golde, & McCormick, 2007). Labs are normally operated by one faculty member who has graduate students working on a grant funded to that faculty member who coordinates the lab, supervises students, and serves as the advisor (Tinto, 1993). In addition, students are often paid from funding lines on projects proposed by the advisors. Thus, advisors are both mentors and bosses. In these settings, students' ideas may be less likely to be incorporated into academic work and advisors may provide less affective and instrumental support due to the structural conditions of the lab and culture of the discipline.

On the other hand, graduate students in the social sciences and humanities normally have a different set of interactions with faculty. The setting is usually the advisor's office in a one-on-one format and the

discussion normally centers on the student's work. These structural differences between disciplines may shape students' perceptions of advisors. Consequently, graduate students in the physical/biological sciences may rate their advisors as less supportive than students in the social sciences/humanities. Therefore, discipline may serve as an axis of inequality concerning the quality of advising relationships.

Gender Differences in Graduate Student Mentorship

Women face a systemic and numerical disadvantage in higher education when compared with men. Although women earned 51% of all doctoral degrees in 2007–2008, compared to 42% a decade earlier (U.S. Department of Education, 2010), they continue to be less likely to obtain tenure, full professor rank, and be in the upper quintile of faculty salaries (Glazer-Raymo, 2001, 2008). They are also more likely to have longer stints at each stage of the academic pipeline (Committee, 1992; Petrzelka, 2005). While women outnumber men in the student population, men outnumber women in faculty, administrative, and managerial positions at the university (Johnsrud & Heck, 1994; Kolodyny, 2000; McCall et al., 2000). The women in science literature shows that gender disparities are even greater in the physical/biological sciences (Fox, 2001; Fox, Sonnert, & Nikiforova, 2009; Herzig, 2004).

The lower numerical representation of women in the faculty ranks means that women may be more likely to be advised by male professors (Burke & McKeen, 1990; Noe, 1988). As a result, women may experience the mentoring process differently than men (Rose, 2005; Wilde & Schau, 1991; Zhao, Golde, & McCormick, 2007). Fried and colleagues (1996) found that male graduate students were significantly more likely to report that their mentors provided instrumental support by enhancing their visibility in the discipline by including them in conference proceedings and helping them network with other scholars. Men were also less likely to report that they had an exploitative advisor (Fried et al., 1996).

In addition to having different mentoring experiences, women may actually prefer different types of advising. Rose (2005), for example, finds that women preferred mentors who valued them as a person. In her study of over 400 professionals, Collins (1983) comes to a similar conclusion stating that women preferred mentors who provided encouragement and instilled confidence. These studies suggest that women may be more likely to gravitate to advisors who provide affective forms of support. Given the exploitation that some female graduate students report in interactions with faculty, they may be more likely to seek secondary

advisors who provide the type of support they desire (Forrett & Dougherty, 2001).

Racial Differences in Graduate Student Mentorship

Similar to gender, race serves as a sorting mechanism throughout the educational and academic life course. Spann (1990) highlights the "chilly climate" concerning the lack of respect and support for scholars of color. Existing research notes that scholars of color in higher education face isolation, exclusion, marginalization, devaluation, and alienation (Padilla & Chavez, 1995; Turner & Myers, 2000). They are underrepresented and disadvantaged in most aspects of academia including graduate degrees, salaries, and promotions (Allen, 1992; Golde & Walker, 2006; Hoffman, Llagas, & Snyder, 2003; Thomas & Hollenshead, 2001; Turner & Myers, 2000). In addition, scholars of color report more interpersonal difficulties and challenges with both students and professors (Turner & Myers, 2000).

Although these interpersonal difficulties are prevalent at all levels, much research focuses on the challenges of junior faculty of color rather than graduate students. The Collaborative on Academic Careers in Higher Education (COACHE, 2007) conducted a survey of nontenured, tenure-track faculty. They found that faculty of color, in comparison to whites, reported lower levels of satisfaction in personal interactions with tenured professors, fewer opportunities to collaborate with tenured faculty, and less fair and equitable treatment than other colleagues. Two notable challenges that faculty of color raised was a lack of affirmation for their intellectual contributions and being excluded from the academic discourse. For example, W. E. B. Du Bois, who was one of the first social theorists on race, is not included in many social theory courses in sociology despite the widespread recognition of his contribution by scholars across disciplines (Ray, 2011). The marginalization experienced by scholars of color speaks not only to the fact that their ideas and research are devalued, but that their core academic identities are devalued as well. While it is a common assumption that Asian Americans may not face the same issues as other minority groups, the COACHE (2007) study reveals otherwise and finds that Asian Americans report similar experiences and treatment to African Americans and Latinos.

These experiences speak to intellectual isolation, benign neglect, and a lack of respect that may begin and be compounded by advisor/student relations in graduate school. Minority graduate students may perceive that their advisors are less invested in their work and less likely to be instrumental in their development as a scholar. It may also lead to minority

graduate students working almost exclusively with faculty of color, if they are available (Stanley, 2006). In fact, some students of color find themselves having to work with faculty outside of their home department just to find someone willing to mentor them and allow them to research their topics of interest (Few, Stephens, & Rouse-Arnett, 2003; Thomas & Hollenshead, 2001). Morgan's (1980) research implies that while students of color may be disadvantaged in primary mentorship, they may find supportive advisors who serve in a secondary role.

Given what we know about the experiences and treatment of women and students of color, are women of color doubly disadvantaged? Existing research suggest that women of color are hit with "a double whammy" of marginalization in academia (Clark & Corcoran, 1986; Thomas & Hollenshead, 2001; Turner, 2002; Tuner & Myers, 2000, p. 106). Next, we examine the utility of the intersectionality framework for exploring the importance of the intersection of race and gender on advisor/student relations (Bonner, 2006).

The Intersection of Race and Gender in Graduate Student Mentorship

The "interlocking effects of gender and race" (Turner & Myers, 2000, p. 106) suggest that women of color experience more disadvantage than white women and men of color. In her examination of legal policies on violence against women, Crenshaw (1991) shows that race-based priorities often suppress issues facing women and feminist priorities suppress the concerns of minority women. According to Crenshaw (1991, p. 1282), "Race and gender converge so that the concerns of minority women fall into the void between concerns about women's issues and concerns about racism." Consequently, women of color remain on the outside looking in and are continuously mapped onto the margins of alliances that they should be in the center of.[2]

The intersectionality framework (Chafetz, 1997; Choo & Ferree, 2010; Collins, 2000, 2004; Crenshaw, 1989, 1991; Few, 2007) becomes useful for examining how gender and race simultaneously influence the treatment graduate students receive and interpret from interactions with faculty advisors. Emerging in the aftermath of the Civil Rights and Women's Liberation Movements, the intersectionality framework developed in opposition to theoretical approaches that conceptualize categories of difference such as gender and race as disconnected, individual constructs. Accordingly, intersectionality theory takes a holistic, active approach to the empirical experience. Coined and tested by Crenshaw (1989, 1991) and led by pioneers of Black feminism such as Davis (1981), Lorde (1984), and Collins (1986, 2000, 2004), intersectionality

focuses on the similarities and differences that are situated in the spaces within the overlap of identities and categories instead of between them (Valentine, 2007). Gender and race "are not separate and additive, but interactive and multiplicative in their effects" (Chaftez, 1997, p. 115).

The intersectionality framework can be a useful theoretical tool for broadening the breadth of education research on gender and race disparities. The purpose of intersectionality theory within the education literature is to provide a much needed lens to construct a space for the multiplicity of social identities and categories that provide context-specific scripts for marginalized groups (Few, 2007). As Collins (2004) asserts, an intersectionality approach that speaks to the racialized and gendered lens by which society functions can help illuminate the nature of existing inequalities within domains. Within higher education, implementing an intersectionality approach reformulates how to view the meaning and interpretation of relations between faculty and students by deconstructing traditional frames of whiteness and maleness.

Taken together, intersectionality provides a frame to examine the intersections of gender and race in higher education. Given research about the challenges students of color and women face, intersectionality suggests that raced and gendered experiences in graduate school may be multiplicative. Therefore, the experiences of being female and nonwhite, may elicit a unique experience within higher education. Graduate students with experiences that make their race and gender salient may have specific research agendas. Yet, these ideas may not fit within the traditional theoretical cannon of their disciplines. As a result, women of color may interpret their advisors' comments to be disrespectful of their personal experiences and identities. Consequently, they may be less likely than white women, white men, and men of color, to report that their advisors are respectful of their ideas and provide other forms of advisor support. Therefore, we use the intersectionality framework to query how the advisor/student relationship of women of color may be distinct from other students.[3]

Methodology

Data

In order to explore the ways in which race and gender impact doctoral students' assessments of their advisors, we use data from the Survey on Doctoral Education and Career Preparation (Golde & Dore, 2001). The survey is a national, cross-sectional study of advanced doctoral students in 11 disciplines at 27 universities. To our knowledge, this survey is the only dataset that draws its sample from a variety of universities and

disciplines and includes questions on students' perceptions of their primary and secondary advisors. Doctoral students who began their studies in the fall of 1996 or earlier and were still pursuing their doctoral education in 1999 were included in the sample. The vast majority of respondents (94%) were full-time students. Fifty percent are women and 15% are students of color, including African American, Latino, Asian American, Native American, biracial, and multiracial students. In an effort to increase the racial diversity of the sample, the survey includes students affiliated with the Compact for Faculty Diversity. The Compact for Faculty Diversity is composed of regional, federal, and foundation programs focused on minority graduate education and faculty diversity. It aims to increase the percentage of racial minorities who obtain doctoral degrees and faculty positions. All of the students assessed in this paper were born in the United States.

The disciplines of the study represent four main areas: humanities (art history, English, history, and philosophy; 36% of the sample), social sciences (psychology and sociology; 21%), physical sciences (chemistry, geology, and mathematics; 20%), and biological sciences (ecology and molecular biology; 23%). The data are based on 4,114 completed surveys with a response rate of 42.3% utilizing both paper and web surveys.[4] After excluding students who did not have an advisor and those who identified their discipline as "other," the sample comprised 4,010 students.

The survey only included students who spent at least three years in their program. This sampling strategy is important for this paper for a few reasons. First, a majority of students who make it to their third year end up completing their doctoral degree. Second, they are more likely to have chosen and established a relationship with their primary advisor. Third, most graduate students in their third year or higher have been socialized to the culture and inner workings of their department. This sampling decision also leads to a limitation of the data. We do not have information on the students who dropped out of the program. This may be a key group for examining systematic disadvantage. Nonetheless, this study can be considered as optimizing the point at which we would expect for the advisor/student relationship to be most solidified—the third year of graduate training or after.

Measures

Outcome Variables: Advisor Type. We focus on the section of the survey that asked respondents to identify the extent to which their advisor displays particular behaviors or traits. The list comprises 24 items and respondents used a 4-point Likert scale ("strongly disagree" to "strongly agree") in response to the root question: "Advisors engage in many dif-

ferent behaviors. For each of these statements, indicate the extent that it describes the behavior of your advisor" (see Tables A1 and A2 in the Appendix for a list of these items). This set of questions was asked about the student's primary and secondary advisor.

Following Noy and Ray (forthcoming), we identify six dimensions of mentorship: *affective, instrumental, intellectual, exploitative, available*, and *respectful*. Tables A1 and A2 indicate the items that make up each scale and the Cronbach alphas of each scale (the items for each scale loaded at > 0.62). The last dimension, respectful, is made up of only one item and taps something uniquely different from the other advisor type scales. Therefore, we made it a distinct advisor type. Collectively, these types can be viewed as being consistent with categorizations about the various types of advisors indicated to exist in doctoral education.

Explanatory Variables: Race, Gender, and Controls. To test the utility of the intersectionality framework, we compare women of color to white women, white men, and men of color.[5] The small number of students of color prevents a detailed analysis of specific racial groups.[6] We also compare the social sciences and humanities to the physical and biological sciences as previous literature indicates there may be important differences in mentorship by discipline, as it may function as another axis of inequality in graduate student training and mentoring.

The descriptive statistics are presented in Table 1 where advisor types are each measured on scales of 1 to 4 where a higher score means a student identifies their advisor as having more of that particular attribute. In terms of the explanatory variables, we first examine differences between men and women, where women comprise 55% of the sample. Second, we examine differences between students of color and white students, where students of color comprise 15% of the sample. Next, we examine differences between white men (39% of the sample), men of color (5% of the sample), white women (46% of the sample) and women of color (10% of the sample). We then introduce differences between those in the biological and physical sciences (40% of the sample) and those in the social sciences and the humanities (60% of the sample). In addition to race, gender, and discipline, we control for other factors that might influence students' perceptions of their advisors. These variables include number of years in the doctoral program (5.16 years sample average), amount of time between BA completion and the start of the doctoral program (with an average of 3.25 years), relationship status (capturing whether respondents were partnered; 55% of the sample), parental status (whether respondents had children; 16% of the sample), and parent's education (an ordinal variable measuring parents' educational attainment).

TABLE 1

Descriptive Statistics for the Variables Used in the Analysis

	Mean	SD	Range	N	Description
Outcome Variables					
Affective primary advisor	2.82	0.75	(1, 4)	3,278	Scale for affective primary advisor
Instrumental primary advisor	2.65	0.66	(1, 4)	3,278	Scale for instrumental primary advisor
Intellectual primary advisor	2.81	0.71	(1, 4)	3,280	Scale for intellectual primary advisor
Exploitative primary advisor	1.81	0.79	(1, 4)	3,274	Scale for exploitative primary advisor
Available primary advisor	3.24	0.71	(1, 4)	3,278	Scale for available primary advisor
Respectful primary advisor	3.43	0.71	(1, 4)	3,274	Item for respectful primary advisor
Affective secondary advisor	2.92	0.69	(1, 4)	1,985	Scale for affective secondary advisor
Instrumental secondary advisor	2.56	0.63	(1, 4)	1,996	Scale for instrumental secondary advisor
Intellectual secondary advisor	2.75	0.66	(1, 4)	1,994	Scale for intellectual secondary advisor
Exploitative secondary advisor	1.61	0.67	(1, 4)	1,943	Scale for exploitative secondary advisor
Available secondary advisor	3.18	0.67	(1, 4)	2,017	Scale for available secondary advisor
Respectful secondary advisor	3.49	0.63	(1, 4)	1,999	Item for respectful secondary advisor
Explanatory Variables					
Women	0.55	0.50	(0, 1)	3,341	1 if woman; 0 if man
Students of color	0.15	0.36	(0, 1)	3,341	1 if student of color; 0 if not student of color
White men	0.39	0.49	(0, 1)	3,341	1 if white man; 0 if not white man
Men of color	0.05	0.46	(0, 1)	3,341	1 if male student of color; 0 if not male student of color
White women	0.46	0.50	(0, 1)	3,341	1 if white women; 0 if not white women
Women of color	0.10	0.29	(0, 1)	3,341	1 if woman student of color; 0 if not woman student of color;
Biological and physical sciences	0.40	0.49	(0, 1)	3,341	1 if in the biological or physical sciences; 0 if in the social sciences or humanities

TABLE 1 *(Continued)*

Descriptive Statistics for the Variables Used in the Analysis

	Mean	SD	Range	N	Description
Control Variables					
Parents' education	3.44	1.26	(1, 5)	3,338	1 if R's parent has no college education; 2 if some college; 3 if has completed a bachelor's; 4 if has an MA/professional degree; 5 if has a PhD
Years off between BA and PhD	3.25	4.94	(0, 46)	3,341	Years of between the BA and the PhD
Relationship status	0.55	0.50	(0, 1)	3,308	1 if has a partner; 0 if single
Parental status	0.16	0.36	(0, 1)	3,229	1 if has children; 0 if no children

Analysis

The average regression sample size for primary advisor measures is 3,277 and the average sample size for secondary advisor measures is 1,989. We include all available cases for any particular outcome. Supplementary analyses indicate that the results are robust when we limit the sample size to only those with full information on all variables in the analysis. It should be noted that we also conducted the analysis with those who only have a secondary advisor and reached similar results.[7] Therefore, we retained the full sample for the analysis of primary advisors. The analyses for secondary advisor outcomes were conducted with a limited sample size as approximately 40% of the students in the sample indicated they did not have a secondary advisor. This percentage is similar by race and gender. In other words, the possession of a secondary advisor is not an axis of inequality.

We use ordinary least squares (OLS) regression for all of the advisor types, except for the respectful advisor item, to examine how gender, race, and discipline affect students' perceptions of their primary and secondary advisors' behaviors. We analyze the respectful advisor item using ordinal logistic regression. While we focus on race and gender effects, we recognize that differences may be a function of other factors. Therefore, we control for time off between degrees, years in the graduate program, relationship status, parental status, and parent's education. The results are robust to the inclusion of controls so we display only the full model coefficients but do not display the coefficients for the control variables themselves.

Results

Race and Gender Differences in Students' Perceptions of Their Doctoral Advisors

Table 2 shows regression models of graduate students' perceptions of their primary and secondary advisors by race and gender. We find that women, compared to men, report that their primary advisors are more affective by 0.07 of a point on a 4-point scale (B = 0.07, $p < 0.01$).[8] They also report having a more instrumental (B = 0.08, $p < 0.01$) and affective (B = 0.14, $p < 0.001$) secondary advisor than men. More specifically, women categorize their secondary advisors as more affective and instrumental by providing emotional support when needed, being sensitive and caring, and assisting with the development of professional relationships.

Students of color report having a less respectful primary advisor than whites. The odds of believing that students' primary advisors treat them

with respect are 24% lower for students of color than for their white counterparts, all else equal (B = -0.27, $p < 0.01$).

Overall, these results indicate that women are actually identifying their advisors as providing more support than men. However, the fact that students of color, compared to whites, report their primary advisors to be less respectful implies disadvantage. While this disadvantage is not in terms of resources and attention, it does capture students' of color perceptions that their primary advisors hold more negative assessments of their ideas. As a whole, when examining race and gender separately, we do not find overwhelming support for systematic disadvantage. In fact, our findings document that women may actually be advantaged in graduate mentorship. Below, we explore whether race and gender intersect to shape disadvantage in graduate mentorship.

The intersectionality framework highlights the importance of examining how race and gender operate in tandem, arguing that people's experiences are a combination of these attributes. In order to explore whether women of color report more disadvantage in advisor support than others, we examine the differences between women of color, white women, white men, and men of color. As Table 2 indicates, women of color are at a disadvantage in primary mentorship. Compared to white men, they view their primary advisors as providing less instrumental support (B = -0.10, $p < 0.05$) and being less respectful (B = -0.42, $p < 0.05$). These negative effects for women of color hold even when compared with men of color and white women. However, women of color indicate their advisors are less exploitative than white men (B = -0.10, $p < 0.05$). Men of color, while not different from white men and women in how respectful their primary advisors are, report receiving less affective support from their secondary advisors compared to both white women and women of color.

Finally, white women are more advantaged than all other groups. Compared to women of color, they report a more instrumental and respectful primary advisor. They also indicate that their secondary advisor provides more instrumental support than white men and is more affective than both white men and students of color. So once we disaggregate the sample by the intersection of race and gender, we see that the intersectionality framework holds showing that women of color are the most disadvantaged in advisor support.

Disciplinary Differences in Students' Perceptions

So far, we have not separated the sample by discipline. Because of the nature of socialization and professionalization across the physical sciences, biological sciences, social sciences, and humanities, there is

TABLE 2

Regressions of Graduate Students' Perceptions of Their Primary and Secondary Advisors' Attributes, by Gender and Race and Gender and Race Groups

	Affective Primary Advisor	Instrumental Primary Advisor	Intellectual Primary Advisor	Exploitative Primary Advisor	Available Primary Advisor	Respectful Primary Advisor[a]
By Gender and Race						
Women	0.07**	-0.01	0.01	-0.05	<0.01	-0.04
	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)	(0.07)
Students of color	-0.01	-0.06	<0.01	-0.05	-0.01	-0.27**
	(0.04)	(0.03)	(0.04)	(0.04)	(0.04)	(0.10)
Constant	2.78	2.93	2.98	2.28	3.30	
N	3,159	3,159	3,162	3,155	3,159	3,156
By Gender and Race Groups						
Women of color	0.04	-0.10 [WM, WW]	0.01	-0.10 [WM]	-0.03	-0.42 [WM, WW, MC]
	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.12)
Men of color	0.07	0.01	0.01	-0.03	0.03	0.08 [WC]
	(0.06)	(0.05)	(0.06)	(0.07)	(0.06)	(0.17)
White women	0.09 [WM]	<0.01 [WC]	0.02	-0.05	0.01	0.03 [WC]
	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)	(0.08)
Constant	2.77	2.92	2.98	2.28	3.30	
N	3,159	3,159	3,162	3,155	3,159	3,156

Notes. Standard errors included in parentheses below the coefficient.
The reference category to which the coefficients refer is white men. Superscripts for the gender and race groups indicate significant differences at the 0.05 level (*F* tests for all advisor types except for the respectful advisor type, which uses χ^2 tests) where WM = white men, MC = men of color, WW = white women and WC = women of color.
All regressions include controls for number of years in the doctoral program, amount of time between BA completion and the start of the doctoral program, relationship status, parental status, and parents' education. Coefficients for controls are available from the authors on request.
[a] Regressions for the respectful advisor item is based on an ordinal logistic regression. Cut points are not displayed but available from the authors upon request. Ordinary Least Squares (OLS) regressions are used for all other advisor types.
For all other coefficients: *, **, *** significant at 0.05, 0.01, and 0.001 level.

TABLE 2 (Continued)

Regressions of Graduate Students' Perceptions of Their Primary and Secondary Advisors' Attributes, by Gender and Race and Gender and Race Groups

	Affective Secondary Advisor	Instrumental Secondary Advisor	Intellectual Secondary Advisor	Exploitative Secondary Advisor	Available Secondary Advisor	Respectful Secondary Advisor[a]
By Gender and Race						
Women	0.14***	0.08**	0.05	-0.03	0.03	0.16
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.09)
Students of color	0.08	0.06	0.04	-0.03	0.05	-0.05
	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)	(0.13)
Constant	2.72	2.59	2.90	1.89	3.23	
N	1,916	1,927	1,925	1,879	1,949	1,930
By Gender and Race Groups						
Women of color	0.27$^{WM, MC, WW}$	0.16^{WM}	0.1	-0.08	0.1	0.05
	(0.06)	(0.05)	(0.05)	(0.06)	(0.05)	(0.16)
Men of color	-0.03$^{WC, WW}$	0.03	0.02	<0.01	-0.02	0.11
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.21)
White women	0.12$^{WM, WC, MC}$	0.08^{WM}	0.04	-0.03	0.02	0.19
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.10)
Constant	2.73	2.59	2.90	1.89	3.24	
N	1,916	1,927	1,925	1,879	1,949	1,930

Notes. Standard errors included in parentheses below the coefficient.
The reference category to which the coefficients refer is white men. Superscripts for the gender and race groups indicate significant differences at the 0.05 level (F tests for all advisor types except for the respectful advisor type, which uses χ^2 tests) where WM = white men, MC = men of color, WW = white women and WC = women of color.
All regressions include controls for number of years in the doctoral program, amount of time between BA completion and the start of the doctoral program, relationship status, parental status, and parents' education. Coefficients for controls are available from the authors on request.
[a] Regressions for the respectful advisor item is based on an ordinal logistic regression. Cut points are not displayed but available from the authors upon request. Ordinary Least Squares (OLS) regressions are used for all other advisor types.
For all other coefficients: *, **, *** significant at 0.05, 0.01, and 0.001 level.

reason to believe that meaningful differences may exist. Typically, students in the physical sciences work in labs and in close proximity to their primary advisors, and are often attached to lab-based grants. In the social sciences and humanities, in terms of both location and subject matter, students' research is often farther removed from that of their advisors and advisor/student relations become much more oriented toward the research of the students. As we are ultimately interested in whether discipline influences perceptions of mentorship by race and gender, we group the biological and physical sciences together and the humanities and social sciences together.[9]

Table 3 shows regression models by discipline only. Besides students in the biological and physical sciences reporting more instrumental support in their primary advisors (B = 0.13, *p* < 0.001), they report more disadvantage on every other primary and secondary advisor type when compared to students in the social sciences and humanities (coefficients ranging between-0.08 and -0.81, *p* < 0.05). In other words, students in the biological and physical sciences perceive their primary and secondary advisors as universally providing less support, with the exception of instrumental support in their primary advisors. It seems that if a form of systematic disadvantage is occurring for advisor/student relations, it is definitely at the discipline level.

Does Discipline Pattern Race and Gender Differences?

In order to examine whether discipline matters for how students of color and women perceive their advisors, we run separate regression models by discipline. We present these results in Table 4. We find that students of color in the social sciences and humanities report their primary advisors to be less respectful (B = -0.40, *p* < 0.01) and instrumental (B = -0.10, *p* < 0.05) than white men.[10] The respect finding is consistent with the results documented in Table 2. In terms of the role of gender on advisor support for students in the social sciences and humanities, the only statistically significant effect is for women who report more affective secondary advisors (B = 0.09, *p* < 0.05) than men. This finding is also consistent with Table 2.

For those in the physical and biological sciences, there are no differences between students of color and whites for primary advisors.[11] Students of color report having a more available and less exploitative secondary advisor. Unlike women in the social sciences and humanities, the odds of women in the biological and physical sciences believing that their primary advisor treats their ideas with respect are 0.78 times lower than for men (B = -0.25, *p* < 0.05). Women in the biological and physical sciences, however, are overwhelmingly positive about their

TABLE 3

Regressions of Biological and Physical Sciences Doctoral Students' Perceptions of Their Primary and Secondary Advisors' Attributes Compared with Social Sciences and Humanities Students

	Affective Primary Advisor	Instrumental Primary Advisor	Intellectual Primary Advisor	Exploitative Primary Advisor	Available Primary Advisor	Respectful Primary Advisor[a]
Biological and physical sciences	-0.23***	0.13***	-0.14***	0.57***	-0.06*	-0.81***
	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)	(0.07)
Constant	2.91	2.60	2.87	1.58	3.26	
N	3,159	3,159	3,162	3,155	3,159	3,156

Notes. Standard errors included in parentheses below the coefficient.

[a] Regressions for the respectful advisor item is based on an ordinal logistic regression. Cut points are not displayed but available from the authors upon request. Ordinary Least Squares (OLS) regressions are used for all other advisor types.

*, **, *** significant at 0.05, 0.01, and 0.001 level

TABLE 3 *(Continued)*

Regressions of Biological and Physical Sciences Doctoral Students' Perceptions of Their Primary and Secondary Advisors' Attributes Compared with Social Sciences and Humanities Students

	Affective Secondary Advisor	Instrumental Secondary Advisor	Intellectual Secondary Advisor	Exploitative Secondary Advisor	Available Secondary Advisor	Respectful Secondary Advisor[a]
Biological and physical sciences	-0.19***	-0.13***	-0.19***	0.26***	-0.08*	-0.76***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.09)
Constant	2.99	2.60	2.82	1.53	3.20	
N	1,916	1,927	1,925	1,879	1,949	1,930

Notes. Standard errors included in parentheses below the coefficient.

[a] Regressions for the respectful advisor item is based on an ordinal logistic regression. Cut points are not displayed but available from the authors upon request. Ordinary Least Squares (OLS) regressions are used for all other advisor types.

*, **, *** significant at 0.05, 0.01, and 0.001 level

TABLE 4

Regressions of Race and Gender on Graduate Students' Perceptions of Their Primary and Secondary Advisors' Attributes, by Discipline

	Affective Primary Advisor	Instrumental Primary Advisor	Intellectual Primary Advisor	Exploitative Primary Advisor	Available Primary Advisor	Respectful Primary Advisor[a]
Humanities and Social Sciences						
Women	0.03	0.02	-0.01	0.02	-0.04	-0.07
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.10)
Students of color	-0.05	-0.10*	-0.06	0.03	-0.05	-0.40**
	(0.05)	(0.04)	(0.05)	(0.04)	(0.05)	(0.13)
Constant	2.96	2.88	3.11	1.83	3.41	
N	1,874	1,873	1,876	1,870	1,873	1,870
Biological and Physical Sciences						
Women	0.08	-0.04	-0.01	0.01	0.03	-0.25*
	(0.04)	(0.03)	(0.04)	(0.05)	(0.04)	(0.11)
Students of color	0.03	<0.01	0.08	-0.09	0.04	-0.24
	(0.06)	(0.05)	(0.06)	(0.07)	(0.06)	(0.16)
Constant	2.78	2.91	2.99	2.37	3.26	
N	1,285	1,286	1,286	1,285	1,286	1,286

Notes. Standard errors included in parentheses below the coefficient.
All regressions include controls for number of years in the doctoral program, amount of time between BA completion and the start of the doctoral program, relationship status, parental status, and parents' education. Coefficients for controls are available from the authors on request.
[a] Regressions for the respectful advisor item is based on an ordinal logistic regression. Cut points are not displayed but available from the authors upon request. Ordinary Least Squares (OLS) regressions are used for all other advisor types.
*, **, *** significant at 0.05, 0.01, and 0.001 level

TABLE 4 (*Continued*)

Regressions of Race and Gender on Graduate Students' Perceptions of Their Primary and Secondary Advisors' Attributes, by Discipline

	Affective Secondary Advisor	Instrumental Secondary Advisor	Intellectual Secondary Advisor	Exploitative Secondary Advisor	Available Secondary Advisor	Respectful Secondary Advisor[a]
Humanities and Social Sciences						
Women	0.09*	0.04	-0.01	0.04	-0.03	-0.12
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.12)
Students of color	0.07	0.08	0.03	0.06	-0.03	-0.05
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.16)
Constant	2.86	2.69	3.03	1.67	3.36	
N	1,278	1,281	1,282	1,267	1,289	1,281
Biological and Physical Sciences						
Women	0.18**	0.12*	0.08	-0.08	0.12*	0.39*
	(0.06)	(0.05)	(0.05)	(0.06)	(0.05)	(0.16)
Students of color	0.11	0.03	0.07	-0.21*	0.19**	-0.03
	(0.08)	(0.07)	(0.07)	(0.09)	(0.07)	(0.22)
Constant	2.66	2.56	2.86	2.01	3.11	
N	638	646	643	612	660	649

Notes. Standard errors included in parentheses below the coefficient.
All regressions include controls for number of years in the doctoral program, amount of time between BA completion and the start of the doctoral program, relationship status, parental status, and parents' education. Coefficients for controls are available from the authors on request.
[a] Regressions for the respectful advisor item is based on an ordinal logistic regression. Cut points are not displayed but available from the authors upon request. Ordinary Least Squares (OLS) regressions are used for all other advisor types.
*, **, *** significant at 0.05, 0.01, and 0.001 level

secondary advisors compared to men. They report a more respectful (B = 0.39, $p < 0.05$), affective (B = 0.18, $p < 0.05$), instrumental (B = 0.12, $p < 0.05$), and available (B = 0.12, $p < 0.05$) secondary advisor.

In Table 5, we examine differences by discipline among women of color, men of color, white women, and white men. Within the social sciences and humanities, women of color report having less respectful primary advisors compared with white men, white women, and men of color. The odds of believing one's primary advisor treats one's ideas with respect are 42% lower for women of color as compared with white men (B = -0.55, $p < 0.05$). However, they report having a more affective (B = 0.20, $p < 0.05$) and instrumental (B = 0.13, $p < 0.05$) secondary advisor as compared with white men.[12] Men of color, however, identify their secondary advisors as being more exploitative than white men (B = 0.20, $p < 0.05$).

As in the social sciences and humanities, women of color in the biological/physical sciences perceive their primary advisors to be less respectful of their ideas than other groups (48% less likely than white men). Women of color also perceive their secondary advisors more favorably and identify them as more affective (B = 0.33, $p < 0.05$) and available (B = 0.31, $p < 0.05$) and less exploitative (B = -0.26, $p < 0.05$) than white men.[13] White men in the biological and physical sciences view their secondary advisors as more exploitative than students of color. White women, compared to white men, identify their primary advisors as more affective (B = 0.09, $p < 0.05$) and their secondary advisors as more affective (B = 0.16, $p < 0.05$), instrumental (B = 0.13, $p < 0.05$), and respectful (B = 0.43, $p < 0.05$).

Conclusion

Summary of Results

This paper had three central aims: (a) to explore whether race and gender establish a systematic disadvantage in graduate students' perceptions of their advisors; (b) to examine whether women of color experience disadvantage compared to white women, white men, and men of color; and (c) to investigate how discipline affects graduate students' raced and gendered perceptions of their primary and secondary advisors. We find that systematic disadvantage does exist in ways that confirm and extend the literature on mentorship in graduate school. Concerning race, the results are fairly similar for whites and students of color with one important exception. Students of color consistently report that their primary advisor is less respectful of their ideas compared to whites. This finding aligns with research on the marginalization of

TABLE 5

Regressions of Race and Gender Groups on Graduate Students' Perceptions of Their Primary and Secondary Advisors' Attributes, by Discipline

	Affective Primary Advisor	Instrumental Primary Advisor	Intellectual Primary Advisor	Exploitative Primary Advisor	Available Primary Advisor	Respectful Primary Advisor[a]
Humanities and Social Sciences						
Women of color	-0.04	-0.1[WW]	-0.07	0.04	-0.1	-0.55[WM, MC, WW]
	(0.06)	(0.05)	(0.06)	(0.05)	(0.06)	(0.16)
Men of color	0.03	-0.03	-0.06	0.08	-0.04	0.01[WC]
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.24)
White women	0.05	0.03[WC]	-0.01	0.02	-0.04	0.01[WC]
	(0.04)	(0.03)	(0.04)	(0.03)	(0.04)	(0.10)
Constant	2.95	2.87	3.11	1.82	3.41	
N	1,874	1,873	1,876	1,870	1,873	1,870
Biological and Physical Sciences						
Women of color	0.07	-0.06	0.06	-0.07	0.03	-0.66[WM, MC, WW]
	(0.08)	(0.07)	(0.08)	(0.09)	(0.08)	(0.20)
Men of color	0.1	0.05	0.09	-0.12	0.09	0.10[WC]
	(0.09)	(0.07)	(0.09)	(0.10)	(0.09)	(0.24)
White women	0.09[WM]	-0.03	-0.01	0.01	0.04	-0.17[WC]
	(0.05)	(0.04)	(0.04)	(0.05)	(0.04)	(0.11)
Constant	2.78	2.91	2.99	2.37	3.25	
N	1,285	1,286	1,286	1,285	1,286	1,286

Notes. Standard errors included in parentheses below the coefficient.
The reference category to which the coefficients refer is white men. Superscripts for the gender and race groups indicate significant differences at the 0.05 level (F tests for all advisor types except for the respectful advisor type, which uses χ^2 tests) where WM = white men, MC = men of color, WW = white women and WC = women of color.
All regressions include controls for number of years in the doctoral program, amount of time between BA completion and the start of the doctoral program, relationship status, parental status, and parents' education. Coefficients for controls are available from the authors on request.
[a] Regressions for the respectful advisor item is based on an ordinal logistic regression. Cut points are not displayed but available from the authors upon request. Ordinary Least Squares (OLS) regressions are used for all other advisor types.
For all other coefficients: *, **, *** significant at 0.05, 0.01, and 0.001 level

TABLE 5 (*Continued*)

Regressions of Race and Gender Groups on Graduate Students' Perceptions of Their Primary and Secondary Advisors' Attributes, by Discipline

	Affective Secondary Advisor	Instrumental Secondary Advisor	Intellectual Secondary Advisor	Exploitative Secondary Advisor	Available Secondary Advisor	Respectful Secondary Advisor[a]
Humanities and Social Sciences						
Women of color	$0.20^{WM, MC, WW}$	0.13^{WM}	0.05	0.07	-0.02	-0.23
	(0.07)	(0.06)	(0.06)	(0.06)	(0.07)	(0.20)
Men of color	-0.07^{WC}	0.04	-0.07	0.20^{WM}	-0.19	0.19
	(0.10)	(0.09)	(0.09)	(0.09)	(0.10)	(0.31)
White women	0.07^{WC}	0.03	-0.02	0.07	-0.06	-0.07
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.13)
Constant	2.87	2.69	3.04	1.66	3.38	
N	1,278	1,281	1,282	1,267	1,289	1,281
Biological and Physical Sciences						
Women of color	0.33^{WM}	0.14	0.1	-0.26^{WM}	0.31^{WM}	0.28
	(0.11)	(0.09)	(0.10)	(0.12)	(0.10)	(0.29)
Men of color	0.04	0.05	0.16	-0.27^{WM}	0.20	0.11
	(0.12)	(0.10)	(0.10)	(0.12)	(0.11)	(0.32)
White women	0.16^{WM}	0.13^{WM}	0.11	-0.10	0.12*	0.43^{WM}
	(0.06)	(0.05)	(0.06)	(0.06)	(0.06)	(0.17)
Constant	2.66	2.56	2.85	2.01	3.00***	
N	638	646	643	612	660	649

Notes. Standard errors included in parentheses below the coefficient.

The reference category to which the coefficients refer is white men. Superscripts for the gender and race groups indicate significant differences at the 0.05 level (*F* tests for all advisor types except for the respectful advisor type, which uses χ^2 tests) where WM = white men, MC = men of color, WW = white women and WC = women of color.

All regressions include controls for number of years in the doctoral program, amount of time between BA completion and the start of the doctoral program, relationship status, parental status, and parents' education. Coefficients for controls are available from the authors on request.

[a]Regressions for the respectful advisor item is based on an ordinal logistic regression. Cut points are not displayed but available from the authors upon request. Ordinary Least Squares (OLS) regressions are used for all other advisor types.

For all other coefficients: *, **, *** significant at 0.05, 0.01, and 0.001 level

the intellectual contributions of scholars of color (Padilla & Chavez, 1995; Turner & Myers, 2000).

In regards to gender, we find that women do not seem to perceive disadvantage in advisor support. In fact, the results show that women actually find more affective and instrumental support in their secondary advisors than men. These findings are in line with the gender socialization literature that asserts women are socialized to be more emotional and caring (Burke & McKeen, 1990; Noe, 1988; Van Emmerik, 2004). In turn, women doctoral students may search for secondary advisors who take interest in their personal lives and are concerned with their well-being besides just being a scholar.

Examining how race and gender operate in tandem, we find evidence that systematic disadvantage is concentrated among women of color. In other words, it is *the intersecting effects of race and gender*, rather than minority or gender status alone, that are driving perceptions of less advisor support. Women of color report having less respectful and sometimes less instrumental primary advisors than all other groups. It is important to note that these findings do not simply reflect an additive effect of double disadvantage. Rather these findings demonstrate the interactive and multiplicative effects of race and gender (Chaftez, 1997; Choo & Ferree, 2010).

Another key finding from this study is that systematic disadvantage exists at the discipline level with students in the biological/physical sciences reporting their primary and secondary advisors to be overwhelmingly less supportive than those in the social sciences and humanities. Our findings are similar to those produced by Zhao, Golde, and McCormick (2007) who also found differences by discipline. Women in the biological/physical sciences report a less respectful primary advisor but a more supportive secondary advisor than men. These findings correspond to the literature on women in science (Fox, 2001; Fox, Sonnert, & Nikiforova, 2009; Herzig, 2004), which documents that women in the physical and biological sciences are numerically underrepresented and face difficult issues interacting with professors. As a result, they seek more supportive secondary advisors to obtain more beneficial mentorship.

Limitations

Although these data provide an opportunity to examine the experiences of a diverse array of graduate students from a variety of schools, they are not without limitations. First, as noted previously, small sample sizes preclude us from modeling differences between specific racial groups. Research on racial stratification has noted the problems with assuming the homogeneity of experiences across racial/ethnic groups

(Bonilla-Silva, 2004; Zuberi & Bonilla-Silva, 2008). We agree and urge future data collection efforts to allow for detailed comparisons of advisor/student relations by race/ethnicity. So while this paper goes a long way towards unpacking the experiences of students of color regarding how mentorship and discipline impact experiences in graduate school, it does not examine differences between specific racial/ethnic groups. In this regard, our pursuit to truly implement the intersectionality framework is limited in this manner as well. Education researchers should view this as a vital opportunity to build onto the findings and assertions made in this paper.

Second, the race and gender of the advisors are unknown. Therefore, we cannot examine gender and race matching between students and advisors. Third, we do not have specific information on the representativeness of each school, nor about whether the response rates of women and students of color vary from the overall sample. Nonetheless, we believe these data provide an important opportunity to examine racial, gender, and discipline differences in students' perceptions of their advisors.

Discussion

While we do not find systematic disadvantage for women of color along all dimensions, respect and instrumental support are very important components of mentoring. The fact that women of color report finding less of these types of support should not be underplayed. Being an instrumental advisor includes providing students with survival skills for being academics in their discipline, building professional relations on behalf of and with students, showing students how to obtain funding and publish, and advocating on students' behalves. Some would consider these characteristics to be the most important duties of advisors to help graduate students matriculate through school, publish, obtain tenure-track positions, and get promoted once in those positions. These findings underscore the importance of an intersectionality approach (Choo & Ferree, 2010; Collins, 2000; Crenshaw, 1991). Since women of color are reporting their mentors as possessing these two important qualities to a lesser extent than other groups, the intersectionality framework becomes useful in demonstrating systematic disadvantage in the quality of advisor/student relations.

What then explains these differences in respectful and instrumental mentorship? Some studies note that the type of research women of color engage in is viewed as "outside of the mainstream" (Few, Stephens, & Rouse-Arnett, 2003). This may be especially true for students in the social sciences and humanities who address issues centering on race and gender. Yet, if it was simply the types of ideas that students were bring-

ing to their advisors that were driving these group differences, we might expect only to see significant differences in the social sciences and humanities. In these fields, students often have more choice about their specialty and research projects as research and opportunity is less contingent on prescribed topics based on research grants.

The fact that even after controlling for a variety of factors, including discipline, demonstrates that women of color still perceive their advisors to be less respectful leads us to conjecture that perhaps racialized processes discussed in other areas of social life are also present in graduate education in the form of perceived discrimination in student-advisor relationships. For example, the medical sociology literature argues that racial dynamics in the patient-doctor relationship (with minority patients perceiving their doctors as less likely to provide information, care for their needs, and be concerned for their overall well-being) lead to people of color experiencing higher levels of distrust for doctors and the health care system (Blanchard & Lurie, 2004; Kaplan et al., 2006; LaVeist, Nickerson, & Bowie, 2000). Similarly, women of color in graduate school may perceive, interpret, and be subjected to less than satisfying interactions with faculty in the classroom, during one-on-one meetings, and in the quality and content of responses on their writing. These unsatisfying interactions between women of color and faculty members may surface in responses about respect in this study. These problematic interactions may lead to women of color being less likely to trust their advisors and listen to their advice. Consequently, they may have a more difficult time matriculating through their programs because they are perceived by some faculty as defiant and/or incapable of succeeding at the doctoral level. In turn, women of color may be less likely to receive exceptional letters of recommendation and the types of jobs they believe they should obtain. In this regard, respect has dire consequences for the current and future outcomes of women of color in doctoral programs.

Unlike primary advisor support, women of color across all disciplines report having more supportive secondary advisors. One plausible explanation for this finding is that women of color may seek out minority and/or female faculty who they believe will recognize, understand, and appreciate their raced/gendered academic and personal struggles (Crawford & Smith, 2005; Few, Stephens, & Rouse-Arnett, 2003). Secondary advisors may help women of color cope with the trials and tribulations of graduate school and unsatisfying interactions with faculty and other students. Secondary advisors also may be available to talk and assist with research endeavors and professional development. Students of color, African Americans and Latinos in particular, are more con-

centrated in the social sciences and humanities. As a result, they may be able to mobilize at various levels of the academic pipeline. These groups have organizations and programs that cater specifically to their needs and aim to ameliorate the lack of advisor support they receive in their home departments.

Still, it is unclear of the role that secondary advisors play in decision-making. While they may be a dissertation co-chair, they may also be an advisor in another field or a junior faculty member who provides respectful and instrumental support. It is a limitation that these data cannot answer this question, but having a secondary advisor is an important part of the experiences of students of color and women and should be addressed in future research.

Our results provide evidence of systematic disadvantage at the discipline level with students in the biological/physical sciences reporting their primary and secondary advisors to be overwhelmingly less supportive than those in the social sciences and humanities. The lab setting potentially structures the type of mentoring interactions that occur in the physical/biological sciences. As a result, the culture of these fields is for students to talk about and work on the research of their advisors compared to discussing their own work. Students in the social sciences and humanities, on the other hand, are more likely to engage in settings with advisors that are more one-on-one and centered on their own research.

In sum, we find that *women of color are the most disadvantaged in advisor support*. Moreover, it is the intersection of race and gender that determines graduate mentorship the most. With these findings, this study helps move toward further unpacking differential experiences in graduate school. By extending existing analyses on racial and gendered dynamics of graduate training to a large, national sample of doctoral students in the U.S., our study builds on qualitative studies that describe and explore the experiences of women and minorities in graduate school (see Beiber & Worley, 2006; Lyons, 1999). Future research should examine whether the race and gender of graduate students' primary and secondary advisors systematically impact perceptions of mentorship. Existing literature has indicated that faculty of color frequently face increased demands on the part of students of color who seek them as mentors, either for their specialty areas or because they may personally understand their experiences. Junior faculty members of color who may be the only one or two in their departments are further hampered with mentoring and service requests that hinder their ability to focus on research as much as their white counterparts (COACHE, 2007; Turner & Myers, 2000). Therefore, an exploration focused on the relationship between students and advisors who are of the same versus a different

race and gender will allow us to further clarify how students' master statuses pattern their perceptions of advisors in graduate school.

Contributions and Broader Impacts

Our findings speak to a "mentoring glass ceiling" where women of color are provided with certain forms of support, but lack important interpersonal components of mentorship that makes relations with faculty rewarding, pleasurable, and productive for their future successes as faculty members. In other words, women of color get material support but not interpersonal support. There is a difference between a professor reading a student's paper and making comments, on one hand, and critically analyzing the student's ideas to help the paper along because they believe in it and the student, on the other.

While we applaud the efforts of some institutions for diversifying the racial and gender composition of their graduate programs, the interpersonal relations that occur within the social environments of higher education (e.g., classrooms, labs, offices) seem to be highly problematic and speak to further changes needed on an institutional level. There is a lot of emphasis on minority assimilation and acculturation, but what about the acculturation of whites regarding their interactions with students and faculty of color (see Davidson & Foster-Johnson, 2001, for this discussion)? It is assumed that professors are open-minded about diversity. However, this does not always mean altering afforded privileges based on whiteness and maleness (Jackman & Muha, 1984).

Similar to others before us (Hill, 1991; Turner & Myers, 2000), our recommendations center on changing the organizational culture of departments so that students of color can experience the same respectful and instrumental interactions that many of their white colleagues are privy to. University and departmental workshops that address diversity, multiculturalism, and positive interpersonal communication should be institutionally incorporated. Universities need seminars for all faculty (rather than only junior faculty) at the beginning of the academic year on how various mentoring styles conform to the expectations of women, students of color, and women of color. Faculty awarded for their mentorship could lead these workshops. This dialogue may go a long way towards increasing faculty's sensitivity to how their interpersonal relations with students are being perceived. Although some faculty and administrators, and perhaps even students, view the student-advisor relationship as strictly professional, doctoral education takes upwards of five years. Interpersonal feelings and issues inevitably arise and form a substantial part of these relationships. While faculty members definitely do not need added responsibilities on top of their current demands, it

may be necessary and essential for higher education institutions to properly reflect their true ideals. Representation is only part of addressing diversity and multiculturalism. Understanding and appreciation is the other half.

Notes

[1] Zhao et al. (2007) also use factor analysis to identify advisor types, which are not identical but very similar to the advisor types we draw upon by Noy and Ray (forthcoming). Zhao et al (2007) found a "career development" type which corresponds exactly to our "instrumental" advisor type. Their "personal touch" advisor corresponds to our "affective" advisor and their "cheap labor" advisor to our "exploitative" advisor. They also found that the respect item did not load with the other advisor types. While they chose to exclude it, we include the respect item and analyze it as a separate category. They also found an "academic advising" type, which we disaggregate into an "intellectual" and "available" type of advisor. These distinctions emerge from our analysis on the intersections of race and gender.

[2] While the intersectionality framework emphasizes differences that may exist between women of color and white women, the framework has been extended to apply to class, sexual orientation, and several other axes of inequality. In graduate education, race and gender are found to influence mentor-student interaction, with disciplinary differences operating as another potential axis of inequality.

[3] As discussed in the methods and discussion, the data preclude us from examining within group differences by race. Still, we are able to disentangle the intersections of race and gender to advance the literature on graduate student mentorship.

[4] Unfortunately, we do not have specific information on the response rates of women and minorities.

[5] Since international students (who constitute less than 10% of the sample) were not asked their race, we limit our analysis to U.S. citizens and residents as our aim was to interrogate the gendered and raced dynamics of mentorship in graduate school.

[6] African Americans and Latinos each comprise four percent of the sample, while Asian Americans comprise five percent of the sample. Students in the "other race" category represent approximately one percent of the sample. While we ran analysis for specific race and gender groups, small sample sizes rendered non-robust results. However, these analyses are available from the authors upon request.

[7] In the limited sample, the effect of female on affective primary advisor and non-white women on instrumental primary advisor moves into marginal significance. Overall, these results do not substantively change our conclusions.

[8] At the bivariate level, women report having a less exploitative primary advisor.

[9] We performed supplementary analyses comparing social sciences to humanities and physical sciences to biological sciences. We find that graduate students in the social sciences report similar perceptions of their advisors as those in the humanities with a few exceptions. Graduate students in the social sciences report their primary advisors to be less respectful and more instrumental and exploitative and their secondary advisors to be more instrumental and exploitative than those in the humanities. In terms of differences between those in the biological and physical sciences, they all occur at the secondary advisor level. Students in the biological sciences report more respectful, affective, intellectual, and available secondary advisors than those in the physical sciences.

[10] The negative effect for students of color on instrumental primary advisor in the humanities and social sciences becomes statistically significant when adding in controls.

[11] At the bivariate level for students in the biological and physical sciences, students of color report having a more intellectual advisor, although this effect moves out of statistical significance upon the inclusion of controls.

[12] The significant effect of having a more instrumental secondary advisor for women of color in the social sciences and humanities moves into significance upon the inclusion of control variables.

[13] Bivariate regressions indicate that men of color in the biological/physical sciences identify their secondary advisors as less exploitative than white men, though this effect moves out of significance upon the inclusion of controls.

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Factor Scales for Primary Advisor-Types (Rotated Matrix)

Variable	Affective Primary Advisor	Instrumental Primary Advisor	Intellectual Primary Advisor	Exploitative Primary Advisor	Available Primary Advisor	Respectful Primary Advisor
a13a	Are available to me when I need help with my research				0.822	
a13b	Are available to me when I need to talk about my program and my progress in the program				0.6819	
a13c	Treat my ideas with respect					0.1078
a13d	Give me regular and constructive feedback on my research		0.5646			
a13e	Teach me the details of good research practice		0.4182			
a13f	Provide me with information about ongoing research relevant to my work		0.3468			
a13g	Teach me survival skills for this field	0.4721				
a13h	Help me secure funding for my graduate studies	0.6563				
a13i	Help me develop professional relationships with others in the field	0.6255				
a13j	Assist me in writing presentation or publications	0.5394				
a13k	Teach me to write grant and contract proposals	0.6328				
a13l	Advocate for me with others when necessary	0.4488				
a13m	Provide emotional support when I need it	0.7354					
a13n	Are sensitive to my needs	0.7011					
a13o	Take an interest in my personal life	0.7439					
a13p	Have my best interests at heart	0.5795					
a13q	Care about me as a whole person, not just as a scholar	0.8067					
a13r	Provide direct assessments of my progress			0.6836			
a13s	Would support me in any career path I choose	0.4794					
a13t	See me as a source of labor to advance his/her research				-0.7243		
a13u	Expect me to work so many hours that it is difficult for me to have a life outside of school				-0.6234		
a13v	Give me regular and constructive feedback on my progress towards degree completion			0.7569			
a13w	Provide information about career paths open to me		0.4266				
a13x	Solicits my input on matters of teaching and research		0.4436				
	Cronbach's alpha	0.88	0.83	0.82	0.62	0.8	n/a

APPENDIX: TABLE A2

Factor Scales for Secondary Advisor-Types (Rotated Matrix)

Variable		Affective Secondary Advisor	Instrumental Secondary Advisor	Intellectual Secondary Advisor	Exploitative Secondary Advisor	Available Secondary Advisor	Respectful Secondary Advisor
a13a	Are available to me when I need help with my research					0.7275	
a13b	Are available to me when I need to talk about my program and my progress in the program					0.6785	
a13c	Treat my ideas with respect						0.0647
a13d	Give me regular and constructive feedback on my research			0.5465			
a13e	Teach me the details of good research practice			0.5921			
a13f	Provide me with information about ongoing research relevant to my work			0.5995			
a13g	Teach me survival skills for this field		0.4041				
a13h	Help me secure funding for my graduate studies		0.603				
a13i	Help me develop professional relationships with others in the field		0.5391				
a13j	Assist me in writing presentation or publications		0.477				
a13k	Teach me to write grant and contract proposals		0.5818				
a13l	Advocate for me with others when necessary		0.4432				
a13m	Provide emotional support when I need it	0.735					
a13n	Are sensitive to my needs	0.723					
a13o	Take an interest in my personal life	0.7122					
a13p	Have my best interests at heart	0.6051					
a13q	Care about me as a whole person, not just as a scholar	0.8151					
a13r	Provide direct assessments of my progress			0.3256			
a13s	Would support me in any career path I choose	0.5336					
a13t	See me as a source of labor to advance his/her research				0.7021		
a13u	Expect me to work so many hours that it is difficult for me to have a life outside of school				0.6092		
a13v	Give me regular and constructive feedback on my progress towards degree completion			0.2663			
a13w	Provide information about career paths open to me		0.3617				
a13x	Solicits my input on matters of teaching and research		0.2725				
	Cronbach's alpha	0.89	0.84	0.83	0.62	0.82	n/a