The Role of Faculty-Student Interactions on College Student Persistence at Four-Year Institutions

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Thank you very much for being here with us today. My name is Katrina Borowiec, and I am here on behalf of my NCES Data Institute 2019 team members, Catherine, Elka, Pesha, Hongwei, and Enyu. We would also like to express our appreciation for our NCES Institute mentors Dr. Kristina Powers and Dr. Adam Ross Nelson, and to AIR and NCES for the opportunity to participate in the Institute.

Agenda

1. Research Questions
2. Overview of Prior Literature
3. Data & Variables
4. Analytic Method
5. Results
6. Conclusion & Implications
7. Questions

Before I discuss our research, I wanted to provide a quick agenda for this presentation. I will begin with reviewing our research questions and the prior literature before transitioning to a discussion of our data and methodology, key results, conclusions, and implications. At the end I would be happy to answer your questions.

Research Questions

RQ1: Is there a relationship between students' interaction with faculty and students' **two-year persistence** at four-year institutions?

RQ2: Are there differences in the relationship between interactions with faculty and two-year student persistence at four-year institutions, depending on students' gender, disability status, Pell grant status, first-generation status, academic major, or race/ethnicity?

Two research questions guided this work. The first research question asked whether there was a relationship between students' interactions with faculty and their persistence. It is worth noting that the current study focused on **two-year persistence**. Most retention and persistence studies focus on either first-year retention or four- and six-year graduation. Therefore, when designing this study, we thought it might be interesting to examine two-year persistence. We also decided to focus on four-year institutions, since the expected time-to-degree differs depending on the academic program.

In addition to examining persistence overall, we also wanted to understand whether the relationship between interactions with faculty and two-year persistence differed across student populations.

Overview of Prior Literature

Prior research has shown that faculty relationships with students impact their academic achievement and persistence (Baxter Magolda, 1987; Campbell & Campbell, 1997; Kim & Sax, 2009; Shepherd & Sheu, 2014).

Yet, these gains may differ depending on students' race/ethnicity (Cejda & Hoover, 2010), gender (Sax et al., 2005), disability status (Patrick & Wessel, 2013), socioeconomic status (Kim & Sax, 2009), and academic major (Kim & Sax, 2011).

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Student-faculty interactions are associated with students' academic achievement and persistence. However, prior research also indicates that interacting with faculty may not benefit all students equally.

Faculty-Student Interaction: Differences by Race/ethnicity, Gender, and Disability

Prior studies have found:

- Course-related contact has a *positive* effect on GPA among African American students, but a *negative* effect among Asian American students (Cole, 2010).

- Talking with faculty outside class has a higher positive effect on GPA for men than for women (Sax et al., 2005).

- Students with disabilities sometimes experience uncomfortable interactions with faculty members when they seek accommodations (Barnar-Brak et al., 2010).

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Prior studies have found that course-related contact with faculty had a positive effect on African American students' GPAs, but a negative effect for Asian Americans. With respect to gender, talking with faculty members outside the classroom had a higher positive effect on the GPA of men than women.

While the research we identified did not specifically focus on faculty-student interactions and academic outcomes for students with disabilities, prior research indicates that students with disabilities may encounter negative interactions with faculty members when asking for accommodations. This could negatively affect their persistence.

Faculty-Student Interaction: Differences by Socio-Economic Status and Major

Prior studies have found:

- Undergraduates from lower- and middle-class households are *less likely* to interact with faculty members during class, to communicate with faculty in person or via email, and to participate in research with faculty for academic credit than their upper-class peers, but they are *more likely* to participate in research with faculty for pay (Kim & Sax, 2009).

- Cognitive skill development is generally higher in academic departments/ majors where students perceived more faculty support (Kim & Sax, 2011).

Additionally, prior studies have found that relative to students from upper-class households, students from lower- and middle-class households have less frequent contact with faculty both during and outside of class. While they were less likely to participate in research for credit, they were more likely to work with faculty on research for pay. Additionally, supportive faculty relationships are associated with higher cognitive skill development.

Given these differences, our study seeks to better understand the relationship between student-faculty interactions and persistence.

Data

Our study utilized the Beginning Postsecondary Students (BPS) 2004/09 Longitudinal Study dataset from the National Center for Education Statistics (NCES, 2009) DataLab.

BPS included a nationally representative sample of students entering postsecondary institutions during the 2003-04 academic year (Wine et al., 2011).

Our study utilized data from the nationally representative 2004/2009 Beginning Postsecondary Students Longitudinal Study. All students in the study entered postsecondary institutions during the 2003-04 academic year.

Data are collected from students at three time points—during 2003-04, which corresponds to their first year, 2005-06, which corresponds to the third year of the study, and 2008-09, which corresponds to the sixth and final year of the BPS study. By 2008-09, some students have graduated, while others are either still enrolled or have left college before graduating.

Our analysis focuses on the first two years of data collection, given our focus on two-year persistence. In total, there were 8,600 students in our sample.

Variables

Dependent:

1. Cumulative retention and attainment at first institution 2004-05 (Retained through second year, *Not retained*)

Independent:

1. Frequency of informal or social meetings with faculty (*Never*, Sometimes/Often)
2. Frequency of talking outside class about academics with faculty (*Never*, Sometimes/Often)
3. Sex (*Male*, Female)
4. Disability (Yes, *No*)
5. Pell grant received (Yes, *No*)
6. Parents' highest level of education (First-generation, *Continuing generation*)
7. Major (STEM, Social/behavioral sciences, Both areas, Other field, *Undeclared*)
8. Race/ethnicity (*White*, Black or African American, Hispanic or Latino, Asian, Other, Multiracial)

Note: The reference group in the regression models is italicized.

This slide displays the list of dependent and independent variables used in the analysis. We only examined one dependent variable, which was whether the student was still retained at their current institution through the **second year**.

Our analysis included **8 independent variables**. The focus of the analysis was the faculty interaction variables. Students were asked how often they informally interacted with faculty and how often they had conversations about academics outside class. Drawing upon prior research on the relationship between student characteristics and faculty-student interactions, we used gender, disability status, Pell grant status, parent education, major, and race/ethnicity as additional independent variables.

Method

RQ1: Full Population Model

$\ln(P/1-P) = b_0 + b_1 \text{(Formal interaction)} + b_2 \text{(Informal interaction)} + b_3 \text{(Student Characteristics)}$, where p=probability of being retained for two years

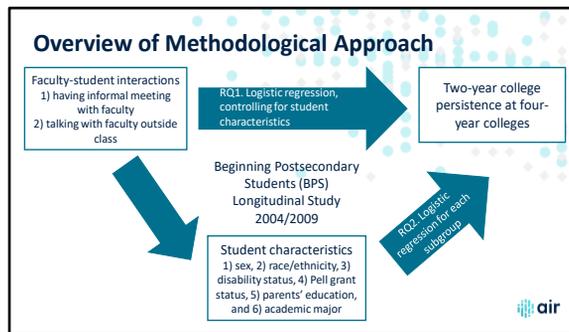**RQ2: Models for Each Subpopulation based on Student Characteristics**

$\ln(P/1-P) = b_0 + b_1 \text{(Formal interaction)} + b_2 \text{(Informal interaction)} + b_3 \text{(Other Student Characteristics)}$, where p=probability of being retained for two years

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We used binary logistic regression to answer our research questions. The outcome was whether the student was retained for two years at the institution they first enrolled in. The independent variables were described on the prior slide.

To answer research question 1, all student demographic characteristics were entered into the model. In comparison, research question two focused on the relationship between student-faculty interactions and two-year persistence for specific student subpopulations—for example, students with disabilities. In these cases, the data set was first filtered by the focal student characteristics—for example, disability—and then the other five student characteristics were entered into the model as covariates.

Another approach to answering research question two would have been using an interaction term between student/faculty interaction and each student characteristic. However, since we were using the web-based PowerStats tool, rather than the unit-record data, we could not compute interaction terms.

Overview of Methodological Approach

Faculty-student interactions
1) having informal meeting with faculty
2) talking with faculty outside class

RQ1. Logistic regression, controlling for student characteristics

Two-year college persistence at four-year colleges

Beginning Postsecondary Students (BPS) Longitudinal Study 2004/2009

Student characteristics
1) sex, 2) race/ethnicity, 3) disability status, 4) Pell grant status, 5) parents' education, and 6) academic major

RQ2. Logistic regression for each subgroup

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The following diagram displays an overview of what I have previously outlined earlier. In sum, this study answers two research questions using logistic regression for the overall population and for specific student subgroups.

Results: Descriptive Statistics & Demographics

Variable	Percent
Retained at first institution (2-year)	87%
Sometimes/often have informal or social meetings with faculty	46%
Sometimes/often talk with faculty outside class about academics	83%
Sex: Female	56%
Has disability – any type	8%
Pell grant recipient	30%
First-generation college student	28%
Major: STEM / Social or behavioral sciences / Both / Other / Undeclared	25% / 17% / 2% / 53% / 3%
Race/ethnicity: White / Black or African American / Hispanic or Latinx / Asian / Other / Multiracial	68% / 11% / 11% / 6% / 2% / 3%

The current slide displays descriptive statistics for all variables in the analysis. From this table, we observe that 87% of the sample was retained at the two-year time point at four-year colleges. Furthermore, while 46% of students "sometimes" or "often" had informal or social meetings with faculty, a much higher percentage, 83%, had conversations with faculty about academic matters outside class.

With respect to student demographic and other characteristics, we can see that 56% of students identified as female and 8% reported having a disability. About one-third of students received a Pell grant and 28% were the first in their families to attend college. 25% of students majored in STEM. Also, about two-thirds of students identify as White.

As a reminder, the first research question was "Is there a relationship between students' interaction with faculty and students' two-year persistence at four-year institutions." Put simply, the answer is "yes." Both formal and informal interactions with faculty increased students' probability of persisting in college for two years. More specifically, those who often or sometimes talked with faculty outside class about academic matters were 42% more likely to persist, while those who often or sometimes had informal or social meetings with faculty increased their odds of two-year persistence by 24%.

Results: RQ2

Are there differences in the relationship between interactions with faculty and student persistence at four-year institutions, depending on students' gender, disability status, Pell grant status, first-generation status, academic major, or race/ethnicity?

Student Subpopulation	Formal Interactions	Informal Interactions
Female student	42% increase in probability of persistence	--
Student with disability	--	92% increase
Pell grant recipient	--	--
First-generation college student	47% increase	--
STEM Major	--	--
Social/behavioral science major	93% increase	
Asian student	--	--
Black/African American student	--	--
Hispanic or Latinx student	--	--
White student	61% increase	27% increase

An alpha level of .05 was used to designate statistical significance.

This table displays findings related to the second research question: "Are there differences in the relationship between interactions with faculty and student persistence at four-year institutions, depending on students' gender, disability status, Pell grant status, first-generation status, academic major, or race/ethnicity?" To answer this question, yes, there are differences by student characteristics. We can see that formal interactions with faculty outside class about academic matters increases the odds of persistence for female students, first-generation college students, social/behavioral science majors, and White students. In comparison, informal or social meetings with faculty increase the odds of persistence for students with disabilities and White students.

It is concerning that neither formal nor informal interaction was associated with an increase in persistence for Pell grant recipients, STEM majors, Asian students, Black/African American students, and Hispanic or Latinx students.

Conclusions

In alignment with prior research, these findings suggest that students benefit from interacting with faculty.

Interactions about academic matters outside class increased the odds of persistence notably higher than did informal interactions.

These findings also indicate that interacting with faculty does not benefit all students equally.

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Overall, our research indicates that there is a positive association between both formal and informal interactions with faculty and student persistence. However, this positive association was not universally experience by all students.

Note: The comparison in the odds of persistence for informal versus formal interaction was not based on a formal statistical comparison.

Implications

To create a more equitable campus environment, more research (see for instance, Cejda & Hoover, 2010; Newman, 2011) is needed to identify how faculty can support students from diverse populations.

Findings from this study are essential for developing and implementing policies to transform campus culture that strengthens faculty-student relationships and student persistence.

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Given these inequities, more research is needed to understand how faculty can better support students from diverse populations. Campuses can develop policies and programs designed to foster student-faculty relationships.

Thank you!

Any Questions?

References

Barnar-Brak, L., Lectenberger, D., & Lan, W. Y. (2010). Accommodation strategies of college students with disabilities. *The Qualitative Report, 15*(2), 411-429.

Baxter Magolda, M. B. (1987). The affective dimension of learning: Faculty-student relationships that enhance intellectual development. *College Student Journal, 21*(1), 46- 58.

Campbell, T. A., & Campbell, D. E. (1997). Faculty/student mentor program: Effects on academic performance and retention. *Research in Higher Education, 38*(6), 727-742.

Cejda, B. D., & Hoover, R. E. (2010). Strategies for faculty-student engagement: How community college faculty engage Latino students. *Community College Review, 29*(1), 35-57.

Cole, D. (2010). The effects of student-faculty interactions on minority students' college grades: Differences between aggregated and disaggregated data. *Journal of the Professoriate, 3*(2), 137-160.

Kim, Y. K., & Sax, L. J. (2009). Student–faculty interaction in research universities: Differences by student gender, race, social class, and first-generation status. *Research in Higher Education, 50*(5), 437-459.

Kim, Y. K., & Sax, L. J. (2011). Are the effects of student-faculty interaction dependent on academic major? An examination using multilevel modeling. *Research in Higher Education, 52*(6), 589-615.

Lundberg, C. A., & Schreiner, L. A. (2004). Quality and frequency of faculty-student interaction as predictors of learning: An analysis by student race/ethnicity. *Journal of College Student Development, 45*(5), 549-565.

NCES. (2009). *Beginning Postsecondary Students Longitudinal Study (BPS: 04/09)* [Data set]. Retrieved from https://nces.ed.gov/datalab/index.aspx

Newman, C. B. (2011). Engineering success: The role of faculty relationships with African American undergraduates. *Journal of Women and Minorities in Science and Engineering, 17*(3), 193-207.

Patrick, S., & Wessel, R. D. (2013). Faculty mentorship and transition experiences of students with disabilities. *Journal of Postsecondary Education and Disability, 26*(2), 105-118.

Sax, L. J., Bryant, A. N., & Harper, C. E. (2005). The differential effects of student-faculty interaction on college outcomes for women and men. *Journal of College Student Development, 46*(6), 642-657.

Shepherd, M. M., & Sheu, T. S. (2014). The effects of informal faculty-student interaction and use of information technology on non-traditional students' persistence intentions and educational outcomes. *Journal of Higher Education Theory & Practice, 14*(2).

Wine, J., Janson, N., and Wheeless, S. (2011). *2004/09 Beginning Postsecondary Students Longitudinal Study (BPS:04/09) full-scale methodology report* (NCES 2012-246). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.

Here is a list of the references cited in the presentation.