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Title IX Data Collection: Technical Manual for Developing the User's Guide

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Introduction

The purpose of this report, undertaken at the behest of the Office for Civil Rights (OCR) of the U.S. Department of Education, is to develop a user's guide for conducting student interest and ability surveys in order to satisfy Part 3 of Title IX that are based on scientifically accepted survey practice.

Chapter 1 of the report provides concise background on Title IX (section 1.2), the "Three-Part Test" (section 1.2) for demonstrating compliance, and the responses to the Title IX Commission (section 1.3) that provided the impetus for producing this manual.

Chapter 2 summarizes the data on which chapters 3 and 4 are based. It provides background information for ascertaining the representativeness of understanding institutional differences between **OCR** cases and a national set of **COMPARISON** institutions, between **OCR** cases that resulted from a **COMPLIANCE** review and those that were the result of a **COMPLAINT** that was filed, between those **OCR** institutions that have used **PART 3** as opposed to **PARTS 1 AND 2**, between those **PART 3** institutions that have used a **SURVEY** and **NO SURVEY** institutions. The differences are represented by means of fourteen characteristics having to do with the nature and scale of each institution, the demographics of its student body, and its athletic programs. There are a total of 56 comparisons. This chapter highlights selected differences among these sets of institutions. The complete set of tables is located in appendix C.

Chapter 3 is a review and analysis of the 52 data collection instruments contained in the OCR files. In section 3.1, these instruments are categorized along 21 dimensions, which range from the target population to the presence or absence of particular kinds of questions to the representation of sports and levels of interest, experience or ability. Section 3.2 discusses notable items from the individual data collections. Most of these are notable because they are problematic or simply baffling, but a few seem to be quite effective. The chapter concludes in section 3.3, with discussion of a number of issues that are generic to virtually all of the surveys.

Chapter 4 describes a small number of data collections regarding students' athletic experience, interest and ability that have been located by means of searches of the World Wide Web. Although most of these are web-based, none of them is dramatically better than the data collection instruments discussed in chapter 3.

Finally, chapter 5 describes a recommended procedure for Part 3-stimulated data collection, including a web-based data collection instrument and procedures for principled statistical analysis of the data. The prototype instrument uses web-associated interactivity to avoid the pitfalls exhibited by the data collection instruments reviewed in chapters 3 and 4. In particular, a compact, comprehensible representation of "sports across levels" of experience, interest and ability is provided. Chapter 5 contains detailed advice as to how to conduct a scientifically valid data collection that will satisfy the requirement of Part 3.

Chapter 1: Background

This chapter contains background on Title IX, on the “Three-Part Test” (sometimes, “Three-Prong Test”) used by educational institutions to demonstrate compliance with the provisions of Title IX.

1.1 Introduction to Title IX

Title IX of the Higher Education Act (20 U.S.C. §§ 1681-1688), enacted in 1972, addresses issues of gender discrimination in colleges and universities. Specifically, it states that:

“...no person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance...” (20 U.S.C. § 1681 (a)).

The initial legislation addressed a wide range of areas, from admissions to scholarships, but made no specific mention of intercollegiate sports. Two years later (Education Amendments of 1974, P.L. 93-380 § 844), Title IX was amended to include athletic programs. Subsequently, issues involving gender equity in intra- and inter-collegiate athletics have become an important part of Title IX implementation.

Enforcement of Title IX is primarily the responsibility of the Office for Civil Rights (OCR) of the U.S. Department of Education. Courts, however, have resolved some cases. The associated body of case law (e.g., NCAA, 2004) has addressed legal issues ranging from the standing of plaintiffs to whether Title IX violates the equal protection clause of the Fourteenth Amendment to the U.S. Constitution.

1.2 The Three-Part Test

Postsecondary educational institutions may be required to (attain and) demonstrate compliance with Title IX in response to either specific complaints or monitoring activities conducted by the OCR. As of January 2004, 132 cases involving 130 institutions had been initiated and resolved. (This report does not address any cases currently in progress.)

The 1979 Policy Interpretation of Title IX established three means by which institutions can demonstrate compliance. Collectively, these are known as the “Three-Part Test” (the term we employ) or, alternatively, as the “Three-Prong Test.” The three parts are as follows: an institution must (44 Fed. Reg. 71,418)

1. Demonstrate that intercollegiate level participation opportunities for male and female students are provided in numbers substantially proportionate to their respective enrollments; *or*
2. Where the members of one sex have been and are underrepresented among intercollegiate athletes, show a history and continuing practice of program

- expansion which is demonstrably responsive to the developing interests and abilities of the members of that sex; *or*
0. Where the members of one sex are underrepresented among intercollegiate athletes, and the institution cannot show a continuing practice of program expansion such as that cited above [in Part 2], demonstrate that the interests and abilities of the members of that sex have been fully and effectively accommodated by the present program.

1.3 The Title IX Commission and the Assistant Secretary's Letter

On February 26, 2003, then Secretary of Education Rod Paige's Commission on Opportunity in Athletics reported on the results of its investigation as to whether further guidance from OCR on Title IX requirements regarding student athletics was needed (U.S. DOE, 2003).

In response to the Commission's report, OCR issued a letter of clarification. The three-part test described above was retained. The letter reaffirmed that each of the three parts was a valid means of compliance and that "institutions have flexibility in providing nondiscriminatory participation opportunities to their students, and OCR does not require quotas." Further, OCR "encourages schools to request individualized assistance for meeting the requirements of Title IX," and promised that OCR will "share information on successful approaches with the broader scholastic community (Reynolds, 2003)." This manual is intended as a contribution to sharing that information and to providing a relatively easy way of creating and implementing an interest and ability survey in order to satisfy Part 3 of Title IX.

Chapter 2: Analysis of OCR Cases

Chapter 2 analyzes the institutional characteristics of OCR cases in order to determine how representative they are of the national population of postsecondary institutions. In addition, the Title IX Commission reported: “many institutions attempt to comply solely with part 1, while others seek to rely on parts 2 or 3 (2002, p. 3).” This chapter thus investigates whether OCR cases can be differentiated according to the approach they successfully used to achieve Title IX compliance. The questions considered here are: Do the “OCR institutions” differ from an appropriately defined universe of comparable institutions? Do institutions that have had a complaint filed against them differ from those whose efforts were the results of an OCR compliance review? Do the institutions employing Part 3 differ from those employing Part 1 or Part 2? Among those using Part 3 to demonstrate compliance, do those conducting surveys differ from those that do not? Is there any tendency for the use of student interest surveys in Part 3 to increase over time?

2.1 Summary of the Data

OCR provided to National Center Education Statistics (NCES) files covering 132 OCR cases involving 130 institutions in 43 states, over the period 1992-2002. Information about these 130 unique institutions constitutes the basic data that are analyzed in this chapter. This population is enumerated in appendix A.

They are compared to a base population of 1,723 institutions that include the members of the National Collegiate Athletic Association (NCAA), the National Association of Intercollegiate Athletics (NAIA), and the National Junior College Athletic Association (NJCAA). In summary, the population of OCR institutions is decomposed into:

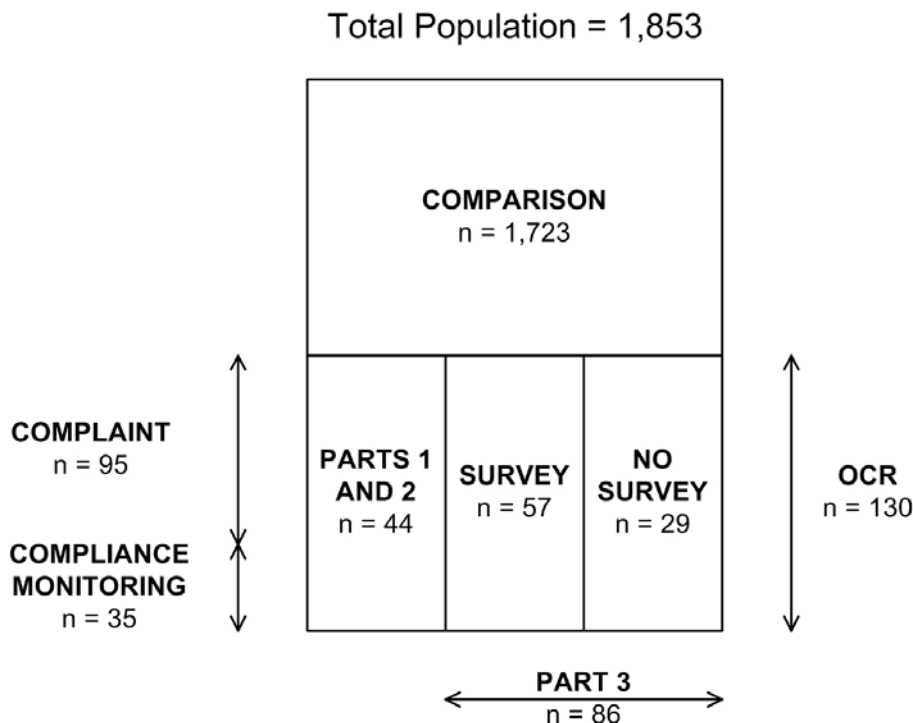
- **PARTS 1 AND 2**, the 44 institutions that demonstrated compliance with Title IX using either Part 1 or Part 2. Because only eight institutions used Part 2, it was decided on both statistical and interpretive grounds to merge the Part 1 and Part 2 institutions. They are referred to as **NON-PART 3** institutions.
- **PART 3**, the 86 institutions that demonstrated compliance with Title IX using Part 3. This subpopulation is further divided into
 - **SURVEY**, the 57 institutions that, as best can be determined from the files, conducted a survey of student athletic interest and abilities as part of the compliance process.¹
 - **NO SURVEY**, the 29 institutions that, again, as best can be determined from the files, did not conduct surveys of student athletic interest and

¹ Following completion of the NISS analysis, OCR provided documentation showing that ten of the 29 institutions identified in this report as not having used a survey had, in fact, used one (and did not have a copy of the instrument). The numbers here, unlike those in the User's Guide, have not been adjusted to take this into account. These institutions are identified in Appendix A.

abilities as part of the compliance process and achieved compliance in some other manner.

Figure 2.1 summarizes these various populations, which collectively comprise 1,853 institutions.

Figure 2.1: The populations of institutions appearing in this report.



SOURCE: NCES compilation of OCR files.

Our attention focuses on four specific sets of comparisons, which we describe in order to decreasing scale. The first set of comparisons is of the 130 **OCR** institutions (**NON-PART 3** plus **SURVEY** plus **NO SURVEY**) to the 1,723 **COMPARISON** institutions. This addresses the question as to whether **OCR** is representative of the 1,853-institution universe.

The second set of comparisons is between the 44 **NON-PART 3** institutions and the 86 **PART 3** institutions, with **OCR** (n = 130) treated as the “universe.” These address whether there are differences between the institutions that demonstrate Title IX compliance using Part 1 or Part 2 and those that use Part 3.

The third set of comparisons is between the 57 **SURVEY** institutions and the 29 **NO SURVEY** institutions, with **PART 3** (n = 86) as the universe. These address whether there are differences between the **PART 3** institutions that determine students’ athletic interests and abilities using surveys and those that do not use surveys.

The final set of comparisons, not shown in the above chart, is between the 95 **COMPLAINT** institutions and the 35 **COMPLIANCE MONITORING** institutions, with the 130 **OCR** institutions as the universe. These address whether there are differences between institutions against which a complaint was filed and those which OCR engaged in compliance monitoring in the absence of a complaint.

The comparisons are made using 14 characteristics. These are divided into three groups. The first group, **Institutional Characteristics**, consists of seven characteristics: These are Sector, Geographical Region, Urbanicity, Carnegie Classification, Selectivity, In-State Cost, and Out-of-State Cost. The second group of characteristics, **Student Body Demographics**, contains four characteristics of the student body: These are Enrollment:, Percent Female:, Percent Black and: Percent Out-of-State. The third group, **Athletic Program Characteristics**, contains three characteristics: Association Membership, Football, and Number of Sports. Complete details describing the full set of characteristics are given in appendix B.

The final tabulations report changes over time in the use of Part 3 and of a student interest survey in using Part 3.

The data used in the comparisons were taken from extracts from the Integrated Postsecondary Education Data System (IPEDS). All IPEDS data pertain to the 2002-2003 academic year. The decision to use this single year, even though the OCR cases span the period 1992-2002, was made for simplicity and consistency.

The tables discussed in the chapter are only those involving characteristics for which there is a statistically significant difference between the two groups compared. The complete set of 56 tables is included in appendix C.

2.2 Results

2.2.1 Comparisons Between OCR and COMPARISON

The tables below compare **OCR** to **COMPARISON** institutions according to 14 selected institutional characteristics. Only statistically significant results ($p < .01$) are reported here. For categorical characteristics, we performed standard Pearson Chi-squared tests to check the significance of the effect (non-independence of the characteristics). In cases where the cell counts were such that the Chi-squared test might be suspect, we used a Monte Carlo simulation based p -value computed by drawing random samples from the set of all contingency tables with given marginal totals. For numerical characteristics, including percentages, we performed standard two-sided t -tests for differences in means.

Table 2.1 summarizes the comparisons of **OCR** to **COMPARISON** for the 14 institutional characteristics. There are nine highly significant differences: Sector, Region, Carnegie Classification, In-State Cost, Enrollment, Percent Female, Association Membership, Football and Number of Sports. There are no moderately

significant differences. Finally, there are no significant differences with respect to Urbanicity, Selectivity, Out-of-State Cost, Percent Black or Percent Out-of-State.

Table 2.1: Results of statistical tests comparing OCR to COMPARISON.

Characteristic	OCR Compared to COMPARISON	Full Results in
Sector	p < .001	Table 2.2
Region	p < .001	Table 2.3
Urbanicity	NS	
Carnegie	p < .001	Table 2.4
Selectivity	NS	
Out-of-State Cost	NS	
In-State Cost	p < .001	Table 2.5
Enrollment	p < .001	Table 2.6
Percent Female	p < .001	Table 2.7
Percent Black	NS	
Percent Out-of-State	NS	
Association Membership	p < .001	Table 2.8
Football	p < .001	Table 2.9
Number of Sports	p < .001	Table 2.10

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Institutional Characteristics

Sector. Table 2.2 shows that “Public, 4-year or above” institutions are over- represented in **OCR**.

Table 2.2: Tabular summary comparing OCR to COMPARISON for the characteristic Sector.

Sector	OCR		COMPARISON	
	Number	Percent	Number	Percent
Public, 4-year or above	71	54.62	453	26.29
Private nonprofit, 4-year or above	32	24.62	801	46.49
Private for-profit, 4-year or above	0	0.00	6	0.35
Public, 2-year	27	20.77	436	25.30
Private nonprofit, 2-year	0	0.00	20	1.16
Private for-profit, 2-year	0	0.00	7	0.41
Total	130	100.00	1,723	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Geographical Region. Table 2.3 shows that there is over-representation of “Southeast” and “Far West” in **OCR**.

Table 2.3: Tabular summary comparing OCR to COMPARISON for the characteristic Region.

Region	OCR		COMPARISON	
	Number	Percent	Number	Percent
New England	8	6.15	128	7.43
Mid East	12	9.23	342	19.85
Great Lakes	14	10.77	265	15.38
Plains	14	10.77	226	13.12
Southeast	44	33.85	413	23.97
Southwest	7	5.38	161	9.34
Rocky Mountains	9	6.92	53	3.08
Far West	22	16.92	125	7.25
Other	0	0.00	10	0.58
Total	130	100.00	1,723	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Carnegie Classification. Table 2.4 shows that there is over-representation of the two “Doctoral/Research” categories in **OCR**, and under-representation of “Baccalaureate.”

Table 2.4: Tabular summary comparing OCR to COMPARISON for the characteristic Carnegie Classification.

Carnegie Classification	OCR		COMPARISON	
	Number	Percent	Number	Percent
Doctoral/Research Universities--Extensive	28	21.54	120	7.13
Doctoral/Research Universities--Intensive	14	10.77	79	4.70
Masters Colleges and Universities I	46	35.38	395	23.48
Masters Colleges and Universities II	3	2.31	90	5.35
Baccalaureate Colleges--Liberal Arts	5	3.85	190	11.30
Baccalaureate Colleges--General	7	5.38	260	15.46
Baccalaureate/Associates Colleges	0	0.00	23	1.37
Associates Colleges	27	20.77	465	27.65
Other	0	0.00	60	3.57
Total	130	100.00	1,682	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

NOTE: Total number of cases is 1,682 rather than 1,723 because of missing values.

In-State Cost. Table 2.5 shows that **COMPARISON** institutions are more expensive.

Table 2.5: Tabular summary comparing OCR to COMPARISON for the characteristic In-State Cost.

In-State Cost	OCR	COMPARISON
Mean	7,194.35	10,177.50
Standard deviation	7,412.00	8,009.88
Minimum	432	0
25th percentile	2,668	3,084
Median	4,122	6,812
75th percentile	8,154.50	16,685
Maximum	28,965	30,330
N/A	0	8
n	130	1,723

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Student Body Demographics

Enrollment. Table 2.6 shows that **OCR** institutions are larger than **COMPARISON** institutions.

Table 2.6: Tabular summary comparing OCR to COMPARISON for the characteristic Enrollment.

Enrollment	OCR	COMPARISON
Mean	10,910.10	4,769.75
Standard deviation	9,451.16	6,004.96
Minimum	588	53
25th percentile	3,203.50	1,367.50
Median	8,996.50	2,546
75th percentile	14,208.75	5,497.50
Maximum	41,617	48397
N/A	130	1,723

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Percent Female. Table 2.7 contains the tabular summary for this characteristic. Unlike **COMPARISON**, **OCR** does not contain any all-female institutions. Excluding these would have no effect on the analyses.

Table 2.7: Tabular summary comparing OCR to COMPARISON for the characteristic Percent Female.

Percent Female	OCR	COMPARISON
Mean	56.10	58.50
Standard deviation	6.01	11.67
Minimum	30.82	0.00
25th percentile	52.51	53.90
Median	56.82	58.28
75th percentile	60.10	63.01
Maximum	71.96	100.00
N/A	0	1
n	130	1,723

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Athletic Program Characteristics

Association Membership. Table 2.8 shows that **OCR** contains relatively more NCAA members than does **COMPARISON** institutions.

Table 2.8: Tabular summary comparing OCR to COMPARISON for Association Membership.

Association Membership	OCR		COMPARISON	
	Number	Percent	Number	Percent
NCAA only	96	73.85	922	53.51
NAIA only	6	4.62	278	16.13
NJCAA only	12	9.23	500	29.02
Multiple associations	1	0.77	23	1.33
None	15	11.54	0	0.00
Total	130	100.00	1,723	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Football. Table 2.9 shows that the prevalence of football is significantly higher in **OCR** than in **COMPARISON** institutions.

Table 2.9: Tabular summary comparing OCR to COMPARISON for the characteristic Football.

Football	OCR		COMPARISON	
	Number	Percent	Number	Percent
Yes	86	66.15	622	36.10
No	44	33.85	1,101	63.90
Total	130	100.00	1,723	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Number of Sports. Table 2.10 shows that relatively more **OCR** than **COMPARISON** institutions are conference members for all four (baseball, basketball, cross country/track, football) sports.

Table 2.10: Tabular summary comparing OCR to COMPARISON for the characteristic Number of Sports.

Number of Sports	OCR		COMPARISON	
	Number	Percent	Number	Percent
0	27	20.77	512	29.72
1	0	0.00	58	3.37
2	2	1.54	195	11.32
3	34	26.15	428	24.84
4	67	51.54	530	30.76
Total	130	100.00	1,723	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Discussion. There are eight highly significant differences between **OCR** and **COMPARISON** institutions: Sector, Region, Carnegie Classification, In-State Cost, Enrollment, Association Membership, Football and Number of Sports. Three characteristics of the data appear to explain most of the significant differences.

First, the over-representation of “Public, 4-year or above” and institutions Carnegie classification “Doctoral/Research Universities--Extensive” in **OCR** results from the presence of 18 major state universities in **OCR**. This encompasses the differences in Sector, Carnegie Classification, In-State Cost Enrollment, Association Membership, Football and Number of Sports. More specifically, these 18 institutions represent 14 percent of **OCR**, while a conservative estimate of the prevalence of comparable institutions in **COMPARISON** is 5 percent (85 of 1,723). We do not attempt to explain this concentration, although the scale and visibility of such institutions may be a factor.

Second, **Region** is strongly influenced by the “cluster” of 10 **OCR** cases involving community colleges in North Carolina.

2.2.2 Comparisons of PART 3 to NON-PART 3

This section addresses differences between the 86 **PART 3** institutions and the 44 **NON-PART 3** institutions.

Table 2.11 contains the comparisons of **PART 3** to **NON-PART 3** for the 14 institutional characteristics. There are only two highly significant differences: Out-of-State Cost and Percent Black. There are five moderately significant differences: Carnegie Classification, Enrollment, Percent Female, Percent Out-of-State, and Association Membership. There is no statistically significant difference with respect to Sector, Region, Urbanicity, Selectivity, In-State Cost, Football or Number of Sports.

Table 2.11: Results of statistical tests comparing PART 3 to PARTS 1 AND 2.

Characteristic	PART 3 Compared to NON-PART 3	Full Results in
Sector	NS	
Region	NS	
Urbanicity	NS	
Carnegie	.001 < p < .01	Table 2.12
Selectivity	NS	
Out-of-State Cost	p < .001	Table 2.13
In-State Cost	NS	
Enrollment	.001 < p < .01	Table 2.14
Percent Female	.001 < p < .01	Table 2.15
Percent Black	p < .001	Table 2.16
Percent Out-of-State	.001 < p < .01	Table 2.17
Association Membership	.001 < p < .01	Table 2.18
Football	NS	
Number of Sports	NS	

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Institutional Characteristics

Carnegie Classification. Table 2.12 shows that “Doctoral/Research Universities- - Extensive” are over-represented in **NON-PART 3**, while “Associates Colleges” are over-represented in **PART 3**.

Table 2.12: Tabular summary comparing PART 3 to NON-PART 3 for Carnegie Classification.

Carnegie Classification	PART 3		NON-PART 3	
	Number	Percent	Number	Percent
Doctoral/Research Universities--Extensive	11	12.79	17	38.64
Doctoral/Research Universities--Intensive	10	11.63	4	9.09
Masters Colleges and Universities I	32	37.21	14	31.82
Masters Colleges and Universities II	1	1.16	2	4.55
Baccalaureate Colleges--Liberal Arts	4	4.65	1	2.27
Baccalaureate Colleges--General	4	4.65	3	6.82
Baccalaureate/Associates Colleges	0	0.00	0	0.00
Associates Colleges	24	27.91	3	6.82
Total	86	100.00	44	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Out-of-State Cost. Table 2.13 shows that **NON-PART 3** institutions are more expensive than **PART 3**.

Table 2.13: Tabular summary comparing PART 3 to NON-PART 3 for Out-of-State Cost.

Out-of-State Cost	PART 3	NON-PART 3
Mean	10,562.21	14,940.77
Standard deviation	5,501.64	6,551.51
Minimum	432	3,150
25 th percentile	6,332.50	10,957
Median	9,797	14,348
75 th percentile	13,151	18,456.50
Maximum	28,209	28,965
N/A	86	44

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Student Body Demographics

Enrollment. Table 2.14 shows that **NON-PART 3** institutions are larger than **PART 3**.

Table 2.14: Tabular summary comparing PART 3 to NON-PART 3 for Enrollment.

Enrollment	PART 3	NON-PART 3
Mean	8,764.27	15,104.23
Standard deviation	7,444.25	11,455.11
Minimum	592	588
25 th percentile	2,821	6,282
Median	6,425	13,122.50
75 th percentile	12,275	21,694.50
Maximum	35,667	41,617
N/A	86	44

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Percent Female. Table 2.15 shows that **PART 3** institutions have a greater percentage female than do the others.

Table 2.15: Tabular summary comparing PART 3 to NON-PART 3 for Percent Female.

Percent Female	PART 3	NON-PART 3
Mean	57.19	53.95
Standard deviation	5.78	5.92
Minimum	43.22	30.82
25th percentile	53.50	50.65
Median	57.66	53.53
75th percentile	60.84	58.12
Maximum	71.96	65.49
N/A	86	44

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Percent Black. Table 2.16 shows that the percentage of Black students is higher at **PART 3** institutions than at **NON-PART 3** institutions.

Table 2.16: Tabular summary comparing PART 3 to NON-PART 3 for Percent Black.

Percent Black	PART 3	NON-PART 3
Mean	15.09	6.75
Standard deviation	19.87	8.52
Minimum	0	0
25th percentile	4	2
Median	8.50	4
75th percentile	18.75	7
Maximum	94	51
N/A	86	44

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Percent Out-of-State. Table 2.17 shows that the percentage of out-of-state students is higher at **NON-PART 3** institutions than at **PART 3** institutions.

Table 2.17: Tabular summary comparing PART 3 to NON-PART 3 for Percent Out-of-State.

Percent Out-of-State	PART 3	NON-PART 3
Mean	17.10	31.68
Standard deviation	18.83	26.48
Minimum	0	0
25th percentile	2.92	8.88
Median	9.64	29.67
75th percentile	25.88	47.21
Maximum	97.05	97.20
N/A	13	4
n	86	44

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Athletic Program Characteristics

Association Membership. Table 2.18 shows that unlike **PART 3**, **NON-PART 3** is composed almost exclusively of “NCAA Only” institutions.

Table 2.18: Tabular summary comparing PART 3 to NON-PART 3 for Association Membership.

Association Membership	PART 3		NON-PART 3	
	Number	Percent	Number	Percent
NCAA only	55	63.95	41	93.18
NAIA only	6	6.98	0	0.00
NJCAA only	12	13.95	0	0.00
Multiple associations	1	1.16	0	0.00
None	12	13.95	3	6.82
Total	86	100.00	44	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Discussion. A higher proportion of **PART 3** users are public, 2 year colleges, whose highest degree is an associates degree, are located in the Southeast, tend to have cheaper in-state and out-of-state tuition, and have both smaller enrollments and a smaller proportion of out-of-state enrollments than Parts 1 and 2 institutions. They are likely to have a higher proportion of females and a substantially higher proportion of Blacks.

NON-PART 3 using institutions are more likely to belong exclusively to the NCAA, are slightly more likely to have football, and are less likely to have no sports, while being more likely to have four sports.

2.2.3 Comparisons of SURVEY to NO SURVEY

This section compares the 57 **SURVEY** institutions to the 29 **NO SURVEY** institutions. None of the differences is statistically significant.

Discussion. Although none of these is statistically significant, **SURVEY** institutions average higher in and out-of-state tuition, are slightly more likely to be private nonprofits, 4 years or above, and somewhat less likely to be public institutions of a similar type than **NO SURVEY** institutions. Virtually all the **NO SURVEY** institutions are in the Southeast, while **SURVEY** institutions are scattered more evenly across the U.S. **NO SURVEY** institutions are likely to be larger than **SURVEY** institutions.

2.2.4 Comparisons of COMPLAINT to COMPLIANCE MONITORING

This section compares the 95 **COMPLAINT** institutions to the 35 **COMPLIANCE MONITORING** institutions.

Table 2.19 summarizes the comparisons of **COMPLAINT** to **COMPLIANCE MONITORING** for the 14 institutional characteristics. Only one of the differences, namely Region, is statistically significant.

Table 2.19: Results of statistical tests comparing COMPLAINT to COMPLIANCE MONITORING.

Characteristic	COMPLAINT Compared to COMPLIANCE MONITORING	Full Results in
Sector	NS	
Region	p < .001	Table 2.20
Urbanicity	NS	
Carnegie	NS	
Selectivity	NS	
Out-of-State Cost	NS	
In-State Cost	NS	
Enrollment	NS	
Percent Female	NS	
Percent Black	NS	
Percent Out-of-State	NS	
Association Membership	NS	
Football	NS	
Number of Sports	NS	

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Institutional Characteristics

Region. Table 2.20 contains the tabular summary for this characteristic. There is a dramatically high number of **COMPLAINT** institutions in “Southeast” (42 versus 24 percent).

Table 2.20: Tabular summary comparing COMPLAINT to COMPLIANCE MONITORING for Region.

Region	COMPLAINT		COMPLIANCE MONITORING	
	Number	Percent	Number	Percent
New England	4	4.21	4	11.43
Mid East	10	10.53	2	5.71
Great Lakes	11	11.58	3	8.57
Plains	12	12.63	2	5.71
Southeast	40	42.11	4	11.43
Southwest	4	4.21	3	8.57
Rocky Mountains	3	3.16	6	17.14
Far West	11	11.58	11	31.43
Total	95	100.00	35	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Discussion. While there are small differences between **COMPLAINT** and **COMPLIANCE MONITORING**, the former has a substantially disproportionate representation of institutions located in the Southeast.

2.3 Time Effects in the Use of Part 3 and Non-Part 3

Table 2.21 shows the start dates of the 130 OCR cases, classified with respect to **NON-PART 3, SURVEY** or **NO SURVEY**. There is an evident peak in 1993, with a secondary peak in 1999. There is also some evidence that surveys seem to be increasingly common over time. In particular, the fraction of **PART 3** institutions belonging to **SURVEY** increases over time, as shown in Table 2.22.

Table 2.21: Number of OCR cases, by start year.

Start Year	NON-PART 3	SURVEY	NO SURVEY	Total
1988			1	1
1989	2	2		4
1990	1	1	1	3
1991	4	3	1	8
1992	8	5	2	15
1993	8	9	12	29
1994	7	3	5	15
1995	2	3	1	6
1996	4	3	4	11
1997	2	3		5
1998	2	7		9
1999	1	11	1	13
2000	2	4	1	7
2001		3		3
2002	1			1

Source: OCR files provided to NISS.

Table 2.22 shows the percentage of **PART 3** cases belonging to **SURVEY** as a function of time. Despite fluctuations arising from small numbers, the prevalence of surveys among **PART 3** institutions has increased over time.

Table 2.22: Percentage of PART 3 cases for which surveys were conducted, by start year.

Year	SURVEY as a Percentage of PART 3
1988	0
1989	100
1990	50
1991	75
1992	71
1993	43
1994	38
1995	75
1996	43
1997	100
1998	100
1999	92
2000	80
2001	100
2002	N/A

Source: OCR files provided to NISS.

Table 2.23 shows the end dates of the OCR cases. The 1993 peak in start dates appears to translate to the 1995 peak in end dates.

Table 2.23: End years of the OCR cases.

Year	NON-PART 3	SURVEY	NO SURVEY	Total
1989			1	1
1990	1	1		2
1991	1	1		2
1992	2	2		4
1993	5	6	4	15
1994	10	7	3	20
1995	7	6	14	27
1996	7	2	4	13
1997	2	3	1	6
1998	3	4		7
1999		11	1	12
2000	3	7	1	11
2001	2	4		6
2002		3		3
2003	1			1

Source: OCR files provided to NISS.

Table 2.24 shows the duration of OCR cases by type. Non-systematic study of the OCR files indicates that protracted cases are those in which evidence provided by the institution is either inadequate or unacceptable to OCR. There is mild but not statistically significant evidence that **SURVEY** cases are resolved more rapidly than **NO SURVEY** cases. Otherwise, there do not seem to be any noteworthy effects.

Table 2.24: Durations (see note) of OCR cases.

Duration (years)	NON-PART 3	SURVEY	NO SURVEY	Total
0	6	14	7	27
1	20	28	9	57
2	12	11	10	33
3	3	3	3	9
4	3	1		4

Note: Duration is defined as the difference between the start year and the end year.

Source: OCR files provided to NISS.

Chapter 3: The Data Collection Instruments

When an institution employs Part 3, there is the issue of precisely how it establishes that “interests and abilities of the members of that sex have been fully and effectively accommodated by the present program.” Chapter 2 showed that the most common means of doing so is to collect data from students regarding whether the current program satisfies their interests and abilities.

Fifty-two of the OCR files contained data collection instruments.² These instruments themselves constitute the data on which chapter 3 is based. The 52 instruments and associated OCR cases were classified along 20 categorical dimensions. Appendix D contains a full list and description of these dimensions.

The first class consists of properties of the survey itself. These are:

- Whether the case is the result of a complaint against the institution or routine monitoring activities of OCR.
- The target population that the data are intended to characterize, which may consist of the entire student body, only females or some other group. This is the group whose interests and abilities the survey purports to describe.
- The respondent selection mechanism, which we translate into whether there is explicit selection of a subset of the target population or whether the data collection is conceptually meant to be a census.
- The degree of proactivity in conducting the data collection, as best it could be determined from the files. This is the extent to which the institution exerted effort to secure a reasonable response rate. As discussed below, the most positive thing that can be said is that proactive institutions were less unsuccessful than others in this respect.

The second set of dimensions consists largely of characteristics of the data collection instrument. Most of these are the presence or absence of specific kinds of questions:

- Age: are respondents asked their age?
- Class: are respondents asked which class (freshman, ...) they are a member of?
- Gender: are respondents asked their gender?
- Spectator interest: are respondents asked about their interest as spectators, either in person or via television or radio, of athletic events?
- Attitudes about athletics: are respondents asked explicitly about their attitudes regarding athletics in general or intercollegiate athletics?
- Opinion about the institution’s athletic programs: are respondents asked explicitly for opinions regarding the institution’s athletic programs (as opposed to implicit

² There were five OCR case files that did not contain an instrument despite being recorded as having carried out a survey.

- questions associated with whether their personal interests and abilities are satisfied)?
- Identifying information: are respondents asked for information that identifies them?
 - Ability: are respondents asked explicitly about their athletic ability?
 - Recruiting: are respondents asked whether they had been recruited as athletes by a postsecondary institution?

Three of the dimensions are global characteristics of the instrument:

- Caveats and benefits: are questions regarding intercollegiate athletics (especially, but also possibly other forms) accompanied by a statement of the potential disadvantages (for example, time spent in practice or missed classes) and advantages (for example, financial aid)?
- Reasons for the survey: are respondents told why the survey is being conducted?
- Statement of confidentiality: are respondents promised explicitly that their responses will be kept confidential?

The final four dimensions concern how athletic interest, experience, and ability are represented in the data collection instrument. Because this is central to the discussion of how such a survey should be conducted, which is the subject of chapter 5, we elaborate at this point.

Focusing for concreteness on interest (exactly the same considerations apply to experience and ability), the most efficient and accurate way of representing the information is quite clear: there is a matrix, shown in figure 3.1, of “sports across level of interest.” Because the nature of the question is “What is your level of interest in each sport?” the conceptual map, as in figure 3.1, has rows corresponding to sports and columns corresponding to levels of interest. Respondents are being asked to select a column representing their level of interest for each row.

These selections are the heart of the data collection. The most substantive differences among the data collection instruments are how they operationalize such matrices. These differences are of two kinds. The first is how sports are represented, which occurs in the instruments three ways:

- By fixed entries (e.g., archery, baseball, basketball, ...) in the “Sport” column.
- By blank entries in the “Sport” column, in which respondents are asked to write in the names of sports for which they wish to provide information.
- By blank entries in the “Sport” column, into which respondents are to place numerical codes for sports of interest, which are listed elsewhere in the instrument.

The second difference is the number of levels, which ranges from one nonzero level of interest to ten levels.

Therefore, the final four characteristics are:

- For interest, representation of sports;
- For interest, number of levels;
- For experience, representation of sports;
- For experience, number of levels.

We do not do the same for ability because, despite the explicit mention of ability in Part 3, relatively few data collection instruments ask specifically about it. Instead, most use experience as a surrogate for ability.

Figure 3.1: Conceptual map of matrix of sports cross levels of interest.

	Level of interest				
Sport	None	Mild	Moderate	Strong	Overwhelming
Sport 1					
...					
Sport n					

SOURCE: NISS

In section 3.2, we list a number of items excerpted from the data collection instruments. These are classified as effective, problematic, or simply puzzling. There is a strong element of judgment in this classification. Because the focus is on items and not institutions, we do not identify the instruments to which individual items belong.

Finally, section 3.3 discusses a number of issues that seem to span all the data collections. For example, none of them has response rates that satisfy NCES standards (U.S.DOE, 2003), and, as least insofar as can be determined from the OCR files, there are no principled treatments of the results as statistical estimates accompanied by uncertainties.

We note that the nature of the data collection and the items indicates that detailed psychometric item-level analysis is not needed (Converse and Presser, 1989 and Miller and Salkind, 2002 are representative references). As described in section 3.3, there are few examples where item wording appears to affect responses and fewer instances where item wording seems to be designed to engender particular responses. All items appear to be equally comprehensible to identifiable groups of students. Even students with effectively no athletic interest or experience seem, as a matter of broad culture, likely to understand the concepts and terms. However, there are, as noted in section 3.2.3, some items that might be incomprehensible to anyone.

There is, however, one possible exception to this. Several of the instruments contain language and implicit assumptions that foreign students may not be able to cope with. These pertain to the nature of athletic programs in both secondary and postsecondary institutions in the U.S. While many of the **OCR** institutions have no or small numbers of foreign undergraduates, the same is not true of the “major” **OCR** institutions.

3.1 Characteristics of the Data Collections and Instruments

All data in the tables in this section are drawn from the OCR files provided to NISS. For consistency with earlier chapters, we denote by **INSTRUMENT** the subset of 52 **SURVEY** institutions whose files contained copies of the data collection instrument.

Case and Survey Characteristics

Complaint: Table 3.1 shows the origins of the **INSTRUMENT** institutions as either “Complaint = Yes” or “Complaint = No”.

Table 3.1: Classification of the origin of the cases for INSTRUMENT institutions.

Complaint?	Number	Percent
Yes	37	71.2
No	15	28.8
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Among the 67 institutions using Part 3, 44 cases originated with a complaint.

Target Population: Table 3.2 classifies the 52 data collections according to the target population, which may be the entire student body, female students only (the “under-represented sex”) or another group. The most common but still infrequent example of the latter is a group of potential students such as applicants or campus visitors. Two findings of note are 1) more than one-half of the data collections targeted both female and male students, and 2) fewer than five of the 52 data collections made any attempt to reach target populations larger than the student body, usually by embedding the data collection in a campus tour.

Table 3.2: Target populations for data collections conducted by the INSTRUMENT institutions.

Target Population	Number	Percent
Student Body	29	55.8
Females	20	38.5
Other/Could not determine	3	5.8
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Respondent Selection: Table 3.3 shows the respondent selection mechanisms for the conducted by the **INSTRUMENT** institutions. Nearly two-thirds of the data collections are at some level attempts to reach the entire target population, which here we term “censuses.” We note, however, that “census” is used in a looser sense here than in chapter 5. Here, it means that any member of the target population could have responded, and not—as in chapter 5—that all members of this population (which in chapter 5 we term the data collection population) were individually contacted and requested to respond.

Those data collections that were sample surveys usually sampled students in particular classes, as opposed to selecting a random sample of students. In some cases, the classes seem to have been chosen in some sense to over-sample students with an *a priori* interest in athletics. Examples are physical education and similar classes. The use of classes also may be intended to improve response rates, especially if the instrument is to be completed during class time with the instructor present.

Table 3.3: Respondent selection mechanisms in data collections conducted by the INSTRUMENT institutions.

Respondent Selection	Number	Percent
Census	34	65.4
Survey	9	17.3
Could not determine	9	17.3
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Proactivity: Table 3.4 shows the level of proactivity, as best could be determined from the files, of the data collections conducted by the **INSTRUMENT** institutions. There is discernible proactivity in fewer than one-fifth of the data collections. A typical data collection with no proactivity would be a paper form available in a central place, asking students to “Please complete and return this form.” Proactive approaches included incentives (tee shirts, for example, given to respondents) and various forms of non-response follow-up.

Table 3.4: Level of proactivity in data collections conducted by the INSTRUMENT institutions.

Proactivity	Number	Percent
Yes	9	17.3
No	31	59.6
Could not determine	12	23.1
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Response rate: Table 3.5 shows response rates in the data collections conducted by the **INSTRUMENT** institutions. One-half (26 of 52) of the files did not contain sufficient information to determine a response rate. Some of these did contain the number of responses, but not the number of students asked to respond. None of the response rates exceeded the NCES standard of 75% for censuses (U.S.DOE 2003), and only 6 (11%) even exceeded 50%. Despite the fact that the kind of non-response bias analysis described in section 5.5.3 is necessary on the basis of good statistical practice, there is no evidence that any of the **INSTRUMENT** institutions conducted or even contemplated performing one. On the contrary, some descriptions of the results incorrectly assert that response rates below 50% yield statistically valid estimates in the absence of non-response bias analyses.

Table 3.5: Response rates in data collections conducted by the INSTRUMENT institutions.

Response Rate	Number	Percent
< 10%	5	9.6
10-25%	6	11.5
26-50%	9	17.3
51-75%	6	11.5
> 75 %	0	0.0
Insufficient Information	26	50.0
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Instrument Characteristics

We first deal with three dimensions associated with questions about respondent demographics.

Age: Table 3.6 categorizes the data collections conducted by the **INSTRUMENT** institutions according to whether respondents were asked for their age. This might be relevant to institutions that attract many older or returning students, who may not have the ability to engage in varsity athletics.

Table 3.6: Whether respondents asked their age in data collections conducted by INSTRUMENT institutions.

Age Asked?	Number	Percent
Yes	38	73.1
No	14	26.9
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Class: Table 3.7 categorizes the data collections conducted by the **INSTRUMENT** institutions according to whether respondents were asked for their class. The form in which this information was asked showed some variation that reflects the nature of institutions. The most common forms were the “traditional” classes (freshman, sophomore, junior, senior) and the number of credit hours completed.

Table 3.7: Whether respondents asked their class in data collections conducted by the INSTRUMENT institutions.

Class Asked?	Number	Percent
Yes	36	69.2
No	16	30.8
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Gender: Table 3.8 categorizes the data collections conducted by the **INSTRUMENT** institutions according to whether respondents were asked for their gender. The “N/A” category represents institutions in which the target population was females and the question was not present. A number of institutions whose target population was females asked the question despite this restriction.

Table 3.8: Whether respondents asked their gender in data collections conducted by the INSTRUMENT institutions.

Gender Asked?	Number	Percent
Yes	36	69.2
No	7	13.5
N/A	9	17.3
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Spectator interest: Table 3.9 classifies the data collections conducted by the **INSTRUMENT** institutions according to whether respondents were asked their interest as athletic spectators (either in person or via television or radio). While the purpose of doing so is unclear, such questions were present in nearly 20 percent of the instruments. Possibly the institutions were simply attempting to gather additional information. It is also possible that the institutions were attempting to broaden the definition of “satisfied interest.”

Table 3.9: Whether respondents asked their interest as athletic spectators in data collections conducted by the INSTRUMENT institutions.

Spectator Interest	Number	Percent
Yes	10	19.2
No	42	80.8
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Attitudes about athletics: Table 3.10 shows that a small number of **INSTRUMENT** institutions asked respondents explicitly about their attitudes regarding either athletics in general or intercollegiate athletics.

Table 3.10: Whether respondents asked about their general attitudes toward (intercollegiate) athletics in data collections conducted by the INSTRUMENT institutions.

Attitudes Toward Athletics	Number	Percent
Yes	5	9.6
No	47	90.4
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Opinion about the institution’s athletic programs: Table 3.13 shows that nearly one-half of the data collection instruments asked respondents explicitly for opinions regarding

the institution’s athletic programs. This seems to be an attempt to ask directly whether interests and abilities are satisfied. This is in contrast to implicit questions associated with whether their personal interests and abilities are satisfied, for example, that desire for further participation in activities not currently offered represents unsatisfied interest.

Table 3.11: Whether respondents asked explicitly about their opinions of the institution’s athletic programs in data collections conducted by the INSTRUMENT institutions.

Opinions about Institution’s Athletic Programs	Number	Percent
Yes	22	42.3
No	30	57.7
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Identifying information: Table 3.12 shows that a number of institutions asked respondents for information that identifies them. In some cases, the intrusiveness was extreme: social security numbers, student ID numbers and telephone numbers. No information was available from the files to determine how often such requests were refused. In cases where the information was optional, it was usually for students who wished to be contacted regarding their athletic interests.

Table 3.12: Whether respondents asked to provide identifying information in data collections conducted by the INSTRUMENT institutions.

Identifying Information	Number	Percent
Yes	9	17.3
No	40	76.9
Optional	3	5.8
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Ability: Table 3.13 shows that, despite the explicit reference in Part 3 to “interests and abilities,” fewer than one-third of the data collection instruments asked respondents explicitly about their athletic ability. These institutions asked respondents to assess their own ability, which is confirmed by the item wording in the surveys that did request ability (see also section 3.2). The predominant practice, instead, was to take high school or previous (intra- or inter-) collegiate athletic experience as a surrogate for ability. Clearly this raises issues of its own, especially the enormous variation among high school programs: varsity at one high school may be the equivalent of intramural at another.

Table 3.13: Whether respondents asked explicit questions regarding their athletic ability in data collections conducted by the INSTRUMENT institutions.

Explicit Questions about Athletic Ability	Number	Percent
Yes	16	30.8
No	36	69.2
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Recruiting: Table 3.14 shows that some data collections conducted by the INSTRUMENT institutions asked respondents whether they had been recruited as athletes by a postsecondary institution (not necessarily the one at which they were enrolled). The motivation for this is not entirely clear, although it may be another surrogate for ability.

Table 3.14: Whether respondents asked whether they had been recruited as athletes by some postsecondary institution in data collections conducted by the INSTRUMENT institutions.

Recruited as Athlete?	Number	Percent
Yes	9	17.3
No	43	82.7
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Caveats and benefits: Table 3.15 shows that in approximately one-quarter of the data collections conducted by the INSTRUMENT institutions, questions regarding intercollegiate athletics were accompanied by a statement of the potential disadvantages (for example, time spent in practice or missed classes) and advantages (for example, financial aid) of participation. As noted in section 3.2, there is a commonly used and essentially neutral statement that does not seem either intended or likely to influence responses.

A small but not insignificant number of instruments asked those who indicating no interest in athletic participation to list the reasons(s). The most common form of doing this was to provide a list of possible reasons, with the respondent to check those that apply. While this information may be interesting, it is not clear that it is relevant to Part 3.

Table 3.15: Whether respondents were provided caveats and benefits concerning athletic participation in data collections conducted by the INSTRUMENT institutions.

Caveats and Benefits about Athletics?	Number	Percent
Yes	15	28.8
No	37	71.2
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Reasons for the survey: Table 3.16 shows that in fewer than one-third of data collections conducted by the **INSTRUMENT** institutions were respondents given any information regarding why the data collection was being conducted. There are understandable and legitimate reasons why an institution might wish not to reveal (although one did) that it is the subject of an OCR case, but it is both unfair to respondents and detrimental to response rates to simply say “Please fill out this form.”

Table 3.16: Whether respondents were provided any explanation of reasons for data collections conducted by the INSTRUMENT institutions.

Explanation of Reasons for Data Collection?	Number	Percent
Yes	16	30.8
No	36	69.2
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Statement of confidentiality: Table 3.17 shows that in fewer than one-sixth of the data collections conducted by the **INSTRUMENT** institutions were respondents promised explicitly that their responses would be kept confidential. It is not possible to determine whether this is an oversight or that the responses in fact would not be kept confidential. In either case, the effect on response rates is likely to be negative.

Table 3.17: Whether respondents were provided any assurance of confidentiality in data collections conducted by the INSTRUMENT institutions.

Confidentiality Statement?	Number	Percent
Yes	8	15.4
No	44	84.6
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

To conclude this section, we address the representation of sports and number of levels for interest and experience.

Interest—representation of sports: Table 3.18 shows the representation of sports with respect to interest in data collections conducted by the **INSTRUMENT** institutions. The clear preference, especially among smaller institutions, was “fixed entries.”

Table 3.18: Representation of sports with respect to interest in data collections conducted by the INSTRUMENT institutions.

Interest—Representation of Sports	Number	Percent
Fixed entries	34	65.4
Write in entries	10	19.2
Codes for entries	4	7.7
Other/Could not determine	4	7.7
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Interest—number of levels: Table 3.19 shows the number of levels of interest (for each sport) in data collections conducted by the **INSTRUMENT** institutions. The dominant practice is to offer simply one (non-zero) level of interest.

Table 3.19: Number of levels of interest (for each sport) in data collections conducted by the INSTRUMENT institutions.

Interest—Number of Levels	Number	Percent
1	25	48.1
2	3	5.8
3	8	15.4
4	8	15.4
5 or more	5	9.6
Could not determine	3	5.8
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Experience—representation of sports: Table 3.20 shows the representation of sports with respect to experience in data collections conducted by the **INSTRUMENT** institutions. The difference from the representation of interest, with a strong shift to “Write-in entries,” is dramatic.

Table 3.20: Representation of sports with respect to experience in data collections conducted by the INSTRUMENT institutions.

Experience—Representation of Sports	Number	Percent
Fixed entries	17	32.7
Write in entries	19	36.5
Codes for entries	6	11.5
Other/Could not determine	10	19.4
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

Experience—number of levels: Table 3.21 shows the number of levels of experience (for each sport) in data collections conducted by the **INSTRUMENT** institutions. Three

levels (usually, recreational, high school intramural and high school interscholastic) are most common.

Table 3.21: Number of levels of experience (for each sport) in data collections conducted by the INSTRUMENT institutions.

Experience—Number of Levels	Number	Percent
1	9	17.3
2	8	15.4
3	11	21.2
4	6	11.5
5 or more	8	15.4
Could not determine	10	19.2
Total	52	100.0

SOURCE: NISS analysis of OCR data collection instruments.

3.2 Notable Items

In this section we list and comment on, without identifying specific sources, individual items from the data collection instruments that seem either especially effective or especially problematic. We also note some items that are simply baffling.

No single instrument was free of potentially major shortcomings.

3.2.1 Effective Items

Only a minority of data collection instruments contained direct questions about whether interests are being met. Examples are:

- “Are your desires for participation in [recreational, intramural, intercollegiate, club] sports met at XXX?”
- “Regardless of whether or not you are a student-athlete at XXX, are your desires for competition at the college level being met by the current offerings of intercollegiate sports at XXX?”

The advantage of these questions is that they speak directly to the requirement in Part 3 that institutions “demonstrate that the interests and abilities of the members of that sex have been fully and effectively accommodated by the present program,” as opposed to inferring the answer from the answers to other questions.

Also as discussed in section 3.1, many (15 of 52), albeit a minority, of the instruments contained statements of caveats and benefits associated with participation in intercollegiate athletics. The following statement, which can be improved, because it mixes up advantages and disadvantages, appeared in several of the instruments:

- “Intercollegiate athletics usually requires athletes to devote 20 hours of practice each week during the season. The athlete is expected to follow an individual regimen of training during the off-season. Many intercollegiate athletes receive financial awards

that cover all or a portion of school expenses. Athletes are required to travel and occasionally miss classes. They are given access to academic support services, including tutoring, counseling and study tables.”

This statement is informative without swaying responses in either direction.

Some instruments were noticeably user friendly, although most were not. Examples of user friendliness include:

- Skips for global “No” answers. An example of this is the question “Did you participate in athletic activities in high school” followed by “If no, skip to ...”
- Guide posts. For example, one instrument states: “Students differ in how much they **follow**, and in how much they actually **participate in**, athletic, fitness and sports activities. The following questions are designed to address your interests.”
- Definitions of responses. While terms such as “varsity letter winner” do not require definitions for most respondents, a small number of instruments did provide definitions. While the prototype instrument in chapter 5 does not do so either, hyperlinks in a web-based instrument can provide access to definitions for those who need it without impeding those who do not.

One instrument provided an opportunity to respond without providing answers: “Thank you, but I do not wish to participate in this study.” While intriguing, this seems unlikely to be an effective means of increasing the response rate.

3.2.2 Problematic Items

These were numerous, but given the ultimately simple nature of the questions, there is no evidence that they produced serious distortion in the results.

Many of the data collection instruments transposed or otherwise distorted the “sport across level of {interest, experience, ability}” matrices discussed in section 3.1. In some cases, sports were columns and levels of interest were rows, which is inconsistent with the conceptual structure of the questions. A more extreme problem was different levels of interest represented by separate questions rather than by columns. In some cases, the matrices appeared in the paper instruments without lines defining the cells, making the responses both difficult to fill in accurately and difficult to extract.

There were two extreme cases. In one, which occurs in the same form in several instruments, respondents were asked, in effect with one sport per set of questions, to provide, each on a scale of 1-10 with no definition of the levels—which clearly do not mean the same thing in all cases:

- “A level of interest
- Willingness to engage in physical fitness conditioning, practice regimens and travel trips for the sport
- Willingness to train during the off-season for the sport
- Willingness to participate in the sport without a scholarship”

In the second, respondents were asked, for ten sports (one sport per question), to respond to “I am interested in the intercollegiate sport of X

- As a spectator /As a participant
- Have you talked to the coach? Yes / No
- Have you tried out? Yes / No

There were numerous problems with scales associated with levels of interest, experience or ability. These include scales with no explanation, one example of which is above, and another example of which is to “Check sports you’re interested in,” without defining “interested in.” Some scales, such as the 10-level scales above, simply have too many levels. One instrument violated both the conceptual structure and psychometric principles by having skill levels that decrease from left to right, making it harder to read.

The use of codes for sports is an extreme form of user unfriendliness. The codes may simplify analysis, but they do so at expense of the respondent (who may need to search for codes on a different page—in one case, the back—of the instrument). In addition, errors may occur during transcription. The most common example, which occurs in several instruments in exactly the same form, is a listing of 78 sports by 2-digit numerical codes that have no inherent or other meaning. Another example is coding of the level of high school participation, with the response to be indicated by filling in “A” if you played the sport at the varsity (or elite) level”, . . . , “E” if you did not play the sport’ for each sport. In the most extreme example, interest and ability were indicated by filling in letters next to sports, with the same levels used for both.

Inexplicably, several instruments force respondents to rank their choices of sports, which is both unnatural and unnecessary. These forced choices unduly constrain individual expressions of interest and, as demonstrated in chapter 5, they are unnecessary. Examples of this are:

- Asking respondents to rank sports by level of interest, separately for intercollegiate, club and intramural participation.
- “Which of the following NCAA sports would be your first choice as an addition to the XXX women’s program (pick only one)”. This is followed by questions asking about past experience and interest in trying *out only for that sport*. The same is then done for a second choice.
- “Check the one intercollegiate sport that you would participate in if offered at XXX.”
- “Rank the THREE sports that you would participate in at XXX if they were offered as an intramural activity.”

Although not uniformly, the instruments rely excessively on free-form responses. This reliance makes analysis unnecessarily complicated or even hopeless. One example of this is free-form entry of sport names. Others are free-form text for experience and free-form lists of reasons why the respondent is not a participant in intercollegiate athletics. There is even one case of free-form entry of gender: “Are you male or female?” And in

cases where free-form responses may at least be defensible, there is often insufficient space. Examples of the latter include:

- Following a global Yes / No response for “Have you ever participated in competitive sports,” the question “If so, which sports, how many years, positions? _____”
- 2.5 inches on one line to list previous athletic experience with 2 inches to list sports
- “Do you plan to participate in intercollegiate athletics at XXX?
_____ Yes (list sport or sports)
_____ No” [check reasons why not]”

Although, as discussed in section 3.2.1, statements of caveats and benefits associated with participation in intercollegiate athletics are necessary and desirable, several instruments embed caveats in individual items, which may influence the responses. Examples of this are:

- “Would you be willing to spend 20 hours per week in structured practice for your sport?”
- “Would you still be interested in participating even if financial aid were not available?”
- Questions asking respondents their reasons for not participating in intercollegiate athletics. There is a “standard” set of about twenty of these that appears in several instruments.

The implicit assumption that collegiate interest cannot exist without high school participation appears in some instruments: questions about collegiate interest are to be skipped if there is no high school participation.

The instruments are rife with superfluous items. One example is “What sports, in your opinion, should be eliminated? _____” Several instruments ask respondents for their race and/or ethnicity, which are often not distinguished correctly. Some ask about living arrangements (on campus, off campus, home, ...).

Many instruments contain questions to which respondents may not know the answers. Examples of such items, most of which are also superfluous, are:

- “Do you know other XXX women students who are interested in participating in intercollegiate athletics at XXX? If so, how many others (approximately) and in which sport(s)?”
- In connection with recruiting, “... were you recruited by a member of the NCAA? the NAIA? Both? If NCAA, a member of Division I? Division II? Division III?”
- “Do you have in interest in participating at the varsity intercollegiate level in any sports not currently offered by XXX” without a list of the sports currently offered.
- “... are you eligible to participate as an intercollegiate athlete?”

Finally, although there are arguments to the contrary, there is widespread forced use of “None” responses in cases where no response clearly means the same thing. For example, this happens for interest in sports, and is particularly burdensome to respondents when there are many sports.

3.2.3 Baffling Items

A number of items in the data collection instruments are simply baffling, in regard to what information is sought, what a meaningful response is, or both.

One such example is the item “From the list below of NCAA sanctioned sports rank the top seven (7) men’s and top seven (7) women’s sports according to your preference. Rate your first choice with a 1 and your last choice with a 7.” Another is a question about multiple sports followed by “If interested, have you competed in this sport at any level?” One instrument contains items whose meaning and responses depend on whether the respondent is male or female, which become almost impossible to analyze. Another instrument states: “Please circle one choice for each item” followed by items with free-form responses.

3.3 Generic Issues

A number of generic issues apply to Part 3 data collections in general.

Uniformly, the response rates are poor. Not all files report the response rates, but as shown in table 3.5, the reported rates range from less than 1 percent to 70 percent. None of these satisfies the NCES statistical standards. The problem posed by low response rates is that non-respondents may systematically differ from respondents, producing biased results.

Coupled with poor response rates is an apparent problem of non-response bias, which in this case works to the detriment of the institutions conducting surveys because those who are dissatisfied with the athletic programs at an institution are probably more likely to respond than those that are satisfied. If this is so, then reported levels of satisfaction are lower than “true” levels. Yet there seems to be no awareness of possible non-response bias, let alone (and it is likely that the data would not support it anyway) any non-response bias analysis. The practice of some institutions of distributing data collection instruments in classes with large numbers of students with presumptive athletic interests may also lead to non-response bias. While this procedure is problematic, it may be understandable since unlike many surveys, finding absolute numbers of women with unsatisfied interests is what is critical to Title IX compliance. Institutions well may believe that such venues capture most of those who might be interested in unsatisfied athletic participation and they may be right, but in the absence of more systematic, easy to implement procedures as described in the next chapter, one cannot be certain. How to deal with possible non-response bias is discussed in section 5.5.3.

While no documentation in the OCR files treats the data collection results as uncertain statistical estimates, this may be less problematic than it appears since, as shown above, many data collections are actually attempted censuses.

That the data collections rely on self-reported data might be a problem, but it is no worse in this setting than in many others. Indeed, in most cases, there is no readily available meaningful corroborative data.

To their credit, **INSTRUMENT** institutions seem not to have fallen victim to the temptation to slant item wording so as to yield a “favorable” result to the institution. This is not intended to impugn institutional motivation, but only to point out that if sufficient interest in a sport not currently offered is displayed, the institution may have to spend money to create a new team.

Chapter 4: Other Data Collection Instruments

A number of institutions other than those involved in OCR cases have conducted data collections regarding students' athletic interests and abilities. Largely through Internet searches conducted by Education Statistics Services Institute personnel, a number of these data collections been identified, although in only a few cases is the actual data collection instrument available. In this chapter, whose structure is parallel to that of chapter 3, we review an additional five instruments that are available. Because of the small number, the level of detail is less than that in chapter 3.

The reasons for institutions' conducting these data collections seem to be self-assessment analogs of demonstrating compliance with Title IX. For instance, the report of a 1998 survey conducted by the University of Kentucky states that:

The survey was the fourth such joint effort conducted in support of the University's efforts to evaluate the interest and accomplishments of students.

The purpose of the survey was to gauge the levels of participation in various varsity sports among entering UK students and to explore possible areas of interest for offering additional sports at the University. The survey was to be distributed to all incoming freshmen during their Freshman Advising Conference. Of the 3,000 surveys distributed 1,642 were returned for a response rate of 54% [*sic*]. Of these responses 925 of the surveys were completed by females, and 678 surveys were completed by males.

One of the major goals of the survey was to assess the level of experience and awards earned in varsity sports in high school. Information was collected for these sports: basketball, across country, fast pitch softball, golf, gymnastics, rifle, soccer, swimming, tennis, track, and volleyball.

4.1 Characteristics of the Instruments

Appendix E lists the five data collection instruments reviewed in this chapter. Because they are recent, four of these are web-based, unlike all of the instruments in the OCR files.

Target Population: In all five additional data collections, the target population was the entire student body.

Respondent selection: It was not possible to determine the respondent selection mechanism for any of the five additional data collections. It *appears* that most were meant to reach either the entire student body or the freshman class.

Proactivity: Table 4.1 shows the level of proactivity in the five additional data collections. In the one proactive instance, a tee-shirt said to be worth \$10 was offered to

those completing the instrument, but this required providing a name and so risking violations of confidentiality.

Table 4.1: Level of proactivity in the additional data collections.

Proactivity	Number	Percent
Yes	1	20.0
No	4	80.0
Total	5	100.0

SOURCE: NISS analysis of other data collection instruments.

Instrument Characteristics

Age: Table 4.2 categorizes the five additional data collections according to whether respondents were asked for their age.

Table 4.2: Whether respondents asked their age in the additional data collections.

Age Asked?	Number	Percent
Yes	1	20.0
No	4	80.0
Total	5	100.0

SOURCE: NISS analysis of other data collection instruments.

Class: Table 4.3 categorizes the five additional data collections according to whether respondents were asked for their class.

Table 4.3: Whether respondents asked their class in the additional data collections.

Class Asked?	Number	Percent
Yes	2	40.0
No	3	60.0
Total	5	100.0

SOURCE: NISS analysis of other data collection instruments.

Gender: All five additional data collections asked respondents for their gender.

Spectator interest: Table 4.4 classifies the five additional data collections according to whether respondents were asked their interest as athletic spectators (either in person or via television or radio).

Table 4.4: Whether respondents asked their interest as athletic spectators in the additional data collections.

Spectator Interest	Number	Percent
Yes	2	40.0
No	3	60.0
Total	5	100.0

SOURCE: NISS analysis of other data collection instruments.

Attitudes about athletics: None of the five additional data collections asked respondents explicitly about their attitudes regarding either athletics in general or intercollegiate athletics.

Opinion about the institution’s athletic programs: Table 4.5 shows that only one of the five additional data collection instruments asked respondents explicitly for opinions regarding the institution’s athletic programs.

Table 4.5: Whether respondents asked explicitly about their opinions of the institution’s athletic programs in the additional data collections.

Opinions about Institution’s Athletic Programs	Number	Percent
Yes	1	20.0
No	4	80.0
Total	5	100.0

SOURCE: NISS analysis of other data collection instruments.

Identifying information: Table 4.6 shows that two of the five additional data collections asked respondents for information that identifies them. This seems to result from web administration: the information was requested in order to spare respondents future e-mails asking them to complete the survey. In one case, the information was said to be necessary in order to receive a tee-shirt promised to respondents.

Table 4.6: Whether respondents asked to provide identifying information in the additional data collections.

Identifying Information	Number	Percent
Yes	2	40.0
No	3	60.0
Total	5	100.0

SOURCE: NISS analysis of other data collection instruments.

Ability: Table 4.7 shows that only one of the five additional surveys asked respondents explicitly about their athletic ability.

Table 4.7: Whether respondents asked explicit questions regarding their athletic ability in the additional data collections.

Explicit Questions about Athletic Ability	Number	Percent
Yes	1	20.0
No	4	80.0
Total	5	100.0

SOURCE: NISS analysis of other data collection instruments.

Recruiting: None of the 5 additional data collections asked respondents whether they had been recruited as athletes by a postsecondary institution.

Caveats and benefits: None of the 5 additional data collections contained a statement of the potential disadvantages and advantages (for example, financial aid) of participation. Several of the instruments asked those who indicated no interest in athletic participation to list the reasons(s).

Reasons for the survey: Table 4.8 shows two of the five additional data collections give respondents information regarding why the survey was being conducted. One of these actually mentioned Title IX.

Table 4.8: Whether respondents were provided any explanation of reasons for the additional data collections.

Explanation of Reasons for Data Collection?	Number	Percent
Yes	2	40.0
No	3	60.0
Total	5	100.0

SOURCE: NISS analysis of other data collection instruments.

Statement of confidentiality: Table 4.9 shows that only one of the five additional data collections promised confidentiality to respondents. In fact, as noted above in connection with **Identifying Information**, use of the web seems to have created more ways of threatening confidentiality.

Table 4.9: Whether respondents were provided any assurance of confidentiality in the additional data collections.

Confidentiality Statement?	Number	Percent
Yes	1	20.0
No	4	80.0
Total	5	100.0

SOURCE: NISS analysis of other data collection instruments.

Interest—representation of sports: Table 4.10 shows the representation of sports with respect to interest in the five additional data collections.

Table 4.10: Representation of sports with respect to interest in the additional data collections.

Representation of Sports	Number	Percent
Fixed entries	4	80.0
Write in entries	1	20.0
Total	5	100.0

SOURCE: NISS analysis of other data collection instruments.

Interest—number of levels: Table 4.11 shows the number of levels of interest (for each sport) in the five additional data collections.

Table 4.11: Number of levels of interest (for each sport) in the additional data collections.

Number of Levels	Number	Percent
1	2	40.0
2	1	20.0
3	2	40.0
Total	5	100.0

SOURCE: NISS analysis of other data collection instruments.

Experience—representation of sports: Table 4.12 shows the representation of sports with respect to experience in the five additional data collections.

Table 4.12: Representation of sports with respect to experience in the additional data collections.

Representation of Sports	Number	Percent
Fixed entries	3	60.0
Write in entries	1	20.0
Other/Could not determine	1	20.0
Total	5	100.0

SOURCE: NISS analysis of other data collection instruments.

Experience—number of levels: Table 4.13 shows the number of levels of interest (for each sport) in the five additional data collections.

Table 4.13: Number of levels of experience (for each sport) in the additional data collections.

Number of Levels	Number	Percent
1	4	80.0
2	1	20.0
Total	5	100.0

SOURCE: NISS analysis of other data collection instruments.

4.2 Notable Items

There are few examples of notable items in the five additional data collections that differ from the notable items discussed in section 4.2. One, but only one, of the data collections provides careful definitions of terms. Another, which is replete with HTML form elements, in effect assigns multiple sports of interest to different questions. As noted in section 4.2, this happens as well in the **INSTRUMENT** data collection instruments, some of which (as does not occur here) actually force respondents to rank sports by level of interest or experience. The impact is that analysis of effectively parallel questions labeled “Activity 1” and “Activity 2” (and “Intercollegiate Activity 1,” “Intercollegiate Activity 2,” “Intercollegiate Activity 3”) is needlessly complicated.

That four of the five additional data collections are web-based reflects evolving information technologies. However, in general the instruments fail to capitalize on their being web-based, and in fact use of the web introduces some additional issues.

Perhaps the most striking aspect is the lack of exploitation of interactivity. For example, three of the surveys, including the one paper-based data collection, incorporate skips that allow recipients to skip questions that become inapplicable as the result of answers to others, but those questions are displayed nevertheless. By contrast, the data collection instrument proposed in chapter 5 does not even display superfluous questions, and makes the selections adaptively, in response to earlier answers.

In general, the web-based data collections use devices such as check boxes, radio buttons and drop-down lists sensibly, in order to constrain responses to some allowable set, although one lengthy web-based data collection has a number of free-form text entries.

Although doing so is straightforward, none of the web-based data collections makes use of hyperlinks, or similar devices such as mouse-overs, to provide access to “metadata” such as definitions of terms.

Two of the web-based data collections introduce gratuitous confidentiality problems by requesting identifying information in order to prevent respondents from being contacted again. (One example is “Your name is requested so that we will not send you another email about this survey.”) Evidently, respondents (the basis of selection is not clear.) were notified by e-mail that they had been selected, and the data collection administration process seems unable to prevent follow-up without identifying information. There are readily available alternatives (such as one-way hashed keys) that make it possible to track who has responded without a link to their responses.

Chapter 5: Implementation of Part 3 Data Collections

In this chapter we describe a process for implementation of data collection when Part 3 of the “Three-Part Test” is employed.

For clarity, we focus on one very specific problem. Attention is restricted to a single sport not currently offered at the intercollegiate (varsity) level by the institution, and we assume—*solely for concreteness*—that women are the underrepresented sex. The problem is to determine (see section 1.2) “whether the interests and abilities of [women] have been fully and effectively accommodated by the present program [for that sport],” *on the basis of data collected from women students.*

We formulate the problem conceptually and mathematically in section 5.1. Sections 5.2 through 5.5 address key steps in the procedure of solving it: specifying the process (section 5.2), data collection process (section 5.3), web-based data collection (section 5.4) and data analysis (section 5.5). A number of precautions imposed by the entire process are discussed in section 5.6, and section 5.7 discusses issues arising prior to and following the data collection process. Each principal component of the chapter contains three particular items:

Practice among SURVEY Institutions, a summary of how that component was addressed by the 57 SURVEY institutions. Most of this information is also in chapter 3, but including it here makes this chapter more self-contained.

Recommendation for Improvement, which would improve SURVEY institution practice without imposing large barriers in terms of information technology or statistical sophistication.

High-Quality Recommendation, describing an approach that satisfies the NCES statistical standards and other important criteria.

5.1 Problem Formulation

As stated in the introduction to this chapter, we restrict attention to a single sport not currently offered at the intercollegiate level, and assume that women are the underrepresented sex. We focus on an institution employing Part 3 that is attempting to determine, using data collected from women students, whether the interests and abilities of women have been “fully and effectively accommodated by the present program.” The alternative is that the interests and abilities of women can be accommodated only by offering the sport at the intercollegiate level.

We now describe an operational formulation of the problem. Let M (for minimum) be the minimal number of team members necessary to “field” a team in the given sport. This number must be specified by the institution. It depends on the sport and possibly contextual factors. For instance, a basketball team cannot play with fewer than five players, but this is not the value of M for basketball, which is presumably in the range 10-15. NCAA or other association rules may provide information about how large M might

be (M cannot exceed maximum allowable team sizes), but prevailing values in the conference to which the institution belongs are also relevant.

There is, conceptually, some number N^+ of women students who, given the current offerings of the institution, possess the interest and ability to compete in the sport at the intercollegiate level. If N^+ were known with certainty, then determination of compliance by OCR would be straightforward:

- If $N^+ \geq M$, and if other OCR-determined criteria are fulfilled, then the institution must offer the sport at the intercollegiate level. These criteria are complex, and discussed in section 5.7.
- If $N^+ < M$, then the interests and abilities of women have been accommodated by the present program.

It is the “conceptually” and “known with certainty” qualifications in this initial formulation that create several significant difficulties.

The first difficulty is that the definitions of interest and ability are subjective. How to assess them for the purposes of Part 3 is discussed in section 5.4.

The second difficulty is that exact determination of N^+ may be impossible. As discussed in chapter 3, most institutions that have demonstrated Title IX compliance using Part 3 have done so using data collections that conceptually are censuses but yield very low response rates. In the samples, retaining our one-sport/women-underrepresented setting, only a—randomly or otherwise—selected subset of women were asked whether their interests and abilities are accommodated by the present program. Even absent other problems that we discuss momentarily, rather than obtain exact knowledge of N^+ , the institution may be forced either to construct a statistical estimator \hat{N}^+ or to regard N^+ as random and calculate its distribution given the observed data. Then, the simple decision criterion stated above is no longer valid; alternatives are discussed in section 5.5.

But, there are further complications. By far the most difficult-to-deal-with of these is that in almost all cases, the number of respondents—those who are asked to complete the data collection instrument who actually do so—is only a fraction, and possibly a rather small fraction. Non-response is a problem in its own right, because it changes both the form and the properties of the estimator \hat{N}^+ .

Another problem is *non-response bias*: the prevalence of interested and able students in the sample who do not respond may differ from the prevalence of interested and able students in the sample who do respond. Indeed, in the setting of Part 3, non-response bias seems almost inevitable: uninterested students are less likely to respond than interested students. Dealing with non-response bias is discussed in section 5.5.3.

There are additional issues when only a sample of the target population is asked to provide information, because the sampling process introduces additional randomness and uncertainty. Sampling is avoidable, however, while non-response bias is not.

A third difficulty is that the data collection process itself may influence the results. This issue was alluded to in chapter 3, in connection with whether data collection instruments accurately or inaccurately depict the benefits and obligations associated with intercollegiate sports. The prototype instrument in section 5.4.1 is specifically intended not to influence the data it generates.

Given these difficulties, an ideal Part 3 implementation would proceed as follows:

1. The target population for purposes of Title IX compliance consists of full-time women undergraduate students.
2. The data collection protocol is a census: all members of the target population are asked for information. In fact, as discussed in section 5.2, we recommend that all students, both female and male, be part of the data collection.
3. Data collection is web-based.
4. Because non-response may be inevitable, telephone-based follow-up of non-respondents may be conducted at a level that supports necessary non-response bias analyses.
5. Data analysis is restricted to responses from the data analysis population, and consists of combining the responses and the non-response bias analysis in a principled statistical manner to produce an estimator \hat{N}^+ and to calculate the distribution of this estimator.
6. The decision criterion employed by OCR is to calculate the conditional probability that \hat{N}^+ (or, in Bayesian formulations, N^+ itself) exceeds the minimum team size M given the observed data from both the census and the non-response bias sample. If this probability exceeds a pre-determined threshold, and if other criteria are satisfied, then OCR would determine that the institution must offer the sport at the intercollegiate level. Otherwise, the determination would be that the interests and abilities of women are accommodated by the present program.

Sections 5.2-5.5 describe various parts of this process in more detail.

5.2 Process Specification

Here we discuss selection of the data collection population, the data collection protocol and the data analysis population.

Data Collection Population. As also mentioned in section 3.1, selection of the data collection population presents both conceptual and logistical issues. For a number of reasons, collecting data only from members of the underrepresented sex is not feasible. Consequently, there are only two defensible choices:

- The entire student population;
- A “catchment” population consisting of both the entire student population and a set of actual or potential applicants.

If the data collection population is the entire student population, then while there are response rate and other issues, at least the population is well-defined and in principle accessible.

Legal cases, however, have implied that the data collection should be larger—for example, a set of potential applicants. This would happen if applicants believed that the institution was not able to satisfy their athletic interests and abilities, and therefore chose either not to apply or to decline offers of admission. The “potential applicant/catchment” population is very problematic. It depends on the nature of the institution, and ranges from quite local to the entire nation or beyond, for institutions with international students. Even if definable, such a large data collection population is almost surely unreachable in any meaningful manner. Attempts to do so described in the OCR files are weak at best. They include requesting information from participants in campus tours or (local) high school administrators. Either of these approaches raises more problems than it solves.

Moreover, the statistical implications of employing a catchment population are effectively impossible to characterize. Even the population size is not known, which prevents calculation of response rates, and non-response bias analyses are simply infeasible.

A data collection population of applicants is better defined but not easier to sample. The same is true of surrogates, such as campus tour participants.

If the data collection population is entire student population, then some issues remain. For example, does “student” mean “full-time student?” Must students be enrolled currently? Given that the purpose of the data collection is to determine whether a sport must be offered to women at the intercollegiate level, perhaps the most sensible definition would be students who are eligible for intercollegiate athletic participation as determined by the athletic association (for example, the NCAA) to which the institution belongs and the institution itself. However, this is not likely to be feasible if criteria such as academic standing are involved.

Practice among SURVEY Institutions: As discussed in section 3.1 (see table 3.4), most of the 52 INSTRUMENT institutions treated the entire student body as the data collection population.

Recommendation for Improvement: The data collection population should be the entire population of full-time students.

High Quality Recommendation: The data collection population should be the entire student population eligible for intercollegiate athletic participation.

Data Collection Protocol. Again, there are two choices:

- A *census*: all members of the data collection population are asked to provide information regarding whether their interests and abilities are accommodated by the present program.
- A *sample survey*: only a subset of members of the data collection population are asked to provide information regarding whether their interests and abilities are accommodated by the present program.

Our use of these terms is consistent with that of the federal statistical agencies. While a census is a larger scale undertaking than a sample survey, it is superior in almost every respect. If response could be mandated, then N^+ would be known with certainty, and the “simple” decision criterion described above is applicable. Moreover, none of the complicated methodology for dealing with non-response bias outlined in section 5.5.3 is necessary. In reality, however, mandating a response may not be feasible.

Perhaps most important, employing a census avoids two difficult issues associated with sample surveys: selection of the sampling mechanism and selection of the sample size. In the OCR surveys described in chapter 3, two classes of sampling mechanisms are employed widely:

- Simple random samples, in which those asked to provide data are selected randomly from the data collection population, in such a way that all members of the population have equal probability of being in the sample. This method has the advantage of simplifying analysis of the data, but has other shortcomings discussed below.
- Targeted non-random samples. The “target” in this case is generally a sub-population of what we have termed “the target population” thought to be likely to contain students with athletic ability and interest. The principal example is enrollees in health or physical education courses.

Intermediate methods, such as randomly selected courses, are present as well in the surveys discussed in chapter 3. These surveys also, however, include some simply indefensible sampling methods, whose statistical properties cannot be adequately described. The most egregious example is placing survey forms in a place where students might simply pick them up.

The statistical implications of such samples are virtually impossible to characterize. In particular, non-response bias analyses are not possible. For this reason we recommend that such samples not be employed.

Given the ready availability of electronic means of data collection (see section 5.4), simple random samples seem unnecessary. Another reason to avoid them is that small sample sizes may not be feasible. To illustrate why this is true, let P be the size of the target population, and suppose that the sample size is S . Then roughly, each student in the sample represents P/S students in the target population. Let N_S^+ be the number of positive

responses (interested and able to participate at the intercollegiate level in the given sport) in the sample. Recalling that the goal is to estimate the number N^+ of students in the target population interested and able to participate at the intercollegiate level in the given sport and ignoring non-response, the estimated value of N^+ is

$$\hat{N}^+ = N_s^+ + \frac{N_s^+}{S}(P - S).$$

To explain briefly (more complicated expressions appear in section 5.5), the N_s^+ sampled students who responded positively are known with certainty to be interested and able. The fraction of students sampled who responded positively, N_s^+ / S , is assumed to be the same as the fraction of the P - S unsampled students who are interested and able, so the estimated number of such students is just the product of these two terms.

If S is small, then every positive response in the survey has a large effect on \hat{N}^+ . At the extreme, if P/S exceeds the minimum team size M , then a single positive response in the sample produces an estimated value of N^+ that exceeds M ! Of course, there is also high variability in the estimate, but still this is a clear problem. But unless P/S is large, the advantages of a sample are negated. Therefore, arguments in favor of a sample are not convincing.

One issue, discussed briefly in chapters 3 and 4, is the use of incentives to promote responses to the census. At an extreme, the institution might *require* response, for example, linking completion to registration status or refusing to provide grade reports to those who had not responded. Even though measures this extreme may be seen by some to have negative consequences such as heavy handedness, decreased data quality in the form of frivolous or inaccurate responses is a more important issue, in part because there are no models or tools to characterize effects on data quality. This problem would be particularly problematic with a data collection instrument of the type described in section 5.4.1. Checking the global “no athletic experience, current participation or interest in future participation” box on screen 3 there (see figure 5.3) becomes the simplest way to fulfill the requirement. The clear consequence of this behavior is an underestimate of N^+ .

Practice among SURVEY Institutions: As shown in table 3.5, most of the **INSTRUMENT** conceptualized the data collection as a census. However, the term “census” is used in chapter 3 in a much looser sense than in this chapter, to mean the absence of a discernible, explicit sampling mechanism.

Recommendation for Improvement: The data collection protocol should be a census, in the strict sense that every member of the data collection population is contacted individually (for example, by e-mail) and requested to respond.

High Quality Recommendation: The data collection protocol should be a census in the strict sense that every member of the data collection population is contacted individually and requested to respond.

Data Analysis Population. By “data analysis population” we mean that part of the data collection population whose data will be used for purposes of determining compliance with Title IX. For the specific setting of this chapter, only females—the assumed underrepresented sex—belong to the data analysis population. OCR has stated that fourth-year and beyond students (assuming a traditional four-year curriculum) should also be excluded from the data analysis population. The data collection instrument in section 5.4.1 requests both gender and year, and so supports either choice of data analysis population. The analysis procedures in section 5.5 are valid in either of these cases.

Practice among SURVEY Institutions: The OCR files contain few to no details regarding statistical analyses of the data. Moreover, there are cases in the files where the data collection population contained both females and males, but respondents were not asked to provide their gender.

Recommendation for Improvement: The data analysis population should consist of all full-time first-, second- and third-year students of the underrepresented sex.

High Quality Recommendation: The data analysis population should consist of all full-time first-, second- and third-year students of the underrepresented sex who meet all criteria for participation in intercollegiate athletics.

5.3 Data Collection Process

Here we discuss principal steps in an electronic data collection process centered on a web-based collection instrument of the type described in section 5.4. We assume that recommendations in section 5.2 are implemented: the data collection population is the entire student population, and the data collection protocol is a census.

Prior to any of the steps described below, the data collection instrument and software must be in place; the former is described in section 5.4.1 and the latter in section 5.4.2.

The initial step is to compile a database of e-mail addresses and telephone numbers (for non-response follow-up; see section 5.5.3) of all members of the data collection population. We assume that all students are required to have e-mail addresses at the institution.

The second step is to send an e-mail message to each member of the data collection population, requesting that she or he complete the data collection instrument. In addition to the request to provide the data, this message should contain:

- A link to the URL of the data collection instrument;
- Embedded within the link, a unique, encrypted ID that allows the software to record that a person has responded without being able to link to that person’s

response (see below). This strategy also precludes multiple responses by one individual.

Non-response follow-up is likely to be necessary. In principle, using the encrypted ID, the institution could monitor responses in such a way that it can determine who has responded without being able to link responses to respondents, and could send e-mail messages to non-respondents. This may not be desirable, however, and a non-response bias analysis may be the only feasible form of follow-up. The NCES standard of a response rate of 85 percent for a census not used as a sampling frame (U.S.DOE, 2003) does not seem likely to be met in the absence of follow-up.

If the response rate falls below 85 percent, then the NCES statistical standards (U.S. DOE, 2003) call for a *non-response bias analysis*, which is described in section 5.5.2. The purpose of the non-response bias analysis is to determine whether the likelihood of response depends on the value of the response. In this case, there is reason to suspect that it does: those with interest and ability are more likely to respond.

The non-response bias analysis consists of a data collection phase and an analysis phase. In the former, a random sample of non-respondents to the census is contacted and their responses ascertained. The data collection phase of the non-response bias analysis would ordinarily be done by telephone.

As discussed in section 5.2, “requiring” a response in a strong sense (that failure to respond places a student somehow “not in good standing”) may not be possible. Nevertheless, there may be methods beyond follow-up that increase response. These include:

- Embedding the survey in a process—registration is the clear and perhaps only example—that every student must perform. This was somewhat successful in some of the OCR cases. The web-based instrument in section 5.4.1 could be linked in a natural way to web-based registration, and could inherit the confidentiality protections and mechanisms for preventing multiple responses associated with the registration process.
- Positive mechanisms: for instance, one survey in chapter 4 offers a tee shirt said to be worth \$10 to respondents. Alone these seem unlikely to be effective at a scale at which they are feasible economically. Moreover, their effects on non-response bias are difficult to characterize.
- Public relations activities, including statements by institution leaders about the importance of responding.

Practice among SURVEY Institutions: The proactivity characteristic reported in table 3.6 measures, albeit qualitatively, the extent to which SURVEY instruments were proactive in attempting to increase response rates. This table shows little evidence of proactivity.

Recommendation for Improvement: The data collection process should be web-based, using e-mail and, if necessary to follow up on non-response, telephone as a means of

contacting members of the data collection population. Linking the data collection to registration should be considered.

High-Quality Recommendation: The data collection should be web-based, using e-mail to initiate the process. Linking the data collection to registration should be considered. Means such as those described in section 5.5 should be in place to deal with low response rates.

5.4 Web-Based Data Collection

In this section, drawing on chapters 3 and 4, we sketch the structure of a data collection instrument that would accomplish the necessary objectives (collection of information regarding whether “interests and abilities of the members of that [underrepresented] sex have been fully and effectively accommodated by the present program.”) with minimal effort. The instrument is web-based, allowing effective implementation of skips and other selection devices. For example, a respondent can choose from a larger list of sports the subset for which she wishes to respond in detail.

Web-based instruments are absent entirely from the **SURVEY** institution instruments discussed in chapter 3, which is understandable because most of the OCR cases preceded widespread use of the web and e-mail. By contrast, they dominate in the more recent instruments in chapter 4. Alternative modes of data collection appearing in the instruments in chapters 3 and 4 include paper forms (mailed, distributed in classes, or “left for the taking”) and one telephone survey.

Section 5.4.1 describes the instrument itself; the software necessary to create it and store data is discussed in section 5.4.1.

5.4.1 Data Collection Instrument

The proposed data collection instrument consists of seven screens, which are shown in figures 5.1-5.7, together with one additional screen, shown in figure 5.8, to which only respondents in the *data analysis population* who indicated interest and ability are taken.

This instrument requests little more information than absolutely necessary to determine compliance with Title IX. Requests for large amounts of superfluous information are a concern because they lower response rates. However, compared to some of the instruments in chapter 3, this instrument is quite minimal.

We now describe the screens one-by-one. Not all respondents need to proceed through all seven (or eight) screens.

Screen 1, shown in figure 5.1, is an introductory screen, on which respondents are informed of the purposes of the data collection and provided an explicit confidentiality statement as well as an explanation of the structure of the instrument.

Screen 2, shown in figure 5.2, requests four items of demographic information—age, gender, year in school and student status. The dropdown boxes and radio buttons constrain responses to those allowed by the institution conducting the census.

Screen 3, shown in figure 5.3, explains the next set of questions—on athletic experience, participation and ability. It allows respondents with no experience, current participation or interest in future participation to so indicate and complete the instrument without having to view any of the other screens.

Screen 4 of the proposed instrument, shown in figure 5.4, is reached only by respondents who wish to enter information concerning athletic experience, interests and abilities. It lists the responses that will be allowed when the information is requested (on screen 6), and contains a neutral statement of the burdens and benefits associated with participation in intercollegiate athletics. A more sophisticated version of the instrument might contain hyperlinks to definitions of various terms.

Screen 5, shown in figure 5.5, allows respondents who wish to enter information concerning athletic experience, interests and abilities to *select the sports for which they wish to provide information*. The purpose of this is to reduce the size and complexity of screen 6, on which the information is actually entered. Only those sports selected on screen 5 are listed on screen 6. The list of sports in figure 5.5 is illustrative, consisting of twenty-three sports in which the NCAA conducts championships and seven NCAA-identified “emerging sports.”³ Reflecting the considerations noted in section 5.7, sports for which Title IX non-compliance is not feasible because of the absence of competitive opportunities would not need to be included on this screen.

Screen 6, shown in figure 5.6, is where actual information regarding experience, current participation, interest in future participation and ability is entered. These four categories appear side-by-side, which is sensible conceptually and psychometrically, but was not done in any of the 57 data collection instruments reviewed in chapters 3 and 4. The allowable responses, which are constrained by radio buttons that also prevent multiple responses, are as follows:

- For experience at the high school level, “Recreational,” “Intramural,” “Club,” “Junior Varsity” and “Varsity”;
- For current participation, “Recreational,” “Intramural,” “Club” and “Intercollegiate”;
- For interest in future participation at the institution: “Recreational,” “Intramural,” “Club” and “Intercollegiate”;
- For ability: “Yes, I have the ability” and “No, I would need to develop the ability”.

The reason for inclusion of four separate categories is that, as discussed further in section 5.5.1, a positive response is defined in terms of at least three and possibly all four.

³ See www2.ncaa.org/sports/general_information/emerging_sports.html.

For some purposes, the number of allowable responses might be reduced. If the sole concern were interest in intercollegiate participation, and assuming that an intercollegiate team does not exist currently, “Intercollegiate” could be eliminated from current participation (as could any others that do not apply), and all but “Intercollegiate” could be eliminated from interest in future participation. Because this screen would be generated dynamically, using information from screen 5, the sets of allowable responses can be sport-dependent.

Although not shown in figure 5.6, hyperlinks could be used to provide access to definitions of these terms (or any other terms, for example, sports with which not all respondents may be familiar). Placing the definitions in a separate window avoids impeding the flow of the data collection instrument.

Screen 6 does not implement default responses, but it could. It does state clearly how item non-responses will be treated.

Screen 7, shown in figure 5.7, is for most respondents the final screen of the instrument. It offers the opportunity for comments or other feedback, asks them to click a button to record their responses, and thanks them for participating. It also informs those who have responded positively about interest and ability that unless they check the “Check here if you do not wish to be contacted” box, they will be taken to one more screen (screen 8), on which they will be asked for contact information.

Screen 8, shown in figure 5.8, is a screen reached only by respondents who are members of the data analysis population (in the example in this chapter, full-time female students who are freshmen, sophomores or juniors) who indicate interest and ability in one or more sports not currently offered at the intercollegiate level. (The language on both this screen and screen 7 is less precise, because no clear purpose is served by complete details.) On this screen, such respondents may request to be contacted by the athletic department regarding their interests. It summarizes their responses and asks for contact information—name, e-mail address and telephone number. This information could either be stored in a CSV file separate from the main data, or forwarded by e-mail to the appropriate office in the institution.

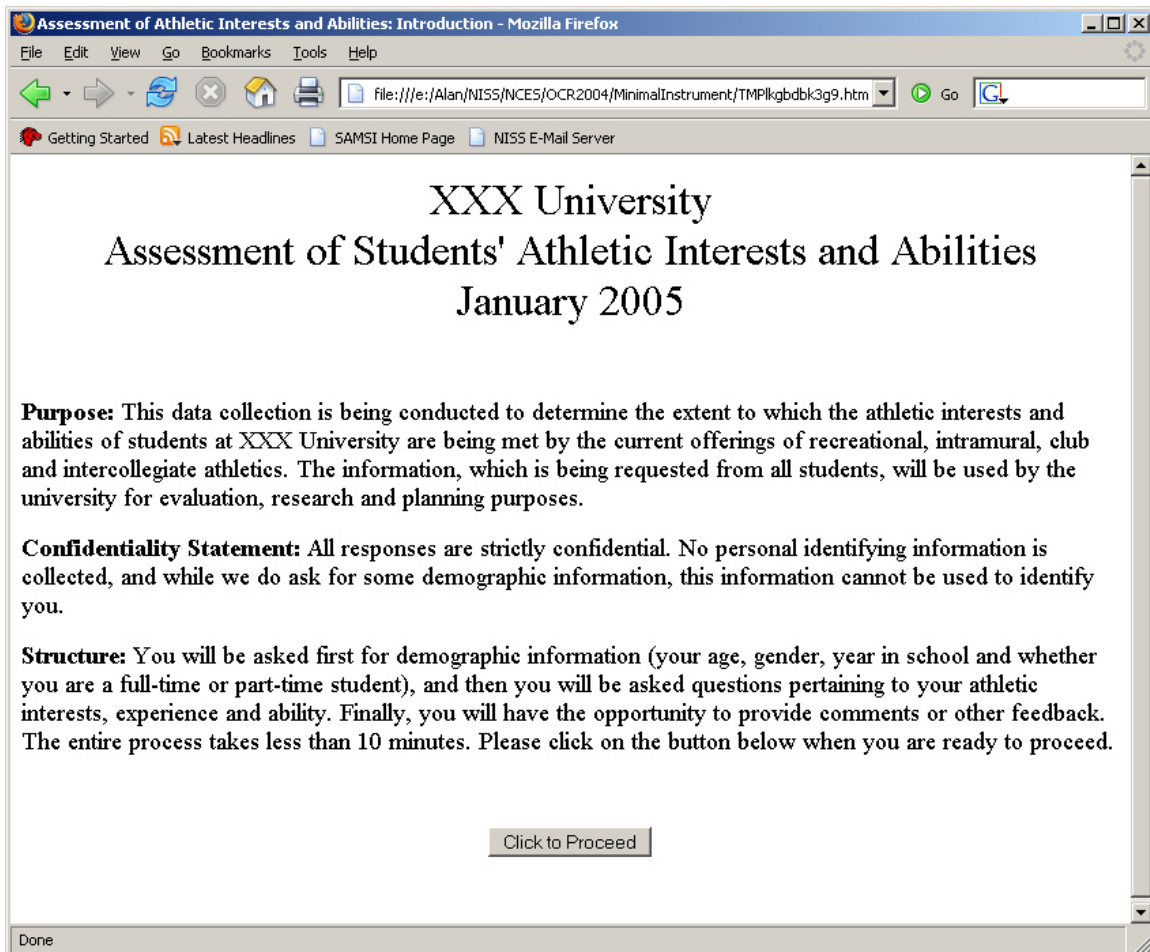
Practice among SURVEY Institutions: As noted above, no SURVEY institution employed web-based data collection.

Recommendation for Improvement: For extremely narrow surveys (one sport, for example) respondents might be asked simply to respond to an e-mail message. Simplified web-instruments (for instance, with less protection for confidentiality) are possible, but should state explicitly their shortcomings relative to the high-quality recommendation. Although, as stated in section 5.6, we believe that if failure to respond (at the item level) is treated as a “no interest” or “no ability” response, the instrument should state so in some difficult-to-ignore manner.

High-Quality Recommendation: The web-based data collection instrument should have the same properties as the prototype described here:

- Simplicity;
- Explicit explanation of reasons for the data collection;
- Explicit confidentiality statement;
- Opportunity for global “no interest or ability” response;
- Opportunity to filter sports for which detail is provided;
- Non-prejudicial wording of items;
- Inclusion of all of experience, current participation, interest in future participation and ability;
- Fixed-form responses.

Figure 5.1: Initial screen of the prototype data collection instrument, containing the purpose of the data collection, a confidentiality statement and an explanation of the structure of the instrument.



SOURCE: NISS-produced prototype.

Figure 5.2: Second screen of the prototype data collection instrument, in which respondents provide four items of demographic and student status information. This example shows a respondent who is 20 years old, female, a junior and a full-time student.

The screenshot shows a Mozilla Firefox browser window with the title "Assessment of Athletic Interests and Abilities: Demographic Information". The address bar shows a local file path. The page content includes the university name, the assessment title, and a section for demographic information. The form contains four items: "Your age:" with a dropdown menu set to "20"; "Your gender:" with radio buttons for "Female" (selected) and "Male"; "Your year at XXX:" with a dropdown menu set to "Junior"; and "Your student status:" with radio buttons for "Full-time" (selected) and "Part-time". A "Click to Proceed" button is located below the form. The browser's status bar at the bottom shows "Done".

Assessment of Athletic Interests and Abilities: Demographic Information - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

file:///E:/Alan/NISS/NCE5/OCR2004/ProposedSurveyInstrument/TMPwb0zdb7fk3.htm

Getting Started Latest Headlines SAMSI Home Page NISS E-Mail Server

XXX University
Assessment of Students' Athletic Interests and Abilities

Demographic Information

Please provide the following demographic information. When you have entered the information, click the button to proceed.

Your age: 20

Your gender: Female Male

Your year at XXX: Junior

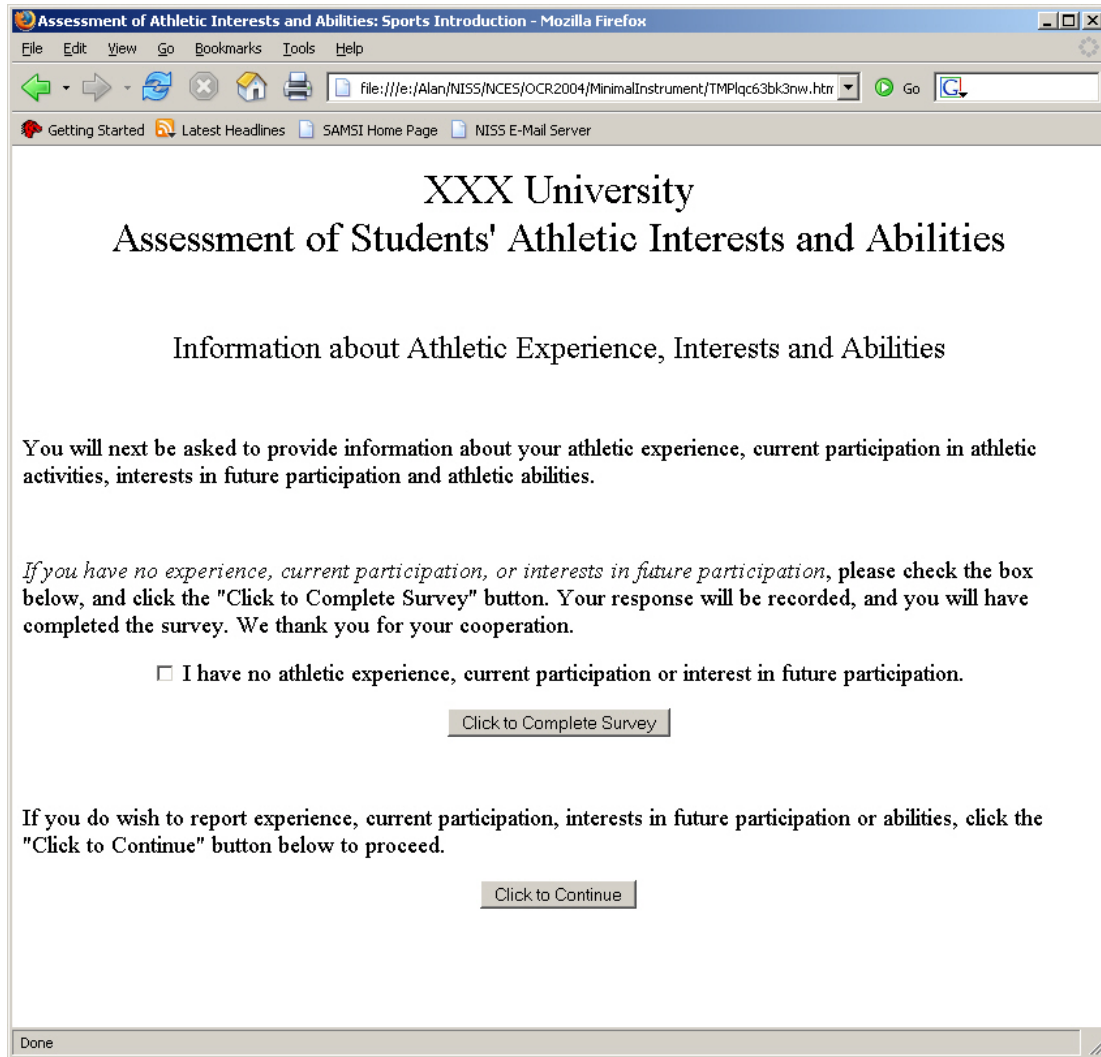
Your student status: Full-time Part-time

Click to Proceed

Done

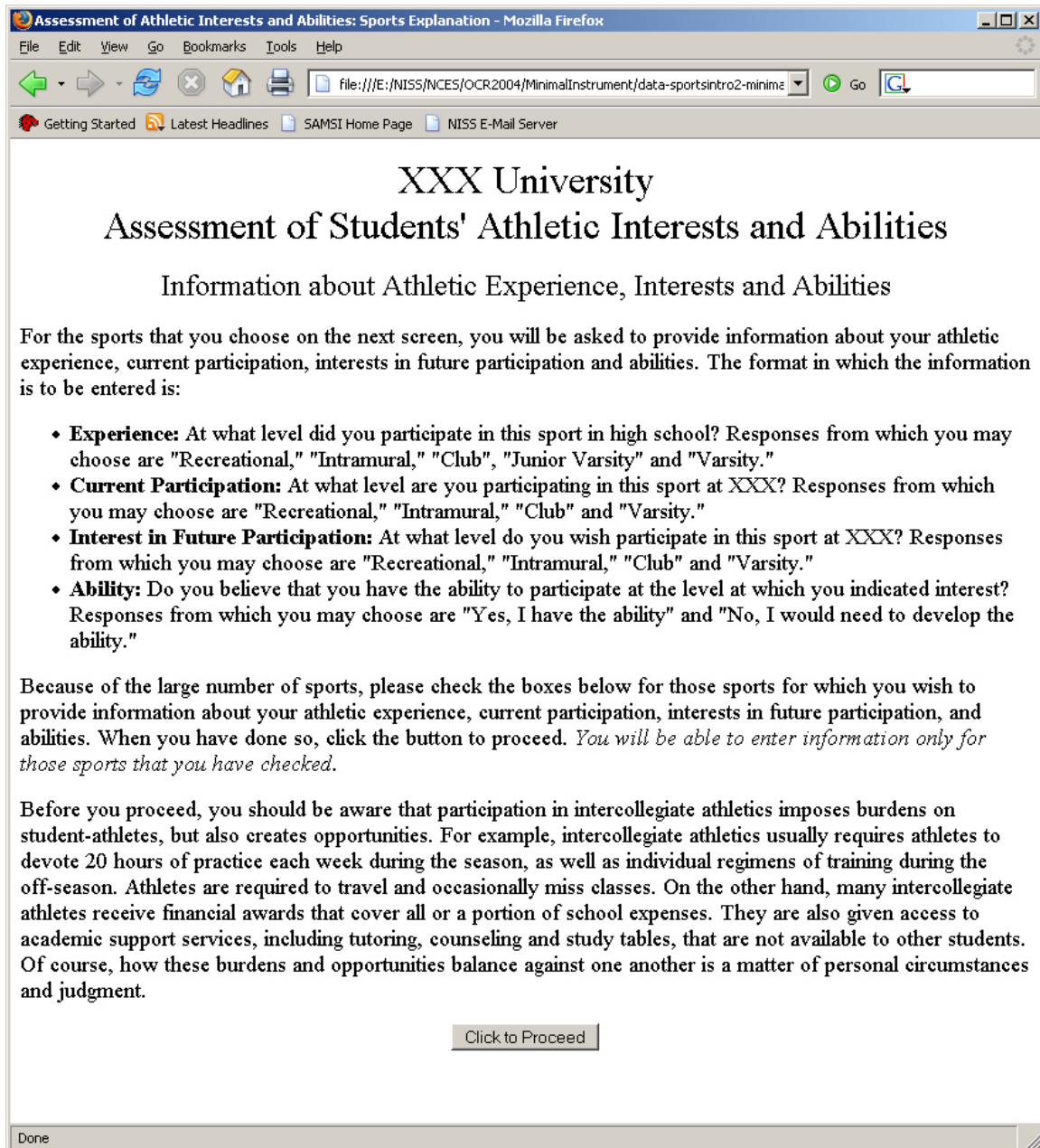
SOURCE: NISS-produced prototype.

Figure 5.3: Third screen of the prototype data collection instrument, on which respondents with no experience, current participation or interest in future participation can so indicate and complete the process.



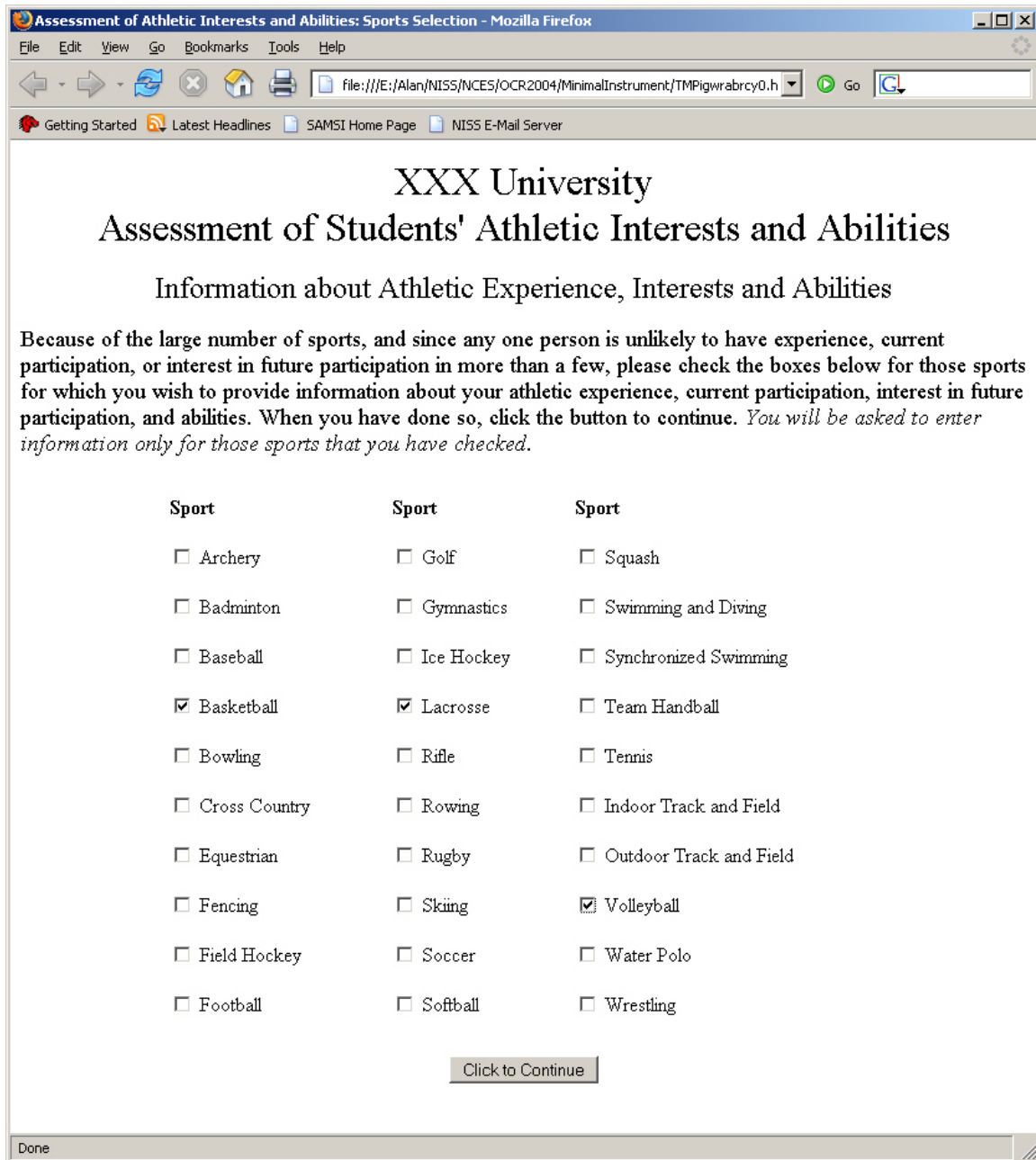
SOURCE: NISS-produced prototype.

Figure 5.4: Fourth screen of the prototype data collection instrument, which is reached only by respondents who wish to enter information concerning athletic experience, interests and abilities.



SOURCE: NISS-produced prototype.

Figure 5.5: Fifth screen of the prototype data collection instrument, which is reached only by respondents who wish to enter information concerning athletic experience, interests and abilities. Here, respondents select the sports for which they wish to provide information. The list consists of 23 sports in which the NCAA conducts championships and seven “emerging sports.” The respondent illustrated here has chosen basketball, lacrosse and volleyball, which appear in screen 6.



SOURCE: NISS-produced prototype.

Figure 5.6: Sixth screen of the prototype data collection instrument, on which respondents enter information concerning experience, current participation, interest in future participation and ability only for those sports selected on screen 5. Continuing the example from screen 5, the respondent—who is female—has indicated high-school varsity experience, current intramural participation, interest in intercollegiate participation and ability for lacrosse.

XXX University
Assessment of Students' Athletic Interests and Abilities
 Information about Athletic Experience, Interests and Abilities

The sports listed below are those you selected on the previous screen.

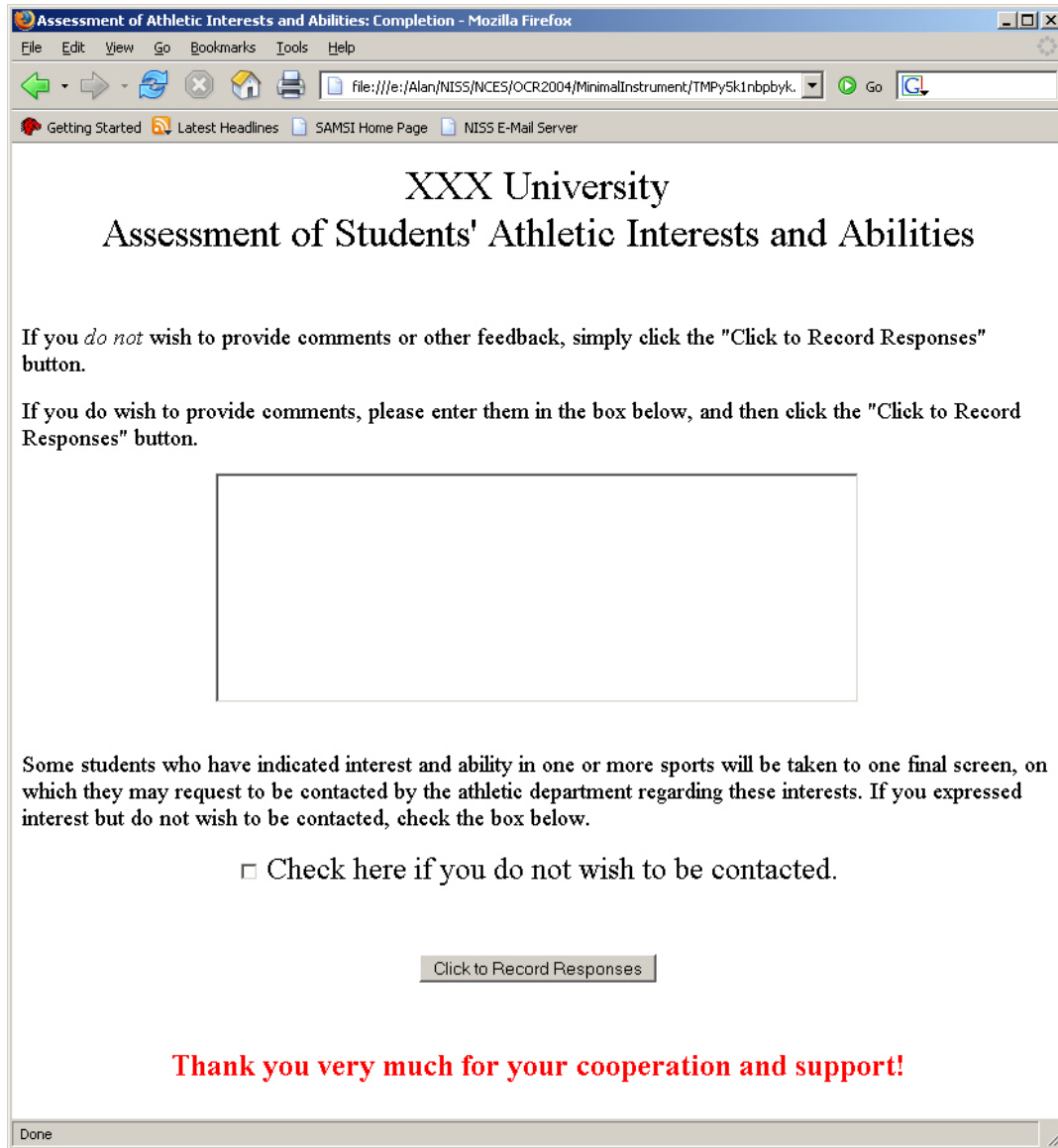
- If the list is not correct, please use your browser's back button to return to the previous screen and modify your choices.
- If the list is correct, please fill in all applicable responses. You do not need to respond to every question, and missing responses will be treated as (depending on category) "No Experience," "No Current Participation," "No Interest in Future Participation" and for Ability, "Not applicable." When you have completed all answers that you wish to complete, click the button to record your responses and proceed to the final part of the survey.

Sport	Experience: At what level did you participate in this sport in high school?	Current Participation: At what level are you participating in this sport at XXX?	Interest in Future Participation: At what level do you wish to participate in this sport at XXX?	Ability: Do you believe that you have the ability to participate at the level at which you indicated interest?
Basketball	<input type="radio"/> Recreational <input type="radio"/> Intramural <input type="radio"/> Club <input type="radio"/> Junior Varsity <input type="radio"/> Varsity	<input type="radio"/> Recreational <input type="radio"/> Intramural <input type="radio"/> Club <input type="radio"/> Intercollegiate	<input type="radio"/> Recreational <input type="radio"/> Intramural <input type="radio"/> Club <input type="radio"/> Intercollegiate	<input type="radio"/> Yes, I have the ability <input type="radio"/> No, I would need to develop the ability
Lacrosse	<input type="radio"/> Recreational <input type="radio"/> Intramural <input type="radio"/> Club <input type="radio"/> Junior Varsity <input type="radio"/> Varsity	<input type="radio"/> Recreational <input type="radio"/> Intramural <input type="radio"/> Club <input type="radio"/> Intercollegiate	<input type="radio"/> Recreational <input type="radio"/> Intramural <input type="radio"/> Club <input type="radio"/> Intercollegiate	<input type="radio"/> Yes, I have the ability <input type="radio"/> No, I would need to develop the ability
Volleyball	<input type="radio"/> Recreational <input type="radio"/> Intramural <input type="radio"/> Club <input type="radio"/> Junior Varsity <input type="radio"/> Varsity	<input type="radio"/> Recreational <input type="radio"/> Intramural <input type="radio"/> Club <input type="radio"/> Intercollegiate	<input type="radio"/> Recreational <input type="radio"/> Intramural <input type="radio"/> Club <input type="radio"/> Intercollegiate	<input type="radio"/> Yes, I have the ability <input type="radio"/> No, I would need to develop the ability

[Click to Proceed](#)

SOURCE: NISS-produced prototype.

Figure 5.7: Seventh, and for most respondents final, screen of the prototype data collection instrument, which offers respondents the opportunity to provide comments or other feedback. Respondents who are members of the data analysis population and have expressed an interest in one or more sports (in our example, full-time female students who are freshmen, sophomores or juniors) are taken automatically to screen 8 unless they check the box “Check here if you do not wish to be contacted.”



SOURCE: NISS-produced prototype.

Figure 5.8: Eighth and final screen of the data collection instrument, reached only by respondents who are members of the data analysis population (in our example, full-time female students who are freshmen, sophomores or juniors), on which they are asked whether they wish to be contacted by the athletic department, and if so to provide contact information. The illustrative values here are the same as in figures 5.2-5.7.

Assessment of Athletic Interests and Abilities: Demographic Information - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

file:///E:/Alan/NISS/NCES/OCR2004/MinimalInstrument/TMP7gxdebail7.htm

Getting Started Latest Headlines SAMSI Home Page NISS E-Mail Server

XXX University

Assessment of Students' Athletic Interests and Abilities

Request to Be Contacted by Athletic Department

You have indicated interest and ability in one or more sports, as summarized below:

Age:	20
Gender:	Female
Year in school:	Junior
Status:	Full-time
Sport(s):	Lacrosse

Experience = Varsity
 Current Participation = Intramural
 Interest in Further Participation = Intercollegiate
 Ability = "Yes, I have the ability"

If you would like to be contacted by the athletic department regarding these interests, please fill in the information below, and then click the "Click to Submit Request" button. This request is optional; your responses have already been recorded. Thank you.

Name:	<input type="text"/>
E-mail address:	<input type="text"/>
Telephone:	<input type="text"/>

Done

SOURCE: NISS-produced prototype.

5.4.2 Software

The screens shown in figures 5.1-5.8 are static HTML prototypes. There are at least two paths to create the software for a full-blown implementation that would generate most of these screens dynamically.

The first of these is commercial tools for web surveys, such as Survey Solutions (Perseus Corporation, 2005). The extent to which commercial tools support functionality such as confidentiality-preserving non-response follow-up is not clear. It is also likely that they involve significant hardware and software overheads that are really not necessary in the setting of this chapter.

The second path is to create CGI, Java, or Visual Basic scripts that

- Allow movement from each screen to the next, including dynamic generation of all screens other than the initial one in figure 5.1;
- Record responses (see additional discussion below).

Implementation of these scripts, together with appropriate security and support, would be a moderate-sized but straightforward programming task.

However, full automation of the process would require one more layer of scripts that would customize such items as

- The institution name;
- Details of wording, with defaults provided that can be edited as necessary;
- The list of sports on screen 5;
- The possibly sport-dependent responses on screen 6.

Storage of responses is straightforward. Other than the free-form text response on screen 7, the instrument described in section 5.4.1 generates only a small number of data items for each respondent:

- Four items of demographic information from screen 2;
- One Yes/No global “no athletic interest, current participation or interest in future participation” from screen 3;
- K Yes/No responses for each sport from screen 5, where K is the number of sports listed there;
- At most $4K$ categorical responses from screen 6, one each for experience, current participation, interest in future participation and ability.

The total number of items is $5K + 5$. To illustrate, for the 30 sports shown in the example in figure 5.5, the survey generates 155 items.

There are, of course, constraints on the item values. First, the instrument itself permits only pre-defined responses to all items (other than on screen 7). This guarantees that responses are interpretable and analyzable. Second, if the value of the global Yes/No

response on screen 3 is “No,” then the remaining $5K$ responses are empty. Similarly if the response on screen 5 for a sport is “No,” meaning that it is not listed on screen 6, then its four items associated with screen 6 are empty.

Finally, the software could store the data in a comma-separated-variable (CSV) file, with one $(5K + 5)$ item line for each response. Since no identifying information is stored, confidentiality of responses is guaranteed. The CSV data file can then be read and manipulated by tools ranging from Microsoft Excel to more powerful statistical packages such as SAS, SPSS, STATA and S-Plus.

The encrypted ID provided in the original e-mail would be severed from the response itself, and used in the database file containing respondents’ e-mail addresses to mark that a response had been received.

Practice among SURVEY Institutions: No SURVEY institution employed web-based data collection.

Recommendation for Improvement: OCR, NCES or another agency should investigate use of commercial software, and either recommend particular products or support development of custom tools such as those described here.

High-Quality Recommendation: OCR, NCES or another agency should investigate use of commercial software, and either recommend particular products or support development of custom tools such as those described here. In either case, data should be stored in “long form” (allowing empty responses) in CSV files, which maximizes flexibility and portability.

5.5 Data Analysis

Recall that goal analysis of the data generated by the census is to estimate N^+ , the number of students in the data analysis population interested and able to participate at the intercollegiate level in the given sport. If data concerning multiple sports is collected in the same instrument, then each sport requires an analysis of the type described in this section. For technical reasons, it is necessary to calculate the distribution of the estimator \hat{N}^+ .

We assume throughout this section that respondents answer truthfully. While there is good reason to expect untruthful responses in some settings, there seems to be none in this case.

As discussed in section 5.2, the data analysis population consists of the subset of members of the data collection population whose data are relevant to determination of compliance with Title IX. Although the techniques in this section are applicable to any choice of the data analysis population, for concreteness, we take that population to be full-time female students not in their final year of study.

Practice among SURVEY Institutions: There is little evidence in the OCR files that any of the 57 SURVEY institutions or the five “additional survey” institutions in chapter 4 has conducted principled statistical analyses of their data that account for possible non-response bias.

5.5.1 Preprocessing

The “raw data” generated by the data collection instrument in section 5.4.1 consist, in a form different from that in section 5.4.1, of six items for each sport:

- The global Yes/No response from screen 3, in which case the remaining five items are empty;
- The Yes/No selection response for that sport from screen 5; if this response is “No,” then the remaining four items are empty;
- The four categorical responses from screen 6.

Preprocessing of the data reduces these six items to a single Yes/No response, with “Yes” signifying that the respondent is interested in and able to participate in the sport at the intercollegiate level, and “No” signifying all other cases. While there is some flexibility—and obviously changes would be needed if a different instrument were employed—we recommend that “Yes” require all of the following conditions:

- On, screen 3, global response = “Yes”;
- On screen 5, selection response for that sport = “Yes”;
- On screen 6, for that sport
 - Experience in high school for = “Club,” “Junior Varsity” or “Varsity”
 - Current participation at any level (i.e., the response is not empty)
 - Interest in future participation = “Intercollegiate”.

This approach provides justification for three of the categories on screen 6.

Another approach, keeping in mind that ability is self-characterized, would also require

- On screen 6, Ability = “Yes, I have the ability”

We do not specifically recommend for or against this stronger criterion.

Effecting this preprocessing, either within a statistical package or with dedicated software, is straightforward. The result, for each sport and respondent, is a single Yes/No item.

Recommendation for Improvement: Data should be pre-processed to produce a single “Yes = Interested and able” or “No = either not interested or not able” response for each respondent and each sport.

High-Quality Recommendation: Data should be pre-processed to produce a single “Yes = Interested and able” or “No = either not interested or not able” response for each respondent and each sport.

5.5.2 Data Analysis in the Absence of Non-Response

In this section and the next, “non-response” means only subject-level non-response—failure of a member of the data collection population to respond at all. The data collection instrument in section 5.4 contains two mechanisms designed to minimize item non-response. The first is screen 3, which permits a global “no experience, participation or interest” response that concludes the data collection. The second is the statement on screen 6 that “... missing responses will be treated as (depending on category) “No Experience,” “No Current Participation,” “No Interest in Future Participation” and for Ability, “Not applicable.”.”

Here we describe analysis of the data for a single sport when there is not a problem with response rate. According to NCES statistical standards for censuses (U.S. DOE, 2003), this requires a subject-level response rate of at least 85 percent.

In this case, the analysis is straightforward. Recall the notation:

- P = size of target population, all of whom have been requested to provide information;
- N^+ = number of women in the target population who are interested in and able to participate in the sport at the intercollegiate level;
- M = minimum team size.

Also, let

- R = number of respondents;
- N_R^+ = number of “Yes” responses.

Table 5.1 summarizes the definitions and sources of these values.

Table 5.1: Sources of values used to estimate N^+

Value	Definition	Source
P	Target population size	Institution
N^+	Number of “Yes” responses in full target population	To be estimated
M	Minimum team size	Institution
R	Number of responses	Data
N_R^+	Number of “Yes” responses	Data

Source: This document.

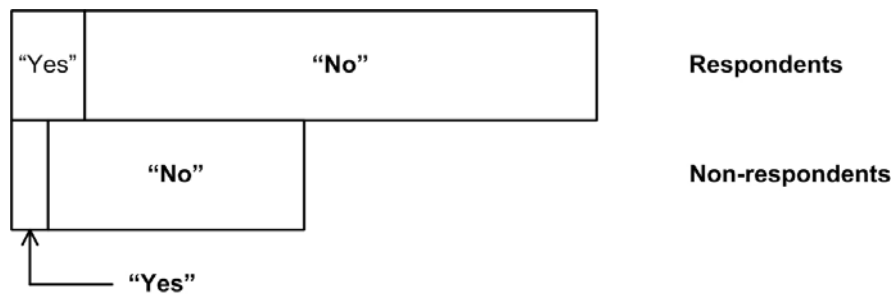
It is important to emphasize that we do not assume that $R = P$, which corresponds to a 100 percent response rate. Were this to happen, then $N^+ = N_R^+$, and the simple decision rule in section 5.1 can be applied by OCR.

Instead, we assume only that $R \geq .85P$. This obviates the need for the more complex analysis described in section 5.5.3, but still requires estimation of the number of “Yes” responses among non-respondents. The estimated value of N^+ is then

$$\hat{N}^+ = N_R^+ + \frac{N_R^+}{R} (P - R)$$

The principal assumption underlying this equation is that the rate of “Yes” responses among the $P-R$ non-respondents has the same value, namely N_R^+ / R , as among respondents. This is shown pictorially in Figure 5.9.

Figure 5.9: Pictorial representation of data analysis in the absence of significant non-response. The proportion of “Yes” responses among non-respondents is assumed to be the same as among respondents.



Source: NISS

The value \hat{N}^+ is not exact. Rather, it is a statistical estimator derived from the census data. As such, it has an associated probability distribution. As noted in section 5.1, we recommend that OCR employ a decision criterion of the form

- If $P\{\hat{N}^+ \geq M\} > \alpha$, where α is a threshold set in advance by agreement between OCR and the institution—in words, if the data indicate that there is sufficiently high probability that \hat{N}^+ exceeds M , then the data collection demonstrates that the interests and abilities of women are *not* accommodated by the present program. What action would be necessary, and under what additional conditions (see section 5.1), must be determined by OCR.
- If $P\{\hat{N}^+ \geq M\} \leq \alpha$ (in words, if the data indicate that there is not sufficiently high probability that \hat{N}^+ exceeds M), then the interests and abilities of women are accommodated by the present program, and no action by the institution is necessary.

Computation of $P\{\hat{N}^+ \geq M\}$ is a technical issue, because in models such as that described in appendix F, this probability depends on the unknown value N^+ . These difficulties can be avoided by treating the data values as known rather than unknown values, a simplification that is acceptable for high response rates but not when, as in section 5.5.2, a non-response bias analysis is conducted. Conditional on the data, the second component of \hat{N}^+ , that is, the estimated number of “Yes” responses among non-respondents, has a binomial distribution with parameters $P - R$ and N_R^+ / R , and tables, approximations or simulation may be used to calculate $P\{\hat{N}^+ \geq M\}$.

There is one case in which this entire analysis is unnecessary. If $N_R^+ \geq M$ then among the census respondents alone there are sufficiently many interested and able students, and it is certain that $N^+ \geq M$.

Practice among SURVEY Institutions: Only one-half of the OCR files containing data collection instruments report response rates or contain enough information to calculate response rates; reported values range from less than 1 percent to approximately 70 percent. There is no description in the files of any principled statistical analyses that were performed on the data. Those files that do contain results have nothing beyond tabulations of responses to items on the data collection instrument. Not one file contains any evidence that results were viewed as uncertain, or that uncertainties were calculated.

Recommendation for Improvement: An institution that does follow up on non-respondents should include in both e-mails and the web-based data collection instrument explicit, difficult-to-ignore statements that non-responses will be recorded as “no interest.” In this case, the estimated value of N^+ is

$$\hat{N}^+ = N_R^+$$

In this case, N^+ is certain to exceed \hat{N}^+ , so a decision criterion on the form

- If $\hat{N}^+ < M$, then the institution is in compliance with Title IX
- If $\hat{N}^+ \geq M$, then the institution may not be in compliance with Title IX, depending on additional considerations discussed above and in section 5.7

is lenient in favor of the institution.

As an intermediate step, non-responses should not be treated as “no interest” and N^+ should be estimated as

$$\hat{N}^+ = N_R^+ + \frac{N_R^+}{R}(P - R)$$

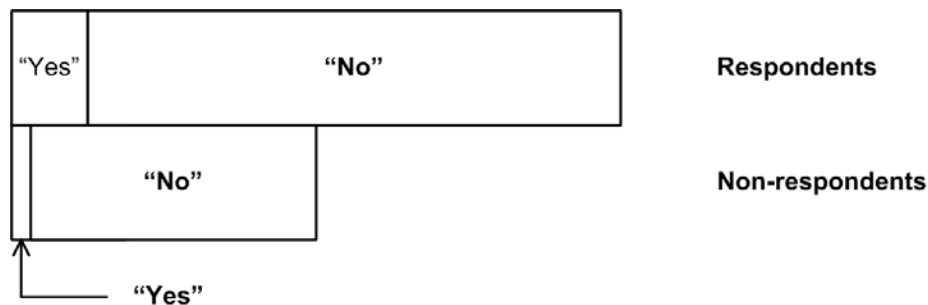
The decision criterion stated above is then unbiased, neither advantaging nor disadvantaging the institution.

High-Quality Recommendation: In the absence of significant non-response (that is, if the response rate exceeds 85 percent), N^+ should be estimated using methods described here, and the compliance decision should be based on $P\{\hat{N}^+ \geq M\}$.

5.5.3 Data Analysis in the Presence of Non-Response

When there is significant non-response, the central assumption in section 5.2.1 and figure 5.9 is called into question: that the probability of a “Yes” response is the same among non-respondents as among respondents. This failure is known as *non-response bias* and is shown pictorially in Figure 5.10, where the relative frequency of “Yes” is higher for respondents than for non-respondents.

Figure 5.10: Pictorial representation of non-response bias. “Yes” responses are relatively more frequent among respondents than among non-respondents.



Source: NISS.

There is, in fact, reason to suspect that the phenomenon in figure 5.8 arises in the setting of this chapter. Students who are interested and consider themselves able to participate in the sport at the intercollegiate level clearly have reason to respond, while those with no athletic interests have much less motivation to respond.

NCES statistical standards (U.S.DOE, 2003) prescribe that when the response rate (R/P in the notation of section 5.2.1) is less than 85 percent a non-response bias analysis be conducted. This process, which can be very resource-intensive, consists of

- Selecting (in most cases) a random sample of non-respondents;
- Contacting them (almost always by phone, to maximize the chances of reaching them);
- Ascertaining their response.

In principle, every selected non-respondent should be contacted, but often of course this is not possible.

Before proceeding, we emphasize that if $N_R^+ \geq M$, then regardless of the response rate, it is certain that $N^+ \geq M$, because among the census respondents alone there are

sufficiently many interested and able students. If this happens, there is no need to collect any additional data, and in particular no need for the non-response bias analysis.

In the most simplistic case, the products of the non-response bias analysis are:

- A sample size S_{NR} ;
- A number N_{NRBS}^+ of positive responses in the non-response bias analysis sample, from students in the non-response bias analysis sample who are interested and able to participate in the sport at the intercollegiate level;
- An estimate \hat{q}_{NR} of the frequency of “Yes” responses among the remaining non-respondents (i.e., those not in the non-response bias analysis sample). Assuming that the non-response bias analysis sample is a simple random sample, then in almost all cases, $\hat{q}_{NR} = N_{NRBS}^+ / S_{NR}$.

Using the same notation as in section 5.2.1, the estimated value of N^+ is then

$$\hat{N}^+ = N_R^+ + N_{NRBS}^+ + \hat{q}_{NR} (P - R - S_{NR})$$

The distribution of \hat{N}^+ , even conditional on the data, is more complex than in section 5.2.2, because \hat{q}_{NR} is based on a sample of non-respondents. An approach that parallels the approach in section 5.5.2 is to condition on all data values. In this case, the first two terms in the expression above are known, and the third term—corresponding to the number of students who neither responded nor are in the non-response bias analysis sample but who are interested and able—has a binomial distribution with parameters $P - R - S_{NR}$ and $\hat{q}_{NR} = N_{NRBS}^+ / S_{NR}$, which allows calculation of $P\{\hat{N}^+ \geq M\}$. Then, the decision criteria described in section 5.5.2 can be applied in the same manner.

The approach in the preceding paragraph overlooks randomness associated with the non-response bias sample. At a deeper level, it is also inconsistent with the underlying purpose of the non-response bias analysis, which is to determine if the *probability* of response depends on whether the response is positive or negative. A Bayesian modeling strategy is outlined in appendix F. In principle, it should be preferred to the approach described in the preceding paragraph, but it may be beyond the capabilities of some institutions, although the services of those who could implement it are readily available.

Recommendation for Improvement: In the presence of significant non-response (that is, if the response rate is less than 85 percent and consequent possible non-response bias, OCR should require, as NCES does, a non-response bias analysis. The decision criterion can be based solely on the estimator $\hat{N}^+ = N_R^+ + N_{NRBS}^+ + \hat{q}_{NR} (P - R - S_{NR})$, without consideration of associated uncertainties.

High-Quality Recommendation: In the presence of significant non-response (that is, if the response rate is less than 85 percent) and consequent possible non-response bias, OCR

should require, as NCES does, a non-response bias analysis. The estimated probability that N^+ exceeds M should be calculated using methods described in appendix F.

5.6 Precautions

The process outlined in sections 5.1-5.6 contains a number of safeguards against what would ordinarily be considered an “unsafe” situation: data collection conducted by an organization with a definable vested interest in the outcome. Specifically, if the institution did not want to offer the sport at the intercollegiate level, then one can assume that the institution would like the data collection to demonstrate N^+ is less than M , so that it will not have to offer the sport.

The census recommendation in section 5.2 avoids a potentially biased sample—a subset of the target population where interest and ability are thought to be low. Interestingly, many of the **INSTRUMENT** institution surveys summarized in chapter 3 actually focus on sub-populations where interest and ability would be expected to be high, such as students enrolled in physical education courses. This recommendation also avoids excessively small samples meant to produce no interested and able respondents. As discussed in section 5.2, such a strategy is risky, because every positive response carries high weight.

The data collection instrument in section 5.4.1 contains no prejudicial items or wording designed to induce negative responses. Some, but relatively few, of the instruments summarized in chapter 3 exhibit this shortcoming.

The data analysis procedures in section 5.5 specifically do not ever equate failure to respond at all with either lack of interest or ability. The OCR files do not contain information sufficient to determine whether this was done by any of the **INSTRUMENT** institutions.

5.7 Pre- and Post-Data Collection Procedures

The issues noted here lie outside the data collection process itself, but are important.

When an institution should (or must) conduct data collections such as those described in this chapter is influenced by both external and internal factors. OCR complaints or monitoring activities (see section 2.2.4) are the principal external stimuli. As noted in section 2.3, in the OCR files analyzed by NISS, use of Part 3, and within **PART 3** institutions, use of data collections, seem to increase over time. An institution may also, however, wish to conduct periodic assessments on its own, or in response to petitions from students.

An OCR determination of non-compliance requires that the region in which the institution is located offer competitive opportunities in the sport for the under-represented sex. Presumably this can be determined in advance of any data collection. Whether the conference to which the institution belongs offers competitive opportunities is not part of the decision process.

Following completion of the data collection, if the estimated value of N^+ exceeds the minimum team size M , then additional steps take place before OCR would determine that the institution must offer the sport at the intercollegiate level:

1. Especially if the data collection is confidential as in section 5.4, the institution must identify those students who stated themselves to be interested, and ascertain that they remain interested. Holding one or more widely announced meetings appears to be the most common way of doing this. Students who self-identified using the process pictured in figure 5.8 can be contacted directly. If the number of students identified at this stage is less than M , the remaining steps do not occur. There is no logical necessity, however, that this number be less than \hat{N}^+ : the meeting itself may generate additional students—in particular, non-respondents to the data collection—who consider themselves interested and able.
2. If sufficiently many students are identified as interested, the institution (ordinarily, the athletic department) must determine if those students who state they are able to compete at the intercollegiate level are actually able to do so. In most cases, this would be by means of tryouts.
3. Finally, if the number of students who are interested and able, as determined by steps 1 and 2, exceeds M , then OCR would declare the institution not to be in compliance with Title IX.

Considerations of cost (that is, whether the institution would need to build or otherwise access) new facilities are not part of the OCR criteria for determination of Title IX compliance.

Acknowledgments

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References

Converse, J. M. and Presser, S. (1989). *Survey Questions: Handcrafting the Standardized Questionnaire*. Newbury Park, CA: Sage.

Dillman, D. A. (2000). *Mail and Internet Surveys: The Tailored Design Method*. New York: Wiley.

Gelman, A. Carlin, J. B., Stern, H. S., and Rubin, D. B. (1995). *Bayesian Data Analysis*. London: Chapman and Hall.

Miller, D. C., and Salkind, N. J. (2002). *Handbook of Research Design and Social Measurement*, Sixth Edition. Thousand Oaks, CA: Sage.

U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics (2003). *NCES Statistical Standards*, NCES 2003-601.

National Collegiate Athletic Association (2004). Gender Equity/Title IX. Information available on-line at www1.ncaa.org/membership/ed_outreach/gender_equity/resource_materials/index.html

Perseus Corporation (2005). Survey Solutions. Information available on-line at www.perseus.com.

Wentland, E. J., and Smith, K. W. (1993). *Survey Responses: An Evaluation of their Validity*. New York: Academic Press.

Appendix A: List of OCR Populations

This appendix lists the 130 OCR institutions, and categorizes each as belonging to **SURVEY**, **NO SURVEY** or **PARTS 1 AND 2** (also referred to in chapter 2 as **NON-PART 3**). **PART 3** is the union of **SURVEY** and **NO SURVEY**. Each institution is also characterized as to whether it belongs to **COMPLAINT** or **COMPLIANCE MONITORING**. See figure 1.1 for details.

ID	Name	Population	COMPLAINT / COMPLIANCE MONITORING
100724	Alabama State University	NO SURVEY	COMPLAINT
164447	American International College	SURVEY	COMPLIANCE MONITORING
109350	Antelope Valley Community College	SURVEY	COMPLAINT
104151	Arizona State University	PARTS 1 AND 2	COMPLIANCE MONITORING
106458	Arkansas State University	NO SURVEY	COMPLAINT
100858	Auburn University	NO SURVEY	COMPLAINT
223232	Baylor University	SURVEY	COMPLAINT
175421	Belhaven College	SURVEY	COMPLAINT
219709	Belmont University	PARTS 1 AND 2	COMPLIANCE MONITORING
142115	Boise State University	SURVEY	COMPLIANCE MONITORING
128744	University of Bridgeport	PARTS 1 AND 2	COMPLAINT
230038	Brigham Young University	PARTS 1 AND 2	COMPLAINT
198084	Brunswick Community College	SURVEY	COMPLAINT
110662	University of California Los Angeles	PARTS 1 AND 2	COMPLAINT
110705	University of California Santa Barbara	PARTS 1 AND 2	COMPLIANCE MONITORING
110565	California State University Fullerton	PARTS 1 AND 2	COMPLIANCE MONITORING
198215	Catawba College	PARTS 1 AND 2	COMPLAINT
198233	Catawba Valley Community College	SURVEY	COMPLAINT
128771	Central Connecticut State University	PARTS 1 AND 2	COMPLIANCE MONITORING
132903	University of Central Florida	NO SURVEY*	COMPLAINT
206941	University of Central Oklahoma	SURVEY	COMPLIANCE MONITORING
111887	Cerritos College	SURVEY	COMPLIANCE MONITORING
217688	Charleston Southern University	PARTS 1 AND 2	COMPLIANCE MONITORING
166124	College of the Holy Cross	SURVEY	COMPLIANCE MONITORING
126614	University of Colorado	PARTS 1 AND 2	COMPLAINT
126818	Colorado State University	PARTS 1 AND 2	COMPLIANCE MONITORING
162210	Columbia Union College	PARTS 1 AND 2	COMPLAINT

198367	Craven Community College	NO SURVEY*	COMPLAINT
113193	Cuesta College	PARTS 1 AND 2	COMPLAINT
182670	Dartmouth College	PARTS 1 AND 2	COMPLAINT
113634	Diablo Valley Community College	NO SURVEY	COMPLIANCE MONITORING
144892	Eastern Illinois University	SURVEY	COMPLIANCE MONITORING
156620	Eastern Kentucky University	SURVEY	COMPLAINT
113980	El Camino Community College	SURVEY	COMPLIANCE MONITORING
155025	Emporia State University	SURVEY	COMPLAINT
101189	Faulkner University	NO SURVEY*	COMPLAINT
169910	Ferris State University	PARTS 1 AND 2	COMPLAINT
198552	Forsyth Tech Community College	SURVEY	COMPLAINT
110556	Fresno State University	PARTS 1 AND 2	COMPLIANCE MONITORING
131496	Georgetown University	SURVEY	COMPLIANCE MONITORING
237385	Glenville State College	SURVEY	COMPLIANCE MONITORING
159009	Grambling University	SURVEY	COMPLAINT
104717	Grand Canyon University	SURVEY	COMPLAINT
191649	Hofstra University	SURVEY	COMPLAINT
145619	Illinois Benedictine College	NO SURVEY*	COMPLAINT
151351	Indiana University	NO SURVEY	COMPLAINT
151324	Indiana State University	SURVEY	COMPLIANCE MONITORING
153603	Iowa State University	NO SURVEY	COMPLIANCE MONITORING
175856	Jackson State University	NO SURVEY	COMPLAINT
101480	Jacksonville State University	NO SURVEY	COMPLAINT
134945	Jacksonville University	PARTS 1 AND 2	COMPLIANCE MONITORING
156921	Jefferson Community College	SURVEY	COMPLAINT
162928	Johns Hopkins University	PARTS 1 AND 2	COMPLAINT
155317	University of Kansas	NO SURVEY	COMPLAINT
157076	Kentucky Wesleyan College	PARTS 1 AND 2	COMPLAINT
117788	Los Angeles City College	PARTS 1 AND 2	COMPLAINT
117247	Laney College	SURVEY	COMPLAINT
198817	Lenoir Community College	SURVEY	COMPLAINT
142328	Lewis-Clark State College	NO SURVEY	COMPLIANCE MONITORING
173920	Mankato State University	PARTS 1 AND 2	COMPLAINT
163268	University of Maryland Baltimore County	SURVEY	COMPLAINT
163286	University of Maryland College Park	PARTS 1 AND 2	COMPLAINT
166629	University of Massachusetts Amherst	PARTS 1 AND 2	COMPLAINT
135726	University of Miami	PARTS 1 AND 2	COMPLAINT
140483	Middle Georgia College	NO SURVEY*	COMPLAINT
220978	Middle Tennessee State University	NO SURVEY	COMPLAINT
174233	University of Minnesota Duluth	PARTS 1 AND 2	COMPLAINT

174066	University of Minnesota Twin Cities	PARTS 1 AND 2	COMPLAINT
180489	University of Montana	SURVEY	COMPLAINT
185590	Montclair State University	SURVEY	COMPLIANCE MONITORING
174358	Moorhead State University	SURVEY	COMPLIANCE MONITORING
157401	Murray State University	PARTS 1 AND 2	COMPLAINT
227146	Navarro College	SURVEY	COMPLAINT
181464	University of Nebraska	NO SURVEY	COMPLAINT
187985	University of New Mexico	SURVEY	COMPLAINT
188030	New Mexico State University	PARTS 1 AND 2	COMPLIANCE MONITORING
199111	University of North Carolina Asheville	NO SURVEY	COMPLAINT
199139	University of North Carolina Charlotte	NO SURVEY	COMPLAINT
200332	North Dakota State University	SURVEY	COMPLAINT
167358	Northeastern University	PARTS 1 AND 2	COMPLAINT
127741	University of Northern Colorado	SURVEY	COMPLAINT
147703	Northern Illinois University	SURVEY	COMPLAINT
171456	Northern Michigan University	SURVEY	COMPLIANCE MONITORING
147767	Northwestern University	PARTS 1 AND 2	COMPLAINT
171599	Olivet College	SURVEY	COMPLAINT
120342	Orange Coast Community College	NO SURVEY*	COMPLIANCE MONITORING
209542	Oregon State University	PARTS 1 AND 2	COMPLIANCE MONITORING
199333	Pitt Community College	SURVEY	COMPLAINT
155681	Pittsburg State University	SURVEY	COMPLIANCE MONITORING
215293	University of Pittsburgh	SURVEY	COMPLAINT
121363	Porterville College	PARTS 1 AND 2	COMPLAINT
218539	Presbyterian College	PARTS 1 AND 2	COMPLAINT
148131	Quincy College	SURVEY	COMPLAINT
233277	Radford College	PARTS 1 AND 2	COMPLAINT
195003	Rochester Institute of Technology	PARTS 1 AND 2	COMPLAINT
199485	Rockingham Community College	SURVEY	COMPLAINT
122180	Sacramento City College	NO SURVEY	COMPLAINT
102049	Samford University	NO SURVEY	COMPLAINT
122409	San Diego State University	PARTS 1 AND 2	COMPLAINT
122755	San Jose State University	PARTS 1 AND 2	COMPLIANCE MONITORING
102067	Shelton State Community College	NO SURVEY	COMPLAINT
123563	Solano Community College	NO SURVEY*	COMPLIANCE MONITORING
218733	South Carolina State University	NO SURVEY*	COMPLAINT
199722	Southeastern Community College	SURVEY	COMPLAINT
160612	Southeastern Louisiana University	PARTS 1 AND 2	COMPLAINT
130493	Southern Connecticut State University	SURVEY	COMPLIANCE MONITORING
179566	Southwest Missouri State University	SURVEY	COMPLAINT

155812	St Mary College	SURVEY	COMPLAINT
123554	St Mary's College	SURVEY	COMPLAINT
186432	St Peters College	SURVEY	COMPLAINT
196194	State University of New York Oswego	SURVEY	COMPLAINT
199768	Surry Community College	SURVEY	COMPLAINT
221740	University of Tennessee Chattanooga	NO SURVEY	COMPLAINT
221768	University of Tennessee Martin	NO SURVEY*	COMPLAINT
206084	University of Toledo	SURVEY	COMPLAINT
164076	Towson State University	SURVEY	COMPLAINT
221892	Trevecca Nararene University	SURVEY	COMPLAINT
102368	Troy State University	NO SURVEY	COMPLAINT
178615	Truman State University	SURVEY	COMPLAINT
236887	Walla Walla Community College	NO SURVEY*	COMPLIANCE MONITORING
230782	Weber State University	PARTS 1 AND 2	COMPLAINT
157951	Western Kentucky University	SURVEY	COMPLIANCE MONITORING
125727	Westmont College	SURVEY	COMPLAINT
156125	Wichita State University	PARTS 1 AND 2	COMPLAINT
199926	Wilkes Community College	SURVEY	COMPLAINT
240444	University of Wisconsin Madison	PARTS 1 AND 2	COMPLAINT
240471	University of Wisconsin River Falls	PARTS 1 AND 2	COMPLAINT
240189	University of Wisconsin Whitewater	SURVEY	COMPLAINT
240727	University of Wyoming	PARTS 1 AND 2	COMPLIANCE MONITORING
237109	Yakima Valley Community College	SURVEY	COMPLAINT
		PARTS 1 AND 2 = 44	COMPLAINT = 95
		SURVEY = 57	COMPLIANCE MONITORING = 35
		NO SURVEY = 29	
		Total = 130	Total = 130

*Following the completion of our analysis, OCR provided documentation showing that 10 of the 29 institutions identified as not having surveys in the analysis presented in this report had, in fact, used a survey. However, copies of the survey instruments used were not available for analysis and shortness of time precluded reanalysis of the affected data.

Appendix B: The Institutional Characteristics

Here we list the 14 characteristics on which institutions are compared in chapter 2. For each, we give its name, its definition (which also appears in chapter 2), its nature (categorical or numerical), the Integrated Postsecondary Education Data System data elements from which it is derived, the IPEDS files containing those data elements and the formula defining the characteristic.

- **Sector**
 - Definition: The control and level of the institution
 - Nature: Categorical
 - IPEDS data element: SECTOR-19
 - IPEDS source: dctfile_9-30-2004_6774.csv
 - Formula: **Sector** = SECTOR-19
- **Geographical Region**
 - Definition: The geographical region of the U.S. in which the institution is located
 - Nature: Categorical
 - IPEDS data element: OBEREG-8
 - IPEDS source: dctfile_9-30-2004_6774.csv
 - Formula: **Region** = OBEREG-8
- **Urbanicity**
 - Definition: The degree of urbanization of the institution's locale
 - Nature: Categorical
 - IPEDS data element: LOCALE-38
 - IPEDS source: dctfile_9-30-2004_6774.csv
 - Formula: **Urbanicity** = LOCALE-38
- **Carnegie Classification**
 - Definition: The 2000 Carnegie Classification of institutions based on their degree-granting activities from 1995-96 through 1997-98
 - Nature: Categorical
 - IPEDS data element: CARNEGIE-37
 - IPEDS source: dctfile_9-30-2004_6774.csv
 - **Carnegie** = CARNEGIE-37
- **Selectivity**
 - Definition: The ratio of the total number of admissions to the total number of applicants
 - Nature: Numerical percentage
 - IPEDS data elements: APPLCN-3016, ADMSSN-3018
 - IPEDS source: dctfile_9-30-2004_6774.csv
 - Formula: **Selectivity** = ADMSSN-3018 / APPLCN-3016

- **In-State Cost**
 - Definition: The price of attendance for full-time, first-time *in-state* undergraduate students for the full academic year, including tuition and fees, books and supplies, room and board, and other expenses
 - Nature: Numerical
 - IPEDS data element: CHG2AY3-551
 - IPEDS source: dctfile_9-30-2004_6774.csv
 - Formula: In-State Cost = CHG2AY3-551
- **Out-of-State Cost**
 - Definition: The price of attendance for full-time, first-time *out-of-state* undergraduate students for the full academic year, including tuition and fees, books and supplies, room and board, and other expenses
 - Nature: Numerical
 - IPEDS data element: CHG3AY3-557
 - IPEDS source: dctfile_9-30-2004_6774.csv
 - Formula: Out-of-State Cost = CHG3AY3-557
- **Enrollment**
 - Definition: The number of first-time, degree/certificate-seeking undergraduate students enrolled (full or part time) at the institution
 - Nature: Numerical
 - IPEDS data element: ENRLT-3024
 - IPEDS source: dctfile_9-30-2004_6774.csv
 - Formula: Enrollment = ENRLT-3024
- **Percent Female**
 - Definition: The percentage of the student body that is female
 - Nature: Numerical percentage
 - IPEDS data elements: EFRACE16-1186, EFRACE16-1188
 - IPEDS source: ef2003a_9-30-2004_6253.csv
 - Formula: Percent Female = $\frac{\text{EFRACE16-1188}}{(\text{EFRACE16-1186} + \text{EFRACE16-1188})}$
- **Percent Black**
 - Definition: The percentage of the student body that is Black non-Hispanic
 - Nature: Numerical percentage
 - IPEDS data element: PCTMIN1-29
 - IPEDS source: dctfile_9-30-2004_6774.csv
 - Formula: Percent Black = PCTMIN1-29

- **Percent Out-of-State**
 - Definition: The percentage of undergraduate students whose state of residence is other than the state in which the institution is located
 - Nature: Numerical percentage
 - IPEDS data elements: FIPS-7, EFCSTATE-1198
 - IPEDS sources: dctfile_9-30-2004_6774.csv for FIPS-7, ef2003c_9-30-2004_6668.csv for EFCSTATE-1198
 - Formula: **Percent Out-of-State** = $\sum_{s \neq s_l} N_s$, where N_s is the number of students whose state of residence is s and s_l is the state in which the institution is located.
- **Association Membership**
 - Definition: To which of the NCAA, NAIA, and NJCAA the institution belongs, including none and possibly more than one
 - Nature: Categorical
 - IPEDS data elements: ASSOC1-601, ASSOC1-602, ASSOC1-603:
 - IPEDS source: dctfile_9-30-2004_6774.csv
 - Association is defined by the following table:

ASSOC1-601	ASSOC1-602	ASSOC1-603	Value of Association
No	No	No	None
Yes	No	No	NCAA Only
No	Yes	No	NAIA Only
No	No	No	NJCAA Only
More than one "Yes"			Multiple Associations

- **Football**
 - Definition: Whether the institution is a conference member for football
 - Nature: Categorical
 - IPEDS data element: SPORT1-607
 - IPEDS source: dctfile_9-30-2004_6774.csv
 - Formula: **Football** = SPORT1-607
- **Number of Sports**
 - Definition: The number of sports among football, baseball, basketball and cross-country/track for which the institution is a conference member
 - Nature: Categorical
 - IPEDS data elements: SPORT1-607, SPORT1-609, SPORT1-611, SPORT1-613
 - IPEDS source: dctfile_9-30-2004_6774.csv
 - Formula: **Number of Sports** = number of "Yes" responses among SPORT1-607, SPORT1-609, SPORT1-611, SPORT1-613

Appendix C: Complete Set of Institutional Comparisons

C.1 Comparisons of OCR to COMPARISON

This section contains the 14 comparisons of the 130 **OCR** institutions to the 1,723 **COMPARISON** institutions. For each comparison there is a tabular summary. For categorical characteristics, this table contains complete information. The tables for numerical characteristics contain summary statistics of the distributions—the mean, standard deviation, minimum value, 25th percentile, median (50 percentile), 75th percentile and maximum value.

Institutional Characteristics

Sector. Table C.1 contains the tabular summary for this characteristic.

Table C.1: Tabular summary comparing OCR to COMPARISON for the characteristic Sector.

Sector	OCR		COMPARISON	
	Number	Percent	Number	Percent
Public, 4-year or above	71	54.62	453	26.29
Private nonprofit, 4-year or above	32	24.62	801	46.49
Private for-profit, 4-year or above	0	0.00	6	0.35
Public, 2-year	27	20.77	436	25.30
Private nonprofit, 2-year	0	0.00	20	1.16
Private for-profit, 2-year	0	0.00	7	0.41
Total	130	100.00	1,723	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Geographical Region. Table C.2 contains the tabular summary for this characteristic.

Table C.2: Tabular summary comparing OCR to COMPARISON for the characteristic Region.

Region	OCR		COMPARISON	
	Number	Percent	Number	Percent
New England	8	6.15	128	7.43
Mid East	12	9.23	342	19.85
Great Lakes	14	10.77	265	15.38
Plains	14	10.77	226	13.12
Southeast	44	33.85	413	23.97
Southwest	7	5.38	161	9.34
Rocky Mountains	9	6.92	53	3.08
Far West	22	16.92	125	7.25
Other	0	0.00	10	0.58
Total	130	100.00	1,723	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Urbanicity. Table C.3 contains the tabular summary for this characteristic.

Table C.3: Tabular summary comparing OCR to COMPARISON for the characteristic Urbanicity.

Urbanicity	OCR		COMPARISON	
	Number	Percent	Number	Percent
Large city	22	16.92	266	15.53
Mid-size city	42	32.31	446	26.04
Urban fringe of large city	19	14.62	314	18.33
Urban fringe of mid-size city	9	6.92	132	7.71
Large town	11	8.46	65	3.79
Small town	20	15.38	370	21.60
Rural	6	4.62	111	6.48
Other	1	0.77	9	0.53
Total	130	100.00	1,723	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Carnegie Classification. Table C.4 contains the tabular summary for this characteristic.

Table C.4: Tabular summary comparing OCR to COMPARISON for the characteristic Carnegie Classification.

Carnegie Classification	OCR		COMPARISON	
	Number	Percent	Number	Percent
Doctoral/Research Universities--Extensive	28	21.54	120	7.13
Doctoral/Research Universities--Intensive	14	10.77	79	4.70
Masters Colleges and Universities I	46	35.38	395	23.48
Masters Colleges and Universities II	3	2.31	90	5.35
Baccalaureate Colleges--Liberal Arts	5	3.85	190	11.30
Baccalaureate Colleges--General	7	5.38	260	15.46
Baccalaureate/Associates Colleges	0	0.00	23	1.37
Associates Colleges	27	20.77	465	27.65
Other	0	0.00	60	3.57
Total	130	100.00	1,682	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

NOTE: Total number of cases is less than 1,723 because of missing responses.

Selectivity. Recall that this is the percentage of applicants who are admitted and enrolled. Table C.5 contains the tabular summary for this characteristic.

Table C.5: Tabular summary comparing OCR to COMPARISON for the characteristic SELECTIVITY.

Selectivity	OCR	COMPARISON
Mean	69.85	69.56
Standard Deviation	17.93	18.78
Minimum	12.55	3.48
25th Percentile	59.65	59.99
Median	74.06	73.46
75th Percentile	82.16	82.10
Maximum	97.16	100.00
N/A	30	521
n	130	1,723

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

In-State Cost. Table C.6 contains the tabular summary for this characteristic.

Table C.6: Tabular summary comparing OCR to COMPARISON for the characteristic In-State Cost.

In-State Cost	OCR	COMPARISON
Mean	7,194.35	10,177.50
Standard deviation	7,412.00	8,009.88
Minimum	432	0
25th percentile	2,668	3,084
Median	4,122	6,812
75th percentile	8,154.50	16,685
Maximum	28,965	30,330
N/A	0	8
n	130	1,723

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Out-of-State Cost. Table C.7 contains the tabular summary for this characteristic.

Table C.7: Tabular summary comparing OCR to COMPARISON for the characteristic Out-of-State Cost.

Out-of-State Cost	OCR	COMPARISON
Mean	12,044.18	12,496.45
Standard deviation	6,211.07	6,790.17
Minimum	432	0
25th percentile	7,322.50	7,076
Median	11,477.50	11,720
75th percentile	15,231.50	17,050
Maximum	28,965	30,330
N/A	0	8
n	130	1,723

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Student Body Demographics

Enrollment. Table C.8 contains the tabular summary for this characteristic.

Table C.8: Tabular summary comparing OCR to COMPARISON for the characteristic Enrollment.

Enrollment	OCR	COMPARISON
Mean	10,910.10	4,769.75
Standard deviation	9,451.16	6,004.96
Minimum	588	53
25th percentile	3,203.50	1,367.50
Median	8,996.50	2,546
75th percentile	14,208.75	5,497.50
Maximum	41,617	48,397
N/A	130	1,723

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Percent Female. Table C.9 contains the tabular summary for this characteristic.

Table C.9: Tabular summary comparing OCR to COMPARISON for the characteristic Percent Female.

Percent Female	OCR	COMPARISON
Mean	56.10	58.50
Standard deviation	6.01	11.67
Minimum	30.82	0.00
25th percentile	52.51	53.90
Median	56.82	58.28
75th percentile	60.10	63.01
Maximum	71.96	100.00
N/A	0	1
n	130	1,723

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Percent Black. Table C.10 contains the tabular summary for this characteristic.

Table C.10: Tabular summary comparing OCR to COMPARISON for the characteristic Percent Black.

Percent Black	OCR	COMPARISON
Mean	12.27	12.97
Standard deviation	17.33	19.92
Minimum	0	0
25th percentile	3	3
Median	6	6
75th percentile	15	13
Maximum	94	100
N/A	130	1,723

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Percent Out-of-State. Table C.11 contains the tabular summary for this characteristic.

Table C.11: Tabular summary comparing OCR to COMPARISON for the characteristic Percent Out-of-State.

Percent Out-of-State	OCR	COMPARISON
Mean	22.26	24.13
Standard deviation	22.83	24.25
Minimum	0	0
25th percentile	3.75	4.56
Median	16.32	15.10
75th percentile	36.36	37.06
Maximum	97.20	100
N/A	17	351
n	130	1,723

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Athletic Program Characteristics

Association Membership. Table C.12 contains the tabular summary for this characteristic.

Table C.12: Tabular summary comparing OCR to COMPARISON for the characteristic Association Membership.

Association Membership	OCR		COMPARISON	
	Number	Percent	Number	Percent
NCAA only	96	73.85	922	53.51
NAIA only	6	4.62	278	16.13
NJCAA only	12	9.23	500	29.02
Multiple associations	1	0.77	23	1.33
None	15	11.54	0	0.00
Total	130	100.00	1,723	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Football. Table C.13 contains the tabular summary for this characteristic.

Table C.13: Tabular summary comparing OCR to COMPARISON for the characteristic Football.

Football	OCR		COMPARISON	
	Number	Percent	Number	Percent
Yes	86	66.15	622	36.10
No	44	33.85	1,101	63.90
Total	130	100.00	1,723	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Number of Sports. Table C.14 contains the tabular summary for this characteristic.

Table C.14: Tabular summary comparing OCR to COMPARISON for the characteristic Number of Sports.

Number of Sports	OCR		COMPARISON	
	Number	Percent	Number	Percent
0	27	20.77	512	29.72
1	0	0.00	58	3.37
2	2	1.54	195	11.32
3	34	26.15	428	24.84
4	67	51.54	530	30.76
Total	130	100.00	1,723	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

C.2 Comparisons of PART 3 to NON-PART 3

This section contains the 14 comparisons of the 86 **PART 3** institutions to the 44 **NON-PART 3** institutions.

Institutional Characteristics

Sector. Table C.15 contains the tabular summary for this characteristic.

Table C.15: Tabular summary comparing PART 3 to NON-PART 3 for Sector.

Sector	PART 3		NON-PART 3	
	Number	Percent	Number	Percent
Public, 4-year or above	45	52.33	26	59.09
Private nonprofit, 4-year or above	17	19.77	15	34.09
Private for-profit, 4-year or above	0	0.00	0	0.00
Public, 2-year	24	27.91	3	6.82
Private nonprofit, 2-year	0	0.00	0	0.00
Private for-profit, 2-year	0	0.00	0	0.00
Total	86	100.00	44	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

NOTE: Rows with counts of zero are preserved for comparability with other tables.

Geographical Region. Table C.16 contains the tabular summary for this characteristic.

Table C.16: Tabular summary comparing PART 3 to NON-PART 3 for Region.

Region	PART 3		NON-PART 3	
	Number	Percent	Number	Percent
New England	3	3.49	5	11.36
Mid East	8	9.30	4	9.09
Great Lakes	10	11.63	4	9.09
Plains	10	11.63	4	9.09
Southeast	34	39.53	10	22.73
Southwest	5	5.81	2	4.55
Rocky Mountains	4	4.65	5	11.36
Far West	12	13.95	10	22.73
Total	86	100.00	44	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Urbanicity. Table C.17 contains the tabular summary for this characteristic.

Table C.17: Tabular summary comparing PART 3 to NON-PART 3 for Urbanicity.

Urbanicity	PART 3		NON-PART 3	
	Number	Percent	Number	Percent
Large city	11	12.79	11	25.00
Mid-size city	27	31.40	15	34.09
Urban fringe of large city	13	15.12	6	13.64
Urban fringe of mid-size city	7	8.14	2	4.55
Large town	8	9.30	3	6.82
Small town	14	16.28	6	13.64
Rural	5	5.81	1	2.27
Other	1	1.16	0	0.00
Total	86	100.00	44	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Carnegie Classification. Table C.18 contains the tabular summary for this characteristic.

Table C.18: Tabular summary comparing PART 3 to NON-PART 3 for Carnegie Classification.

Carnegie Classification	PART 3		NON-PART 3	
	Number	Percent	Number	Percent
Doctoral/Research Universities--Extensive	11	12.79	17	38.64
Doctoral/Research Universities--Intensive	10	11.63	4	9.09
Masters Colleges and Universities I	32	37.21	14	31.82
Masters Colleges and Universities II	1	1.16	2	4.55
Baccalaureate Colleges--Liberal Arts	4	4.65	1	2.27
Baccalaureate Colleges--General	4	4.65	3	6.82
Baccalaureate/Associates Colleges	0	0.00	0	0.00
Associates Colleges	24	27.91	3	6.82
Total	86	100.00	44	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

NOTE: Rows with counts of zero are preserved for comparability with other tables.

Selectivity. Table C.19 contains the tabular summary for this characteristic.

Table C.19: Tabular summary comparing PART 3 to NON-PART 3 for Selectivity.

Selectivity	PART 3	NON-PART 3
Mean	70.98	68.14
Standard deviation	17.35	18.86
Minimum	12.55	18.18
25th percentile	59.65	59.76
Median	75.01	73.63
75th percentile	84.38	80.48
Maximum	97.16	95.73
N/A	26	4
n	86	44

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

In-State Cost. Table C.20 contains the tabular summary for this characteristic.

Table C.20: Tabular summary comparing PART 3 to NON-PART 3 for In-State Cost.

In-State Cost	PART 3	NON-PART 3
Mean	6,132.05	9,270.68
Standard deviation	6,525.05	8,601.29
Minimum	432	468
25th percentile	2,250.75	3,316.50
Median	3,847	5,125.50
75th percentile	6,367.75	15,424.50
Maximum	28,209	28,965
N/A	86	44

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Out-of-State Cost. Table C.21 contains the tabular summary for this characteristic.

Table C.21: Tabular summary comparing PART 3 to NON-PART 3 for Out-of-State Cost.

Out-of-State Cost	PART 3	NON-PART 3
Mean	10,562.21	14,940.77
Standard deviation	5,501.64	6,551.51
Minimum	432	3,150
25th percentile	6,332.50	10,957
Median	9,797	14,348
75th percentile	13,151	18,456.50
Maximum	28,209	28,965
N/A	86	44

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Student Body Demographics

Enrollment. Table C.22 contains the tabular summary for this characteristic.

Table C.22: Tabular summary comparing PART 3 to NON-PART 3 for Enrollment.

Enrollment	PART 3	NON-PART 3
Mean	8,764.27	15,104.23
Standard deviation	7,444.25	11,455.11
Minimum	592	588
25th percentile	2,821	6,282
Median	6,425	13,122.50
75th percentile	12,275	21,694.50
Maximum	35,667	41,617
N/A	86	44

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Percent Female. Table C.23 contains the tabular summary for this characteristic.

Table C.23: Tabular summary comparing PART 3 to NON-PART 3 for Percent Female.

Percent Female	PART 3	NON-PART 3
Mean	57.19	53.95
Standard deviation	5.78	5.92
Minimum	43.22	30.82
25th percentile	53.50	50.65
Median	57.66	53.53
75th percentile	60.84	58.12
Maximum	71.96	65.49
N/A	86	44

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Percent Black. Table C.24 contains the tabular summary for this characteristic.

Table C.24: Tabular summary comparing PART 3 to NON-PART 3 for Percent Black.

Percent Black	PART 3	NON-PART 3
Mean	15.09	6.75
Standard deviation	19.87	8.52
Minimum	0	0
25th percentile	4	2
Median	8.50	4
75th percentile	18.75	7
Maximum	94	51
N/A	86	44

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Percent Out-of-State. Table C.25 contains the tabular summary for this characteristic.

Table C.25: Tabular summary comparing PART 3 to NON-PART 3 for Percent Out-of-State.

Percent Out-of-State	PART 3	NON-PART 3
Mean	17.10	31.68
Standard deviation	18.83	26.48
Minimum	0	0
25th percentile	2.92	8.88
Median	9.64	29.67
75th percentile	25.88	47.21
Maximum	97.05	97.20
N/A	13	4
n	86	44

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Athletic Program Characteristics

Association Membership. Table C.26 contains the tabular summary for this characteristic.

Table C.26: Tabular summary comparing PART 3 to NON-PART 3 for Association Membership.

Association Membership	PART 3		NON-PART 3	
	Number	Percent	Number	Percent
NCAA only	55	63.95	41	93.18
NAIA only	6	6.98	0	0.00
NJCAA only	12	13.95	0	0.00
Multiple associations	1	1.16	0	0.00
None	12	13.95	3	6.82
Total	86	100.00	44	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Football. Table C.27 contains the tabular summary for this characteristic.

Table C.27: Tabular summary comparing PART 3 to NON-PART 3 for Football.

Football	PART 3		NON-PART 3	
	Number	Percent	Number	Percent
Yes	53	61.63	33	75.00
No	33	38.37	11	25.00
Total	86	100.00	44	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Number of Sports. Table C.28 contains the tabular summary for this characteristic.

Table C.28: Tabular summary comparing PART 3 to NON-PART 3 for Number of Sports.

Number of Sports	PART 3		NON-PART 3	
	Number	Percent	Number	Percent
0	24	27.91	3	6.82
1	0	0.00	0	0.00
2	2	2.33	0	0.00
3	18	20.93	16	36.36
4	42	48.84	25	56.82
Total	86	100.00	44	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

NOTE: Rows with counts of zero are preserved for comparability with other tables.

C.3 Comparisons of SURVEY to NO SURVEY

This section summarizes the 14 comparisons of the 57 SURVEY institutions to the 29 NO SURVEY institutions. For each comparison there is a tabular summary. Notable effects in the summaries are described.

Institutional Characteristics

Sector. Table C.29 contains the tabular summary for this characteristic. SURVEY has relatively more “Private nonprofit, 4-year or above” institutions than NO SURVEY, which in turn has relatively more “Public, 4-year or above” institutions than SURVEY.

Table C.29: Tabular summary comparing SURVEY to NO SURVEY for Sector.

Sector	SURVEY		NO SURVEY	
	Number	Percent	Number	Percent
Public, 4-year or above	27	47.37	18	62.07
Private nonprofit, 4-year or above	14	24.56	3	10.34
Private for-profit, 4-year or above	0	0.00	0	0.00
Public, 2-year	16	28.07	8	27.59
Private nonprofit, 2-year	0	0.00	0	0.00
Private for-profit, 2-year	0	0.00	0	0.00
Other	0	0.00	0	0.00
Total	57	100.00	29	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

NOTE: Rows with counts of zero are preserved for comparability with other tables.

Geographical Region. Table C.30 contains the tabular summary for this characteristic.

Table C.30: Tabular summary comparing SURVEY to NO SURVEY for Region.

Region	SURVEY		NO SURVEY	
	Number	Percent	Number	Percent
New England	3	5.26	0	0.00
Mid East	8	14.04	0	0.00
Great Lakes	8	14.04	2	6.90
Plains	7	12.28	3	10.34
Southeast	16	28.07	18	62.07
Southwest	5	8.77	0	0.00
Rocky Mountains	3	5.26	1	3.45
Far West	7	12.28	5	17.24
Total	57	100.00	29	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Urbanicity. Table C.31 contains the tabular summary for this characteristic.

Table C.31: Tabular summary comparing SURVEY to NO SURVEY for Urbanicity.

Urbanicity	SURVEY		NO SURVEY	
	Number	Percent	Number	Percent
Large city	9	15.79	2	6.90
Mid-size city	18	31.58	9	31.03
Urban fringe of large city	8	14.04	5	17.24
Urban fringe of mid-size city	4	7.02	3	10.34
Large town	5	8.77	3	10.34
Small town	9	15.79	5	17.24
Rural	4	7.02	1	3.45
Other	0	0.00	1	3.45
Total	57	100.00	29	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Carnegie Classification. Table C.32 contains the tabular summary for this characteristic.

Table C.32: Tabular summary comparing SURVEY to NO SURVEY for Carnegie Classification.

Carnegie Classification	SURVEY		NO SURVEY	
	Number	Percent	Number	Percent
Doctoral/Research Universities--Extensive	6	10.53	5	17.24
Doctoral/Research Universities--Intensive	6	10.53	4	13.79
Masters Colleges and Universities I	23	40.35	9	31.03
Masters Colleges and Universities II	1	1.75	0	0.00
Baccalaureate Colleges--Liberal Arts	3	5.26	1	3.45
Baccalaureate Colleges--General	2	3.51	2	6.90
Baccalaureate/Associates Colleges	0	0.00	0	0.00
Associates Colleges	16	28.07	8	27.59
Total	57	100.00	29	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

NOTE: Rows with counts of zero are preserved for comparability with other tables.

Selectivity. Table C.33 contains the tabular summary for this characteristic.

Table C.33: Tabular summary comparing SURVEY to NO SURVEY for Selectivity.

Selectivity	SURVEY	NO SURVEY
Mean	72.51	68.35
Standard deviation	17.05	17.96
Minimum	22.73	12.55
25th percentile	60.17	60.86
Median	76.11	71.86
75th percentile	84.59	78.82
Maximum	97.16	89.83
N/A	19	7
n	57	29

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

In-State Cost. Table C.34 contains the tabular summary for this characteristic.

Table C.34: Tabular summary comparing SURVEY to NO SURVEY for In-State Cost.

In-State Cost	SURVEY	NO SURVEY
Mean	7,100.19	4,229.14
Standard deviation	7,430.36	3,629.14
Minimum	432	432
25th percentile	1,896	2,280
Median	4,254	3,612
75th percentile	9,274	4,426
Maximum	28,209	17,110
N/A	57	29

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Out-of-State Cost. Table C.35 contains the tabular summary for this characteristic.

Table C.35: Tabular summary comparing SURVEY to NO SURVEY for Out-of-State Cost.

Out-of-State Cost	SURVEY	NO SURVEY
Mean	11,084.54	9,535.55
Standard deviation	6,024.46	4,201.16
Minimum	2,026	432
25th percentile	6,327	6,374
Median	9,784	10,720
75th percentile	14,298	12,353
Maximum	28,209	17,552
N/A	57	29

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Student Body Demographics

Enrollment. Table C.36 contains the tabular summary for this characteristic.

Table C.36: Tabular summary comparing SURVEY to NO SURVEY for Enrollment.

Enrollment	SURVEY	NO SURVEY
Mean	7,641.05	10,971.97
Standard deviation	5,866.34	9,580.47
Minimum	592	1,692
25th percentile	2,285	3,868
Median	5,941	7,258
75th percentile	11,900	15,672
Maximum	23,552	35,667
N/A	57	29

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Percent Female. Table C.37 contains the tabular summary for this characteristic.

Table C.37: Tabular summary comparing SURVEY to NO SURVEY for Percent Female.

Percent Female	SURVEY	NO SURVEY
Mean	57.88	55.85
Standard deviation	5.88	5.43
Minimum	43.22	43.87
25th percentile	53.67	52.49
Median	57.77	57.60
75th percentile	61.70	59.56
Maximum	71.96	64.50
N/A	57	29

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Percent Black. Table C.38 contains the tabular summary for this characteristic.

Table C.38: Tabular summary comparing SURVEY to NO SURVEY for Percent Black.

Percent Black	SURVEY	NO SURVEY
Mean	11.96	21.24
Standard deviation	14.55	26.76
Minimum	0	0
25th percentile	3	5
Median	8	12
75th percentile	17	23
Maximum	94	94
N/A	57	29

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Percent Out-of-State. Table C.39 contains the tabular summary for this characteristic.

Table C.39: Tabular summary comparing SURVEY to NO SURVEY for Percent Out-of-State.

Percent Out-of-State	SURVEY	NO SURVEY
Mean	17.43	16.47
Standard deviation	21.02	14.06
Minimum	0	0
25th percentile	2.75	5.96
Median	8.47	13.07
75th percentile	24.89	26.37
Maximum	97.05	46.09
N/A	9	4
n	57	29

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Athletic Program Characteristics

Association Membership. Table C.40 contains the tabular summary for this characteristic.

Table C.40: Tabular summary comparing SURVEY to NO SURVEY for Association Membership.

Association Membership	SURVEY		NO SURVEY	
	Number	Percent	Number	Percent
NCAA only	36	63.16	19	65.52
NAIA only	4	7.02	2	6.90
NJCAA only	10	17.54	2	6.90
Multiple associations	1	1.75	0	0.00
None	6	10.53	6	20.69
Total	57	100.00	29	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Football. Table C.41 contains the tabular summary for this characteristic.

Table C.41: Tabular summary comparing SURVEY to NO SURVEY for Football.

Football	SURVEY		NO SURVEY	
	Number	Percent	Number	Percent
Yes	36	63.16	17	58.62
No	21	36.84	12	41.38
Total	57	100.00	29	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Number of Sports. Table C.42 contains the tabular summary for this characteristic.

Table C.42: Tabular summary comparing SURVEY to NO SURVEY for Number of Sports.

Number of Sports	SURVEY		NO SURVEY	
	Number	Percent	Number	Percent
0	16	28.07	8	27.59
1	0	0.00	0	0.00
2	2	3.51	0	0.00
3	11	19.30	7	24.14
4	28	49.12	14	48.28
Total	57	100.00	29	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

NOTE: Rows with counts of zero are preserved for comparability with other tables.

C.4 Comparisons of COMPLAINT to COMPLIANCE MONITORING

This section contains the 14 comparisons of the 95 COMPLAINT institutions to the 35 COMPLIANCE MONITORING institutions.

Institutional Characteristics

Sector. Table C.43 contains the tabular summary for this characteristic.

Table C.43: Tabular summary comparing COMPLAINT to COMPLIANCE MONITORING for Sector.

Sector	COMPLAINT		COMPLIANCE MONITORING	
	Number	Percent	Number	Percent
Public, 4-year or above	48	50.53	23	65.71
Private nonprofit, 4-year or above	26	27.37	6	17.14
Private for-profit, 4-year or above	0	0.00	0	0.00
Public, 2-year	21	22.11	6	17.14
Private nonprofit, 2-year	0	0.00	0	0.00
Private for-profit, 2-year	0	0.00	0	0.00
Other	0	0.00	0	0.00
Total	95	100.00	35	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

NOTE: Rows with counts of zero are preserved for comparability with other tables.

Geographical Region. Table C.44 contains the tabular summary for this characteristic.

Table C.44: Tabular summary comparing COMPLAINT to COMPLIANCE MONITORING for Region.

Region	COMPLAINT		COMPLIANCE MONITORING	
	Number	Percent	Number	Percent
New England	4	4.21	4	11.43
Mid East	10	10.53	2	5.71
Great Lakes	11	11.58	3	8.57
Plains	12	12.63	2	5.71
Southeast	40	42.11	4	11.43
Southwest	4	4.21	3	8.57
Rocky Mountains	3	3.16	6	17.14
Far West	11	11.58	11	31.43
Total	95	100.00	35	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Urbanicity. Table C.45 contains the tabular summary for this characteristic.

Table C.45: Tabular summary comparing COMPLAINT to COMPLIANCE MONITORING for Urbanicity.

Urbanicity	COMPLAINT		COMPLIANCE MONITORING	
	Number	Percent	Number	Percent
Large city	18	18.95	4	11.43
Mid-size city	31	32.63	11	31.43
Urban fringe of large city	11	11.58	8	22.86
Urban fringe of mid-size city	8	8.42	1	2.86
Large town	4	4.21	7	20.00
Small town	17	17.89	3	8.57
Rural	5	5.26	1	2.86
Other	1	1.05	0	0.00
Total	95	100.00	35	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Carnegie Classification. Table C.46 contains the tabular summary for this characteristic.

Table C.46: Tabular summary comparing COMPLAINT to COMPLIANCE MONITORING for Carnegie Classification.

Carnegie Classification	COMPLAINT		COMPLIANCE MONITORING	
	Number	Percent	Number	Percent
Doctoral/Research Universities--Extensive	19	20.00	9	25.71
Doctoral/Research Universities--Intensive	12	12.63	2	5.71
Masters Colleges and Universities I	31	32.63	15	42.86
Masters Colleges and Universities II	3	3.16	0	0.00
Baccalaureate Colleges--Liberal Arts	4	4.21	1	2.86
Baccalaureate Colleges--General	5	5.26	2	5.71
Baccalaureate/Associates Colleges	0	0.00	0	0.00
Associates Colleges	21	22.11	6	17.14
Total	95	100.00	35	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

NOTE: Rows with counts of zero are preserved for comparability with other tables.

Selectivity. Table C.47 contains the tabular summary for this characteristic.

Table C.47: Tabular summary comparing COMPLAINT to COMPLIANCE MONITORING for Selectivity.

Selectivity	COMPLAINT	COMPLIANCE MONITORING
Mean	68.21	74.05
Standard deviation	18.03	17.27
Minimum	12.55	22.73
25th percentile	57.37	65.62
Median	73.63	77.81
75th percentile	81.26	87.53
Maximum	97.16	95.09
N/A	23	7
n	95	35

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

In-State Cost. Table C.48 contains the tabular summary for this characteristic.

Table C.48: Tabular summary comparing COMPLAINT to COMPLIANCE MONITORING for In-State Cost.

In-State Cost	COMPLAINT	COMPLIANCE MONITORING
Mean	7,688.76	5,852.40
Standard deviation	7,573.85	6,878.30
Minimum	468	432
25th percentile	2,863	2,556
Median	4,279	3,595
75th percentile	11,830	5,162
Maximum	28,965	28,209
n	95	35

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Out-of-State Cost. Table C.49 contains the tabular summary for this characteristic.

Table C.49: Tabular summary comparing COMPLAINT to COMPLIANCE MONITORING for Out-of-State Cost.

Out-of-State Cost	COMPLAINT	COMPLIANCE MONITORING
Mean	12,388.43	11,109.80
Standard deviation	6,208.69	6,209.99
Minimum	2,026	432
25th percentile	7,286	7,842
Median	11,700	10,976
75th percentile	16,625	12,960
Maximum	28,965	28,209
n	95	35

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Student Body Demographics

Enrollment. Table C.50 contains the tabular summary for this characteristic.

Table C.50: Tabular summary comparing COMPLAINT to COMPLIANCE MONITORING for Enrollment.

Enrollment	COMPLAINT	COMPLIANCE MONITORING
Mean	10,150.21	1,2972.66
Standard deviation	9,554.30	8,974.40
Minimum	588	1,276
25th percentile	2,746.50	7,247
Median	6,903	11,901
75th percentile	13,811	16,489
Maximum	40,567	41,617
Total	95	35

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Percent Female. Table C.51 contains the tabular summary for this characteristic.

Table C.51: Tabular summary comparing COMPLAINT to COMPLIANCE MONITORING for Percent Female.

Percent Female	COMPLAINT	COMPLIANCE MONITORING
Mean	56.79	54.20
Standard deviation	6.39	4.36
Minimum	30.82	43.87
25th percentile	52.75	51.33
Median	57.60	53.78
75th percentile	60.85	57.74
Maximum	71.96	61.74
n	95	35

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Percent Black. Table C.52 contains the tabular summary for this characteristic.

Table C.52: Tabular summary comparing COMPLAINT to COMPLIANCE MONITORING for Percent Black.

Percent Black	COMPLAINT	COMPLIANCE MONITORING
Mean	14.46	6.31
Standard deviation	19.49	6.22
Minimum	1	0
25th percentile	4	2
Median	8	4
75th percentile	17	8
Maximum	94	25
n	95	35

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Percent Out-of-State. Table C.53 contains the tabular summary for this characteristic.

Table C.53: Tabular summary comparing COMPLAINT to COMPLIANCE MONITORING for Percent Out-of-State.

Percent Out-of-State	COMPLAINT	COMPLIANCE MONITORING
Mean	22.71	21.19
Standard deviation	22.73	23.39
Minimum	0	0
25th percentile	5.29	1.74
Median	15.33	17.51
75th percentile	37.47	26.20
Maximum	97.20	97.05
N/A	15	2
n	95	35

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Athletic Program Characteristics

Association Membership. Table C.54 contains the tabular summary for this characteristic.

Table C.54: Tabular summary comparing COMPLAINT to COMPLIANCE MONITORING for Association Membership.

Association Membership	COMPLAINT		COMPLIANCE MONITORING	
	Number	Percent	Number	Percent
NCAA only	68	71.58	28	80.00
NAIA only	5	5.26	1	2.86
NJCAA only	12	12.63	0	0.00
Multiple associations	1	1.05	0	0.00
None	9	9.47	6	17.14
Total	95	100.00	35	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Football. Table C.55 contains the tabular summary for this characteristic.

Table C.55: Tabular summary comparing COMPLAINT to COMPLIANCE MONITORING for Football.

Football	COMPLAINT		COMPLIANCE MONITORING	
	Number	Percent	Number	Percent
Yes	60	63.16	26	74.29
No	35	36.84	9	25.71
Total	95	100.00	35	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

Number of Sports. Table C.56 contains the tabular summary for this characteristic.

Table C.56: Tabular summary comparing COMPLAINT to COMPLIANCE MONITORING for Number of Sports.

Number of Sports	COMPLAINT		COMPLIANCE MONITORING	
	Number	Percent	Number	Percent
0	21	22.11	6	17.14
1	0	0.00	0	0.00
2	2	2.11	0	0.00
3	22	23.16	12	34.29
4	50	52.63	17	48.57
Total	95	100.00	35	100.00

SOURCE: U. S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2003.

NOTE: Rows with counts of zero are preserved for comparability with other tables.

Appendix D: Data Collection Classification Characteristics

Here we list the 20 characteristics according to which the 52 **INSTRUMENT** data collection instruments are classified in section 3.1. Table 3.5, in that same section, contains additional information concerning response rates, even though these are not in the list of characteristics.

Characteristic	Values
CASE AND SURVEY (4 characteristics)	
Complaint?	Y = Yes N = No
Target Population	S = Student Body F = Females Only O = Other
Sampling	C = Census S = True Survey
Proactivity (exhortations, incentives, follow-up, ...)	Y = Yes N = No
INSTRUMENT (16 characteristics)	
Age Asked?	Y = Yes N = No
Class Asked?	Y = Yes N = No
Gender Asked?	Y = Yes N = No
Spectator Interest	Y = Yes N = No
Attitudes toward Athletics	Y = Yes N = No
Opinion about Institution's Athletic Programs	Y = Yes N = No
Identifying Information	Y = Yes N = No
Explicit Questions about Athletic Ability	Y = Yes N = No
Whether Recruited as an Athlete	Y = Yes N = No
Statement of Caveats and Benefits?	Y = Yes N = No
Explanation of Reasons for Survey?	Y = Yes N = No
Statement of Confidentiality of Responses?	Y = Yes N = No
Interest—Representation of Sports	F = Fixed Rows W = Write In C = Codes
Interest—Number of Levels	N
Experience—Representation of Sports	F = Fixed Rows W = Write In C = Codes
Experience—Number of Levels	N

Appendix E: Data Collection Instruments in Chapter 4

The table below lists the five additional data collections reviewed in chapter 4, showing the institution, the year during which the data collection was conducted, and the source of information about it.

Institution	Year	Source of Information
James Madison University	2000	www.jmu.edu/instresrch/resrchstud/Athletics/Report 2000.pdf
North Arkansas College	2004	www.northark.edu/Departments/IR_Web/title9survey_2004.htm
Nova Southeastern University	2004	www.nova.edu/athletics/
Radford University	2002	www.radford.edu/~irpa/Surveys/SportsParticipation2002.pdf
Western Carolina University	2004	www.wcu.edu/assess/surveys/sports/sport_interest.asp

Appendix F: Complete Analysis in the Presence of Non-Response

This appendix lays out technical details of analysis of the data when a non-response bias analysis must be conducted (see section 5.5.3). It is also less than strictly prescriptive, with some discussion of alternative models and assumptions.

We suppose that the recommendations in chapter 5 are implemented: that the target population is all female students and the data collection is a census. It is likely that many members of the target population will either not respond at all, or will not respond in a timely manner. This appendix addresses the case of section 5.5.3, where the response rate, for whatever reason, fails to meet the NCES standard of 85%, so that a non-response bias analysis is necessary.

In this appendix we lay out a full Bayesian analysis (Gelman, *et al.*, 1995) of the data. This formulation differs slightly from that in section 5.5.3. Here we assume that N^+ , the “true” number of interested and able students in the target population, is an unobservable random variable, so that the decision criterion depends on the conditional probability that $N^+ \geq M$ given the observed data. More specifically, with N_R^+ the number of interested and able students among the respondents to the census, then the decision process is as follows:

- If $N_R^+ \geq M$, that is, if the number of interested and able respondents exceeds the minimum team size M , then clearly $P\{N^+ \geq M \mid \text{Data}\} \geq P\{N_R^+ \geq M \mid \text{Data}\} = 1$, and there is no need for a non-response bias analysis.
- If $N_R^+ < M$ then the non-response bias analysis generates additional data. The analysis described below produces the conditional probability $P\{N^+ \geq M \mid \text{Data}\}$.
 - If $P\{N^+ \geq M \mid \text{Data}\} \geq \alpha$, where α is the pre-set threshold, then—as described in section 5.5—the institution may not be in compliance with Title IX. (As described in chapter 5, non-compliance also requires at least that appropriate facilities and competition exist.)
 - If, on the other hand, $P\{N^+ \geq M \mid \text{Data}\} < \alpha$, then the data do not provide sufficient evidence that $N^+ \geq M$, and the institution is in compliance with Title IX.

In order to allow for possible non-response bias, the model contains three parameters:

- N^+ , the number of interested and able students in the target population
- $q^+ = P\{\text{Response to census} \mid \text{Positive response}\}$
- $q^- = P\{\text{Response to census} \mid \text{Negative response}\}$

The non-response bias analysis is necessary since there is reason to suspect that $q^+ \geq q^-$, i.e., that interested and able students are more likely to respond to the census.

In the Bayesian formulation, all three parameters are treated as random, and assigned prior distributions representing a priori knowledge about them, which are discussed below. The Bayesian paradigm is then to

- Calculate the conditional distribution of the data given the parameters (N^+, q^+, q^-) , a process that we describe below.
- Use Bayes theorem to calculate the posterior distribution of the parameters (N^+, q^+, q^-) given the observed values of the data:

$$p(N^+, q^+, q^- | \text{Data}) = \frac{p(\text{Data} | N^+, q^+, q^-)}{p(N^+, q^+, q^-)}.$$

Finally, to obtain the conditional distribution of N^+ given the data, it is necessary to integrate out q^+ and q^- in this expression:

$$p(N^+ | \text{Data}) = \iint p(N^+, q^+, q^- | \text{Data}) dq^+ dq^-.$$

The data are generated by both the census and the non-response bias analysis, and consist of:

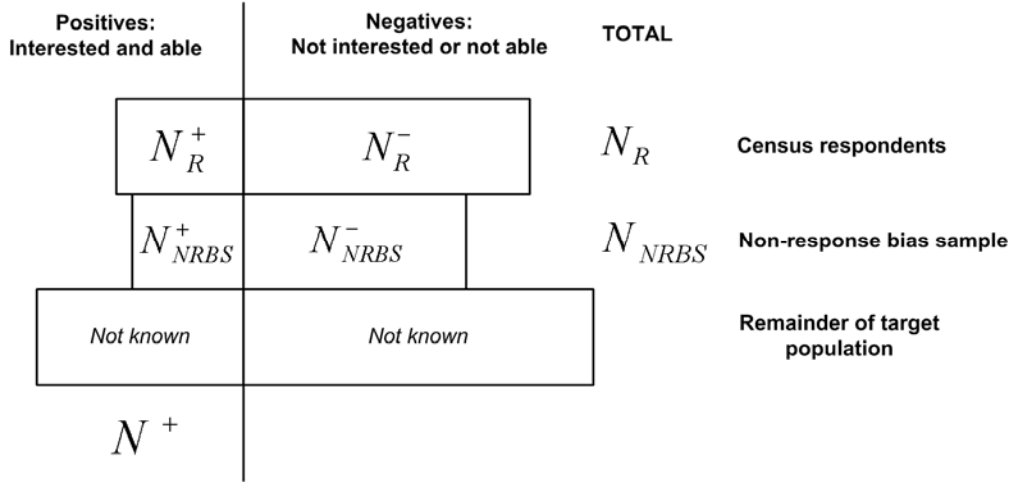
- N_R^+ , the number of positive responses to the original census
- N_R^- , the number of negative responses to the original census
- N_{NRBS}^+ , the number of positive responses in the non-response bias sample
- N_{NRBS}^- , the number of negative responses in the non-response bias sample.

A more convenient but equivalent representation of the data consists of:

- N_R^+ , the number of positive responses to the original census
- $N_{NR} = P - N_R^+ - N_R^-$, the number of non-responses to the original census (recall that P is the size of the target population)
- N_{NRBS}^+ , the number of positive responses in the non-response bias sample
- N_{NRBS} , the number of non-respondents in the non-response bias sample.

Figure F.1 shows the data pictorially.

Figure F.1: Pictorial representation of data and unknown values.



Source: NISS

For the prior distributions of N^+ , q^+ and q^- , we recommend:

- For N^+ , a discrete uniform distribution on $\{0, \dots, K\}$, where K is set on the basis of external knowledge and the minimum team size M . A reasonable choice is $K = 5M$. If there is external knowledge about N^+ , arising for example from an earlier survey, then it also can be incorporated into the prior distribution.
- For q^+ and q^- , beta distributions chosen so that the prior mean of q^+ exceeds that of q^- .

Independence of the three priors can be assumed. However, it is also possible to choose a joint prior distribution for (q^+, q^-) that imposes the restriction $q^+ \geq q^-$.

The remaining step is to calculate the conditional distribution of the data given the parameters (N^+, q^+, q^-) . By properties of conditional probabilities,

$$\begin{aligned}
 & p(N_R^+, N_{NR}^+, N_{NRBS}^+, N_{NRBS}^- | N^+, q^+, q^-) \\
 &= p(N_{NRBS}^+, N_{NRBS}^- | N^+, q^+, q^-, N_R^+, N_{NR}^+) p(N_R^+, N_{NR}^+ | N^+, q^+, q^-)
 \end{aligned}$$

Concerning the second term in this expression, assuming (there is no meaningful alternative) that response is independent across students,

- The conditional distribution of N_R^+ given (N^+, q^+, q^-) is binomial with parameters N^+ and q^+

- Similarly, the conditional distribution of N_R^- given (N^+, q^+, q^-) is binomial with parameters $P - N^+$ and q^- , where P is the size of the target population
- N_R^+ and N_R^- are conditionally independent given (N^+, q^+, q^-) .

Consequently,

$$\begin{aligned}
& P\{N_R^+ = j, N_{NR} = k \mid N^+, q^+, q^-\} \\
&= P\{N_R^+ = j, N_R^- = p - k - j \mid N^+, q^+, q^-\} \\
&= P\{N_R^+ = j \mid N^+, q^+, q^-\} P\{N_R^- = p - k - j \mid N^+, q^+, q^-\} \\
&= \binom{N^+}{j} (q^+)^j (1 - q^+)^{N^+ - j} \binom{P - N^+}{p - k - j} (q^-)^{p - k - j} (1 - q^-)^{k + j - N^+}
\end{aligned}$$

Suppose that the non-response bias analysis consists of selecting a simple random sample of $p\%$ of the N_{NR} non-respondents: each non-respondent is selected with probability p independent of what others are selected. This is not the only way to perform the sampling for the non-response bias analysis, but it is one for which the computations are least complicated. Assume that all students in the non-response bias sample are contacted and do respond. Then:

- The conditional distribution of N_{NRBS}^+ given $(N^+, q^+, q^-, N_R^+, N_{NR})$ is binomial distribution with parameters $N^+ - N_R^+$ and p
- Similarly, the conditional distribution of N_{NRBS}^- given $(N^+, q^+, q^-, N_R^+, N_{NR})$ is binomial distribution with parameters $N_{NR} + N_R^+ - N^+$ and p
- N_{NRBS}^+ and N_{NRBS}^- are conditionally independent given $(N^+, q^+, q^-, N_R^+, N_{NR})$.

This implies that

$$\begin{aligned}
& P\{N_{NRBS}^+ = i, N_{NRBS}^- = l \mid N^+, q^+, q^-, N_R^+, N_{NR}\} \\
&= P\{N_{NRBS}^+ = i, N_{NRBS}^- = l - i \mid N^+, q^+, q^-, N_R^+, N_{NR}\} \\
&= P\{N_{NRBS}^+ = i \mid N^+, q^+, q^-, N_R^+, N_{NR}\} P\{N_{NRBS}^- = l - i \mid N^+, q^+, q^-, N_R^+, N_{NR}\} \\
&= \binom{N^+ - N_R^+}{i} p^i (1 - p)^{N^+ - N_R^+ - i} \binom{N_{NR} + N_R^+ - N^+}{l - i} p^{l - i} (1 - p)^{N_{NR} + N_R^+ - N^+ - l + i} \\
&= \binom{N^+ - N_R^+}{i} \binom{N_{NR} + N_R^+ - N^+}{l - i} p^l (1 - p)^{N_{NR} - l}
\end{aligned}$$

This completes calculation of the components of $p(N_R^+, N_{NR}, N_{NRBS}^+, N_{NRBS}^- \mid N^+, q^+, q^-)$.