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Authors

Eagan, M. Kevin, Jr
Jaeger, Audrey J.

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3

This chapter reports the results of a large study on the effects of part-time faculty on student persistence and suggests that administrators give careful consideration when trying to reduce expenses through the use of such faculty in large beginning courses.

Closing the Gate: Part-Time Faculty Instruction in Gatekeeper Courses and First-Year Persistence

M. Kevin Eagan Jr., Audrey J. Jaeger

Calls for greater accountability in terms of graduation rates and increased economic efficiency among higher education institutions have prompted scholars to examine nontraditional factors that might help to explain the retention puzzle. Terenzini and Reason (2005) emphasize the critical importance of examining factors that lead to first-year student attrition, as four-year institutions, on average, lose more than 25 percent of students by the start of the second year. Recently researchers have begun examining the effects of exposure to part-time faculty on student outcomes (Bettinger and Long, 2006; Jacoby, 2006; Jaeger and Hinz, forthcoming; Jaeger, Thornton, and Eagan, 2007; Kerhberg and Turpin, 2002; Ronco and Cahill, 2006); however, these studies do not specifically address the types of courses students take with part-time faculty. Research on student retention has given limited attention to the role that introductory, or gatekeeper, courses play in students' decisions to remain enrolled at an institution. Gatekeeper courses refer to classes with high enrollment that generally represent the introductory courses required for matriculation into a major field of study (Tobias, 1992).

In this chapter, we describe the employment of part-time faculty in four-year higher education institutions, as well as highlight research on the importance of key gatekeeper courses. Informed by Bean's model (1990) of student attrition, which posits that students leave higher education institutions because of a sense of dissatisfaction with their environment, our analyses

examine how the type of faculty instruction students receive in gatekeeper courses in their first year of college influences their decision to reenroll for the fall of their second year. We draw data from four cohorts of students at four public universities within a state system of higher education. The chapter concludes with implications for administrators and policymakers, as well as directions for future research, in regard to the employment of part-time faculty instructors in gatekeeper courses.

Literature Review

High levels of competition, large class sizes, and high failure rates characterize typical introductory or gatekeeper courses (Tobias, 1992; Van Valkenburg, 1990). Tobias (1990) suggests that professors of these courses generally have high expectations for first-year students and thus teach at a level that supersedes many students' actual abilities. Pedagogical practices of faculty in these courses often encourage passive learning among students as students listen to lectures and take notes rather than engage in discussion with their classmates and instructors (Seymour and Hewitt, 1997). In addition, introductory math and science courses have received significant criticism for grading on a curve and encouraging students to memorize information rather than to think critically about concepts (Seymour and Hewitt, 1997). The competition created by grading on a curve engenders a survival-of-the-fittest mentality among students (Epstein, 2006). Asking questions or otherwise being engaged during class or after the class with the instructor often proves difficult for students in these introductory courses.

Generally introductory science and mathematics courses hold the distinction of gatekeepers (Seymour and Hewitt, 1997; Tobias, 1990). Tobias describes these courses as gatekeepers because, particularly for science, math, and engineering majors, they represent the first class in a series of course work required for matriculation into the major. These gatekeeper courses are designed to weed out students who cannot perform at the expectations of faculty (Seymour and Hewitt, 1997). Gatekeeper courses serve as the initial roadblock to student persistence. Not succeeding in these gatekeeper courses may prompt students, particularly those majoring in math, science, and engineering, to change their major, transfer to a new institution, or drop out of higher education entirely (Seymour, 2001). For students not majoring in math, science, or engineering, gatekeeper courses often come in the form of a general education requirement, and failing to do well in such a course may result in a student's withdrawing from the institution due to an inability to complete required courses necessary to demonstrate degree progress. In addition, poor performance in gatekeeper courses may discourage students psychologically by deflating their self-confidence in their ability to succeed academically (Seymour, 2001).

Given the strong influence of academic engagement on a student's likelihood to persist, having a sense of connection to peers and faculty within

gatekeeper courses may substantially bear on a student's decision to reenroll at the same institution. Institutions rely on these high-enrollment introductory courses as a way to improve economic efficiency without much of an understanding of how these types of courses affect student learning and matriculation toward a degree. Prior research that has examined the effect of gatekeeper courses on student retention, academic achievement, and engagement has not considered the type of faculty to whom students have been exposed while taking such classes.

Contingent or contract faculty represent the majority of newly hired academics and nearly half of all faculty at colleges (American Association of University Professors, 2006; Schuster and Finkelstein, 2006). The term *contingent faculty* refers to graduate assistants, postdoctoral researchers, and other types of faculty who are not on the tenure track. In 2003, degree-granting institutions nationwide employed 46.3 percent of faculty in part-time appointments compared to 35.1 percent of faculty in tenured or tenure-track appointments (American Association of University Professors, 2006). Scholars have documented the multitude of reasons that universities tend to employ more part-time faculty, including that these faculty are as much as 80 percent less expensive than full-time faculty (Bettinger and Long, 2006; Gappa, 1984; Leslie, 1998; Liu and Zhang, 2007; Schuster and Finkelstein, 2006). As higher education institutions, particularly those in the public sector, continue to face uncertainty in regard to state appropriations and philanthropic donations, part-time faculty offer increased flexibility in budgeting. In addition, the cost of granting tenure has increased with the elimination of mandatory retirement in 1994, which makes employing contingent faculty an even more attractive option for reducing labor costs (Ehrenberg, 2005; Liu and Zhang, 2007).

Employing part-time faculty can also provide a more student-centered approach (Schuster and Finkelstein, 2007), which may be more responsive to diverse student populations, such as students who work full time and attend college part time. Part-time faculty tend to offer universities flexible scheduling options to meet the needs of students who may need to take classes in late evenings and on weekends. Yet this more flexible response approach to delivering instruction may be at a cost to students. A growing body of research examines the cost to students of substituting tenure-track faculty with part-time and full-time tenure-ineligible faculty.

Many full-time tenure-ineligible faculty are dedicated teachers who, without research expectations placed on them, can more fully commit to teaching (Ehrenberg, 2005). Yet full-time nontenure-track faculty teaching loads are often higher than tenure-track faculty teaching loads, which may leave these faculty with less, rather than more, time for individual students. In contrast, unlike their full-time, tenure-ineligible counterparts, many part-time faculty members are employed at multiple institutions or have jobs outside academia and thus have limited time to meet with students outside class. Schuster (2003) suggests that part-time faculty are less accessible to

students, bring less scholarly authority to their jobs, and are less integrated into the campus culture.

Umbach (2007) focused on the relationship between faculty appointments and teaching effectiveness and found that part-time faculty spent less time preparing for class, had fewer interactions with students on course- and noncourse-related issues, challenged their students less, and used active and collaborative teaching techniques less often when compared to their tenured, tenure-track, and tenure-ineligible full-time colleagues. This research also showed a difference in part-time faculty and student interaction across institutional types, with interactions being lowest at research institutions.

A number of single-institution studies have examined the effect of taking courses with part-time faculty on student persistence, but these studies have not specifically focused on faculty teaching gatekeeper courses. The studies consistently have found a significant negative correlation between the amount of exposure to part-time faculty, as measured by percentage of total credits taken with part-time instructors, and students' likelihood of being retained at the institution (Harrington and Schibik, 2004; Jaeger and Hinz, forthcoming; Jaeger, Thornton, and Eagan, 2007; Ronco and Cahill, 2006). Ronco and Cahill (2006) examined students at a public research-intensive university and found a significant, negative effect on retention from having high exposure to part-time faculty instruction. In a similar single-institution study, Jaeger and Hinz (forthcoming) concluded that students' likelihood of being retained significantly decreased as their exposure to part-time faculty instruction increased. Ehrenberg and Zhang (2005) found that increased part-time faculty employment at a four-year institution was negatively associated with student graduation rates. While this study was informative, it focused solely on institutional characteristics and thus did not examine student-level differences. Furthermore, their study did not link specific faculty types with students' courses, which prevented conclusions regarding how exposure to part-time faculty in various courses affected students individually. Examining the relationship between part-time faculty in key introductory courses and student retention is warranted, given the importance of gatekeeper courses and the differential effects that different types of faculty have on student outcomes.

Conceptual Model

The conceptual model for our study assumes that students exposed to greater levels of part-time faculty instruction in introductory courses experience fewer meaningful interactions with those faculty and thus become less integrated into the campus academic culture. Students may view part-time faculty as less stable or less secure, thus becoming less likely to develop relationships with these individuals and see them as role models or potential mentors (Baldwin and Chronister, 2001). Research (Cotten and Wilson, 2006; Endo and Harpel, 1982; Pascarella and Terenzini, 2005) has consistently found a significant and positive relationship between student-faculty

interactions and students making gains in a variety of outcomes, even after controlling for key background characteristics. For example, students gain in their cognitive and affective development by increasing their in- and out-of-class interactions with faculty (Endo and Harpel, 1982; Milem and Berger, 1997). Cotten and Wilson (2006) concluded that more frequent interactions with faculty increase students' level of academic achievement in college. In addition, Cotten and Wilson found a positive association between student-faculty interactions and student satisfaction with their overall college experience.

Bean (1990) suggests that increased satisfaction with the overall college experience provides students with reason to persist in college; conversely, Bean suggests that dissatisfaction with college leads to an increased likelihood of attrition. To the extent that prior research suggests a variety of positive outcomes associated with increased student-faculty interactions, it is plausible that students who interact with faculty less often or have fewer meaningful connections to their professors may become dissatisfied with their experience and thus more inclined to leave their college or university. Indeed Jaasma and Koper (2002) note that students who are more satisfied with their experience indicate their instructors are more accessible and involved. Given the limited availability and accessibility of part-time faculty, students likely interact and connect with these instructors less often than with full-time professors, and as a consequence, students may become dissatisfied with their college experience and leave the institution. With this assumption in mind, this study addresses the following research question: Controlling for student background and college-entry characteristics, what is the effect of exposure to contingent faculty instruction in introductory courses on students' decision to persist into the second year?

Methods

We analyzed data from four public universities within a state system of higher education located in the southeastern United States. The Carnegie Foundation for the Advancement of Teaching (2006) classifies these four institutions as four-year, primarily residential institutions. The final sample contained 15,142 students from a doctoral-extensive institution, 13,588 students from two doctoral-intensive institutions, and 2,000 students from a master's comprehensive institution.

Independent variables for the analysis were drawn from enrollment and transcript data. Enrollment data included students' race, gender, Standardized Aptitude Test (SAT) scores, high school grade point average (GPA), state residency, demonstrated financial need, and financial aid awards, including the amount of money students received in the form of loans, grants, and work study.

Transcript data provided information on students' major, first-year course work, and academic performance in each course taken during the

first year of enrollment. We classified students' academic majors into five broad categories: humanities; social sciences; life and medical sciences; physics, math, and engineering; and business. In the analyses, undeclared majors were the reference group. Data from students' transcripts were used to derive students' cumulative GPA through the end of the first year.

The transcript data also provided important information regarding the characteristics of the courses in which students enrolled. Drawing from prior research describing various characteristics of gatekeeper courses (Borden and Burton, 1999; Seymour and Hewitt, 1997; Tobias, 1990, 1992; Van Valkenberg, 1990), we defined gatekeeper courses as classes with at least ninety students. In addition, gatekeeper courses in this study were defined as the first (fall semester) or second (spring semester) course in a specific sequence of classes required for a major or general education requirement. These parameters limited the courses in this study considered to be gatekeeper courses to classes in the fields of chemistry, biology, physics, mathematics, engineering, economics, sociology, and psychology.

With gatekeeper courses identified, we calculated the percentage of students' exposure to three types of contingent faculty for their introductory course work. These variables were calculated as the number of introductory course credits taken with three types of contingent faculty (graduate assistants; other part-time faculty, including postdoctoral researchers, adjunct professors, and part-time lecturers; and full-time, tenure-ineligible faculty) divided by the total number of introductory course credits taken for the first year. The term *other part-time faculty* refers to instructors who were employed at or below 0.98 full-time equivalent by the institution and were not classified as graduate assistants. Examples of part-time faculty are part-time lecturers and adjunct professors.

In addition, we calculated the average gatekeeper class size for each student. We constructed this variable by averaging the total number of students in each class for all gatekeeper courses in which a student enrolled during his or her first year. This served as a control variable to account for the contextual effects associated with these large, competitive classroom environments and allowed us to determine how exposure to contingent faculty affected students' likelihood of being retained into the second year, independent of the average number of students in their key gatekeeper courses.

Finally, the analyses controlled for the number of gatekeeper credits a student completed during his or her first year. Controlling for the number of gatekeeper credits, rather than the total number of credits completed in the first year, enabled us to isolate the effects of exposure to various types of faculty within these key introductory courses.

This study employed separate logistic regressions for each Carnegie classification (one doctoral-extensive university, two doctoral-intensive universities, and one master's comprehensive university) to examine the effects of contingent faculty exposure in introductory courses on students' likelihood to persist.

Table 3.1. Descriptive Statistics by Institutional Type

	<i>Doctoral Extensive</i>		<i>Doctoral Intensive</i>		<i>Master's Comprehensive</i>	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Retained to second fall semester	0.90	0.30	0.76	0.42	0.88	0.33
Black	0.10	0.30	0.15	0.36	0.02	0.15
Asian	0.04	0.20	0.04	0.20	0.02	0.13
Hispanic	0.02	0.15	0.02	0.15	0.02	0.13
American Indian	0.01	0.09	0.00	0.07	0.01	0.07
Other race	0.01	0.12	0.02	0.15	0.03	0.16
White	0.81	0.39	0.76	0.43	0.90	0.34
Female	0.44	0.50	0.61	0.49	0.51	0.50
Out-of-state resident	0.10	0.15	0.11	0.05	0.10	0.30
High school GPA	3.59	0.26	3.49	0.40	0.35	0.29
Combined SAT	11.91	1.24	10.60	1.26	11.23	1.12
Humanities	0.05	0.22	0.11	0.31	0.11	0.32
Social sciences	0.12	0.32	0.22	0.41	0.35	0.48
Life and medical sciences	0.16	0.36	0.13	0.33	0.11	0.31
Physics, math, and engineering	0.38	0.49	0.09	0.29	0.06	0.23
Business	0.07	0.26	0.11	0.31	0.10	0.30
Undeclared	0.22	0.15	0.34	0.25	0.27	0.21
Need	3.44	5.42	4.10	5.44	2.71	5.85
Grants	3.31	4.85	1.82	2.79	1.50	2.53
Subsidized loans	0.57	1.17	0.95	1.67	0.67	1.24
Work study	0.06	0.26	0.08	0.49	0.08	0.38
Total first-year GPA	2.72	0.80	2.57	0.89	2.74	0.80
Percentage of introductory courses with graduate students	0.08	0.20	0.05	0.20	0.00	0.00
Percentage of introductory courses with other part-time faculty	0.22	0.28	0.08	0.29	0.14	0.32
Total introductory credits earned in first year	9.53	4.28	5.12	2.51	4.74	2.23
Average class size in gatekeeper courses	180.48	84.12	172.12	83.10	125.64	49.26

Table 3.1 presents descriptive statistics of the variables in the analysis. First-year retention rates ranged from 76 percent at the doctoral-intensive universities to 90 percent at the doctoral-extensive university. Exposure to graduate assistant instruction in gatekeeper courses appeared to be relatively low across all institutional types, as students, on average, had less than 10 percent of their introductory credits with graduate assistant instructors. Specifically, at the master's comprehensive institution, no graduate students taught courses identified as gatekeeper ones. Students at the doctoral-extensive institution had nearly 25 percent of all of their gatekeeper credits with other types of part-time faculty, whereas students at the doctoral-intensive institutions had just 8 percent of introductory credits with such faculty.

Student financial need ranged from an average of \$3,440 at the doctoral-extensive institution to \$4,100 at the doctoral-intensive institutions. More students (34 percent) at the master's comprehensive institutions had not declared a major by the end of their first year compared to students at the other types of institutions. The doctoral-extensive institution holds a strong national reputation for its engineering program and therefore had a high concentration (38 percent) of physics, math, and engineering majors.

As anticipated, average gatekeeper class sizes were largest at the doctoral-extensive institution and smallest at the master's comprehensive institution. Similarly, students at the doctoral-extensive institution tended to have more credits in gatekeeper courses compared to their peers at the doctoral-intensive and master's comprehensive institutions. Finally, though not shown in Table 3.1, it is important to note that 97 percent of first-year students at the doctoral-extensive institution had enrolled in at least one gatekeeper course. In contrast, 71 percent of students at the doctoral-intensive and just 18 percent of students at the master's comprehensive institutions had enrolled in a gatekeeper course during their first year.

Table 3.2 presents the results of the logistical regression, presented as odds ratios. Odds ratios greater than 1 indicate an increased likelihood of persistence into the second year, whereas odds ratios less than 1 suggest reduced odds of persistence. The results suggest that students, regardless of institutional type, were not significantly affected by exposure to graduate student instruction in their introductory course work. The graduate student exposure variable was dropped from the model for students at the master's comprehensive institution, as no graduate students instructed gatekeeper courses at this university. Similarly, students appeared not to be significantly affected by exposure to full-time, tenure-ineligible faculty. Initial analyses suggested multicollinearity associated with the full-time, tenure-ineligible faculty variable. Due to this multicollinearity and its nonsignificance in initial models, we dropped the full-time, tenure-ineligible variable from future analyses.

Regarding other types of part-time faculty, such as postdoctoral researchers, adjunct professors, and part-time lecturers, in gatekeeper courses, students became less likely to persist into their second year as their exposure to such part-time faculty increased. In each institutional type, the effect of exposure to other part-time faculty was negative. Among the doctoral-extensive and -intensive institutions, students were about 20 percent less likely (odds ratio = 0.80, $p < 0.05$) to persist into the second year for every percentage point increase in exposure to other part-time faculty in gatekeeper courses. The effect at the master's comprehensive institution was slightly stronger: students became about 37 percent (odds ratio = 0.63, $p < 0.05$) less likely to be retained into the second year for every percentage point increase in exposure to other part-time faculty in gatekeeper courses.

Another clear trend across all institutional types, albeit less substantial, was the significant and negative effect of average gatekeeper class size on students' likelihood of persistence. As the average class size in gatekeeper

Table 3.2. Logistic Regression Results by Institutional Type

Variable	Doctoral Extensive			Doctoral Intensive			Masters Comprehensive		
	Odds Ratio	SE	Significance	Odds Ratio	SE	Significance	Odds Ratio	SE	Significance
Black	1.77	0.12	***	1.66	0.09	***	1.26	0.51	
Asian	1.14	0.16		1.56	0.14	***	1.05	0.59	
Hispanic	1.05	0.20		1.17	0.17		1.00	0.56	
American Indian	0.81	0.33		0.96	0.32		0.43	0.72	
Other race	0.89	0.23	***	0.79	0.17	***	1.34	0.51	
Female	0.76	0.07	***	0.84	0.06	***	0.80	0.16	*
Out-of-state resident	0.45	0.09	***	0.52	0.08	***	0.55	0.24	*
High school GPA	0.94	0.08	***	0.75	0.06	***	1.00	0.19	*
Combined SAT	0.89	0.02	***	0.96	0.02	*	0.99	0.05	
Humanities	1.03	0.14		1.08	0.10		1.04	0.25	
Social sciences	0.95	0.10		1.31	0.07	***	1.08	0.19	
Life and medical sciences	0.81	0.10	*	0.96	0.08		1.00	0.28	
Physics, math, and engineering	1.18	0.09	*	1.39	0.11	**	1.34	0.38	
Business	2.35	0.15	***	0.95	0.09		0.80	0.26	
Need	0.98	0.01		0.97	0.01	***	1.00	0.02	
Grants	1.02	0.01	*	1.08	0.01	***	1.03	0.04	
Subsidized loans	0.98	0.04		1.01	0.02		0.91	0.07	
Work study	1.25	0.14		0.96	0.05		0.90	0.20	
Total first-year GPA	3.16	0.04	***	3.33	0.03	***	2.10	0.09	***
Percentage of introductory courses with graduate students	0.82	0.15		0.79	0.13				
Percentage of introductory courses with other part-time faculty	0.80	0.11	*	0.80	0.09	**	0.63	0.23	*
Total gatekeeper credits completed in first year	1.25	0.01	***	1.34	0.02	***	1.35	0.05	***
Average class size in gatekeeper courses	0.97	0.01	***	0.94	0.01	***	0.92	0.01	***
Percentage correctly classified	74.70			73.30			69.30		
Hosmer and Lemeshow chi-square statistic	121.13		***	174.82		***	45.87		***

Note: *** $p < 0.001$. ** $p < 0.01$. * $p < 0.05$.

courses increased, students became significantly less likely to persist into their second year. This trend was weakest at the doctoral-extensive institution (odds ratio = 0.97, $p < 0.001$) and strongest, although still modest, at the master's comprehensive institution (odds ratio = 0.92, $p < 0.001$).

As the number of gatekeeper credits that students completed increased, their likelihood of persistence also increased. This variable served as a proxy for students' level of academic engagement, or enrollment intensity, during their first year. Students at the doctoral-extensive institution became about 25 percent more likely (odds ratio = 1.25, $p < 0.001$) to persist for every additional gatekeeper credit they completed. Similarly, students at the master's comprehensive institution became about 35 percent more likely (odds ratio = 1.35, $p < 0.001$) to persist for every additional gatekeeper credit they completed. This result may suggest that students who attempt more hours may have a greater sense of self-efficacy and are already more likely to persist.

Consistent with prior research (Titus, 2006), students' cumulative first-year GPA had a significant positive effect on persistence likelihood, as students at the doctoral-extensive (odds ratio = 3.16, $p < 0.001$) and doctoral-intensive (odds ratio = 3.33, $p < 0.001$) institutions became more than three times as likely to persist for every unit increase in GPA. Students at the master's comprehensive institution became more than twice as likely to persist for every unit gain in first-year college GPA (odds ratio = 2.10, $p < 0.001$).

Students from out of state had significantly reduced odds of persistence than their in-state peers across all institutional types. In general, students from out of state were about half as likely to return for their second year compared to their in-state classmates. The state system to which the institutions in this study belong limits the proportion of out-of-state students the institutions can enroll each year. During the time frame of this study, that limit was 17 percent.

The models for each institutional type did a fair job at correctly classifying each case in the analysis as persisting or not persisting. The poorest-predicting model was the model for the master's comprehensive institution, which correctly classified 69 percent of all cases. The models for the doctoral-extensive and doctoral-intensive institutions correctly classified 75 percent and 73 percent of cases, respectively.

Implications and Conclusions

The results from our study have several implications for higher education administrators and policymakers who face the task of balancing the financial reality of needing to employ greater numbers of part-time faculty while simultaneously maintaining, if not raising, retention and graduation rates. First, students appeared not to be significantly affected by having graduate students as instructors for their introductory course work. Second, exposure to full-time, tenure-ineligible faculty did not appear to significantly affect students' likelihood of persisting into their second year. Perhaps the fact that

graduate students and full-time, tenure-ineligible faculty tend to be more visible and more integrated into the campus culture mitigates any shortcomings they may have in course preparation or pedagogical expertise. In addition, Umbach (2007) concluded that full-time, tenure-ineligible faculty behaved more like their full-time, tenure-eligible colleagues and less like their part-time counterparts. The nonsignificant finding for exposure to full-time, tenure-ineligible faculty on first-year student persistence seems to support Umbach's conclusion (2007), at least in part. Because our data did not provide specific information about faculty practices inside and outside the classroom, future research would need to examine specifically how the actual behaviors and pedagogical practices of full-time, tenure-ineligible faculty affect students on a variety of outcomes and compare these practices to those of tenured and tenure-track faculty.

Third, students appear to be significantly and negatively affected by having gatekeeper courses taught by other part-time faculty. This finding emerges even after controlling for key variables, such as students' prior and current academic achievement, academic major, average gatekeeper course size, and number of gatekeeper credits a student completed. By controlling for these extenuating variables, we see that exposure to other part-time faculty may have less to do with this faculty subgroup's pedagogy and possibly more to do with their level of availability and accessibility on campus. According to Seymour and Hewitt (1997), these gatekeeper courses are characterized by high enrollments and high levels of competition among students. Because of these characteristics, gatekeeper courses suffer from poor pedagogical practices regardless of the type of instructor, as these classes generally focus on lectures and fail to engage students in the classroom. Given that Schuster (2003) and Schuster and Finkelstein (2006) concluded that part-time faculty are generally less accessible and less available to students, it is possible that the negative effects on retention of having gatekeeper classes taught by other part-time faculty stemmed from students' inability to meet with or connect with these instructors outside the classroom for additional guidance or assistance with course content. In fact, the type of interaction that students report as being most important is contact with faculty outside the classroom (Stodt, 1987). Furthermore, students' perceptions of faculty members' availability and concern for them have positive and significant effects on persistence (Halpin, 1990; Mallette and Cabrera, 1991). Haeger (1998) notes that part-time faculty often do not have offices, hold limited or no meeting hours, have limited or no telephone and computer access, and are not compensated for advising students. Thus, part-time faculty may not be as engaged with students outside the classroom, leading students to conclude that this faculty subgroup has a lack of interest in interacting with them. Since gatekeeper courses are often the most challenging classes for first-year students, the ability to connect with faculty outside the classroom may be an important component to students' pursuit of success.

Student success should be the force that drives institutional decision making. Although research suggests that the employment of part-time faculty instructors enables institutions to become more cost-efficient with their academic labor (Bettinger and Long, 2006; Gappa, 1984; Leslie, 1998; Liu and Zhang, 2007; Schuster and Finkelstein, 2006), this financial flexibility may be at a significant cost to an institution's ability to retain students. If students are unsuccessful in navigating foundational high-enrollment introductory courses because of the type of faculty instructing such courses, administrators should reconsider the types of courses that part-time faculty teach. Perhaps relying more heavily on full-time tenured faculty, who likely have a stronger presence on the campus and may maintain a stronger sense of availability to students, to teach these key gatekeeper courses may serve as a feasible alternative to having part-time instructors take on these important responsibilities. Hagedorn, Perrakis, and Maxwell (2002) concluded that to encourage student success, colleges should not rely heavily on part-time faculty who hold sparse office hours and appear inaccessible. Bean (2005) notes, "When students feel faculty members do not care about the student's development, their bonds to the institution weaken" (p. 225).

The finding of negative effects on persistence from the large class sizes in these key introductory courses supports prior research (Borden and Burton, 1999; Seymour and Hewitt, 1997). Kennedy and Siegfried (1997) noted that small-class discussion methods are favored when instructors hope to instill skills such as retention of information, problem solving, critical thinking, and attitude change or motivation in students. Because of the difficulty in creating collaborative curricula for high-enrollment classes, instructors, regardless of level of appointment, may rely more heavily on lecture to teach students the content. The lack of interaction between students and instructor in the classroom may lead to increased disengagement among students, which translates into a decreased likelihood of persistence (Bean, 1990). This disengagement in students' academic lives may contribute to students' sense of dissatisfaction with their environment, which can lead to an increased risk of attrition (Bean, 1990). Similarly, in a qualitative study addressing college graduates' perceptions relative to what facilitated their continued enrollment, Hofmann, Posteraro, and Presz (1994) found that graduates noted that faculty were the primary way in which the college contributed to their success. In addition, an important feature to their success was small class size. This conclusion is critical to note as it illustrates students' perceived benefits of faculty-student interaction and small class size.

Future research needs to address how the level of availability and the pedagogical practices of various types of contingent faculty in gatekeeper courses affect students' likelihood to persist. While we appropriately controlled for key intervening variables, such as student major, course size, and enrollment intensity, we were unable to account for the level of availability and pedagogical practices employed by various faculty types. Given that prior research (Schuster and Finkelstein, 2006; Umbach, 2007) suggests

that full-time tenure-ineligible faculty are significantly different from their part-time counterparts across several dimensions, future research using advanced statistical techniques, such as hierarchical linear modeling, needs to examine how these specific characteristics of contingent faculty intersect with and affect student experiences and outcomes.

Given the consistent findings from this study as well as previous related studies (Harrington and Schibik, 2004; Jaeger and Hinz, forthcoming; Ronco and Cahill, 2006) and the increasing reliance on part-time faculty labor, particularly in the public sector, administrators and policymakers need to revisit their current practices with regard to part-time faculty. The use of part-time faculty has become a fiscal reality; however, administrators can become more intentional about the placement of part-time instructors in specific courses. Rather than appointing part-time instructors to teach important foundational courses for lower-division undergraduates, perhaps these instructors would be better suited to teach courses with more advanced students who have established a greater sense of commitment to their institution and degree program. If the negative effects of part-time faculty exposure on first-year student retention continue to be ignored within institutions of higher education, these institutions may continue to sacrifice their ability to retain students in order to remain cost-efficient.

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M. KEVIN EAGAN is a graduate student at the University of California, Los Angeles.

AUDREY J. JAEGER is an associate professor of higher education at North Carolina State University