

# Academic Elitism: Parental Education and the Career Experiences of Faculty in U.S. Institutions

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**Abstract:** The U.S. academy has long been accused of elitism. Evidence of high proportions of faculty with PhD parents suggest generational effects on inclusion and access to the profession. Conversely, increased attention to first generation university graduates has not extended to those who succeed in breaking through the potential barriers of generational elitism, completing their doctoral degrees and entering the professoriate. Using a nationwide sample of academic scientists in the United States from across four STEM disciplines and across institutions, we examine the extent to which socioeconomic status offers advantage (or disadvantage) to faculty as they advance in their careers. We find that faculty with PhD parents are one and a half times more likely to work at higher-ranked and more competitive universities, while first-generation faculty are three times more likely to work in lower-ranked and non-doctoral-serving institutions. We find that first-generation scholars are especially disadvantaged in navigating the competitive work environment of research-intensive institutions.

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## **1. Introduction**

Access to the professoriate has been historically inequitable. Evidence of limited hiring networks, where most faculty are graduates of a small number of elite institutions points to hierarchy and stratification (Wapman et al., 2022). Increased interest in this social stratification among academic faculty address factors that matter in faculty career opportunities and advancement. Current studies have examined how hiring patterns (Wapman et al., 2022) and parental education (Morgan et al., 2022) demonstrate that characteristics of privilege can determine who gets to produce scientific research, the resources researchers have access to (e.g., access to collaborators, funding, and institutional placement), and other factors central to career advancement. Though considerable attention has been given to the challenges of first-generation students and how they matter for academic performance and persistence (Webster, 2004). The social background of scientists has largely been neglected. Yet, socioeconomic status represents an important aspect of diversity, particularly in light of evidence of elitism and limitations in access to the professoriate.

In fact, students with privileged backgrounds tend to perform well, with evidence of higher social class predicting higher GPA (Phillips et al., 2020). Further, lower social class has been shown to be significantly and negatively associated with poor academic outcomes and poor psychological well-being for first-generation college students (first in their families to attend a four-year university) (Veldman et al., 2019). Though the literature on first-generation faculty is small, evidence of experiences common to the experiences of first-generation students include discomfort with academic culture (Ryan & Sackrey, 1984), lack of belonging (Lee, 2017), and unfamiliarity with navigating career expectations (Bechard & Gragg, 2020). Despite these common formative experiences, first-generation faculty persist, and many are hired at prestigious institutions. However, there is paucity in differences in first-generation faculty's work experiences as a variation of institutional characteristics. We question whether the effects of social class on careers can continue to have lasting impact on first-generation faculty. We ask: does parental education impact faculty institutional placements? And how does the parental education (lack of university degree as compared to those with parents with PhDs) of faculty matter for their experiences?

## **2. Current Study**

The current study examines whether perceptions of climate and institutional placement vary as a function of parental education. Past evidence has shown that in the United States, the production of academic faculty is largely concentrated such that 20.4% of universities produce 80% of domestically trained faculty (Wapman et al., 2022). Not only do high levels of social reproduction occur at the institutional level, but because having PhD parents also greatly increase one's likelihood of also becoming academic faculty (Morgan et al., 2022), social reproduction also occurs at the individual level. Because of these patterns between parental education, institutional placement, and institutional prestige, it is also helpful to understand how parental education influences these trends at the other end of spectrum, or faculty who are the first in their families to obtain a four-year degree. If having highly educated parents predicts one's placement into a reputable institution, it is expected that having parents with lower levels of education would predict placement into a lower-ranked institution.

For the purposes of this study, we use the Carnegie 2000 basic classification system to categorize institutions which organizes institutions into the following broad categories: doctoral/research universities-extensive, doctoral/research universities-intensive, master's

colleges and universities, and liberal arts colleges. Because the aim of this study is to examine patterns of prestige by parental education, we define the research universities as the most prestigious since due to their nature they have the highest research production. In line with this, we categorize master's comprehensive universities as having less prestige due to the lower level of research funding and decreased focus on research. Additionally, though liberal arts schools are not research-focused, most of them are private institutions which may be demonstrative of its student and faculty composition. We hypothesize that:

*H1. Faculty with PhD parents are more likely to work at research-extensive institutions compared to first-generation faculty.*

*H2. First-generation faculty are more likely to work at a master's comprehensive institution compared to faculty with PhD parents.*

Similarly, because past studies find that first-generation faculty feel socially excluded (Heller, 2011; Lee, 2017), we expect perceptions of climate to vary by parental education, and parental education to vary with institution type and have differential effects. Extensive work on women faculty's experience of a "chilly climate" show that women faculty are excluded from decision-making processes and grants across different departments (Hopkins et al., 2002). Moreover, a chilly climate decreases women faculty's job satisfaction while increasing intentions to quit (Callister, 2006). Social class may be another individual characteristic that increases the likelihood that faculty experience a chilly climate. Studies examining the use of cultural mismatch theory in undergraduate students show that first-generation students feel increased social discomfort in the university setting, and this results in negative outcomes such as lowered GPA (Phillips et al., 2020), a decreased sense of fit (Phillips et al., 2020), and perceiving tasks as more difficult (Stephens et al., 2012). Though first-generation faculty have completed each level of education, similar experiences may continue to follow them as they transition from being graduate students to faculty. Then, we hypothesize that:

*H3. First-generation faculty experience a chillier work climate than faculty with PhD parents.*

Additionally, institutions likely have climate differences owing to variations in institution mission and purpose. By nature, research-extensive and -intensive institutions are competitive due to public funding structures (Arora-Jonsson, et al, 2023). In turn, this can influence how faculty from different backgrounds perceive that climate. For example, faculty with PhD parents may already have exposure to the competitive nature of research institutions which can buffer them from negative consequences such as role ambiguity. In contrast, first-generation faculty may not have this additional form of support and source of knowledge. Then, first-generation faculty may perceive the "strongest" climate at research institutions compared to teaching institutions. Thus, we hypothesize that:

*H4. Within research-extensive institutions, first-generation faculty will experience a chillier climate compared to faculty with PhD parents.*

### **3. Methods**

We draw on data from the NETWISE II study (N = 4,195) which is comprised of academic US faculty from across four disciplines (biology, biochemistry, civil engineering, and mathematics). The purposeful sampling aimed to collect responses from underrepresented faculty in the USA. The sampling frame included all research extensive universities, research

intensive universities, all historically black colleges and universities, all Hispanic-serving institutions, all Oberlin liberal arts institutions, and nineteen women's colleges. For the purposes of this study, the sample was limited to respondents whose parental education was provided. This excluded 724 participants (17.26% of total sample, final sample size is N = 3,471). Sample descriptives are provided in Table 1.

Due to the high proportion of missing data on parental education, descriptives were compared with respondents who did provide parental education to examine potential added bias into the statistical model. Overall, respondents with missing parental education did not differ significantly than those who did provide parental education. Two notable differences were that of those who had missing data, 33.01% were Asian and 47.93% were white compared to 23.05% Asian and 61.03% White respondents who provided parent data. Similarly, a slightly higher portion of respondents who were missing data were in Math (32.87%) compared to respondents who did provide parent data (28.1%). Of the full sample, 693 respondents did not provide data on foreign-born status and parental education. Logistic regression was conducted to determine the effect of parental education on institutional placement. Within each subset, multivariate regression analysis was conducted to ascertain differential experiences of climate by parental education.

Table 1. Descriptive demographic statistics (N = 3,471).

Variable name	Frequency	Percentage	Weighted frequency	Weighted percentage
<i>Gender</i>				
Female	1,529	43.76%	957	28.91%
<i>Race/Ethnicity</i>				
White*	2,213	63.76%	2,532	76.48%
African American	244	7.03%	107	3.24%
Native American/Alaskan	16	.46%	20	.6%
Hispanic	201	5.79%	135	4.07%
Asian	728	20.97%	437	13.21%
<i>Citizenship</i>				
Foreign-born	1,226	35.39%	1,032	31.25%
<i>Institution Type</i>				
Research extensive	930	26.79%	1,671	50.49%
Research intensive	629	18.12%	528	15.94%
Master's comprehensive	611	17.6%	522	15.77%
Liberal arts*	493	14.2%	214	6.47%
<i>Discipline</i>				
Biology	1,217	35.06%	1,377	41.62%
Biochemistry*	615	17.72%	364	10.99%
Civil Engineering	639	18.41%	550	16.61%
Mathematics	941	27.11%	1,019	30.78%
Other STEM	59	1.7%	0.0	0.0%
<i>Parental Education</i>				
First-generation	1,218	35.09%	1,174	35.47%
CG	1,511	43.53%	1,394	42.13%
Bachelors/Masters* CG PhD	742	21.38%	742	22.4%

\*Denotes referent group

### *Measure of Parental Education*

Parental education was used here as the main predictor variable and was measured using two items asking for the highest level of education of the participant's mother and father. Answer options were less than high school, high school, associate degree, bachelor's degree, master's degree, doctoral degree, and other. The parental education variable was measured by taking the highest level of parental education between the mother and father. If participant's highest level of parental education was less than a bachelor's degree, they were categorized as first-generation (FG). If the highest level of parental education was a bachelor's or master's degree, they were categorized as continuing-generation (CG) Bachelor's/Master's. Lastly, if either parent had a doctoral degree, participants were placed into the CG PhD category. These categories were proposed to distinguish between high levels of socioemotional support and knowledge regarding academia in CG PhDs compared to FG respondents (Morgan et al., 2022).

### *Measure of a Perceived Chilly Climate*

Past studies have operationalized a chilly climate using two dimensions: ostracism and incivility. For the purposes of this study, we focus on the ostracism dimension of a chilly climate. This is defined as one's perception of being ignored or excluded (Miner et al., 2019). To measure this, we used a Likert-type scale with six items with responses ranging from "strongly agree" (coded as 1) to "strongly disagree" (coded as 4). Example items include "faculty care about each other" and "faculty have little contact with each other." Four items were reverse-coded since they indicated a more friendly climate.

### *Institutional Selection*

Institutions were categorized according to the Basic Carnegie Classification of Institutions (2000). The four main categories used were research extensive, research intensive, master's comprehensive, and liberal arts colleges. Research extensive institutions are defined by the conferral of 50 or more doctoral degrees across at least 15 disciplines. Research intensive institutions confer at least 10 doctoral degrees across three or more disciplines, or at least 20 doctoral degrees per year. Master's comprehensive institutions focus on graduate education through the master's degree. Liberal arts institutions are focused on undergraduate education and are defined by awarding at least half of their baccalaureate degrees in liberal arts fields.

### *Other Explanatory Variables*

Because the sample consists of STEM faculty from across different institutions, additional variables that were expected to influence climate were included in the models as controls. Those variables included faculty rank (assistant, associate, full), race (White, African American, American Indian/Alaskan, Asian, Hispanic), discipline (biology, biochemistry, chemistry, civil & environmental engineering, physics), gender (male/female), a foreign Ph.D. (a Ph.D. from outside the U.S.) and being foreign-born (born outside the U.S.).

## **4. Results**

To test the first hypothesis that CG PhD status will predict placement into a research-extensive institution, a logistic regression was conducted to examine the effects of parental education, gender, race, rank, and discipline on the likelihood that an academic faculty member would work at a research-extensive institution. The logistic regression model was

statistically significant,  $X^2(12, N = 3,420) = 243.55, p = .000$ . The model explained 6.0% of the variance in placement at a research-extensive institution. Faculty with PhD parents were one and a half times more likely to work at a research-extensive institution compared to first-generation faculty (OR = 1.27, 95% CI [1.04, 1.6]). Thus, we find evidence in support of the first hypothesis.

To test the second hypothesis that first-generation status will predict placement into a master's comprehensive institution, a logistic regression was conducted to determine the likelihood that a faculty member would work at a master's comprehensive institution. Additional explanatory variables were gender, race, rank, and discipline. The logistic regression model was statistically significant,  $X^2(13, N = 3,420) = 154.78, p = .000$ . The model explained 4.0% of the variance in placement at a master's comprehensive university. First-generation faculty were three times more likely to teach at a master's comprehensive compared to faculty with PhD parents (OR = .36, 95% CI [0.15, .57]). Therefore, the evidence supports the second hypothesis.

Next, we tested if parental education predicted faculty's perceptions of a chilly climate not accounting for institution. The results of the multivariate regression analysis explained 4.0% of the variance ( $R^2 = .04, F(12, 3293) = 12.17, p = .000$ ). However, first-generation status and CG PhD status did not significantly predict perceptions of a chilly climate. Significant predictors were gender ( $\beta = .36, p < .05$ ), underrepresented minority status ( $\beta = .36, p < .05$ ), foreign-born status ( $\beta = .85, p < .01$ ), and civil engineering ( $\beta = .54, p < .01$ ). Then, the results of the analysis do not support the third hypothesis.

Lastly, recognizing the diversity of U.S. higher educational institutions, we examined whether parental education influenced perceptions of a chilly climate by type of institution. The data were subset by the following institution types: research-extensive, research-intensive, liberal arts, and master's comprehensive. Table 2 shows the results of the regression analysis of parental education on climate within each institution. In the master's comprehensive institutions ( $N = 1,032$ ), the results of the regression did not indicate that parental education significantly predicted perceptions of a chilly climate,  $R^2 = .03, F(12, 1019) = 2.77, p < .01$ . The only significant predictor was foreign-born status ( $\beta = .75, p < .05$ ). Similarly, in liberal arts institutions ( $N = 483$ ), parental education also did not significantly predict perceptions of a chilly climate,  $R^2 = .05, F(12, 470) = 1.95, p < .05$ . Significant predictors in this model were gender ( $\beta = .59, p < .05$ ) and URM status ( $\beta = 1.19, p < .05$ ). Next, perceptions of a chilly climate were examined within research institutions. In research-intensive institutions, parental education did not significantly predict perceptions of a chilly climate,  $R^2 = .06, F(12, 583) = 3.02, p < .001$ . Significant predictors were gender ( $\beta = .67, p < .05$ ), foreign-born status ( $\beta = 1.13, p < .05$ ), and biology ( $\beta = 0.71, p < .05$ ). Finally, faculty perceptions of a chilly climate were examined at research-extensive institutions. The results of the regression indicated that first-generation status did significantly predict perceiving a chillier climate ( $\beta = .62, p < .05$ ), and this was the only significant predictor in the model,  $R^2 = .02, F(12, 865) = 2.31, p < .05$ .

Table 2. Regression table showing  $\beta$ -coefficients of a “chilly” climate.

Variable Name	Master’s Comprehensive	Liberal Arts	Research- Intensive	Research- Extensive
First-generation	.24	.23	-.21	**.62
PhD parents	-.15	-.33	-.22	-.21
Female	-.14	*.59	*.67	.28
Asian	.31	.82	-.24	-.02
URM	.27	*1.19	.03	-.08
Foreign-born	**.75	.27	**1.13	.38
Biology	-.27	.45	*-.71	-.20
Biochemistry	-.27	.55	-.25	-.4
Civil Engineering	-.01	1.11	.16	.25

\*Significant at  $p < .05$ , \*\*significant at  $p < .01$

## 5. Discussion

Using a large survey of U.S. based academic scientists across four disciplines and spanning a diverse set of institutions, we measured the degree to which institutional placement and perceptions of a chilly climate were affected by parental education. Because first-generation status has been shown to increase negative psychological and academic outcomes and is also conflated with URM status (Schuyler et al., 2021), examining first-generation faculty’s career experiences and behaviours can illuminate which dimensions of academic institutions can be addressed to create more accessibility to the professoriate. Especially given the trend that first-generation doctoral recipients have steadily been declining since the 1970s while those with parents with PhDs have been increasing (NSF Science & Engineering Indicators, 2021), additional attention on socioeconomic characteristics within academia will provide much needed information on barriers to diversifying academic faculty.

To summarize, parental education did impact which types of institutions faculty worked at such that having PhD parents predicted working at the most prestigious universities, research-extensive ones, and first-generation status predicted working at master’s comprehensive universities. These results correspond with similar results finding that faculty with PhD parents are more likely to be employed at elite institutions (Morgan et al., 2022). However, these results also find evidence about first-generation status and institutional placement. Though the findings show that first-generation faculty are more likely to work at master’s comprehensive universities, this study does not examine *why* this pattern occurs. Past literature demonstrate that first-generation faculty have strong motivations to mentor (Chase, 2010). It is possible that first-generation faculty may be more likely to self-select into teaching-focused institutions over research institutions because they are motivated to give back to students like them. At the same time, preference towards applicants with PhD parents may also operate to exclude first-generation faculty from research institutions. On a larger scale, universities tend to hire applicants who received PhDs from a small portion of prestigious universities (Wapman et al., 2022). Since parental education predicts placement into a higher prestige university, these hiring dynamics likely also impact faculty diversity.

In addition to examining institutional placement, we also studied how parental education interacted with institutional type to influence faculty’s climate perceptions. Our findings coincide with past studies showing that women faculty do experience a more

chilly climate across liberal arts and research-intensive universities (Casad et al., 2021; Maranto & Griffin, 2011). Regarding parental education, the results found that only first-generation faculty experienced a chilly climate at research-extensive institutions. This finding has serious implications for diversifying research production. By nature, producing science is a social process, and social exclusion or lack of belonging can result in lower quality collaborations and mentoring and smaller professional networks. Such results have been shown in women faculty and contribute to retention issues of women academics in STEM (Greene et al., 2010). Because first-generation status is often conflated with other variables of marginalization (e.g., race), these findings suggest that addressing socioeconomic barriers to the professoriate are equally important as addressing issues of representational diversity.

## **6. Conclusion**

This study extended recent findings on parental education and institutional placement (Morgan et al., 2022) by also examining the influence of parental education on perceptions of climate. In line with past results, faculty with PhD parents were more likely to teach at research-extensive universities. However, a unique finding of this study is that patterns of institutional placement were also identified for first-generation faculty who were more likely to teach at master's comprehensive universities. Moreover, a chilly climate varied across institutions but was most salient for first-generation faculty in research-extensive institutions. Our findings show, however, that underrepresented minorities are the most affected by a chilly work environment. Since these are the sites of most research production in the U.S., first-generation faculty's sense of exclusion at these institutions has serious implications for their careers, diversification of academic faculty, and science production.

### **Author contributions**

Victoria Pham took the lead on the data analysis, outline and initial draft of this paper. Julia Melkers, PhD, is the primary advisor on this paper. She provided feedback for the research design, study narrative, and data analysis plan, and contributed to the writing and editing of the paper. Mayra M. Tirado, PhD, provided feedback and edits for the theoretical basis, narrative, measurement validity, and contributed to the writing and editing of the paper.

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