The Individual and Environmental Effects

of Part-Time Enrollment Status on Student-Faculty Interaction

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Abstract

Based on over 55,000 responses from seniors at 224 public colleges and universities, this study focuses on the difference between full-time and part-time students' interactions with faculty, the effect of those interactions on self-reported gains in general education, and the differential impact of institutions with greater percentages of part-time students. We found, not surprisingly, that part-time students interact with faculty less and report slightly less gains in general education than their full-time peers. We also found that the proportion of part-time students is a negative predictor of full-time student interactions with faculty, suggesting that campuses with greater percentages of part-time students are negatively effecting the engagement of full-time students. The effect of student-faculty interaction on self-reported gains in general education was relatively strong for all students (in fact, slightly stronger for part-time students), which implies that campuses that can find a way to increase the student-faculty interaction of full-time and part-time students will see a beneficial impact on student outcomes.

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Student-Faculty Interaction

In a recent article offering ten directions for future research on the impact of college, Pascarella (2006) praised the efforts of researchers in the 1990s who considered previously ignored students and institutions, and he called for the expansion of that work in the current decade to include an even broader array of student and institution types. Part-time students, those students enrolled in fewer credit hours than necessary to be considered full-time, are among those who have been largely ignored in the literature on college impacts. Yet, in 2004, part-time students represented 37.2% of the total undergraduate enrollment in two- and four-year degree-granting postsecondary institutions in the U.S., and the representation of part-time students is projected to decrease only slightly (35.7%) by 2015 (U.S. Department of Education, National Center for Education Statistics, 2006). In addition, the effects of those postsecondary institutions that educate a disproportionate share of part-time students – often large public, commuter institutions within urban settings – have also been under-examined relative to the environmental impacts of more residential campuses with few part-timers. Given the significant presence of these students within higher education, the dearth of empirical research on the learning and development of part-time students as well as the effect of institutions with larger percentages of part-time students is surprising.

Part-Time Student Engagement and Outcomes

The little we know about part-time students' collegiate experiences comes largely from descriptive findings from national studies. The evidence that exists suggests that part-time status is generally negatively associated with measures of collegiate success. Compared to full-time students, a smaller percentage of part-time students – at least those that start part-time – ever

complete a degree (Snyder, Tan, & Hoffman, 2006) and, for those that do, it obviously takes longer than their full-time colleagues to finish. Recent studies have also reported that during any particular term in college, part-timers engage in educationally purposeful activities less than their full-time counterparts and spend more time on activities that can detract from their collegiate experience, such as working off-campus and caring for dependents (National Survey of Student Engagement [NSSE], 2004, 2006). In particular, part-timers are less likely than full-time students to participate in a learning community, in a practicum or internship, in community service or volunteer work, or in foreign language coursework (NSSE, 2004; Zhao & Kuh, 2004). Part-time students generally view their campus environments as less supportive and spend less time studying and participating in co-curricular activities than full-timers (NSSE, 2000, 2001, 2004).

Although descriptive findings support the idea that part-time students are less involved than their full-time peers, and although a few studies (e.g., Pascarella, Bohr, Nora, & Terenzini, 1996) that have examined the differences in student outcomes by enrollment status confirm that part-timers gain less, surprisingly few studies of good educational practices or of college student outcomes have focused on the differences between full-time and part-time students on these measures. Rather, numerous recent studies of student engagement and college impact use enrollment status as a statistical control, but most of these studies do not report the net effects of this variable in their published form (e.g., Pascarella, et al., 2006; Pascarella, Wolniak, Cruce, & Blaich, 2004; Kuh, & Huh, 2001; Kuh, Hu, & Vesper, 2000; Nelson Laird & Kuh, 2004).

The measures of collegiate success cited above have been developed out of several frameworks for studying college students that have directly linked developmental gains during college to the extent to which students participate in those educationally purposeful activities that have long been associated with *traditional* students (e.g., Astin, 1984; Chickering & Gamson,

1987; Pace, 1980, 1984; Pascarella, 1985). For example, according to the related conceptions of student involvement (Astin, 1984), quality of student effort (Pace, 1980, 1984), and student engagement (Kuh, 2001, 2003), the amount of learning or personal development that a student attains from his or her education is directly related to the quality and quantity of the time and energy the student invests in his or her educational activities. Since part-time students are taking fewer classes and participating in co-curricular activities less than full-timers in a given academic term, it follows that part-time students would get less out of that term's college experiences. What isn't clear is whether one should anticipate that full-time students get more out of the entire collegiate experience than part-time students and whether the relationship between student engagement and college outcomes will differ by enrollment status.

Campus Environments and Part-Time Students

With part-time students making up a substantial part of college and university enrollments, figuring out how to improve the outcomes of higher education – something faculty, administrators, and policy makers are frequently tuned into – requires that we pay more attention to the ways in which campuses encourage the engagement of part-time students. While student characteristics and other factors play a large role in determining student participation in good educational practices, institutions should be mindful of the effects of their campus environments. In fact, Kuh (2001, 2003) and Pascarella (1985) specifically include the role of institutions in their conceptions of how engagement affects student learning and development. To be an institution that promotes the success of all students, the campus environment must provide an impetus for students to get involved.

While a campus environment can be viewed from various perspectives (e.g., physical environment, campus culture, human aggregate approaches, and climate), what is common

among the perspectives is that student behavior is shaped, to some degree, by the norms, values, and other messages that students receive while interacting with a campus environment (Strange & Banning, 2001). Although there is variability within an institution as to how students view and are affected by the environment, a foundational assumption for environmental perspectives is that some coherent understanding of an institution and its effects can be achieved by examining the environment as a whole.

Interestingly, those institutions that enroll greater proportions of part-time students (e.g., urban commuter campuses) are nearly as understudied as part-time students themselves and the institutional-level indicators often used to distinguish between institutions may not adequately capture differences in the environments at institutions with few versus those with many part-time students. In previous research, measures such as Carnegie type, institutional control (public or private), average achievement scores (e.g., SAT/ACT), and total enrollment are often used to group institutions (see, for example, Pascarella et al., 2006; Umbach & Wawrzynski, 2005). While these variables often serve as proxies for the nature of campus environments – for example, a characteristic such as low enrollment suggests a more intimate campus atmosphere – important aspects of the campus environment may be ignored by employing these often used institutional-level indicators, particularly for questions related to part-time students.

At institutions where the percentage of part-time students is low (e.g., residential colleges), it only makes sense that the culture of the institutions and expectations for student engagement focus on the full-time student experience. The existence of a few part-time students is unlikely to affect the engagement of the other students on campus (i.e., full-timers). However, as the proportion of part-time students increases, two very real possibilities exist for how this affects full-time students. Assuming that part-time students will lag behind full-timers on

measures of engagement, a greater proportion of part-time students could decrease the demand on faculty time, for example, and increase the availability of faculty for contact with full-time students. Under such a scenario, we would see a greater average amount of student-faculty interaction among full-time students at institutions with higher percentages of part-time students.

Alternatively, a higher percentage of part-time students could be an indicator of an environment that contains barriers to engagement for all students. For example, the number of part-time students may coincide with faculty behaviors or characteristics that discourage frequent out of class contact with students and encourage classroom instructional methods that maintain distance between students and instructors. Under such conditions, we would expect lower average amounts of full-time student engagement in educationally purposeful activities, like student-faculty interaction, at institutions with higher percentages of part-time students.

PURPOSE

The purpose of this study is thus to contribute to our understanding of the college experiences of part-time students and of the environmental impact of the presence of part-time students and their experiences on *all* students (i.e., both part-time and full-time students). We have chosen to focus on a single effective educational practice, student-faculty interaction, because the theoretical and empirical literature has been fairly consistent about the positive effects of student-faculty interaction on cognitive and affective gains during college. Like few other areas studied in higher education, meaningful contact between students and faculty is heralded as a positive practice that works across various settings to promote student development and persistence (Astin, 1993; Chickering & Gamson, 1987; Feldman & Newcomb, 1969; Kuh & Hu, 2001; Pascarella & Terenzini, 2001; 2005). While numerous studies document the general effects of student-faculty interaction on student development and persistence, only a limited

number of studies have examined the predictors of student-faculty interaction (e.g., Pascarella et al., 2004; Pascarella & Terenzini, 1977), and very few studies (e.g., Cruce, Wolniak, Seifert, & Pascarella, 2005; Pascarella et al., 2006) have examined the conditional effects of student-faculty interaction by either student or institutional characteristics.

Likewise, we focus on a single outcome measure in this study, students' self-reported gains in general education. Covering areas such as writing and speaking clearly and effectively, critical and analytical thinking, and working effectively with others, this measure speaks to many of the specific outcomes that are desirable in all college graduates (Association of American Colleges and Universities [AAC&U], 2006). Again, while such measure has been used in previous studies (e.g., Umbach & Wawrzynski, 2005), these studies do not focus on the effects of enrollment status and have not looked at institutional differences by the percentage of part-time students.

Four questions guide the current study. First, what is the *net* effect of part-time enrollment status on student-faculty interaction? Although theory (e.g., Astin, 1984) and scant past empirical evidence support the commonly-held assumption that part-time students will interact with their faculty members less than their full-time peers, no other study to our knowledge has purposefully and systematically examined and documented this relationship.

Second, at the level of the college environment, what is the relationship between the proportion of part-time students at an institution and the average level of interaction between full-time students and the faculty? As mentioned previously, the direction of this effect is ambiguous. Being a full-time student in an environment that has a greater share of part-time students may mean less competition for access to instructional faculty time and resources, thus suggesting a positive relationship between the proportion of undergraduates and the average

student-faculty interaction for full-time students. It is also possible, however, that institutions with a greater share of part-time students have a culture of non-contact in which faculty perceive that they do not need to be as available to their students. In that instance, we would expect a negative relationship between the proportion of part-time undergraduates and the average interaction with faculty among full-time students.

Third, do part-time students perceive having gained more or less educationally out of their college experiences than their full-time peers, and to what extent are the differences in their perceptions moderated by their interaction with faculty? For example, we may find that, although part-time students interact with faculty less than their full-time peers, the effect of interacting with faculty on their educational gains may be greater. In other words, we are interested in knowing if there is a compensatory effect of student-faculty interaction on the perceptions of educational gains for part-time students.

Finally, at the college environment level, what is the relationship between the average full-time student-faculty interaction and the average level of perceived educational gains for full-time students? That is, does attending an institution in which the average full-time student-faculty interaction is lower have a negative impact on the perception of educational gains during college?

METHODS

Conceptual Framework

The conceptual model that guides this study is Pascarella's (1985) general causal model for assessing the effects of differential college environments on student learning and cognitive development. For this study, structural/organizational characteristics of institutions serve as proxies for indicators of campus environment, which combines two components of the Pascarella

model. We use students' background and prior experiences (e.g., gender, race, and college major) and structural/organizational characteristics of the institution (student-faculty ratio, selectivity, and percentage of part-time students) to predict student-faculty interaction, a measure of students' interactions with agents of socialization (e.g., faculty and peers). When predicting our measure of student learning and development (perceptions of general education gains), we use students' background and experiences and student-faculty interaction as predictors at the student level, and leave out the structural/organizational characteristics of the institutions, as Pascarella's model suggests that their effects are indirect.

Data Sources and Sample

Data for this study are from the 2005 administration of the National Survey of Student Engagement (NSSE). For a random sample of first-year students and college seniors at each participating institution, NSSE assesses the extent to which the students engage in empirically-vetted good educational practices, perceive that their college or university emphasizes these practices, and perceive that they have developed educationally and personally as a result of these experiences. NSSE is administered in the spring on an annual basis, and the 2005 administration included 539 baccalaureate degree-granting institutions in the U.S. and Canada.

The institution sample for this study was limited to 224 public institutions in the U.S. that participated in the 2005 administration of NSSE. Private institutions were not selected for this study due to the lack of variation in the share of part-time students across institutions of this type. Public postsecondary institutions in Canada were not selected for this study given contextual differences in the structure and operation of higher education in the U.S. and Canada. The size of the undergraduate student body for the institutions in the sample ranged from approximately 700 to 36,500, with a mean of about 9,800 students. These institutions ranged from 'non-competitive'

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to 'most competitive' on Barron's index (i.e., non-competitive, less competitive, competitive, very competitive, highly competitive, and most competitive), with mode and median values of 'competitive'. About 20% of these institutions had Carnegie classifications of Doctoral-Extensive, 13% were classified Doctoral-Intensive, 54% Masters I or II, 6% Baccalaureate-Liberal Arts, and 7% Baccalaureate-General.

The student sample for this study comprised 55,915 seniors who were randomly sampled from the participating institutions described above. Seniors in this study are those students who would have obtained enough credits to graduate from the institution during the spring term of the survey administration or after one additional academic term. By focusing this study on seniors who are near graduation, we hope to reduce the degree to which the students' perceptions of their general educational gains in college are influenced by the differences between full-time and part-time students in the number of credits earned toward a degree.

Response rates among seniors at the 224 participating institutions ranged from 10% to 65%, with a mean response rate of 34% and a median response rate of 33%. The student sample size within institutions ranged from 19 to 1,178, with a mean within-institution sample size of 250 and a median within-institution sample size of 198. Twenty-eight percent of the students in the sample were of nontraditional age (i.e., 26 years or older), 65% were female, and 29% were students of color. Twenty-one percent of the seniors indicated that neither parent had attended college, whereas another 26% indicated that at least one parent had completed some college without earning a baccalaureate degree.

Variables

The first dependent variable for this study is student-faculty interaction, a factorially-derived scale consisting of five items from NSSE that measure the extent to which students did

the following *during the current academic year*: discussed grades or assignments with an instructor, talked about career plans with a faculty member or advisor, discussed ideas from readings or classes with faculty members outside of class, received prompt feedback from faculty on academic performance, and worked with faculty members on activities that are non-course related. All items were measured on a 4-point scale ranging from never to very often. Cronbach's alpha coefficient for the internal consistency of the scale items was .76 for the study sample. The scale was standardized to have a sample mean of zero and a standard deviation of one.

The second dependent variable for this study is the student's perception of general educational gains, a factorially-derived scale consisting of eight items from NSSE that measure students' perceptions of the extent to which their experience at that institution contributed to their development in the following areas: acquiring a broad general education, acquiring job or work-related knowledge and skills, writing clearly and effectively, speaking clearly and effectively, thinking critically and analytically, analyzing quantitative problems, using computing and information technology, and working effectively with others. All items were measured on a 4-point scale ranging from very little to very much. Cronbach's alpha coefficient for the internal consistency of the scale items was .88 for the study sample. The scale was standardized to have a sample mean of zero and a standard deviation of one.

The independent variable of interest at the student level, part-time enrollment status, was derived using both student- and institution-reported data. Institutions that participate in an administration of NSSE are required to report the enrollment status of students who are sampled for the survey. This reporting typically takes place during the fall of the same academic year that NSSE is administered, and this information can be updated as late as the beginning of the winter/spring term. Due to lag between the institution's reporting of this information and the

time of survey administration, the institution-reported enrollment status may not reflect the status of the student at the time that he or she completes the survey. The institution-reported enrollment status was thus supplemented by student-reported status, measured by a single item on NSSE that asks respondents to characterize their primary enrollment status during the current academic year as 'full-time' or 'less than full-time.' Twenty-one percent of students in the overall sample were identified by their institution or self-identified as part-time students, which matches the percentage of part-time students at all 4-year public institutions in the U.S. in 2004 (Snyder et al., 2006). This variable was aggregated at the institution level to represent the proportion of the senior class at the institution that was enrolled part-time. The representation of part-time students ranged from as low as 2% to as high as 67% across the 224 institutions in the study.

Additional variables were added at the student level to control for the students' background characteristics (i.e., age, sex, race, citizenship status, and parents' education) and for characteristics associated with their college experience (i.e., college major, commuter/residential status, transfer/continuing status, and a self-reported measure of cumulative college grades). At the institution level, variables were added to the model that controlled for the institution's selectivity (i.e., Barron's selectivity index score), and for the ratio of full-time equivalent students to full-time equivalent instructional faculty at each institution (this variable came from the Integrated Postsecondary Education Data System for the 2004-2005 academic year). Due to the limited sample of institutions and to the interrelatedness of many institution-level variables (e.g., there is a fairly strong relationship between student-faculty ratio and the institutions' Carnegie Classification), only these two institution-level control variables were employed (though, as discussed below, centering techniques were used to adjust for additional differences

in aggregated student characteristics such as gender and race). Descriptive statistics for all study variables are located in Table 1.

[Table 1 About Here]

Analysis

Given the nested nature of the sampling for this study (i.e., students within institutions), hierarchical linear modeling was employed to address the research questions. The level-1 structural model used to examine the within-institution variance in the dependent variables takes the form:

$$(1) \qquad Y_{ij} = \beta_{0j} + \beta_{1j}PT_{1j} + \sum_{q=1}^{Q} \beta_{qj} X_{qj} + r_{ij},$$

where Y_{ij} is the outcome under study for student i attending college j, β_{0j} is the mean of the outcome for full-time students at college j, β_{1j} is the coefficient for the *uncentered* dummy variable indicating a part-time student at college j (i.e., PT_{1j}), β_{qj} is a vector of coefficients for the X_{qj} vector of grand-mean centered level-1 predictors, and r_{ij} is the random error term. The level-2 structural model used to examine between-institution variability in the dependent variables takes the form:

$$\begin{aligned} \beta_{0j} &= \gamma_{00} + \sum_{s=1}^{S} \gamma_{0s} W_s + \mu_{0j} \\ (2) \qquad \beta_{1j} &= \gamma_{10} \\ &\vdots \qquad \vdots \\ \beta_{qj} &= \gamma_{q0} \end{aligned}$$

where γ_{00} is the mean of the particular outcome under study, γ_{0s} is a vector of coefficients for the W_s vector of grand-mean-centered level-2 predictors, and μ_{0j} is the random error term. For this study, the β_{qj} slopes are treated as fixed in the level-2 model. The works of Raudenbush & Bryk

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(2002) and Raudenbush, Bryk, Cheong, and Congdon (2004) provide more information on the estimation of hierarchical linear models.

In the student-faculty interaction model, all variables at the student level with the exception of part-time enrollment status were entered into the model *grand-mean centered*. Part-time enrollment status was entered into the model *uncentered*. The intercept for a particular institution is then interpreted as the mean level of student-faculty interaction for *full-time students* after *adjusting* for the other characteristics measured at the student level. This combination of variable centering allows for the simultaneous testing of the net effect of part-time enrollment status on student-faculty interaction (at the student level), and the net effect of the proportion of part-time seniors at an institution on the average student-faculty interaction among full-time students (at the institution level).

In the general educational gains model, all variables at the student level with the exception of part-time enrollment status, student-faculty interaction, and the cross-product between these two variables were entered into the model *grand-mean centered*. Student-faculty interaction was entered into the model *group-mean centered,* whereas part-time enrollment status and the cross-product term were entered into the model *uncentered*. The intercept for a particular institution is then interpreted as the mean of the general educational gains of *full-time students* after *adjusting* for all other characteristics measured at the student level *other than student-faculty interaction*. The introduction of the cross-product between the group-mean centered student-faculty interaction variable and the uncentered part-time status variable changes the interpretation of the coefficient for the student-faculty interaction variable to represent the effect of *full-time students'* interaction with faculty on their general educational gains. This introduction of a cross-product term and the combination of variable centering allows for the

simultaneous testing of the net effect of part-time enrollment status on general educational gains (at the student level), the net effect of full-time student-faculty interaction on general educational gains (at the student level), the difference between full-time and part-time students regarding the effect of student-faculty interaction on general educational gains (at the student level), and the net effect of the average full-time student-faculty interaction on the average student-faculty interaction among full-time students (at the institution level).

In addition to aiding us in the estimation of a model to answer multiple research questions simultaneously, this type of variable centering also reduces the number of control variables that are necessary at the institution level, as between-institution variability in student-faculty interaction is being adjusted by the characteristics of the students who attend the institution. The dependent variables were standardized so that parameter estimates can be interpreted as the standard-deviation change in the outcome for a one unit change in the independent variable.

Limitations

One limitation of this study was in the measurement of part-time enrollment status. Given the time lag between institution-reported and student-reported enrollment status, these two sources of information were combined to cast the widest net possible to capture part-time students. There was some inconsistency between the two information sources: 6% of the student sample reported having been full-time during the entire academic year while the institution reported that the student had attended part-time in the fall. Additionally, part-time status was only measured during the senior year. It is plausible that a number of full-time students attended part-time prior to their senior year, and it is also likely that a number of part-time students attended full-time prior to their final year of college. These limitations would most likely

decrease the true differences between full-time and part-time students on the student-faculty interaction and general gains measures.

Although the proportion of part-time students on a campus is a novel addition to the previous set of factors that differentiate institutions, like with other institution-level variables, we must use caution in the interpretation of the differences that we may find by part-time student representation on campus. It may be the case that any finding associated with this variable is indicative of the effects of some other institutional characteristics that are associated with the proportion of part-time students on the campus. Although we entered into the model two control variables that we believed to be confounding influences, we felt it necessary to limit the number of institution-level variables in the model given the moderate to large correlations among our variables and such additional measures as enrollment size, Carnegie classification, and institutional control.

The generalizability of this study is limited to some degree by the self-selection of institutions into the NSSE 2005 administration and by disproportionate survey non-response by students with certain characteristics (e.g., male students). This self-selection by students and institutions requires that some caution be used when generalizing the results to all seniors at all four-year public institutions, even though NSSE institutions mirror all four-year institutions on most institutional characteristics.

<div align="center">RESULTS</div>

Student-Faculty Interaction

As a starting point in the analysis, an unconditional model was estimated to partition the variance into between-institution and within-institution segments (See Table 2). The null hypothesis of no between-institution variance was rejected, as 4.5% of the total variance in

student-faculty interaction was between institutions. The other 95.5% of the variance was within institutions. The aggregate reliability of the dependent variable was 0.877, suggesting good precision in the measurement of student-faculty interaction across the institutions in the study.

A single uncentered variable indicating whether or not the student attended part-time was entered into the level-1 model. The addition of this variable explained 1.1% of the within-institution variance, a statistically significant contribution to the model. Without controlling for any other characteristics of the students in the study, seniors who were enrolled part-time had estimated levels of interaction with faculty that were a little over one-fourth of a standard deviation (-0.272) lower than their full-time peers. Because the variable representing part-time students was entered into the model uncentered, the intercept of this conditional model represents the average student-faculty interaction among full-time students. The between-institution variance for full-time student-faculty interaction was 9.4% smaller than the between-institution variance in the student-faculty interaction for full-time and part-time students combined.

[Table 2 About Here]

A third model was then estimated that included a set of grand-mean centered control variables at the student level (See Table 3). This model explained an additional 3.5% of the within-institution variance. Net of the effects of the students' background characteristics, college experiences, and past academic performance, seniors who were enrolled part-time had estimated levels of interaction with faculty that were a little over one-fifth of a standard deviation (-0.210) lower than their full-time peers. Even after taking into account the confounding influence of such student variables as nontraditional age, commuter status, and parents' education level – three characteristics common to part-time students – the difference in student-faculty interaction between full-time and part-time students did not diminish substantially.

[Table 3 About Here]

By grand-mean centering the control variables in the student-level model, the between-institution variance in full-time student faculty interaction was reduced by 14.2%. A final model was estimated that included the level-2 variable of interest – the proportion of part-time seniors on campus – and control variables for institutional selectivity and student-faculty ratio. The addition of these variables explained 9.8% of the between-institution variance in the *adjusted* mean full-time student-faculty interaction. At the institution level, the proportion of part-time seniors had a small, yet statistically significant negative net effect on the adjusted mean student-faculty interaction for full-time students. Specifically, for a one percentage-point increase in the proportion of part-time seniors at an institution, the student-faculty interaction of full-time seniors decreased by 0.003 (0.305 * 0.01) of a standard deviation.[1] Controlling for other variables in the model, a change in the proportion of part-time seniors spanning the sample range of 0.67 to 0.02 would decrease the student-faculty interaction of full-time seniors by about one-fifth of a standard deviation (-0.198). As illustrated in Figure 1, holding all else constant, an institutional environment with a larger share of part-time students may actually *inhibit* the interactions between full-time students and their faculty.

[Figure 1 About Here]

General Educational Gains

Following the same steps as in the student-faculty interaction model, an unconditional model was first estimated to partition the variance in general educational gains into between-institution and within-institution segments (See Table 4). The null hypothesis of no between-

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[1] Student-faculty interaction was standardized for the entire student sample. The standard deviation change in student-faculty interaction among full-time seniors is thus based on the distribution of full- *and* part-time seniors.

institution variance was rejected, although only 2.1% of the total variance in self-reported general educational gains was between institutions. The other 97.9% of the variance in self-reported gains was within institutions. The aggregate reliability of the dependent variable was 0.775, suggesting relatively good precision in the measurement of self-reported educational gains across the institutions in the study.

A single uncentered variable indicating whether or not the student attended the institution on a part-time basis was entered into the model. Although the addition of this variable accounted for less than one percent of the within-institution variance, the difference in self-reported gains between part-time and full-time students was statistically significant. Without controlling for any other characteristics of the students in the study, seniors who were enrolled part-time had reported general educational gains that were a little over one-tenth of a standard deviation (-0.122) lower than their full-time peers. Because the variable representing part-time students was entered into the model uncentered, the intercept of the conditional model represents the average self-reported gains among full-time students. As with the preliminary models estimating student-faculty interaction, this change in interpretation creates noncomparability among the between-institution variances in the unconditional and conditional models. The proportion of the between-institution variance accounted for by the addition of the part-time variable at the student level was therefore not calculated.

[Table 4 About Here]

A third model estimated the full-/part-time difference in the effect of student faculty interaction on self-reported gains after controlling for a set of grand-mean centered variables that represent student characteristics that are potentially confounding (See Table 5). This model explained an additional 17.5% of the within-institution variance. Net of the effects of the

students' background characteristics, college experiences, past academic performance, and the level of student-faculty interaction, there was a small, yet statistically significant difference in self-reported gains by enrollment status. Specifically, seniors who were enrolled part-time had self-reported gains that were three one-hundredths of a standard deviation lower than the self-reported gains of their full-time peers.

Given the strong positive effect of student-faculty interaction on self-reported gains, the non-significant effect of age, and the positive effects of commuter status and parents' education level, we presume that the decrease in the difference in self-reported gains between full-/part-time students is accounted for by the difference in the extent of student-faculty interaction between these two student types.

By entering into the model the group-mean centered student-faculty interaction variable and the cross-product between this term and the part-time enrollment status variable, the model coefficient for student-faculty interaction represents the effect of this interaction on the self-reported gains of full-time students. As the results in Table 5 illustrate, for a one-standard deviation increase in student-faculty interaction, the self-reported gains of full-time students increased by almost two-fifths of a standard deviation (0.382). Part-time students benefit even more from increased levels of interaction with faculty. For a one-standard deviation increase in student-faculty interaction, the self-reported gains of part-time students increased by over two-fifths of a standard deviation (0.382 + 0.035 = 0.417).

[Table 5 About Here]

By grand-mean centering the control variables in the student-level model, the between-institution variance in self-reported educational gains found in the conditional model was reduced by 6.4%. The final model estimated included the level-2 variable of interest – the

average student-faculty interaction of full-time students. The addition of this variable explained 47.1% of the between-institution variance in the *adjusted* mean full-time self-reported gains. At the institution level, the average student-faculty interaction of full-time seniors had a statistically significant positive net effect on the adjusted mean self-reported gains of full-time seniors. Specifically, for a one standard-deviation increase in the average student-faculty interaction of full-time seniors at an institution, the self-reported educational gains of full-time seniors increased by about one-tenth of a standard deviation (.426 * .240 = .102).[2] For a change in the average full-time student-faculty interaction across the sample range of -0.60 to 0.93, the self-reported gains of full-time seniors would increase by almost two-thirds of a standard deviation (.651).

Figure 2 illustrates both the institution-level effect and the differential student-level effects of student-faculty interaction on self-reported educational gains. Holding all else constant, an increase in the average full-time student faculty interaction of the campus increases the average self-reported gains of the seniors on that campus. Within a particular campus, and increase in self-reported gains has a compensatory effect for part-time students – i.e., part-time students benefit more than full-time students for the same incremental increase in the extent to which they interact with faculty. As illustrated in the estimation of the student-faculty interaction models, however, part-time students interact with faculty to a lesser extent than their full-time peers, and full-time students attending institutions with a larger proportion of part-time students interact with faculty to a lesser extent than their full-time peers who attend other institutions.

[Figure 2 About Here]

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[2] Self reported general education gains was standardized for the entire student sample. The standard deviation change in self-reported gains among full-time seniors is thus based on the distribution of full- *and* part-time seniors.

DISCUSSION AND IMPLICATIONS

Although the direction of the effect of part-time status on student-faculty interaction was not altogether unexpected, we did not anticipate that the effect of part-time enrollment status would be among the largest in the model (only major and grades were greater). The difference between full-time and part-time seniors on self-reported gains in general education was quite small, particularly once student-faculty interaction and other student and institutional level indicators were in the model. Together these results suggests that improving part-time student interaction with faculty could bring full-time and part-time students close to educational parity, at least on students' perceptions of their educational gains in areas such as acquiring a broad general education, acquiring job or work-related knowledge and skills, writing clearly and effectively, thinking critically and analytically, and working effectively with others – areas the AAC&U as well as alumni and business leaders would suggest are essential outcomes for the 21st century (AAC&U, 2006).

How then do we increase part-time student interaction with faculty? The student and institutional level results of this study suggest multiple strategies. For example, while it may be difficult to try to change the background characteristics of part-timers (e.g., gender, race, parental education), resources could be directed toward advising so that part-time students might choose majors where faculty contact is more prevalent (e.g., professional fields) versus fields where it is less prevalent (e.g., business).

It is also difficult to argue that an institution should try to change its selectivity or the percentage of enrolled part-time students. However, having a greater proportion of part-timers doesn't require an institution to have a campus environment that encourages student engagement and success less. In their examination of campuses with higher than expected student

engagement and graduation rates, Kuh and his colleagues (Kuh, Kinzie, Schuh, Whitt, & Associates, 2005) found that the diverse group of 20 campuses they studied shared a strong commitment to student learning and a "positive restlessness" about improving undergraduate education. While the weight of history and budget, among other factors, may make institutional change difficult, there is nothing inherent in having a greater proportion of part-time students that requires an institution to have these cultural qualities less than other institutions. That said, documenting how a college or university can improve its culture in this way, especially for institutions with greater proportions of part-time students, is an essential cause for researchers and practitioners to take up.

Interestingly, one strategy mentioned as a possible way to improve student-faculty interaction is increasing students' reliance on electronic media for communicating with faculty (Chickering & Ehrman, 1996; Kuh et al., 2005). With many campuses well down the path of implementing multiple forms of electronic communication, our results suggest that this strategy alone, while it may have improved matters, may not have closed the gap between full-timers and part-timers enough. It may also be that this strategy, and others like it, may have increased student faculty contact among full-timers as much as it did among part-timers. That this study found a slightly greater affect of student-faculty interaction on students self-reported gains in general education for part-timers than full-timers, suggests that as long as institutions do not implement strategies that end up benefiting full-timers more than part-timers, in terms of student-faculty contact, part-timers will be closing the gap on their perceived gains in general education outcomes.

It is important to emphasize, improving things for part-time students, according to the results of this study, will not come at a cost to full-timers. Rather, changing institutional culture

to lessen the effect of the percentage of part-time students and increasing the average amount of student-faculty interaction overall, should benefit full-time student-faculty interaction as well as full-time student outcomes.

<div align="center">DIRECTIONS FOR FUTURE RESEARCH</div>

Because part-time students and the institutions where there are greater proportions of part-timers are understudied, there are numerous ways to build on this study. The following three examples illustrate important avenues for future research.

As a dichotomous indictor, the enrollment status variable used in this study helped illustrate the difference between full and part-time students on our dependent measures. However, enrollment status does not have to be viewed dichotomously. An expanded set of categories could be developed and used to explore the effects of enrollment status. Categories could differentiate between students who were always full-time or part-time, those that were part-time first or full-time first, and those that changed from full-time to part-time multiple times. Alternatively, enrollment status could be continuous, measuring current number of credit hours, average credit hours per year, or something similar. However, as indicated in the limitations, determining even the dichotomous indicator isn't straightforward. With various enrollment patterns and credit systems, creating continuous measures is a challenge. Yet, with such measures, researchers can examine whether the relationships between enrollment status and measures of student engagement and success are linear. If not linear, is being *almost full-time* better, in some way, than being an *almost no-time student*?

At the institution level, it is important to understand the correlates of the proportion of part-time students. Do campuses with higher proportions of part-time students also have higher proportions of part-time faculty? What is common in the campus climates and cultures of

institutions with very high proportions of part-timers? Additionally, understanding what conditions lead some institutions with high proportions of part-time students to do better than expected would help other institutions develop strategies for changing their current state.

Finally, and informed by a better understanding of what it means for institutions to have higher proportions of part-time students, researchers can explore additional effects of the proportion of part-time students on additional indicators of student engagement and success as well as faculty practices and campus performance. For example, do faculty members' teaching strategies vary by the proportion of part-time students? If the proportion of part-time faculty is positively related to the proportion of part-time students, we might find that teaching practices on such a campus may be less engaging (see Umbach, 2007).

CONCLUSION

Although it is certainly not surprising that we found that part-time seniors interact with faculty less than their full-time counterparts, what is surprising is that such an effect is commonly assumed and yet this is one of the first studies to focus on and document this effect after controlling for individual and institutional characteristics. Further, this is the first study to examine the effect of the proportion of part-time students on full-time student behaviors. Our results lend support to the idea that institutions that enroll greater percentages of part-time students are less engagement-oriented and that the institutional culture at those institutions negatively affects full-time students. However, our results also suggest that improving student-faculty interaction among part-timers will benefit those students and may eliminate the small existing difference between full-time and part-time seniors' perceptions of their general education gains. Our results also suggest that doing so may benefit full-timers as well.

Since so few studies examine part-time student engagement and outcomes, there is much work to be done in this area. Future work can and should further examine student engagement among part-time students as well as investigate methods and institutions that seem to be effective at encouraging student-faculty interaction and other forms of engagement among part-time students. In addition, it is critical to examine whether increased levels of student engagement among part-time students has the desired effect on multiple student outcomes.

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Table 1.
Descriptive Statistics for Study Variables

	Mean	SD	Min	Max
Dependent variables				
Student-faculty interaction	0.00	1.00	-2.18	2.54
General educational gains	0.00	1.00	-3.37	1.44
Independent student-level variables				
Part-time	0.21	0.41	0.00	1.00
Non-traditional age	0.28	0.45	0.00	1.00
Female	0.65	0.48	0.00	1.00
African American	0.05	0.21	0.00	1.00
Asian	0.07	0.25	0.00	1.00
White[a]	0.71	0.45	0.00	1.00
Hispanic	0.06	0.23	0.00	1.00
Other race	0.12	0.32	0.00	1.00
Foreign-national	0.04	0.21	0.00	1.00
Parent education: Bachelor's degree[a]	0.53	0.50	0.00	1.00
Parent education: Some college	0.26	0.44	0.00	1.00
Parent education: High school or less	0.21	0.41	0.00	1.00
Commuter	0.65	0.48	0.00	1.00
Transfer student	0.45	0.50	0.00	1.00
College grades	3.33	0.55	1.75	4.00
Arts and humanities major	0.14	0.34	0.00	1.00
Biological sciences major	0.07	0.25	0.00	1.00
Business major[a]	0.17	0.37	0.00	1.00
Education major	0.12	0.33	0.00	1.00
Engineering major	0.06	0.25	0.00	1.00
Physical sciences major	0.03	0.18	0.00	1.00
Professional fields major	0.08	0.27	0.00	1.00
Social sciences major	0.15	0.36	0.00	1.00
Other major	0.19	0.39	0.00	1.00
Independent institution-level variables (N = 224)				
Barrons selectivity index	3.05	1.06	1.00	6.00
Percent of part-time seniors on campus	0.24	0.14	0.02	0.67
Student-faculty ratio	16.17	3.40	6.22	28.35
Average full-time student-faculty interaction	0.10	0.24	-0.60	0.93

N = 55,915
[a] Reference group in analyses

Table 2.
Preliminary Student-Faculty Interaction Models

	Unconditional Model			Conditional Model		
	B	SE	Sig.	B	SE	Sig.
Intercept, γ_{00}	0.028	0.015	0.066	0.093	0.015	0.000
Part-time (uncentered), γ_{10}				-0.272	0.012	0.000
Level-1 variance, σ^2	0.963			0.952		
Level-2 variance, τ_{00}	0.045			0.041		
Intraclass correlation	0.045					
Reliability	0.877			0.868		
Proportion of σ^2 explained				0.011		

Table 3.
Regression of Student-Faculty Interaction on Student and Institution Predictors

	Student-Level Model			Institution-Level Model		
	B	SE	Sig.	B	SE	Sig.
Intercept, γ_{00}	0.081	0.014	0.000	0.080	0.014	0.000
Part-time (uncentered), γ_{10}	-0.212	0.011	0.000	-0.210	0.011	0.000
Non-traditional age, γ_{20}	-0.032	0.011	0.006	-0.032	0.012	0.006
Female, γ_{30}	-0.027	0.010	0.010	-0.026	0.010	0.011
African American, γ_{40}	-0.044	0.023	0.057	-0.041	0.023	0.078
Asian, γ_{50}	0.190	0.020	0.000	0.191	0.020	0.000
Latino, γ_{60}	0.091	0.020	0.000	0.091	0.021	0.000
Other race, γ_{70}	0.035	0.013	0.006	0.035	0.013	0.006
Foreign-national, γ_{80}	-0.005	0.023	0.835	-0.005	0.023	0.838
Parent education: Some college, γ_{90}	-0.015	0.010	0.139	-0.016	0.010	0.119
Parent education: High school or less, γ_{100}	-0.065	0.012	0.000	-0.066	0.012	0.000
Commuter, γ_{110}	-0.073	0.011	0.000	-0.072	0.011	0.000
Transfer student, γ_{120}	-0.085	0.009	0.000	-0.084	0.009	0.000
College grades, γ_{130}	0.282	0.009	0.000	0.283	0.009	0.000
Arts and humanities major, γ_{140}	0.194	0.020	0.000	0.194	0.020	0.000
Biological sciences major, γ_{150}	0.148	0.023	0.000	0.149	0.023	0.000
Education major, γ_{160}	0.167	0.022	0.000	0.166	0.022	0.000
Engineering major, γ_{170}	0.086	0.024	0.001	0.086	0.024	0.001
Physical sciences major, γ_{180}	0.225	0.029	0.000	0.225	0.029	0.000
Professional fields major, γ_{190}	0.256	0.023	0.000	0.256	0.023	0.000
Social sciences major, γ_{200}	0.142	0.021	0.000	0.142	0.021	0.000
Other major, γ_{210}	0.150	0.017	0.000	0.149	0.017	0.000
Barrons selectivity index, γ_{01}				-0.053	0.013	0.000
Percent of part-time seniors on campus, γ_{02}				-0.305	0.097	0.002
Student-faculty ratio on campus, γ_{03}				0.002	0.004	0.542
Level-1 variance, σ^2	0.919			0.919		
Level-2 variance, τ_{00}	0.035			0.032		
Incremental proportion of σ^2 explained	0.035					
Incremental proportion of τ_{00} explained	0.142			0.098		

<div align="center">
Table 4.

Preliminary General Educational Gains Models
</div>

	Unconditional Model			Conditional Model		
	B	SE	Sig.	B	SE	Sig.
Intercept, γ_{00}	0.014	0.011	0.205	0.043	0.011	0.000
Part-time (uncentered), γ_{10}				-0.122	0.011	0.000
Level-1 variance, σ^2	0.980			0.978		
Level-2 variance, τ_{00}	0.021			0.021		
Intraclass correlation	0.021					
Reliability	0.775			0.778		
Proportion of σ^2 explained				0.002		

Table 5.
Regression of General Educational Gains on Student and Institution Predictors

	Student-Level Model			Institution-Level Model		
	B	SE	Sig.	B	SE	Sig.
Intercept , γ_{00}	0.012	0.011	0.278	0.017	0.009	0.045
SFI (group-mean centered), γ_{10}	0.382	0.005	0.000	0.382	0.005	0.000
SFI x Part-time, γ_{20}	0.035	0.011	0.001	0.037	0.011	0.001
Part-time (uncentered), γ_{30}	-0.030	0.011	0.005	-0.029	0.011	0.006
Non-traditional age, γ_{40}	0.021	0.011	0.066	0.020	0.011	0.076
Female, γ_{50}	0.099	0.009	0.000	0.100	0.009	0.000
African American, γ_{60}	-0.074	0.024	0.003	-0.062	0.024	0.010
Asian, γ_{70}	0.112	0.021	0.000	0.098	0.019	0.000
Latino, γ_{80}	0.130	0.020	0.000	0.140	0.020	0.000
Other race, γ_{90}	-0.159	0.013	0.000	-0.157	0.013	0.000
Foreign-national, γ_{100}	0.111	0.025	0.000	0.113	0.026	0.000
Parent education: Some college, γ_{110}	0.087	0.009	0.000	0.085	0.009	0.000
Parent education: High school or less, γ_{120}	0.122	0.010	0.000	0.119	0.010	0.000
Commuter, γ_{130}	0.059	0.010	0.000	0.060	0.010	0.000
Transfer student, γ_{140}	-0.076	0.010	0.000	-0.073	0.010	0.000
College grades, γ_{150}	0.064	0.009	0.000	0.064	0.009	0.000
Arts and humanities major, γ_{160}	-0.364	0.018	0.000	-0.365	0.018	0.000
Biological sciences major, γ_{170}	-0.316	0.023	0.000	-0.316	0.023	0.000
Education major, γ_{180}	-0.135	0.018	0.000	-0.142	0.018	0.000
Engineering major, γ_{190}	0.062	0.022	0.005	0.067	0.022	0.003
Physical sciences major, γ_{200}	-0.329	0.024	0.000	-0.331	0.025	0.000
Professional fields major, γ_{210}	-0.140	0.021	0.000	-0.144	0.021	0.000
Social sciences major, γ_{220}	-0.261	0.018	0.000	-0.262	0.018	0.000
Other major, γ_{230}	-0.201	0.016	0.000	-0.202	0.016	0.000
Mean full-time SFI, γ_{01}				0.426	0.038	0.000
Level-1 variance, σ^2	0.807			0.807		
Level-2 variance, τ_{00}	0.020			0.010		
Incremental proportion of σ^2 explained	0.175					
Incremental proportion of τ_{00} explained	0.064			0.471		

Figure 1.
Impact of Part-time Students on Student-Faculty Interaction

Student-Faculty Interaction (standardized)

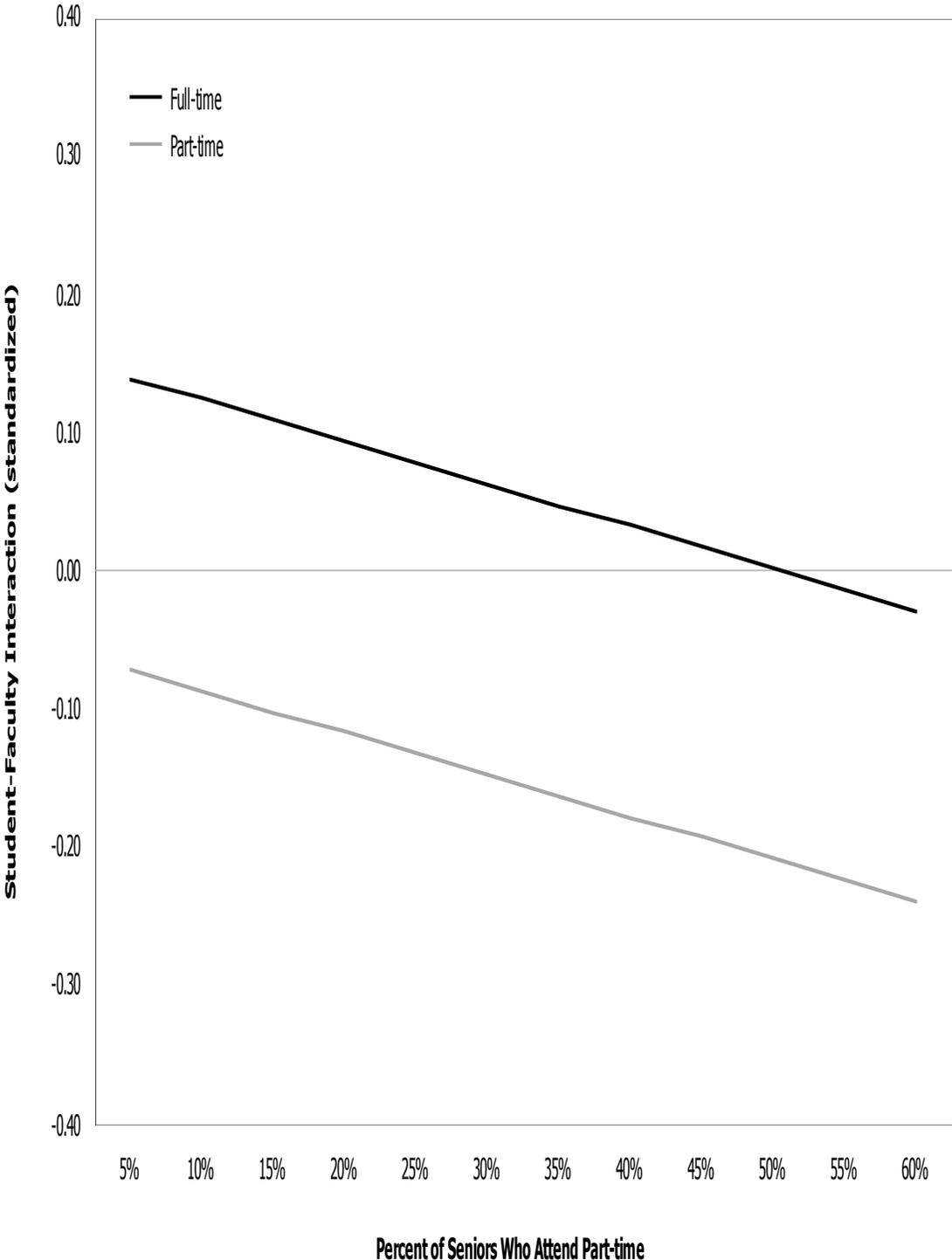Percent of Seniors Who Attend Part-time

- Full-time
- Part-time

Figure 2.
Impact of Student-Faculty Interaction on Educational Gains
by Average Full-time Student-Faculty Interaction on Campus