

STUDENT EXPERIENCE IN THE RESEARCH UNIVERSITY (SERU) PROJECT

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SERU PROJECT TECHNICAL REPORT*

**Overview of University of California Undergraduate
Experience Survey (UCUES) Response
Rates and Bias Issues****

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Steve Chatman

University of California, Berkeley

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ABSTRACT

The following SERU technical report provides a thorough search for evidence of traditional, demographic response bias and of association between tendency to respond early or late in the four month collection interval determined that the overall 38% response rate was adequate as were the 30% or better response rates by campus. There was no evidence of bias due to response resistance and demographic nonresponse bias was small and limited to campus and GPA quartile. Correction for this bias had no appreciable affect on global measures or the upper-division core items examined. The report concludes that weighting is not required or recommended.

Summary

The UCUES 2006 survey administration was a large-scale campaign over a four-month period that achieved about a 38% response rate. Results of analyses searching for evidence of response resistance and nonresponse bias were largely unsuccessful and that is good. Here are the major findings:

- There was no evidence that responses were associated with tendency to respond early or late in data collection. Whether students responded to the first or tenth email appeal did not affect the feedback they provided. Because there

* The SERU Project is a collaborative effort based at the Center for Studies in Higher Education at UC Berkeley and focused on developing new types of data and innovative policy relevant scholarly analyses on the academic and civic experience of students at major research universities and based at the Center for Studies in Higher Education at UC Berkeley. One of the main products of the SERU Project has been the development and administration of the University of California Undergraduate Experience Survey (UCUES).

** An earlier version of this paper was presented at the California Association for Institutional Research Annual Conference held in Pasadena (November, 2006)

was no change over time, a response rate as low as 24% would have been statistically acceptable for a campus with a 48% response rate – the second 24% provided no substantive new information affecting summary statistics. Because every campus achieved a response rate higher than 30%, we can be reasonably confident that the observed response rates were adequate.

- Nonresponse bias was small and limited to two variables, campus and GPA quartile. Students at some campuses responded at a significantly higher rate than did students at a few other campuses and students with high cumulative grade point averages were more willing to participate than were students with lower grade point averages. However, corrections for both of these factors had very little effect on global measures of satisfaction or the over 140 items of the upper-division core. Weighting is not required nor recommended.

In sum,

1. Very little evidence of nonresponse bias was found and its impact was too small to be of practical importance.
2. Corrective weighting of responses is not required nor recommended.
3. The 30% or higher response rate achieved by every campus is adequate and results can be used with confidence.

Introduction

Several sources of potential error affecting survey-based research are better managed by a fully digital census of the undergraduate population like UCUES. UCUES is Internet-based, relying on email contact supplemented by mass publicity, and includes the entire population, not just a sample. Because UCUES is a census, not a sample, then it is not subject to traditional sampling errors. Even problems associated with administration methodology or subjects' handicapping conditions are circumvented by digital media for university populations.

In addition to minimizing sampling errors, a UCUES-like administration also controls many nonsampling errors better than traditional paper-based processes. For example, because UCUES was administered to a university undergraduate population accustomed to the Internet and to receiving official communications from the university by email, coverage issues were of less concern and even in those instances where an email address was in error and the message did not reach a student, the use of mass communication advertising and appeals from various independent sources ameliorated the problem.

The most serious nonsampling concern for UCUES is the same threat shared by mail surveys of student populations, nonresponse, and even here digital administrations have advantages. In particular, response rate is easily tracked and additional appeals with or without new incentives can be used even late in the collection process to bolster response rate. But in spite of everything attempted nonresponse is a serious potential problem that must be addressed.

Of the students asked to participate, 38% complied. The majority did not and it is reasonable to question whether the responses of those who did participate reflected the

larger population. Perhaps responding students viewed their experience more favorably. Perhaps nonresponding students were of a minority that felt unattached to the campus and therefore saw no reason to support the project by responding. Nonresponse is a frustrating problem because it can not be completely corrected without a high response rate. However, there are ways to use characteristics and responses of the participants to make reasonable inferences about the nonresponding students.

The crux of the matter is whether the opinions, experiences and advice of the responding group likely differed from those who did not respond, and if those differences can be inferred from patterns found in the responses. If responding students differ from the population in ways that are associated with differences in responses given, then there is cause to be concerned that the data are misleading – that a nonresponse bias problem exists.

It is important to note that observed differences in demographic characteristics between responding and nonresponding students are insufficient grounds to take corrective action. For example, if all females and males felt exactly the same way about an issue, then there would be no need worry about a 40% response rate. Forty would be adequate as would be 30%, 20% or even less. An incomplete response rate is only of concern when there is evidence that responses differ. This report focuses on two ways in which responses can differ: from early to late responders (response resistance), and by sex, race/ethnicity, matriculation status or any of several demographic variables (demographic nonresponse bias).¹

Accompanying this report are 10 tables and a graph summarizing student response rate measures and two nonresponse bias analyses. Tables 1 and 2 describe response rates by campus, student class level, module, and for the special sample-in-census group whose members received a \$10 iTunes gift certificate for participation. Table 2 tracks the pattern of responses over time for eight UC campuses and is supported by Figure 1 showing that pattern graphically. Tables 3, 4 and 5 subject the responses of students at the two campuses with the highest response rates to response resistance analysis by comparing the characteristics and responses of earlier and later responders. Tables 6 through 10 evaluate the extent to which nonresponse bias exists in the data and its practical consequences.

Response Rate

Table 1: 2006 UCUES Response Rate Summary

The overall response rate of 38% (over 58,000) was good by student research standards, easily exceeding NSSE's reported 32% for doctoral extensive universities, 33% for public and 31% for large campuses (over 20,000).² The UCUES response rate was also strong at each campus with every UC campus attaining a response rate greater than 30%. The total number of participants was very close to the survey goal of a 40% response rate (60,000 responses) and the 30% response rate by campus target was achieved.

¹ The applicable IES Statistical Standards of the National Center for Education Statistics are 4-4-2A, 4-4-2B, and 4-4-2D. See Standard 4-4 of NCEES Statistical Standards (2002) available online.

² 2005 NSSE Annual Report, Exploring Different Dimensions of Student Engagement.

The highest response rates were achieved by two campuses (about 48%). The next two campus were close to 40% and were followed by the final three campuses with response rated from 35% to 32%.³ There was considerable variance in response rate by campus and some of that variance can very likely be attributed to campus support and culture, incentives, and academic support structures, but the decentralized administrative structure prevents measurement of the contribution of the various components. It is known that the two campuses with the highest rates had high academic support with a pool of funds being distributed to departments on a competitive basis.

Table 1: UCUES 2006 Response Rate Report Summary*

	8/1/2006 (Close)	Pool	Responses*
Campus			
A	39.1%		
B	33.1%		
C	35.4%		
D	32.1%		
E	33.3%		
F	47.9%		
G	33.3%		
H	47.8%		
	<hr/>	152,642	57,980
Sample in Census			
A	50%		
B	36%		
C	36%		
D	35%		
E	38%		
F	49%		
G	42%		
H	57%		
	<hr/>	1,894	795
Ratio Upper-Division Response Rate to Lower-Division Response Rate			
A	0.94		
B	0.93		
C	0.78		
D	1.13		
E	0.91		
F	0.96		
G	0.94		
H	0.95		
	<hr/>		
	0.92		
Response Rate by Module			
Academic Experience	38%	31,012	11,928
Civic Engagement	38%	29,485	11,222
Student Development	38%	31,225	11,936
Student Services	37%	35,515	12,967
Wild Cards	39%	23,511	9,132
	<hr/>	150,748	57,185

* Includes a few records used for testing purposes

³ Detailed response rates by campus, module, and class divisions can be requested from the author.

The ratio of upper- to lower-division response rates was 92% overall. In other words, the response rate by declared majors with junior or above status and transfer students was about 90% of the response rate observed for lower-division students and students without declared majors. A difference of that magnitude is fairly common in surveys of undergraduate populations. The more interesting result is the variance among campus ratios. The range was from 1.13 to 0.78 but most were clustered near the average of 0.92. The range of ratios very likely reflects overall campus response rate, efforts made by the academic division to encourage participation by majors, and traditional differences.



Sample in Census

iTunes

UCUES 2006 identified a sample of about 1,900 students to receive guaranteed rewards for participation in hope of reaching a substantially higher response rate to use for more precise UC estimates and as a standard against which to examine nonresponse bias. The sample was drawn systemwide to compensate for historically unresponding groups and was therefore disproportionately composed of students less likely to participate. The sample-in-census managed a 42% response rate and on many campuses reached a rate 10% higher than that obtained for other students. The difference was significant but not the magnitude of difference desired. Likely explanations for the relatively small difference were inadequately tailored appeals and marginally attractive prizes. (The guaranteed incentive was a \$10 iTunes gift certificate.) This report will not consider the sample-in-census further.

The last section of Table 1 reports response rate by module. Differences by module were small and most likely reflected a slight association with overall questionnaire length. The unique by campus wild card modules tended to be shorter and the student services module was clearly the longest questionnaire. Questionnaires were presented as one continuous page instead of the often used series of many screens each displaying a few items. Most notable was the fact that the differences were of no practical consequence.

At this point Merced will be excluded from analysis. Merced is a new campus and the 800 students surveyed are the first students to attend. Because this campus differs so remarkably in size and complexity from other UC campuses, it is atypical and will be excluded from the nonresponse bias analysis.

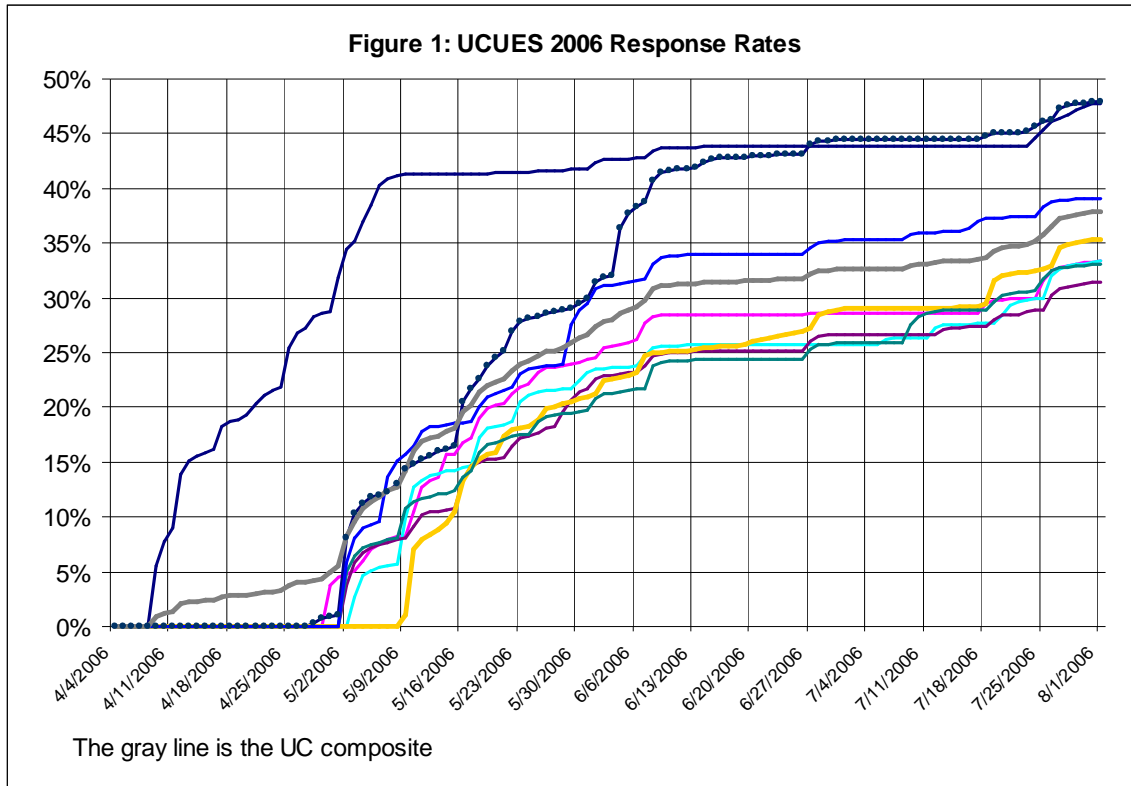
Table 2: Chronology of Survey Returns and Cumulative Response Rates

	Campus								
	A	B	C	D	E	F	G	H	UC*
	Cumulative Response Rate								
4/4/2006								0.0%	0.0%
4/11/2006								8.9%	1.3%
4/18/2006								18.7%	2.8%
4/25/2006								25.5%	3.8%
5/2/2006	8.3%	5.0%	0.0%	3.8%	0.0%	8.1%	4.8%	34.5%	8.3%
5/9/2006	14.2%	10.8%	1.1%	8.1%	9.8%	14.4%	8.3%	41.3%	14.2%
5/16/2006	19.6%	13.6%	13.4%	13.3%	14.5%	20.5%	16.7%	41.4%	19.6%
5/23/2006	24.0%	17.5%	18.1%	17.2%	20.5%	27.8%	21.9%	41.4%	24.0%
5/30/2006	26.4%	19.7%	20.8%	21.4%	22.4%	29.5%	24.0%	41.7%	26.4%
6/6/2006	29.1%	21.7%	23.2%	23.3%	23.8%	38.3%	26.2%	42.8%	29.1%
6/13/2006	31.3%	24.3%	25.3%	25.1%	25.7%	41.9%	28.5%	43.8%	31.3%
6/20/2006	31.6%	24.4%	26.0%	25.2%	25.8%	42.9%	28.5%	43.8%	31.6%
6/27/2006	32.1%	25.3%	27.3%	26.0%	25.8%	44.0%	28.5%	43.8%	32.1%
7/4/2006	32.6%	25.9%	29.1%	26.7%	25.8%	44.5%	28.5%	43.8%	32.6%
7/11/2006	33.1%	28.6%	29.1%	26.7%	26.4%	44.5%	28.5%	43.8%	33.1%
7/18/2006	33.7%	29.0%	29.5%	27.4%	27.7%	44.7%	29.4%	43.9%	33.7%
7/25/2006	35.8%	31.8%	32.6%	28.9%	30.0%	46.1%	31.6%	45.4%	35.8%
8/1/2006	37.9%	33.1%	35.3%	31.4%	33.3%	47.9%	33.3%	47.8%	37.9%

* Figures do not include the Merced campus that was in its first year of operation.

The cumulative response patterns show differences in campus start dates, a steeply rising step function reflecting surges of participation following email distribution followed by plateaus before the next email contact. In all cases, there was a relatively long hiatus beginning with finals and continuing well into the summer. There were summer follow ups and special summer incentives offered. The summer follow up increased response rates by about 5% overall (3.4% to 7.5%).

It should be noted that several more email contacts were made than conventional wisdom would assert as useful. Students were contacted from 9 to 12 times by email and many were contacted in addition by advisors, chairpersons, faculty and others. From the over 1 million emails distributed centrally, only about 500 students replied with a personal note and each was personally answered. The most common message was about an inability to login. Also popular were variations of the "Please drop me from the mailing list" message even though each message included a link by which students could automatically remove themselves from future mailings.



Response Resistance

UCUES 2006 employed a long data collection period with sustained effort to encourage participation. In this situation it is useful to examine differences, if any, between early and late responders to infer the likely responses of nonresponders. In other words, were the reported characteristics, experiences, or opinions of more ready participants different from those more resistant to the campaign? In order to maximize the opportunity to compare responses, the two campuses with unusually high response rates were combined. Their 48% response rates were equivalent and allowed students to be divided into two large groups representing the first 24% of responders and the second 24% responders. It should also be noted that response resistance analysis in this case can be used to evaluate the adequacy of response rates at the other campuses. If responses by the first 24% and second 24% of students at these two campuses are indistinguishable, then a 24% response rate would have been statistically adequate for these two campuses. Therefore, the higher, 30% rate at a similar campus using similar strategies would most likely be an adequate representation of the student body for that campus.

Table 3: Response Resistance Analysis -- Demographic Composition of Early and Late Responders

			First Half	2nd Half	Cramer's V
Overall			9,64 4	10,60 7	
Sex	Female	%	61%	55%	0.064
	Male	%	39%	45%	
	Female	n	5,85 1	5,764	
	Male	n	3,76 9	4,809	
Matriculation Status	Native	%	82%	80%	0.0165
	Transfer	%	18%	20%	
	Native	n	7,81 2	8,473	
	Transfer	n	1,77 1	2,077	
Class Level	Freshman	%	23%	21%	0.0282
	Sophomore	%	19%	18%	
	Junior	%	24%	26%	
	Senior	%	34%	35%	
	Other	%	1%	1%	
	Freshman	n	2,17 8	2,227	
	Sophomore	n	1,81 8	1,920	
	Junior	n	2,29 2	2,724	
	Senior	n	3,29 5	3,679	
	Other	n	61 57	57	
Race/Ethnicity	A = American Indian/Alaskan				0.0523
	Native	%	1%	1%	
	B = Black/African American	%	2%	3%	
	C = Chicano/Mexican-American	%	7%	8%	
	D = Chinese/Chinese-American	%	22%	20%	
	E = Decline to State	%	3%	3%	
	F = East Indian/Pakistani	%	4%	4%	
	G = Japanese/Japanese-American	%	7%	7%	
	H = Korean	%	6%	6%	
	J = Latino/Other Spanish-American	%	3%	3%	

K = Other	%	2%	2%
L = Pilipino/Filipino	%	5%	5%
M = Pacific Islander	%	0%	0%
N = Thai/Other Asian	%	3%	3%
P = White/Caucasian	%	30%	29%
V = Vietnamese	%	6%	6%

			First Half	2nd Half	Cramer's V
	A = American Indian/Alaskan Native	n	50	55	
	B = Black/African American	n	170	270	
	C = Chicano/Mexican-American	n	694	891	
	D = Chinese/Chinese-American	n	2,113	2,111	
	E = Decline to State	n	277	299	
	F = East Indian/Pakistani	n	360	436	
	G = Japanese/Japanese-American	n	694	702	
	H = Korean	n	553	653	
	J = Latino/Other Spanish-American	n	248	338	
	K = Other	n	176	176	
	L = Pilipino/Filipino	n	501	574	
	M = Pacific Islander	n	35	36	
	N = Thai/Other Asian	n	264	343	
	P = White/Caucasian	n	2,922	3,057	
	V = Vietnamese	n	587	666	
Cumulative GPA (All Campuses)	Top Quartile	%	43%	40%	0.0363
	2nd Quartile	%	26%	27%	
	3rd Quartile	%	17%	18%	
	Bottom Quartile	%	14%	15%	
	Top Quartile	n	3,993	4,024	
	2nd Quartile	n	2,364	2,749	
	3rd Quartile	n	1,537	1,793	
	Bottom Quartile	n	1,325	1,560	

Includes only two campuses

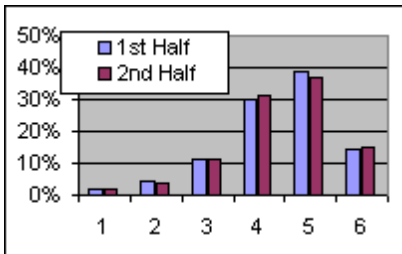
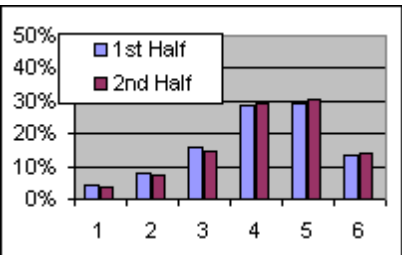
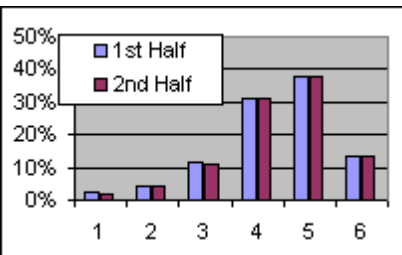
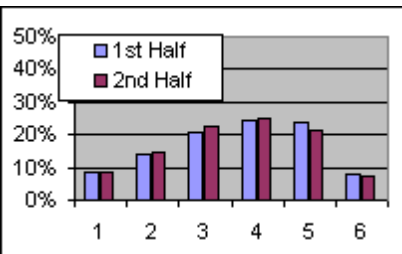
Table 3 compares early and late responders by a series of demographic and academic variables: sex, matriculation status, class level, race/ethnicity, and cumulative grade

point average (GPA)⁴. The analysis relied upon Chi-Square tests and specifically, Cramer's V Coefficient (V) to compensate for the extremely large number of students and inflated levels of statistical significance⁵. The V statistic is a measure of association and values greater than 0.1 are generally recognized as substantive. Using 0.1 as a threshold, none of these demographic or academic variables differed from early to late responders.

⁴ GPA quartile ranges were based on the distribution for the eight campuses.

⁵ In this case, V is the square root of Chi-Square divided by n.

Table 4: Response Resistance Analysis -- Comparison of Early and Late Responders on Broad Indicators of Satisfaction

Questionnaire Item	First Half	Second Half	First Half	Second Half	Cramer's V
Satisfaction with overall academic experience					
1 Very Dissatisfied	2%	2%	184	189	0.022
2 Dissatisfied Somewhat	4%	4%	396	382	
3 Dissatisfied Somewhat	11%	12%	1,052	1,196	
4 Satisfied	30%	31%	2,848	3,231	
5 Satisfied	38%	37%	3,651	3,853	
6 Very Satisfied	14%	15%	1,363	1,531	
					
Satisfaction with overall social experience					
1 Very Dissatisfied	4%	4%	416	393	0.027
2 Dissatisfied Somewhat	8%	7%	773	778	
3 Dissatisfied Somewhat	16%	15%	1,505	1,538	
4 Satisfied	29%	29%	2,729	3,056	
5 Satisfied	29%	30%	2,785	3,152	
6 Very Satisfied	14%	14%	1,294	1,478	
					
Satisfaction with quality of teaching by teaching assistants					
1 Very Dissatisfied	2%	2%	193	198	0.010
2 Dissatisfied Somewhat	4%	4%	387	405	
3 Dissatisfied Somewhat	12%	11%	1,045	1,112	
4 Satisfied	31%	31%	2,815	3,068	
5 Satisfied	38%	38%	3,403	3,751	
6 Very Satisfied	13%	14%	1,189	1,335	
					
Satisfaction with UC grade point average					
1 Very Dissatisfied	9%	9%	817	892	0.036
2 Dissatisfied Somewhat	14%	15%	1,360	1,551	
3 Dissatisfied Somewhat	21%	22%	1,953	2,331	
4 Satisfied	25%	25%	2,348	2,623	
5 Satisfied	24%	21%	2,259	2,235	
6 Very Satisfied	8%	7%	773	764	
					

Satisfaction with quality of upper-division courses in the major

1	Very Dissatisfied	2%	1%	79	78	0.019
2	Dissatisfied	2%	2%	101	115	
	Somewhat					
3	Dissatisfied	7%	7%	319	367	
	Somewhat					
4	Satisfied	23%	23%	1,081	1,184	
5	Satisfied	44%	45%	2,026	2,374	
6	Very Satisfied	22%	22%	1,039	1,129	

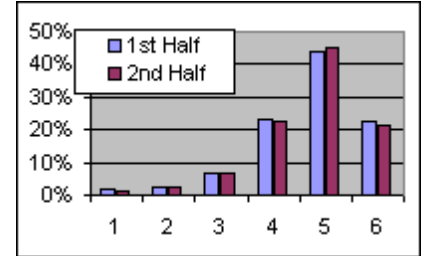
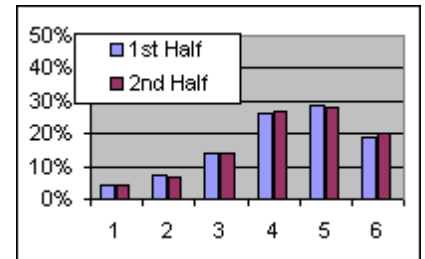


Table 4: (Continued)

Questionnaire Item	First Half	Second Half	First Half	Second Half	Cramer's V
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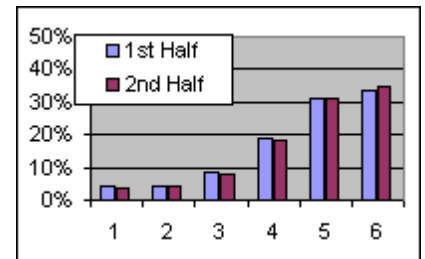
Satisfaction with value of the education for the price

1	Very Dissatisfied	4%	4%	413	456	0.022
2	Dissatisfied	8%	7%	713	684	
	Somewhat					
3	Dissatisfied	14%	14%	1,334	1,475	
	Somewhat					
4	Satisfied	26%	27%	2,492	2,784	
5	Satisfied	29%	28%	2,736	2,925	
6	Very Satisfied	19%	20%	1,809	2,065	



Would reenroll knowing what they now know

1	Strongly Disagree	4%	3%	385	358	0.020
2	Disagree	4%	4%	378	412	
	Disagree					
3	Somewhat	9%	8%	810	839	
	Disagree					
4	Agree Somewhat	19%	19%	1,786	1,921	
5	Agree	31%	31%	2,929	3,253	
6	Strongly Agree	34%	35%	3,198	3,580	



Includes only two campuses

Table 4: Comparison of Early and Late Responders on Global Measures of Satisfaction

Even though early and late responders were not substantially different in categorical characteristics, it was possible that their opinions were different. Conventional wisdom states that early responders are more compliant and better satisfied than late

respondents. That hypothesis was put to the test by comparing the distribution of responses to seven broad indicators of student satisfaction. Table 4 displays the results of those numeric comparisons along with graphical displays. It is clear that responses by the two groups were very much alike. Cramer's V found no instance of substantive difference ($V > 0.1$).

Table 5: Response Resistance Analysis for the Upper-Division Core Items

In Table 5, the same analysis used in Table 4 was extended to all 147 items constituting the upper-division core⁶. In addition, an analysis of variance R-Square was reported for those variables that might be considered interval measures. Based on V, early and late responders differed on only one item and that difference was not confirmed by R-Square. In sum, the one item to which early and late responders might have answered differently was "self awareness and understanding" at college entry. That one difference might be expected by chance or might reflect sex differences but obviously does not rise to a level that should cause concern that response resistance was a problem for the other 146 items or the questionnaire overall.

Table 5: Response Resistance Analysis -- Upper-Division Core Items

Questionnaire Item	Analysis of Variance R- Square	Cramer's V
Ability to appreciate fine arts at entry	0.000	0.026
Ability to appreciate fine arts now	0.002	0.012
Ability to appreciate different cultures at entry	0.001	0.023
Ability to appreciate different cultures now	0.003	0.022
Appreciation of personal responsibility at entry	0.001	0.024
Appreciation of personal responsibility now	0.004	0.023
Self awareness at entry	0.001	0.111
Self awareness now	0.003	0.022
Tolerance at entry	0.001	0.023
Tolerance now	0.003	0.015
Age when learned to speak English	0.001	0.029
Agree that you belong	0.000	0.025
Agree that you would reenroll	0.000	0.020
Percentage of assigned reading done	0.002	0.053
Ability to break down material	0.000	0.023
Worked on class project with others	0.003	0.060
Number of times came to class unprepared	0.000	0.033
Completed a research project	dichotomous	0.001
Plan to do an research project	dichotomous	0.004
Worked on a creative project with faculty	dichotomous	0.015
Plan to work on a creative project with faculty	dichotomous	0.020
International diversity of students	0.000	0.020

⁶ The upper-division core is especially important because it is used for academic program review.

Diversity of political belief among students	0.000	0.021
Diversity of sexual preferences	0.001	0.035
Diversity of races among students	0.000	0.016
Diversity of students' religions	0.000	0.017
Diversity of students' SES backgrounds	0.000	0.023
Times required to evaluate	0.001	0.026
Examined how others developed knowledge	0.001	0.034
Times required to explain methods, ideas	0.000	0.023
Number of faculty who would write recommendation	0.000	0.026
Father's level of education (foreign)	0.000	0.023
Father's level of education (U.S.)	0.001	0.034
Father born in U.S.	dichotomous	0.064
Father's father born in U.S.	dichotomous	0.066
Father's mother from in U.S.	dichotomous	0.062
Times required to generate new ideas	0.000	0.015
Number of grandparents who went to college	0.000	0.024
Times helped classmate	0.001	0.036
Hours spent in class	0.000	0.035
Hours spent studying	0.000	0.026
Total hours worked	0.000	0.021
Hours worked on campus	0.000	0.016
Hours worked in area of major	0.001	0.031

Table 5: (Continued)

Questionnaire Item	Analysis of Variance R-Square	Cramer's V
Year student immigrated to U.S.	0.000	0.036
Family income	0.000	0.032
Confidence in accuracy of reported income	0.000	0.019
Number of time incorporated ideas other classes	0.000	0.019
Number of times turned in assignment late	0.004	0.069
Trips to library for other purposes	0.000	0.029
Trips to library for research	0.001	0.039
Major chosen because 2nd choice	dichotomous	0.010
Accuracy of information about major in cat.	dichotomous	0.015
Policies regarding major are clear	dichotomous	0.002
Major chosen because of interest	dichotomous	0.012
Major is well defined	dichotomous	0.006
Major chosen because it was easy	dichotomous	-0.001
Faculty in major are fair	dichotomous	0.000
Major chosen because it allowed free time	dichotomous	0.011
Major leads to fulfilling career	dichotomous	-0.003
Major leads to high pay	dichotomous	0.003
Major leads to international opportunities	dichotomous	0.001
Communication open in major	dichotomous	0.005
Major was parents preference	dichotomous	0.005

Rules about plagiarism clear in major	dichotomous	0.012
Major is prestigious	dichotomous	0.004
Major complements study abroad	dichotomous	-0.006
Requirements in major are coherent	dichotomous	-0.009
Mother's education (foreign)	0.000	0.027
Mother's education (U.S.)	0.001	0.034
Mother born in U.S.	dichotomous	0.068
Mother's father born in U.S.	dichotomous	0.064
Mother's mother from in U.S.	dichotomous	0.066
Highest degree sought	0.000	0.037
Times that raised performance standards	0.000	0.014
Times that reassessed ideas	0.001	0.031
Times required to recall specifics	0.002	0.050
Completed an independent study	dichotomous	0.004
Plan to do an independent study	dichotomous	0.020
Completed student research course	dichotomous	0.009
Plan to take a student research course	dichotomous	0.018
Completed research with faculty for pay	dichotomous	0.012
Plan to do research with faculty	dichotomous	0.023

Table 5: (Continued)

Questionnaire Item	Analysis of Variance R- Square	Cramer's V
Assisted faculty in research for school	dichotomous	0.002
Plan to work with faculty for school	dichotomous	0.018
Assisted faculty in research as a volunteer	dichotomous	0.012
Plan to assist faculty in research as a volunteer	dichotomous	0.024
Number of times revised paper substantially	0.003	0.060
Satisfaction with overall academic experience	0.000	0.022
Satisfaction with access to faculty	0.000	0.014
Satisfaction with advising by college	0.000	0.015
Satisfaction with advising by department	0.000	0.005
Satisfaction with advising by faculty	0.000	0.006
Satisfaction with advising by peers	0.000	0.014
Satisfaction with course variety	0.000	0.022
Satisfaction with course availability	0.000	0.015
Satisfaction with opportunities for enrichment	0.000	0.024
Satisfaction with faculty teaching	0.000	0.015
Satisfaction with availability of GE	0.000	0.008
Satisfaction with quality of lower-division	0.000	0.024
Satisfaction with availability of library materials	0.000	0.018
Satisfaction with assistance by library staff	0.000	0.020
Satisfaction with ability to get into major of choice	0.000	0.029

Satisfaction with research opportunities	0.000	0.010
Satisfaction with access to small classes	0.000	0.019
Satisfaction with social experience	0.001	0.027
Satisfaction with teaching by TAs	0.000	0.010
Satisfaction with UC GPA	0.001	0.036
Satisfaction with quality of upper-division	0.000	0.019
Satisfaction with value of education	0.000	0.022
Number of service courses taken	0.000	0.025
Computer skills at entry	0.000	0.026
Computer skills now	0.000	0.017
Foreign language skill at entry	0.000	0.017
Foreign language skill now	0.000	0.023
Internet skills at entry	0.000	0.017
Internet skills now	0.000	0.017
Leadership skill at entry	0.000	0.019
Leadership skill now	0.002	0.040
Library research skills at entry	0.000	0.019
Library research skills now	0.001	0.032
Quantitative skill at entry	0.001	0.026
Current Quantitative skill	0.001	0.042

Table 5: (Continued)

Questionnaire Item	Analysis of Variance R-Square	Cramer's V
Ability in major at entry	0.000	0.027
Ability in major now	0.001	0.031
Understanding international perspectives at entry	0.000	0.024
Understanding international perspectives now	0.000	0.032
Other research skills at entry	0.000	0.030
Other research skills now	0.002	0.046
Ability to make presentations at entry	0.000	0.031
Ability to make presentations now	0.003	0.056
Reading ability at entry	0.000	0.015
Reading ability now	0.001	0.029
Social skills at entry	0.000	0.026
Social skills now	0.001	0.027
Speaking skill at entry	0.000	0.028
Current speaking skill	0.000	0.016
Writing ability at entry	0.000	0.020
Writing ability now	0.000	0.027
Frequency of skipping class	0.004	0.064
Social class when growing up	0.000	0.031
Number of times sought help for class	0.000	0.020
Ability to reason critically at entry	0.000	0.013
Ability to reason critically now	0.000	0.020
Times required to use facts to support	0.000	0.025

position		
Frequency of coming to class without reading	0.000	0.021

Includes only two campuses

Table 6: Traditional Nonresponse Bias Demographics

The result of comparing responding and nonresponding students at eight UC campuses is presented as Table 6. Table 6 reports response rate, the difference between the observed response rate for a grouping and the overall 38%, and Cramer's V for the Chi-Square test of association between demographic variable and response behavior. The difference between group response rate and the overall response rate is visually shifted to the right or left if greater than 5%. Continuing to use the threshold standard of $V \geq 0.10$, identified two variables as associated with response, campus and GPA quartile. Differences by campus ranged from a high of 48% to a low of 32%. Response rates by GPA quartile ranged from 47% for the highest quartile to 30% for the lowest with about a 5% increase in response rate for each quartile. Response rate by sex approached but did not exceed the threshold.

Table 6: Traditional Nonresponse Bias Demographics

	Response Rate	Difference from Unweighted, Overall Response Rate			Responded	Did Not Respond	Total	Chi Square / Cramer's V
		Low	Middle	High				
		<5%	5%<x>5%	>5%				
Campus								
A	39%		1.7%				2,685 0.13	
B	33%		-4.6%					
C	35%		-2.1%					
D	31%	-6.0%						
E	33%		-4.1%					
F	48%			10.5%				
G	33%		-4.1%					
H	48%			10.4%				
GPA Quartile								
High GPA Quartile	47%			9.1%	17,628	20,259	37,887	2,375
2nd Quartile	40%		2.2%		14,613	22,237	36,850	0.13
3rd Quartile	35%		-2.3%		13,171	24,283	37,454	
Bottom GPA Quartile	30%	-7.5%			11,127	26,073	37,200	
Sex								
Female	42%		4.1%		34,301	48,292	82,593	1,008
Male	34%		-3.8%		23,489	46,389	69,878	0.08
Matriculation Status								
Matriculant from High School	39%		1.2%		46,343	73,433	119,776	150
Transfer Student	35%		-2.5%		11,406	21,202	32,608	0.03
Class Level								
Freshman	41%		3.3%		10,938	15,887	26,825	128
Sophomore	38%		0.7%		11,106	17,987	29,093	0.03
Junior	37%		-0.3%		15,450	26,172	41,622	
Senior	37%		-0.5%		20,237	34,534	54,771	
5th Year	35%		-2.2%		139	255	394	
Race/Ethnicity								
A = American Indian/Alaskan Native	42%			4.9%	356	484	840	589
B = Black/African American	31%	-6.8%			1,398	3,167	4,565	0.06
C = Chicano/Mexican-American	34%		-3.1%		5,543	10,578	16,121	
D = Chinese/Chinese-American	43%			5.1%	10,157	13,711	23,868	
E = Decline to State	37%		-0.4%		2,793	4,750	7,543	
F = East Indian/Pakistani	38%		0.4%		1,722	2,831	4,553	
G = Japanese/Japanese-American	43%			5.2%	2,282	3,075	5,357	
H = Korean	33%	-4.9%			2,752	5,692	8,444	
J = Latino/Other Spanish-American	36%		-1.6%		1,963	3,514	5,477	
K = Other	35%		-2.0%		1,108	2,020	3,128	
L = Pilipino/Filipino	37%		-0.1%		2,731	4,580	7,311	
M = Pacific Islander	37%		-0.2%		260	438	698	
N = Thai/Other Asian	39%		2.0%		1,564	2,399	3,963	
P = White/Caucasian	38%		0.7%		20,658	33,464	54,122	
V = Vietnamese	38%		0.9%		2,873	4,625	7,498	
Weighted	37.9%				58,160	95,328	153,488	
Unweighted	37.4%							

The Merced campus was excluded as it was in its first year with students.

Table 7: Comparison of Statistical Measures of Nonresponse Bias

Table 7 reports the results of three independent, though very similar, analyses: Chi-Square with Cramer's V, a dichotomous regression with R-Square, and Logistic Regression with the Wald Statistic. Using the results reported in Table 6 to identify the four most likely areas of nonresponse bias, comparison shows confirmation of relative strength and magnitude. Only campus and GPA quartile were statistically meaningful and were very nearly additive. Two of the analyses could also be used to evaluate multivariate models and the results are shown for the results using sequential addition of terms. The results supported the finding of nonresponse bias by campus and GPA quartile but did not support the inclusion of additional terms.

Table 7: Comparing Statistical Measures of Nonresponse Bias

	Chi-Square Cramer's V	Dichotomous Regression (R ²)	Logistic Regression Wald Statistic
(a) Campus	0.1326	0.017407	2,564
(b) GPA Quartile	0.1261	0.016044	2,365
(c) Gender	0.0813	0.006649	988
(d) Ethnicity	0.0621	0.003799	566
(a) + (b)		0.031316	4,544
(a) + (b) + (c)		0.037226	5,366
(a) + (b) + (c) +(d)		0.040531	5,822

Table 8: Nonresponse Bias Analysis, Cramer's V Statistic By Campus for Demographic Variables

Campus	Sex	Race / Ethnic	Matriculation Status	Student Level	GPA Quartile
A	0.119	0.053	0.053	0.062	0.143
B	0.089	0.056	0.020	0.033	0.128
C	0.097	0.042	0.008	0.043	0.109
D	0.095	0.057	0.074	0.065	0.112
E	0.082	0.049	0.013	0.044	0.115
F	0.052	0.099	0.042	0.026	0.084
G	0.090	0.060	0.013	0.035	0.149
H	0.063	0.093	0.024	0.047	0.112

Table 8: Nonresponse Bias Analysis Using Cramer's V Statistic by Campus

Analysis of possible nonresponse bias was extended to the campus level for the five demographic variables: sex, race/ethnicity, matriculation status, student level, and GPA quartile to insure that overall results did not mask unique campus conditions. There were modest campus differences with response rate by sex exceeding the threshold ($V=0.10$) at one campus and race/ethnicity very nearly doing so at another. In neither case were the associations substantially above the threshold. In contrast, GPA quartile was associated with survey participation at 7 of the 8 campuses and was well beyond the threshold at two campuses. These within campus results confirm the overall nonresponse bias finding that GPA quartile was associated with survey participation.

Table 9: Global Satisfaction Results Adjusting for Campus and Grade Point Average Quartile

	Weighted (W)	Unweighted (U)	W	U	W-U	
Satisfaction with overall academic experience						
1 Very Dissatisfied	1,080.0	1,010	2%	2%	0%	
2 Dissatisfied	2,555.4	2,384	5%	4%	0%	
3 Somewhat Dissatisfied	6,692.6	6,381	12%	11%	1%	
4 Somewhat Satisfied	17,177.6	16,878	31%	30%	1%	
5 Satisfied	20,872.3	21,308	38%	38%	-1%	
6 Very Satisfied	7,249.0	7,644	13%	14%	-1%	
Satisfaction with overall social experience						
1 Very Dissatisfied	2,214.8	2,189	4%	4%	0%	
2 Dissatisfied	4,065.0	4,032	7%	7%	0%	
3 Somewhat Dissatisfied	7,745.5	7,771	14%	14%	0%	
4 Somewhat Satisfied	15,123.0	15,217	27%	27%	0%	
5 Satisfied	17,382.3	17,341	31%	31%	0%	
6 Very Satisfied	9,163.3	9,123	16%	16%	0%	
Satisfaction with teaching (TAs)						
1 Very Dissatisfied	1,164.4	1,133	2%	2%	0%	
2 Dissatisfied	2,347.7	2,300	4%	4%	0%	
3 Somewhat Dissatisfied	6,352.0	6,249	12%	12%	0%	
4 Somewhat Satisfied	16,771.7	16,652	32%	32%	0%	
5 Satisfied	19,604.1	19,804	37%	38%	0%	
6 Very Satisfied	6,280.5	6,451	12%	12%	0%	
Satisfaction with UC GPA						
1 Very Dissatisfied	5,248.2	4,631	9%	8%	1%	
2 Dissatisfied	8,614.4	7,832	15%	14%	1%	
3 Somewhat Dissatisfied	12,392.8	11,761	22%	21%	1%	
4 Somewhat Satisfied	14,092.1	14,222	25%	26%	0%	
5 Satisfied	11,647.2	12,843	21%	23%	-2%	
6 Very Satisfied	3,746.6	4,427	7%	8%	-1%	
Satisfaction with quality of upper-division coursework						
1 Very Dissatisfied	445.7	439	2%	2%	0%	
2 Dissatisfied	726.5	716	3%	3%	0%	
3 Somewhat Dissatisfied	1,965.8	1,947	7%	7%	0%	
4 Somewhat Satisfied	6,442.4	6,405	23%	23%	0%	
5 Satisfied	12,303.7	12,497	44%	44%	0%	
6 Very Satisfied	5,911.3	6,128	21%	22%	-1%	

Table 9: Global Satisfaction Results Adjusting for Campus and GPA Quartile

Tables 9 and 10 explore the practical consequences of weighting responses by campus and GPA quartile to reflect their true weight in the population. Both the graphic display and numeric difference between weighted and unweighted distributions show very little difference. Weighting responses to global satisfaction items by campus and GPA quartile did not result in differences of practical importance. Only the percentage responding “satisfied” about UC GPA was changed by as much as 2% by weighting campus and GPA quartile.

**Table 9:
(Continued)**

	Weighted (W)	Unweighted (U)	W	U	W-U
Satisfaction with value of education					
1 Very Dissatisfied	3,169.0	2,976	6%	5%	0%
2 Dissatisfied	4,790.8	4,568	9%	8%	0%
3 Dissatisfied Somewhat	9,097.3	8,802	16%	16%	1%
4 Satisfied	15,704.1	15,587	28%	28%	0%
5 Satisfied	14,938.3	15,253	27%	27%	-1%
6 Very Satisfied	7,969.5	8,462	14%	15%	-1%
Would reenroll knowing what now know					
1 Strongly Disagree	2,432.4	2,325	4%	4%	0%
2 Disagree	2,720.6	2,607	5%	5%	0%
3 Somewhat Disagree	5,104.1	4,978	9%	9%	0%
4 Agree Somewhat	10,458.0	10,357	19%	19%	0%
5 Agree	16,721.8	16,847	30%	30%	0%
6 Strongly Agree	18,121.3	18,422	33%	33%	-1%

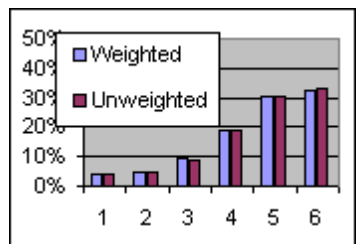
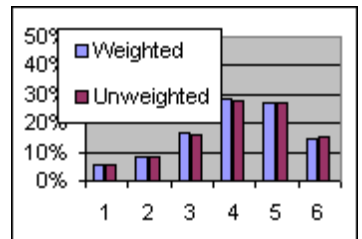


Table 10: Comparison of Weighted and Unweighted Responses to Core Items

The weighted and unweighted results for the 147 items of the upper-division core were compared and the results were reported as Table 10. Table 10 reports the simple difference in mean score and the size of that difference in terms of statistical variance – an effect size in other words. The largest difference was less than 1/10th of a standard deviation and was again for the item asking students their satisfaction with GPA. The fact that satisfaction with GPA was affected by a weighting scheme based on GPA

quartile should not be surprising. No other difference exceeded 0.1 points on the 6 point scale or $1/10^{\text{th}}$ of a standard deviation. Dichotomous items were compared based on percents affirmatives and weighting failed to change the percent affirmative by even one percent.

Table 10: Comparison of Weighted and Unweighted Responses to Core Items

Weights Adjusting for Campus and Grade Point Average Quartile Distributions
(Figures in italics are percent change for dichotomous variables)

Questionnaire Item	Weighted-Unweighted			Weighted		Unweighted	
	(W-U)	(W-U)/sd	n	Mean(W)	sd	Mean(U)	sd
Satisfaction with overall academic experience	-0.04	-0.03	55,605	4.365	1.115	4.403	1.105
Satisfaction with social experience	0.00	0.00	55,673	4.237	1.305	4.237	1.302
Satisfaction with teaching by TAs	-0.02	-0.01	52,589	4.336	1.112	4.351	1.110
Satisfaction with UC GPA	-0.12	-0.08	55,716	3.530	1.395	3.648	1.395
Satisfaction with quality of upper-division	-0.02	-0.02	28,132	4.697	1.055	4.713	1.058
Satisfaction with value of education	-0.05	-0.03	55,648	4.048	1.364	4.095	1.357
Agree that you would reenroll	-0.03	-0.02	55,536	4.632	1.374	4.658	1.361
Ability to appreciate fine arts at entry	-0.01	-0.01	55,637	4.172	1.232	4.179	1.230
Ability to appreciate fine arts now	0.00	0.00	55,537	4.633	1.153	4.630	1.155
Ability to appreciate different cultures at entry	0.00	0.00	55,530	4.299	1.105	4.300	1.100
Ability to appreciate different cultures now	0.00	0.00	55,456	4.838	1.007	4.837	1.006
Appreciation of personal responsibility at entry	0.00	0.00	55,509	4.213	1.096	4.215	1.094
Appreciation of personal responsibility now	0.00	0.00	55,432	4.882	0.963	4.880	0.964
Self awareness at entry	0.00	0.00	55,752	3.994	1.112	3.990	1.112
Self awareness now	0.00	0.00	55,553	4.837	0.964	4.835	0.962
Tolerance at entry	0.00	0.00	55,654	4.575	1.092	4.570	1.090
Tolerance now	0.00	0.01	55,516	5.025	0.945	5.020	0.944
Age when learned to speak English	0.00	0.00	56,539	1.471	1.017	1.466	1.014
Agree that you belong	-0.02	-0.01	55,374	4.477	1.277	4.495	1.271
Percentage of assigned reading done	-0.04	-0.02	32,509	7.061	2.541	7.105	2.538
Ability to break down material	0.00	0.00	43,554	4.361	1.343	4.361	1.317
Worked on class project with others	0.00	0.00	45,816	3.582	1.439	3.586	1.408

Number of times came to class unprepared	0.01	0.01	31,640	3.105	1.227	3.098	1.222
Completed a research project	0.7%			40.2%		40.9%	
Plan to do an research project	0.0%			7.7%		7.7%	

Table 10: (Continued)

Questionnaire Item	Weighted-Unweighted			Weighted		Unweighted	
	(W-U)	(W-U)/sd	n	Mean(W)	sd	Mean(U)	sd
Worked on a creative project with faculty	-0.2%			7.3%		7.5%	
Plan to work on a creative project with faculty	0.3%			10.3%		10.1%	
International diversity of students	0.01	0.00	55,949	3.848	1.398	3.842	1.397
Diversity of political belief among students	0.00	0.00	55,987	3.371	1.289	3.367	1.285
Diversity of sexual preferences	0.00	0.00	55,971	2.835	1.325	2.834	1.327
Diversity of races among students	0.00	0.00	55,872	3.928	1.406	3.924	1.404
Diversity of students' religions	0.00	0.00	56,098	3.180	1.308	3.180	1.305
Diversity of students' SES backgrounds	0.01	0.01	55,947	3.338	1.362	3.328	1.359
Times required to evaluate	0.00	0.00	43,644	4.317	1.343	4.321	1.315
Examined how others developed knowledge	0.00	0.00	53,033	4.013	1.337	4.015	1.338
Times required to explain methods, ideas	0.00	0.00	43,691	4.825	1.183	4.830	1.156
Number of faculty who would write recommendation	-0.05	-0.03	30,174	2.427	1.380	2.474	1.393
Father's level of education (foreign)	-0.02	-0.01	56,539	1.228	1.974	1.243	2.001
Father's level of education (U.S.)	-0.08	-0.03	56,539	3.358	3.044	3.436	3.067
Father born in U.S.	0.01	0.01	50,660	1.544	0.499	1.537	0.499
Father's father born in U.S.	0.01	0.01	50,259	1.608	0.489	1.601	0.490
Father's mother from in U.S.	0.01	0.01	50,377	1.607	0.489	1.601	0.490
Times required to generate new ideas	-0.01	-0.01	43,696	4.028	1.439	4.039	1.408
Number of grandparents who went to college	-0.02	-0.02	56,539	2.299	1.519	2.323	1.529

Times helped classmate	-0.02	-0.01	55,708	3.716	1.331	3.734	1.333
Hours spent in class	-0.01	-0.01	56,279	4.494	1.230	4.502	1.227
Hours spent studying	-0.04	-0.02	56,079	3.960	1.652	3.996	1.663
Total hours worked	0.03	0.01	55,667	2.898	2.039	2.870	2.024
Hours worked on campus	0.02	0.01	55,460	1.937	1.567	1.921	1.550
Hours worked in area of major	0.00	0.00	55,509	1.729	1.436	1.731	1.434
Year student immigrated to U.S.	-0.02	-0.01	56,539	1.929	2.805	1.945	2.834

Table 10: (Continued)

Questionnaire Item	Weighted-Unweighted			Weighted		Unweighted	
	(W-U)	(W-U)/sd	n	Mean(W)	sd	Mean(U)	sd
Family income	-0.08	-0.03	50,468	6.127	2.814	6.205	2.810
Confidence in accuracy of reported income	0.01	0.01	50,746	3.200	1.160	3.192	1.158
Number of time incorporated ideas other classes	0.00	0.00	53,039	4.552	1.221	4.557	1.220
Number of times turned in assignment late	0.02	0.02	31,681	1.777	0.971	1.759	0.957
Trips to library for other purposes	-0.01	0.00	56,539	3.202	2.031	3.208	2.031
Trips to library for research	0.00	0.00	56,539	3.827	1.881	3.831	1.877
Major chosen because 2nd choice	0.1%			1.8%		1.6%	
Accuracy of information about major in cat.	0.00	0.00	28,188	1.087	0.281	1.086	0.280
Policies regarding major are clear	0.00	0.01	28,422	1.197	0.395	1.192	0.394
Major chosen because of interest	-0.9%			41.5%		42.3%	
Major is well defined	0.00	0.01	28,454	1.095	0.292	1.093	0.290
Major chosen because it was easy	0.1%			4.7%		4.6%	
Faculty in major are fair	0.00	0.01	52,911	1.143	0.350	1.139	0.346
Major chosen because it allowed free time	0.0%			6.9%		6.9%	
Major leads to fulfilling career	-0.4%			29.3%		29.7%	
Major leads to high pay	0.1%			14.9%		14.8%	
Major leads to international opportunities	-0.1%			10.6%		10.8%	

Communication open in major	0.00	0.01	52,943	1.188	0.390	1.186	0.389
Major was parents preference	0.1%			4.5%		4.4%	
Rules about plagiarism clear in major	0.00	-0.01	52,998	1.070	0.255	1.072	0.258
Major is prestigious	-0.1%			11.3%		11.3%	
Major complements study abroad	-0.1%			5.8%		5.9%	
Requirements in major are coherent	0.00	0.01	28,497	1.088	0.282	1.087	0.281
Mother's education (foreign)	-0.01	-0.01	56,539	1.175	1.789	1.187	1.810
Mother's education (U.S.)	-0.06	-0.02	56,539	2.959	2.721	3.017	2.742
Mother born in U.S.	0.01	0.01	50,731	1.554	0.498	1.547	0.498

Table 10: (Continued)

Questionnaire Item	Weighted-Unweighted			Weighted		Unweighted	
	(W-U)	(W-U)/sd	n	Mean(W)	sd	Mean(U)	sd
Mother's father born in U.S.	0.01	0.01	50,401	1.616	0.487	1.609	0.488
Mother's mother from in U.S.	0.01	0.01	50,436	1.612	0.488	1.606	0.489
Highest degree sought	-0.05	-0.02	56,539	6.359	3.273	6.411	3.246
Times that raised performance standards	-0.01	-0.01	45,719	3.651	1.332	3.659	1.307
Times that reassessed ideas	-0.01	-0.01	53,045	4.001	1.295	4.008	1.294
Times required to recall specifics	-0.01	-0.01	43,833	5.014	1.083	5.020	1.057
Completed an independent study	-0.8%			12.4%		13.3%	
Plan to do an independent study	0.4%			13.3%		12.9%	
Completed student research course	-0.5%			13.6%		14.1%	
Plan to take a student research course	0.3%			11.6%		11.3%	
Completed research with faculty for pay	-0.1%			5.9%		6.0%	
Plan to do research with faculty	0.3%			12.8%		12.5%	
Assisted faculty in research for sch	-0.7%			10.0%		10.6%	
Plan to work with faculty for sch	0.3%			13.3%		13.0%	
Assisted faculty in research as a volunteer	-0.2%			8.5%		8.7%	
Plan to assist faculty in research as a	0.3%			12.0%		11.7%	

volunteer							
Number of times revised paper							
substantially	-0.03	-0.02	45,792	3.843	1.530	3.871	1.500
Satisfaction with access to faculty	-0.01	-0.01	52,517	4.380	1.044	4.394	1.044
Satisfaction with advising by college	-0.01	0.00	51,987	4.110	1.166	4.116	1.164
Satisfaction with advising by department	-0.01	-0.01	51,964	4.253	1.188	4.267	1.184
Satisfaction with advising by faculty	-0.02	-0.02	51,893	4.377	1.079	4.396	1.075
Satisfaction with advising by peers	0.00	0.00	50,345	3.955	1.132	3.957	1.131
Satisfaction with course variety	-0.01	-0.01	52,582	4.210	1.215	4.223	1.214
Satisfaction with course availability	-0.03	-0.03	52,696	4.062	1.247	4.096	1.242
Satisfaction with opportunities for enrichment	-0.02	-0.02	51,071	4.376	1.100	4.392	1.097
Satisfaction with faculty teaching	-0.03	-0.03	52,697	4.595	1.018	4.623	1.012

Table 10: (Continued)

Questionnaire Item	Weighted-Unweighted (W-U) (W-U)/sd			Weighted		Unweighted	
	(W-U)	U)/sd	n	Mean(W)	sd	Mean(U)	sd
Satisfaction with availability of GE	-0.03	-0.02	52,413	4.085	1.210	4.115	1.205
Satisfaction with quality of lower-division	-0.02	-0.01	27,612	4.148	1.199	4.164	1.204
Satisfaction with availability of library materials	-0.01	-0.01	51,844	4.690	0.950	4.696	0.949
Satisfaction with assistance by library staff	0.00	0.00	51,542	4.597	0.946	4.599	0.944
Satisfaction with ability to get into major of choice	-0.03	-0.03	52,384	4.715	1.153	4.746	1.143
Satisfaction with research opportunities	-0.02	-0.02	51,745	4.147	1.176	4.169	1.178
Satisfaction with access to small classes	-0.02	-0.01	52,645	3.750	1.305	3.767	1.307
Number of service courses taken	0.00	0.00	56,539	1.339	0.851	1.335	0.845
Computer skills at entry	0.01	0.01	55,772	3.917	1.095	3.905	1.091
Computer skills now	0.02	0.02	55,756	4.484	0.996	4.466	0.997

Foreign language skill at entry	0.01	0.01	55,748	3.390	1.242	3.382	1.236
Foreign language skill now	0.01	0.01	55,614	3.554	1.316	3.544	1.315
Internet skills at entry	0.01	0.01	55,767	4.363	1.129	4.350	1.125
Internet skills now	0.02	0.02	55,690	4.937	0.907	4.920	0.910
Leadership skill at entry	0.01	0.01	55,739	3.719	1.131	3.711	1.126
Leadership skill now	0.01	0.01	55,718	4.246	1.117	4.240	1.114
Library research skills at entry	0.01	0.01	55,747	3.285	1.090	3.273	1.084
Library research skills now	0.00	0.00	55,700	4.241	1.063	4.239	1.062
Quantitative skill at entry	-0.02	-0.02	55,811	3.782	1.120	3.800	1.117
Current Quantitative skill	-0.01	-0.01	55,685	4.041	1.135	4.052	1.138
Ability in major at entry	-0.01	-0.01	55,777	3.250	0.983	3.256	0.985
Ability in major now	-0.02	-0.02	55,709	4.669	0.920	4.688	0.916
Understanding international perspectives at entry	0.00	0.00	55,766	3.394	1.065	3.395	1.064
Understanding international perspectives now	-0.01	0.00	55,712	4.381	1.040	4.386	1.039
Other research skills at entry	0.01	0.01	55,558	3.425	0.999	3.414	0.996
Other research skills now	0.00	0.00	55,481	4.252	0.987	4.249	0.987
Ability to make presentations at entry	0.00	0.00	55,655	3.722	1.029	3.723	1.025

Table 10: (Continued)

Questionnaire Item	Weighted-Unweighted			Weighted		Unweighted	
	(W-U)	(W-U)/sd	n	Mean(W)	sd	Mean(U)	sd
Ability to make presentations now	0.00	0.00	55,584	4.297	1.003	4.300	1.000
Reading ability at entry	-0.01	-0.01	55,890	3.810	1.049	3.822	1.047
Reading ability now	-0.02	-0.02	55,766	4.621	0.897	4.641	0.894
Social skills at entry	0.00	0.00	55,699	3.912	1.141	3.908	1.136
Social skills now	0.01	0.01	55,694	4.579	1.067	4.570	1.065
Speaking skill at entry	0.00	0.00	55,811	4.666	1.138	4.670	1.135
Current speaking skill	0.00	0.00	55,724	5.002	0.955	5.003	0.955

Writing ability at entry	-0.02	-0.02	55,957	3.679	1.128	3.698	1.122
Writing ability now	-0.02	-0.02	55,827	4.474	0.946	4.491	0.946
Frequency of skipping class	0.02	0.02	31,532	2.804	1.209	2.781	1.204
Social class when growing up	0.03	0.03	51,891	3.133	1.003	3.104	0.998
Number of times sought help for class	0.00	0.00	55,556	3.450	1.451	3.453	1.455
Ability to reason critically at entry	-0.01	-0.01	29,890	3.822	1.010	3.836	1.013
Ability to reason critically now	-0.02	-0.02	29,796	4.793	0.842	4.813	0.842
Times required to use facts to support position	-0.01	-0.01	53,195	4.911	1.129	4.919	1.126
Frequency of coming to class without reading	0.00	0.00	31,623	3.691	1.337	3.688	1.336
	-0.01	0.00					