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Why Don't They Respond? An Investigation of Longitudinal Survey Nonresponse Among College Students Attending Four-Year Institutions

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Why Don't They Respond?
An Investigation of Longitudinal Survey Nonresponse
Among College Students Attending Four-Year Institutions

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Philosophy

in Education

by

Jessica Ann Sharkness

2012

ABSTRACT OF THE DISSERTATION

Why Don't They Respond?

An Investigation of Longitudinal Survey Nonresponse

Among College Students Attending Four-Year Institutions

by

Jessica Ann Sharkness

Doctor of Philosophy in Education

University of California, Los Angeles, 2012

Professor Sylvia Hurtado, Chair

Over the past few decades, college student survey response rates have been declining. This is a problematic trend because student survey data are used extensively in endeavors such as accreditation, institutional improvement, and scholarly research. While low survey response rates are not necessarily a problem, they will be if they impact the representativeness of survey samples. Unfortunately, the limited literature on student survey nonresponse suggests that nonresponse is usually *not* random, though for college students little is known about the type of student, institutional, or administrative characteristics that promote student survey response.

The purpose of this study was to examine predictors of college student survey response, in a comprehensive model that takes into account both student and institutional factors. Drawing on sociological, organizational, and psychological theories, a conceptual model of student- and

institution-level influences on survey response was developed and tested using national longitudinal surveys administered by the Higher Education Research Institute (HERI) to first-time, full-time students enrolling at four-year institutions in the falls of 2003, 2004 and 2005. The study utilized hierarchical generalized linear modeling (HGLM) to examine predictors of longitudinal survey nonresponse one and four years after matriculation, for all students as well as for groups disaggregated by gender and self-identified race/ethnicity (White, Black/African American, Latino/a, and Asian American).

Results revealed that a key group of response predictors was consistent across aggregated and disaggregated groups of students, one and four years after college entry. For virtually all students, a small set of student-level characteristics (most notably high school achievement, gender, personality, and self-rated likelihood of transfer) strongly predicted response propensities, indicating that students' entering characteristics have an enduring impact on their survey response likelihoods over the entire course of college. Institution-level results revealed that students were far less likely to respond to web surveys and mail surveys than they were to paper surveys handed out in person; survey incentives showed mixed effects. Institutional size was a consistent predictor across all students and surveys, while institutional survey climate significantly impacted response propensities for seniors only. Findings are discussed in terms of their implications for both researchers and practitioners.

The dissertation of Jessica Ann Sharkness is approved.

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M. Belinda Tucker

Sylvia Hurtado, Committee Chair

University of California, Los Angeles

2012

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During my (too) many years of education, there have been a few individuals who have had a significant impact on my trajectory. At Ithaca High School, Dave Bock taught statistics and calculus in such an engaging way that I couldn't help wanting to learn more math. He also nurtured my burgeoning statistical talent and encouraged me to pursue higher education in this area. I took his advice to heart, and it lead more or less directly to my choice of a math/statistics minor to complement my Psychology major at Dartmouth. As I pursued this course of study, I

was extremely fortunate to stumble into a job in the Evaluation and Research office ("EvalRes") at Dartmouth. Not only did this position give me my first taste of student surveys and higher education research, but it also gave me a new friend and mentor in John Pryor, who ran the office.

My experiences in EvalRes opened up a whole new world to me—that of institutional research—and John Pryor provided critical assistance and encouragement for me to begin my career in this field. In addition to employing me part-time for several years while enrolled at Dartmouth, he was the one who told me about my first institutional research job opportunity after college, as an analyst at Tufts University's Office of Institutional Research and Evaluation (OIR&E)—and he virtually forced me to apply. I was lucky enough to get that job, and was luckier still to find it both interesting and challenging. I also got another mentor in the bargain, Dawn Terkla, whose patience, support, and good common sense have helped me develop as a professional and a person.

After a few years at OIR&E, I felt it was time to realize my dream of going to graduate school. I ended up in the Education department at UCLA, where, after a brief stint in a different program, I found my academic niche in the Higher Education and Organizational Change (HEOC) division. My fellow "HEOChers," in particular my cohort-mates, enriched my graduate experience tremendously. Over the years my cohort has provided me with more intellectual stimulation, scholarly collaboration, heated discussion, advice, support, good-natured chiding, karaoke, and happy hours than I ever dreamed possible—especially after they voted me "most likely to rule the academic capitalist learning regime" during our first year. My time in graduate school would have been much poorer in the absence of each member of my cohort; to all of you, I thank you.

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I wish to extend my gratitude to the other two members of my dissertation committee as well. José Luis Santos and Belinda Tucker, my dissertation was enriched by your expertise and advice, and I appreciate the time you have devoted to this project.

The above acknowledgements by no means provide an exhaustive list of everyone I should thank; there are far too many wonderful people that I've met along this journey to name. From classmates to roommates to wine club to the crowd at taco night, almost everyone that I met since graduating college has contributed in some way to my development as a person, friend, or scholar. Thank you to you all, particularly those of you who put up with my constant complaints about the ever-sunny weather in Los Angeles. You had to have known that would never stop, and you befriended me anyway. I appreciate it.

I often suspected and feared this dissertation would never be completed. To all those who believed in me and knew I could power through: you were right. I did it!

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Sharkness, J. (2008). *The American freshman: National norms for fall 2007 - Habits of mind, parental involvement & diversity* (Brief Report). University of California, Los Angeles: Higher Education Research Institute.

CHAPTER 1: INTRODUCTION

Over the past few decades, social science researchers have noticed an alarming trend: survey response rates are declining. Indeed, declines in response rates have been so persistent that the phenomenon has been called "perhaps the greatest threat survey researchers have faced in the past 10 years" (Tourangeau, 2004, p. 781). Rates of survey response are falling both internationally and domestically (Atrostic, Bates, Burt, & Silberstein, 2001; Baruch, 1999; Cull, O'Connor, Sharp, & Tang, 2005; Curtin, Presser, & Singer, 2005; E. de Leeuw & de Heer, 2002; Dey, 1997; Krosnick, 1999; Smith, 1995; Steeh, 1981), and there is some evidence that declines have become steeper since the mid-1990's (Cull, et al., 2005; Curtin, et al., 2005). The speed with which response rates are declining is not entirely clear, but estimates have been made of approximately 0.7 to 1.5 percentage points per annum (Connelly, Brown, & Decker, 2003; Curtin, et al., 2005; Hayes, Bennett, Dennerstein, Gurrin, & Fairley, 2007; Morton, Cahill, & Hartge, 2006).

In higher education research, trends of decreasing response rates are no exception, especially for undergraduate student surveys. Dey (1997) reported that longitudinal response rates on a long-running national survey instrument fell from 58% in the early 1960's to 21% in the early 1990's. Similarly, Jans and Roman (2007) reported that response rates to a national college alcohol study declined from 69% in 1993 to 28% in 2005. Increasing rates of nonresponse to student surveys are particularly alarming because much of the quantitative research in higher education uses data drawn from these surveys (Y. Liu & Yin, 2010; Pascarella & Terenzini, 2005; Pike, 2008). Student survey data are invaluable to researchers and administrators alike, and are used for purposes as wide-ranging as accreditation, institutional improvement, and scholarly research (Dey, 1997; Porter, 2004b; Porter & Umbach, 2006;

Terenzini, 2010; Umbach, 2005). If response rates continue to decline precipitously, student survey data will either become unusable or extremely expensive to collect because of the extent of recruitment efforts required.

A low survey response rate, in and of itself, is not necessarily a problem, but it will be if it affects the representativeness of the survey sample (Cook, Heath, & Thompson, 2000; Dalecki, Whitehead, & Blomquist, 1993). Survey data are typically used to make inferences about a population, and the degree to which a survey's respondent sample can be said to represent the experiences or perceptions of the broader population of interest depends critically on the composition of the sample that responded to the survey (Heeringa, West, & Berglund, 2009). If a survey's respondent sample is not a random subset of the population, the data drawn from the instrument will not represent the larger group. Unfortunately, the non-representativeness of survey samples is often a problem for researchers working with surveys that have low response rates, as "survey nonresponse is usually not random" (Porter, 2004b, p. 6), and low response rates are often associated with some kind of bias (Pike, 2008). Please note, for the purposes of this discussion the term "nonresponse" will be used to mean *unit nonresponse*, or "the failure to obtain any survey measurements on a sample unit" (Dillman, Eltinge, Groves, & Little, 2002, p. 6)—in this study, individual college students are the sample unit. Unit response is distinct from *item nonresponse*, or the failure to obtain responses from a sample unit for one or more survey questions. Further, the term "survey" is used here, unless otherwise specified, to refer to self-administered, self-reported surveys. These differ in many ways from other types of surveys that are conducted in the social sciences (such as structured interviews), as is briefly discussed below.

Although the higher education research community has noticed that student survey response rates are declining (Pike, 2008; Porter & Whitcomb, 2005b), surprisingly little research

has been conducted on the topic, and the college student population is "severely understudied with respect to methodological research on response rates" (Jans & Roman, 2007, p. 3836). As reviewed in the next chapter, a number of studies have examined survey nonresponse among college students, but this literature is not easily accessible, having been published in journals of disciplines as wide-ranging as alcohol and drug research and organizational behavior; relatively few studies have been published in the higher education literature specifically. Additionally, no study has fully captured the broad scope of the nonresponse problem. To begin with, none have adequately accounted—in the same model—for both student and institutional considerations, including, critically, institutional survey administration methods. Indeed, most of the existing studies have used data from one institution only, and among those that have used data from many institutions, only one has taken into account statistically the clustering of students within schools (Porter & Umbach, 2006).

Further, all previous research has predicted nonresponse for aggregated groups of students—that is, males and females together, and students of different race/ethnicities together—which is akin to assuming that the variables that predict college student survey response are constant across these groups of students. This assumption has not been tested—and it should be. As will be shown in the next chapter, females tend to respond at higher rates to surveys than males, and White students tend to respond at higher rates than students of other races/ethnicities. If it is found that these groups of students have different predictors of response, it could imply that the direction and type of nonresponse bias in student survey data is not constant across groups. It could also imply that current methods of dealing with nonresponse may not be adequate, as they typically rely on weighting techniques based on demographic characteristics such as gender and race (Pike, 2008).

Given the insufficiency of research on student survey nonresponse, there is a need for more investigations into the correlates of student survey nonresponse and the extent to which these are the same or different across groups. Because of the demographics of higher education, it is especially critical to compare the correlates of nonresponse among males and females and among White students and students of other race/ethnicities. Current U.S. higher education enrollments are largely female and largely White, and Whites and females are also the groups with the highest graduation rates (along with Asian Americans, who have high graduation rates as well, Snyder & Dillow, 2010). Because Whites and females are the students both most likely to graduate *and* most likely to respond to surveys, it is very likely that current research and assessment efforts are missing information from the portions of the student population least likely to succeed in higher education. Arguably, it is more critical to gather data from these latter groups of students than from their relatively more successful counterparts. At the very least, for research to make valid inferences and for practitioners to design effective programs to improve student success, it is essential to have information that is representative of the entire population of students. To achieve representativeness in student survey samples, more male and more underrepresented minority students need to participate in surveys. To raise response rates among these groups, we need to know why they do not respond.

Purpose

The purpose of the current study is to examine the issue of college student survey nonresponse in the context of longitudinal surveys given to traditionally-aged college students at four-year colleges and universities. Specifically, using a large national survey administered to incoming first-year students at the beginning of academic years 2003-2004, 2004-2005 and 2005-2006 as a baseline sample, this study will investigate the factors that predict longitudinal

survey nonresponse one and four years after matriculation, both for aggregated groups of students as well as separately for males and females and students who self-identify as White, Black/African American, Latino/a, and Asian American. The study will employ a hierarchical statistical modeling technique that appropriately takes into account the fact that students are "nested" within institutions. The following research questions will guide the study:

1. What demographic, attitudinal, behavioral, and institution-level factors (including administration methods) predict response to student surveys?
2. How do predictors of response differ at the end of the first year in college and the end of the fourth year in college?
3. Do predictors of response differ for males and females and for students of different race/ethnicities, in comparison to the general population, to each other, and to surveys administered one and four years after matriculation?

Context: Student Surveys in Higher Education

To understand the significance of the current study one must understand the importance of college student surveys for the higher education enterprise, as student surveys are used extensively in this field for both scholarly and practical purposes. Indeed, student surveys in American higher education play several important (and often overlapping) roles: as means for assessing student outcomes for accountability purposes, as tools employed for institutional improvement efforts, and as sources of data for scholarly researchers (Anaya, 1999; Carini, Kuh, & Klein, 2006; Clarkberg, Robertson, & Einarson, 2008; Porter, 2004a; Porter & Umbach, 2006; Porter & Whitcomb, 2003; Schiltz, 1988). The place of surveys in each of these areas is briefly discussed below.

In terms of internal and external assessment, student surveys are one of the primary ways in which institutions gather information about what happens to their students (Pike, 2007; Schiltz, 1988). In 1999, researchers at the National Center for Postsecondary Improvement

conducted a study of institutional assessment practices, and over three-quarters of the 1400 institutions that responded to their survey reported using student survey instruments in their assessment efforts (Peterson, Einarson, Augustine, & Vaughan, 1999). Surveys that are used for student assessment are typically either developed by institutions or by national survey organizations; Liu and Yin (2010) list at least twelve of the latter type of instrument that are "widely used" (p. 121). Two of the most prominent organizations that offer national student surveys, the National Survey of Student Engagement (NSSE) and the Cooperative Institutional Research Program (CIRP), directly market their instruments as assessment tools. On the CIRP website, it is noted that "results from CIRP surveys are used to document assessment and improvement efforts, as well as to establish the need for and the effectiveness of initiatives aimed at improving the student experience" (Cooperative Institutional Research Program, 2010d, para. 1). NSSE, for its part, asserts at its online home that its surveys "provide colleges and universities with data that have diagnostic value and that can be used to inform educational improvement" (National Survey of Student Engagement, 2010, para. 3).

In addition to assessment efforts in general, student surveys are also important tools for institutional research offices, which exist on most college campuses and which provide data to various campus constituencies for internal improvement purposes. As early as 1988, Schiltz noted that survey research "permeates the work life of institutional research" offices (p. 68). A decade and a half later, Porter (2004b) echoed this statement, writing that "surveys are one of the most important tools in the institutional research toolbox" (p. 5). Providing evidence for such claims, Delaney (1997) reported that student surveys made up almost 16% of the projects in which institutional researchers in New England were involved; program review and program evaluation, which often make use of survey data, made up another 18%. A December 2010

search of the online archives of *New Directions in Institutional Research* returned 699 matches for the words "student" and "survey." Surveys are so commonplace in institutional research that Gonyea (2005) felt comfortable stating that "institutional researchers and assessment professionals will *inevitably* [emphasis added] use surveys that collect…information from students" (p. 85).

Finally, student survey data are also used extensively in scholarly research. In fact, student surveys are one of the most important tools used by researchers to gather information about college students. Hartman, Fuqua and Jenkins (1985) reported that from 1972-1978, over 60% of the articles published in the top journals in higher education, *Research in Higher Education* and *Journal of Higher Education*, used survey methodology to collect data (see Table 1, p. 86). Although such information is dated, with the introduction of web-based survey administration and the proliferation of new national surveys it is unlikely that the importance of survey research in higher education research has decreased since the 1970's. Indeed, it appears to have maintained its importance—Pike (2007) reviewed the 2005 issues of the *Journal of Higher Education*, *Research in Higher Education* and *Journal of College Student Development*, and found that over 60% of the articles published "made use of survey data" (p. 411). My own review of the 2009 issues of these same journals found that 39 of the 59 published quantitative research studies, or two-thirds (66%), utilized data drawn from student surveys.

The reasons student survey data are so often used for assessment and research are manifold. To begin with, survey data are cheap and easy to obtain (Groves et al., 2009; Rea & Parker, 2005); there is perhaps no other way to collect such a wide variety of information from so many people with such little cost (Weisberg, Krosnick, & Bowen, 1989). In addition, self-report surveys are often the only way to collect certain kinds of information from students

(interviews would be another way, but this data collection method is slow and expensive and therefore cannot reach a large number of students). Many of the commonly assessed outcomes of college are non-cognitive and not directly observable, and as a result cannot be assessed via standard testing mechanisms. For example, in catalogues of college outcomes created by notable scholars such as Bowen (1997) and Astin (1991), desired student outcomes of college include personal self-discovery, psychological well-being, human understanding, values, morals, citizenship, interests, self-concept, attitudes, beliefs, and satisfaction. Such affective and psychological college outcomes are echoed often in the literature on outcomes assessment (Bogue & Hall, 2003; Bridger & Wolff, 1991; Gray, Jacobi, Astin, & Ayala, 1987; Y. Liu & Yin, 2010), and are even included in many institutional mission statements (Y. Liu & Yin, 2010). Almost all assessment scholars agree that student surveys are one of the only methods, if not *the* only method, of obtaining information about such "softer" outcomes of college. As Kuh (2005) writes, "student reports are the only feasible, cost-effective source of certain kinds of information from a large enough number of students"; he goes on to say that outcomes like attitudes, values, and indicators of what students have done on campus must be measured with surveys because student reports are "the only meaningful source of data" (p. 149).

In sum, student surveys are an integral part of the higher education enterprise, and are unlikely to be abandoned in favor of other data collection methods. As a result, concerns regarding the quality of data collected with such instruments need to be addressed. One obvious concern is the rising rate of student survey nonresponse, a concern that is compounded by the fact that relatively little is known about why students are not responding.

The Current Study

Scope

This study examines longitudinal student survey nonresponse among traditionally-aged college students at four-year colleges and universities. Specifically, it employs student-level data drawn from a survey administered nationally to students entering four-year schools in the falls of 2003, 2004 and 2005, as well as institution-level data from two sources, which is appended to the student data. The baseline student-level data comes from the 2003, 2004 and 2005 CIRP Freshman Surveys (hereafter this survey will be referred to as TFS, which stands for "The Freshman Survey"), and nonresponse is examined for two surveys given as follow-ups to TFS-takers, the 2004/2005/2006 (as applicable) Your First College Year Survey (hereafter YFCY) and the 2007/2008/2009 College Senior Survey (hereafter CSS). In order to reduce the impact of initial nonresponse to the TFS on the final analyses, only those institutions that were included in CIRP's "norms" for the TFS are used. To be included in the norms, institutions must achieve response rates of at least 75% (see Sax et al., 2004, for norms inclusion criteria).

The TFS is a comprehensive student survey administered nationally every fall, and it collects information about students' demographics, socioeconomic background characteristics, high school academic performance, activities in high school, opinions about national issues, goals for the future, reasons for choosing to attend the institution that they did, reasons for going to college, self-perceptions, and expectations for college. Variables representing most if not all of these areas will be employed in this study, in order to find out what behavioral, attitudinal, and demographic characteristics best predict response. The YFCY and the CSS share essentially the same format as the TFS, with the exception that each of the follow-up surveys is designed to

capture student experiences relevant to the transition to college (YFCY), general experiences in college, gains in key areas, and post-college career plans (CSS).

In order to most accurately assess longitudinal nonresponse, the initial samples of students used in this study are limited to those students who were eligible to take each follow-up survey. Specifically, information from the CSS and YFCY Administrative Report Forms (ARFs)—which are filled out by institutions that administer every CIRP survey, and which contain reports on survey administration methods—were used to screen out students who attended institutions that did not attempt to survey all students who completed the TFS. (Some institutions randomly sampled their freshman and senior populations for the YFCY and CSS; these institutions will be removed from the sample because we do not have information about which students were sampled and it cannot be assumed that all TFS participants had the chance to participate in the follow-up.) Although such a selection criterion limits the size of the initial baseline samples, it is essential to make certain (as much as is possible) that the students who are included in this study had the opportunity to respond to the follow-up surveys.

In total, the baseline sample that is used to predict YFCY response contains 62,465 students from 94 schools across the country. Almost all of these students, 61,660, provided data about their race/ethnicity and can thus be included in the analyses performed separately for each race group. Among these students are 5,478 Asian American students at 89 institutions; 3,466 African American students at 94 institutions; 2,450 Latino/a students at 92 institutions, and 45,771 White/Caucasian students at 94 institutions. Female students make up the majority of the sample, 35,732, and 26,733 were male. The baseline sample that will be used to predict CSS response contains 58,033 students at 94 institutions. Almost all of these students, 57,509, provided information about their race/ethnicity; these included 4,370 Asian American students at

90 institutions; 2,606 African American students at 93 institutions; 3,790 Latino/a students at 93 institutions, and 42,249 White students at 94 institutions. The CSS sample included 32,735 females and 25,298 males.

To the student-level data, institutional information from the Integrated Postsecondary Educational Data System (IPEDS) has been appended. In particular, variables representing graduation and retention rates, student diversity, and institutional enrollment were added to the data. Institution-level data on survey administration methods from the YFCY and CSS ARFs were also merged into the baseline data. The ARFs provide data on survey mode (paper or web), administration method (in-person, mail, or via e-mail) and the use of incentives.

Because the outcomes in this study are dichotomous (responded to the follow-up survey vs. did not respond) and because students are nested within institutions that have varying response rates (Pryor & Sharkness, 2008), this study employs a hierarchical logistic modeling technique. Accounting statistically for the clustering of students within institutions using hierarchical modeling is important for a study such as this one, as students at any given institution are likely similar to one another in important ways, and students at each institution also share the same survey administration experience. If the data were treated as if such similarities among students did not exist, standard errors would be misestimated and results would be incorrect (Heeringa, et al., 2009; Raudenbush & Bryk, 2002).

Significance

The existing research on student survey nonresponse has separately examined the impact on response rates of administration method, institutional characteristics, students' academic background, personality characteristics, and social/academic engagement on campus. No study has simultaneously modeled all of these factors at once. To more fully understand student

survey nonresponse, it is critical to examine all of these aspects in concert with one another so that the unique effect of each component can be ascertained. The current study will thus be significant in terms of being the first to model nonresponse using institutional characteristics, administration methods, student demographics and attitudinal characteristics, all in the same model. Further, no previous study on student survey nonresponse has yet compared the impact of institutional, administrative, and student-level characteristics separately across gender or race. Examining predictors separately across these groups is essential in order to determine whether the groups have similar or different predictors of nonresponse. If predictors are different across different groups, the groups could have different nonresponse biases. Therefore, this study will also be significant in terms of being the first to examine student survey nonresponse by race and gender separately. The findings of the study will have implications for both for research and practice.

Significance for Research. The quality of all research findings using student survey data is in large part dependent on the sample that responded to the survey. Most statistical methods employed by higher education researchers assume that survey samples are randomly drawn from a population, and that all sample units have an equal probability of responding to the survey (Berk & Freedman, 2003; Heeringa, et al., 2009). In practice, such assumptions are rarely, if ever, satisfied, especially with college student surveys (Pike, 2008; Umbach, 2005). To the extent that respondents and nonrespondents differ from one another on important variables on a survey, survey results—and hence research results—can be biased. Bias can either be "simple," as when all respondents and nonrespondents differ on the same important survey variables, or it can be more "complex," as when response rates differ across important subgroups, and these subgroups differ in their responses to certain survey variables (Pike, 2008).

The proposed study will be the first of its kind to investigate the predictors of longitudinal survey nonresponse among men and women and among students of different race/ethnicities in a multi-institutional context using a rich database of student and institution-level variables. As such, it will have important implications for all those who use survey data to draw generalizations beyond a sample. In particular, the study will provide information about what kinds of students are currently best represented in longitudinal survey data and which are least well represented. It will also begin to shed light on why such differences in representation occur, and how to adjust for such differences when using the data.

Significance for Practice. In addition to the above implications for researchers, this study will have further significance for professionals who deal with student surveys on a daily basis—in particular institutional researchers, who often administer both locally-developed and national student surveys (Porter, 2004a). For all those who administer student surveys on their campuses, the study will provide information about specific populations that may need to be oversampled or targeted with extra survey recruitment efforts. It is possible that certain segments of the student body (those who are most likely to respond) do not need special attention when administering surveys, while others (those least likely to respond) need a different level of effort to encourage response. Therefore, this study has the potential to help guide practitioners' decisions about how to more successfully recruit certain groups of students to participate in surveys, given limited time and resources. It will also be helpful in terms of offering suggestions for the recruitment of an entire student population, as the institution-level variables included in this study's models will begin to tease out the effectiveness of various administration techniques.

Outline of the Study

To maintain the quality of data collected in higher education, more research needs to be conducted that investigates the correlates of student survey nonresponse. To that end, this study examines which students are more likely to respond to surveys—and why—one and four years since enrolling in college. Chapter 1 has provided a foundation and rationale for the study, but to better understand how the study fits into and builds upon previous research, Chapter 2 will provide a review of the survey nonresponse literature, summarizing what kind of work has been done on the topic in higher education and related fields. Chapter 2 will also discuss theories that have been put forth to explain why some people choose not to respond to surveys while others do. Chapter 3 offers a thorough discussion of specific details on how the study was conducted. In particular, it provides information concerning the hypotheses driving the study, the data sources employed, variables used, and the statistical methodology utilized. Chapter 4 presents and discusses the results of the analyses described in Chapter 3. Finally, Chapter 5 summarizes and wraps up the study by providing a general discussion of results, focusing in particular on how results align with working hypotheses, and where fruitful areas for future research on student surveys may lie.

CHAPTER 2: REVIEW OF THEORY AND LITERATURE

An appropriate conceptualization of student survey nonresponse requires a review and understanding of the literature and theories relating to both survey response and nonresponse. This chapter examines the relevant streams of research and theorizing, in particular as they relate to self-administered, self-report surveys of students in higher education institutions. The chapter begins with a brief discussion of survey quality, survey error, and the components and types of nonresponse. A summary of the approaches to studying survey nonresponse next follows. The chapter continues with an examination of the body of literature that relates to survey nonresponse in college student populations; tying together these studies, the major theories that have been advanced to explain nonresponse are next discussed. The chapter ends with an integration of nonresponse theory with the literature on college student surveys.

Survey Quality

Nonresponse Error as a Component of Survey Quality

Given the importance of student survey data in higher education, it is critical to ensure that the data collected via such instruments is of high quality. In the survey literature, "quality" is a term used to mean "lack of error." In this sense, "error" refers not to poor survey execution but rather to "imperfections in the design and execution of a well-planned survey" (Biemer & Lyberg, 2003, p. 6). There are many dimensions to survey quality, and there is a large literature that accompanies each dimension (for just some of the many book-length treatises on elements of survey quality, see Biemer & Lyberg, 2003; Dillman, 2007; Groves, 2004; Presser et al., 2004; Weisberg, 2005). Broadly speaking, two general types of error concern most survey researchers: sampling error and nonsampling error.

Sampling error is relevant only for sample surveys, the results of which are intended to describe a population, but which are given to a sample drawn from the population rather than to the entire population. Sampling error reflects the uncertainty revolving around the fact that whatever sample is drawn will not represent the larger population exactly (Fink, 2003). Sampling error is calculable when probability sampling procedures are used (Fowler, 1993), and researchers who are most interested in sampling error are primarily mathematicians and statisticians (Groves, 2004).

Nonsampling error, on the other hand, applies to all surveys, including censuses. Biemer & Lyberg (2003) divide nonsampling error into five categories: specification error, frame error, data processing error, measurement error, and nonresponse error. Specification error arises in the survey design phase, and occurs "when the concept implied by the survey question and the concept that should have been measured in the survey differ" (Biemer, 2010, p. 8). Frame error refers to error resulting from situations in which the sampling frame—the list of persons or units that could receive the survey—differs systematically from the intended population under investigation. Data processing error concerns mistakes occurring in data entry, coding, processing or manipulation. Measurement error is perhaps the most studied form of nonsampling error (Biemer & Lyberg, 2003), and it deals with response accuracy. Unlike specification error, which is a result of poor wording on the survey maker's part, measurement error arises from the people taking the survey—the respondents—and their interactions with the survey.

Finally, nonresponse error is all error that occurs as a result of non-observation. Non-observation in surveys usually results from one of two types of nonresponse: *unit nonresponse*, the failure to collect any information from a sample unit, and *item nonresponse*, the failure to

collect information for a specific survey item from a sample unit (Dillman, et al., 2002). Nonresponse *errors* occur when respondents (to the survey as a whole or to an item) differ in an important way from the sample members who did not respond. When such differences occur, estimates of population parameters that are calculated from respondent data will differ from those that would have been obtained if the entire sample had responded, and as such, the estimates will be biased. The current study focuses on unit nonresponse, which is potentially more damaging for survey users than item nonresponse, because in many cases virtually nothing is known about unit nonresponders while at least partial information is available for item nonresponders.

Definition of Nonresponse

Before a discussion of student survey nonresponse can commence, a detailed definition of nonresponse needs to be provided. Although it may at first seem straightforward to calculate a response rate for any given survey—and therefore a nonresponse rate as well—there is surprising variability in the ways in which different researchers compute such statistics. Due to such definitional confusion, the American Association for Public Opinion Research (AAPOR) has published a series of reports that aim to standardize the definition of nonresponse across all types of surveys. The AAPOR's response rate definitions were first published in 1998, and have been revised six times. In the most recent report, the AAPOR notes that all sampled survey cases can be divided into four groups: (1) interviews (respondents); (2) eligible cases that are not interviewed (non-respondents); (3) cases of unknown eligibility; and (4) cases that are not eligible (American Association for Public Opinion Research, 2009, p. 6). Classification schemes for each particular group vary somewhat depending on the type of survey and the sampled population, but all schemes specifically divide the portion of the sample that does not fall into

the "respondent" category (group 1) into multiple groups (groups 2-4). These latter groups are then themselves divided into further sub-groups. The category of interest for the current discussion is the nonresponse category (group 2, "eligible, no interview"), which consists of three sub-groups: non-contacts, refusals, and other.

Non-contacts and refusals by far make up the bulk of survey nonrespondents (Biemer & Lyberg, 2003). Among non-contacts are all cases in which an intended sample unit was not contacted and therefore was never invited to participate in the survey (American Association for Public Opinion Research, 2009). Refusals consist of all cases in which a respondent receives a request to do the survey, is eligible for the survey, and does not complete it (Weisberg, 2005). The "other" category includes everyone else, primarily sample members who were contacted and technically eligible for the survey, but who could not take the survey due to factors outside their control. For example, "other" nonrespondents may have experienced a language barrier, may have been physically or mentally unable to take the survey, or may have died (Weisberg, 2005).

The sample units that are classified as "refusals" in the above scheme are at the heart of most efforts to understand college student survey nonresponse. However, the term "refusal" is not entirely appropriate for the type of self-report survey that is typically given to college students because it originates from the realm of household interview surveys, which are given in person by an interviewer. When an interviewer comes to a person's door and asks him or her to take a survey, saying "no" can be considered a refusal. However, in the case of self-administered surveys, which are most common among college students, "refusal" is too strong of a term because it implies considerable intention. Self-administered survey nonresponse, especially nonresponse to surveys done by mail or via e-mail, is not necessarily due to active refusal. Indeed, "nonparticipation" or "noncooperation" are perhaps better terms to use, because the

magnitude of a sample's failure to respond to a survey is likely a function of not only outright rejection of the survey request but also simple neglect or forgetfulness (Rogelberg et al., 2003).

Unfortunately, the literature on survey nonresponse uses the term "nonresponse" indiscriminately to refer to various types of nonresponse. For the purposes of the discussion in this study, unless indicated otherwise the term "nonresponse" and its cognates will be used to refer to the group of potential survey participants who were contacted with a survey request (or who we can assume were contacted), and who did not return a survey instrument—those who failed to participate. This is the most worrying component of nonresponse for college students, because in most cases it accounts for the majority of missing sample units. Nonresponse due to noncontact and ineligibility are less often problems for surveys of college students because such surveys are usually done by the institution that these students attend or with the institution's cooperation, and the institution has both student contact information and information about relevant eligibility criteria.

Student Survey Nonresponse

Unique Characteristics of College Student Populations

Because there is a great deal of literature on survey nonresponse in the general social science literature—it is an issue for virtually every discipline that uses survey techniques to gather data—the literature on nonresponse that is reviewed below is limited to studies that were done using college student samples. The primary focus is on American college student samples enrolled at four-year institutions, but other types of students are occasionally referred to as well. The need to impose boundaries on the literature reviewed is due not only to the necessity of restricting the review to manageable proportions, but also to the fact that college students are a population with characteristics largely unlike any other commonly surveyed population. For

example, unlike people in the general population, college students typically have a well-defined relationship with the entity that is surveying them (the institution that they attend). In addition, college students have almost universal internet access (Crawford, Couper, & Lamias, 2001; Dillman, 2007), so web surveys of this population face different challenges than web surveys of other populations. Further, contacting every student sampled for a survey (either by e-mail or otherwise) is generally feasible because institutions maintain databases of student contact information for administrative, billing and emergency communication purposes. Therefore, it is easy for institutions to define a sampling frame for student surveys, and to be fairly confident that they have accurate and complete contact information.

There are additional unique characteristics of the survey environment for college student samples as well. In particular, surveys given to college students are almost always self-administered—with students reading the survey instrument and answering questions on their own—as opposed to interviewer-administered, as are many other social surveys (Dillman, 2007; Fowler, 1993; Groves & Couper, 1998; Groves, et al., 2009). The reason self-administered surveys can be confidently administered to college students reveals another unique characteristic about the population, which is that college students are relatively homogenous in terms of education levels and literacy, especially students attending traditional four-year institutions. Almost by definition, to be a college student one must have graduated high school (or obtained a GED), so it is safe to assume that students will be able to read and answer questions on their own. Such an assumption cannot be made for all members of a survey sample drawn from the general population.

It is important to study survey nonresponse among college students specifically because the factors that affect nonresponse are different for every unique population. Indeed, survey

research is an inherently social activity that takes place between two entities, in a certain place, at a certain time and in a certain climate, and therefore the phenomenon is unique in different circumstances. As Dillman (2000) notes, "choosing to respond or not to respond [to a survey] is a…conscious human action" (p. 202); Tourangeau (2004) adds to this that the decision to respond rests on "a delicate and complicated relationship between those who conduct surveys and those who take part in them" (p. 776). As mentioned above, college students enrolled in higher education institutions have unique relationships with their institutions, and they have other unique characteristics as well. As student surveys become more and more popular, it is critical to build and maintain a literature specifically addressing student survey nonresponse in order to know how to reach students most effectively.

Approaches to Studying Survey Nonresponse

Studying survey nonresponse is a somewhat paradoxical endeavor. After all, one is trying to obtain information about people for whom, by definition, there is no information. There have been four general approaches to overcoming this issue in the published literature: (1) early/late responder comparisons, (2) non-respondent follow-ups, (3) administrative record linking, and (4) longitudinal panel (attrition) analysis. Broadly speaking, these four types of studies have tried to identify characteristics of respondents (sociodemographic, behavioral or attitudinal) that differentiate respondents from nonrespondents. In addition to these approaches, the literature also contains a series of studies that examine how various survey administration techniques (such as the offering of incentives, the use and number of reminders, and different survey modes) affect response rates. The following literature review will examine the studies on student survey response and nonresponse that fall into all five of the above approaches.

Early/Late Responder Comparisons

One approach to studying survey nonresponse is to compare respondents who submit surveys early in the survey administration process—for example those who respond to the first survey request—to those who submit surveys later, typically after several reminders. The assumption underlying such comparisons is that each potential respondent has a general propensity to respond to surveys that falls somewhere on the spectrum that ranges from "always responds" to "never responds." This theoretical range in response propensities is called the "continuum of resistance" (Ellis, Endo, & Armer, 1970; Groves, 2006; Lin & Schaeffer, 1995). Under the continuum of resistance model, it is assumed that (a) non-respondents are more resistant to survey requests and are thus concentrated toward the side of the continuum that ends in "never responds," and (b) that the group of respondents who participate in a survey only after a great effort is made to obtain their cooperation *would have been* nonrespondents if data collection had stopped sooner. Therefore, the theory goes, late respondents must resemble non-respondents. Most studies that use the early/late responder method compare early and late respondents based on collected survey data in order to determine whether there are significant differences between the two groups; if there are, there is evidence that those who did not respond to the survey may differ in important ways from those who did.

Evidence supporting the continuum of resistance model is relatively mixed in studies of the general population (Curtin, Presser, & Singer, 2000; King et al., 2009; Lahaut et al., 2003; Lin & Schaeffer, 1995; Steffen et al., 2008; Stoop, 2004; Voigt, Koepsell, & Daling, 2003), and few researchers have studied college student survey nonresponse under this framework. However, there have been a few studies that use the continuum of resistance model to compare early and late responders to student surveys, and each offers some interesting conclusions.

As part of a larger study of nonresponse among dropouts of a liberal arts college in a large state university, Cope (1968) compared early and late responders to a mail survey (which had a response rate of 80%) in terms of the problems that students faced while they were enrolled. He found almost no differences between early and late survey-takers, with a few exceptions in the academic arena. Specifically, he found that late responders were significantly more likely to report problems with developing regular study habits, being placed on academic probation, and a fear of academic failure. Cope interprets this finding to mean that survey non-respondents are most likely to be students who achieved lower levels of academic success, and that therefore, if a 100% response rate had been achieved, the prevalence of reported academic problems would have been higher.

Another study that compared early and late responders to student surveys was published in 1978 by Nielsen, Moos and Lee. In this study, researchers sent a group of 1,253 seniors at two universities (one large public institution in a rural community, and one small private institution in an urban area) the College Experience Questionnaire. This survey was intended as a follow-up to a similar survey given to these students four years earlier, when they entered college in freshman year. The survey was administered via the mail, and 1,072 of the 1,194 students who had useable addresses responded—a 90% response rate. To determine the extent of nonresponse bias that might be present in the sample, the researchers compared the 74% (n = 882) of subjects who responded "early"—after receiving the first questionnaire in the mail plus up to two reminders—to the 13% (n = 152) who responded "late"—after receiving a second or third copy of the questionnaire in the mail. The remaining 13% of students could not be classified into early or late respondents and were left out of the analyses.

Nielson, Moos and Lee (1978) employed ANOVA to compare means of survey items or scales between early and late responders while controlling for sex and parental socioeconomic status (SES). Some interesting differences in personality characteristics across the two groups of respondents were observed. Specifically, Nielson et al. found that students who responded late in the administration process were significantly more likely to characterize themselves as rebellious and/or deviant (where deviancy is defined as a scale that includes items like "breaking school rules without being caught," and rebelliousness is a self-rating), while those who responded early were more likely to characterize themselves as cooperative. Differences were found in self-reported behaviors among the two groups as well; late responders were more likely to be involved in athletics, to report drinking beer, and to report being involved in dating than were early respondents. Further, early respondents had a significantly higher overall GPA than late respondents, and were also more likely to be female—females made up 54% of the early respondents and only 38% of the late.

Nielson and his colleagues also compared freshman to senior "change scores" for early and late respondents on a small set of variables, including deviance, rebelliousness, athletic activity, dating, and cooperative and intellectual self-concept. They found that in three of these areas, the two groups of respondents actually changed in opposite directions from one another between their freshman and senior years. Specifically, early respondents became less deviant over their four years in college, while late respondents became more deviant. On the other hand, early respondents tended to rate themselves as becoming more cooperative and intellectual over time, while the opposite was true of late respondents.

Taken as a whole, the Nielson, Moos and Lee (1978) study indicates that there may be a qualitative difference between students who respond early to a general student survey, and

students who respond later, with those responding early more likely to be cooperative, high-achieving, intellectually self-confident students, and those responding later more likely to be rebellious, deviant, party-hardy students. The authors suggest that "lack of personal responsibility" may be at the heart of these differences. Cope's (1968) findings, described above, fit in well with these conclusions, as they suggest that students who respond earlier have better study habits, less academic anxiety, and are less likely to have been put on academic probation.

A more recent study of early versus late responders to a student survey was published in 2004 by Kypri, Stephenson and Langley. Using a sample of 1,910 students enrolled at the University of Otago, Dunedin, New Zealand (the third-largest public institution in New Zealand), the authors compared three groups of responders to an internet survey of alcohol use: early, intermediate, and late respondents. Early responders (n = 828) responded in phase 1 of survey recruitment efforts, after a mailed pre-notification and one e-mail survey invitation were sent (days 1-9). Intermediate responders (n = 436) responded in phase 2, after a reminder e-mail and a reminder letter were sent (days 10-19). Late responders (n = 300) responded in phase 3, the "intensive follow-up" phase, in which non-respondents were telephoned and asked to complete the survey. The overall response rate to the study was high, 82%.

Kypri and his colleagues (2004) compared the three groups of respondents on measures of alcohol consumption, alcohol use disorders, and alcohol-related consequences. They found that late respondents exhibited significantly higher rates of hazardous drinking and experienced more alcohol-related problems than did early or intermediate responders. Early and intermediate responders were similar for all measures. The researchers concluded from this information that the incidence of alcohol-related problems and the prevalence of hazardous drinking would have

been underestimated if late respondents had not been included in the sample—a finding that echoes Cope's (1968) suggestion of the underestimation of academic problems that would result without the inclusion of their late respondents.

Unfortunately, Kypri et al. (2004) did not compare demographic characteristics of early, intermediate, and late responders, but they did examine how the demographic characteristics of their respondents differed from those of the intended sample. Kypri and his co-authors found that females were overrepresented in the respondent population, though this overrepresentation was slight (58% of the respondents were female, vs. 55% of the sample). While this study was done on university students in New Zealand, the general conclusions are likely to generalize to American samples, as the authors note that the characteristics of their sample (in terms of residence, age, and diversity) have much in common with North American college students.

Beyond the above studies, there have also been a related series of studies in the psychology literature on the timing of subject pool participation for introductory psychology courses. In many introductory psychology courses, particularly those at research universities, students are required or strongly encouraged to participate in psychology experiments as part of their coursework (Trafimow, Madson, & Gwizdowski, 2006). As a result, college students enrolled in introductory psychology courses are one of the primary sources of data for psychological experiments (Landrum & Chastain, 1999; Sieber & Saks, 1989; Stevens & Ash, 2001). Porter and Whitcomb (2005b) suggest that the timing-of-subject-pool-participation literature is useful in understanding student survey response behavior, although it should be noted that this usefulness depends on the validity of the untested assumption that students who volunteer early in the semester to participate in psychology research studies are similar to students who voluntarily participate in student surveys, or at least to those who participate early.

Findings from the timing-of-participation literature have been somewhat mixed, but a few consistent themes have emerged. First, almost all studies have found that female students tend to participate earlier in the semester than males (Aviv, Zelenski, Rallo, & Larsen, 2002; Cooper, Baumgardner, & Strathman, 1991; Roman, Moskowitz, Stein, & Eisenberg, 1995; Stevens & Ash, 2001; Witt, Donnellan, & Orlando, 2011; Zelenski, Rusting, & Larsen, 2000, 2003). Evans and Donnerstein (1974) suggest that this might be due to the fact that that females are (or were, in their sample) more likely than males to hold attitudes such as being "willing to participate." Along the same lines, several researchers have found that students who are more conforming and/or compliant are more likely to participate early in the semester (Aviv, et al., 2002; Roman, et al., 1995), as are students who are more conscientious (Aviv, et al., 2002; Stevens & Ash, 2001; Witt, et al., 2011). Interestingly, Aviv and his colleagues (2002) found that the effect of conscientiousness was largely attenuated when gender was controlled for, which again suggests that females' earlier participation may be due to the possession of traits that make them more prone to cooperate.

The last set of consistent findings in the timing-of-participation literature involves academic achievement differences between early and late respondents. In particular, several studies have found that students with higher GPAs and/or standardized test scores tend to participate earlier in the semester (Aviv, et al., 2002; Bender, 2007; Evans & Donnerstein, 1974). Some researchers have also found that students who are academically- and/or achievement-motivated, or who are intellectually-oriented participate earlier (Evans & Donnerstein, 1974; Roman, et al., 1995). Finally, a study that looked at not timing of participation but rather propensity to volunteer for psychology research to gain extra credit, found that students who volunteered for experiments had greater academic achievement in terms of exams, papers, and

course performance than did those who did not volunteer (Padilla-Walker, Zamboanga, Thompson, & Schmersal, 2005).

Nonrespondent Follow-Ups

Another way in which researchers have tried to understand nonresponse in surveys is by following up with nonrespondents—in essence, by surveying nonrespondents, usually with a much-shortened version of the original instrument that includes only a few key questions. Often this surveying is done using a different mode than the original survey—for example, after the administration of a mail survey, nonrespondents may be followed-up with via telephone. The aim of the nonrespondent follow-up (NRFU) approach is to compare respondents to the original survey with the respondents to the NRFU survey on key variables. The assumption underlying such comparisons is that if responses among the two groups are similar, there is likely no nonresponse bias in the data collected via the original instrument. In this respect, the method is similar to the comparison of early and late responders—each rests on the assumption that all nonrespondents are similar to one another, so information from some nonrespondents can serve as a proxy for information from all.

Unfortunately, it is often difficult to obtain information from initial nonrespondents, and response rates to NRFU surveys are typically low, often even lower than response rates to the original survey. For example, Kuh (2001) received responses from fewer than a quarter of his nonrespondents (original survey response rate 42%, National Survey of Student Engagement, 2001), McCabe et al.'s (2006) NRFU response rate was 21% (original survey response rate 66%), and Cranford et al.'s (2008) was 35% (original response rate 48%). Nevertheless, a handful of researchers, primarily those working with surveys assessing student alcohol use, have

performed NRFU surveys to look for nonresponse bias. The findings from these studies have been mixed.

Two NRFU studies have been described in the general higher education literature. First, Hutchinson, Tollefson & Wigington (1987) performed a study designed to compare the results of a series of surveys that obtained different response rates. One of these was a telephone survey of a randomly selected group of 70 nonrespondents to a mailed survey of student personality and satisfaction with the university (the mail survey achieved a 35% response rate). Of the 60 selected sample members with working telephone numbers, 58 responded, for an astonishingly high response rate of 96% if one considers only the contacted sample members, or one of 83% if one considers the total sample drawn. Few differences between the telephone survey respondents and the mail survey respondents were observed. However, one significant difference did emerge: the NRFU participants had a significantly lower GPA than the mail survey respondents. Such a finding is not entirely unexpected, given the findings in the literature on timing-of-psychology-research-participation that suggest late-in-the-semester participants have lower academic achievement levels than do early participants.

In 2001, researchers working with the National Survey of Social Engagement (NSSE) performed a NRFU survey of nonrespondents by telephone, conducting interviews with NSSE nonrespondents from 21 different institutions (Kuh, 2001). The sample that was drawn for this project consisted of "between 100 and 200 students from each school (based on total undergraduate enrollment)" (p. 13), and in total, 553 students were interviewed. The exact response rate for this telephone effort was not given, but based on the sampling plan we can infer that it lies between 13% $\left(\frac{553}{200\times21}\right)$ and 26% $\left(\frac{553}{100\times21}\right)$. The telephone NRFU survey was essentially a short version of NSSE's College Student Report, and comparisons were made

between NRFU participants and regular NSSE responders separately for first-years (NRFU n = 291) and seniors (NRFU n = 199).

Interestingly, Kuh (2001) found that the NSSE NRFU participants were "somewhat more engaged" than were regular NSSE participants (p. 13). Only three mean comparisons favored the original NSSE participants (both seniors and first-years); these comparisons showed that the original NSSE respondents were more likely than their NRFU peers to report having used e-mail to contact an instructor, having written more papers fewer than five pages, and having taken more classes that emphasized memorization. By contrast, NRFU first-year participants scored higher on "nine comparisons" of involvement items, and NRFU seniors participants scored higher on "six items" (p. 13, no mention is made of which items these were). Kuh proposes two explanations for these findings. First, he suggests that NSSE nonrespondents may be "busier in many dimensions of their lives" than respondents (p. 13), and may therefore not have time to complete the rather lengthy College Student Report. Alternately, he suggests that responses to the NRFU might have been influenced by a mode effect—that is, students might have responded more positively to survey items given on the telephone simply because there was another person involved in the survey process, the interviewer (as compared to a self-administered survey, which involves only the respondent and the survey).

In addition to the two NRFU studies reported in the higher education literature, there have also been a series of NRFU studies described in the literature on alcohol and other drug use among college students. Research on college student alcohol and drug use relies heavily on surveys (Wechsler et al., 2002), and as a result, researchers in the field are quite concerned with nonresponse. NRFU surveys have typically been used in this field to compare reported alcohol and drug use prevalence between NRFU participants and the original study participants.

Researchers who have done this have more often than not found no significant differences in rates of alcohol use between the two groups, nor any differences in cigarette use and/or other problem health behaviors. A lack of differences has been shown both for samples overall and for samples broken down by gender and race/ethnicity (McCabe, et al., 2006; McCabe et al., 2007; Wechsler, et al., 2002).

One study, however, did find a series of significant differences between NRFU participants and regular survey participants. In a telephone survey of nonrespondents to a web survey about alcohol use and academic engagement at one institution (NRFU N = 221, response rate = 35%) Cranford and his colleagues (2008) discovered that their NRFU participants were significantly more likely to be African American and less likely to be White than the original survey respondents. Further, NRFU respondents had lower rates of past 28-day alcohol use and lower rates of binge drinking than those who responded to the survey (this last finding may in part be due to the fact that African Americans tend to drink less than many other racial/ethnic groups, Blum et al., 2000; Naimi et al., 2003). Finally, Cranford et al.'s NRFU participants reported spending significantly more time per week on class preparation and on socializing than did survey respondents. Perhaps not surprisingly, the number one reason given by NFRU participants for not responding to the original survey was that they were "too busy" (46% cited this reason).

Unfortunately, because NRFU surveys are usually plagued by low response rates, it impossible to rule out the possibility that the students who respond to follow-up surveys are different in important ways from those who do not. Indeed, as we will see later in this chapter, recent research has suggested that NRFU surveys are likely to elicit responses only from those respondents who are most similar to those respondents who responded to the initial survey.

Supporting this supposition, when NRFU participants are asked why they did not complete the original survey, they often say that they simply "forgot" or that they "thought they already had completed it" (Cranford, et al., 2008; McCabe, Boyd, Couper, Crawford, & D'Arcy, 2002). It may not be a stretch to infer that many of the nonrespondents for any given survey probably meant to complete the survey, but forgot about it and neglected to follow through with their intentions. These students are likely not different in extreme ways from those who filled out the original survey (Rogelberg, et al., 2003). There may be another group of nonrespondents, however, who are different in important ways—those who made conscious decisions to not respond to the survey. It is very unlikely that responses will be obtained via NRFU methods from such students, who could make up a quarter of enrolled students or more at some institutions (Porter & Whitcomb, 2005b). We simply do not know much about these "hard-core" refusers, and likely cannot obtain information about them using NRFU techniques.

Administrative Record Linking

The third common approach to studying nonresponse to surveys entails the comparison of responders and nonresponders based on data that was pre-existing when the sample was drawn. Typically these data come from administrative records of some kind; in a college student sample this often means students are compared on data from student information systems, the registrar, and/or admissions. The strength of the record linking approach lies in the fact that in most cases there is no systematic difference in the information available about responders and nonresponders, as there is in the early/late responder and NRFU approaches (and often the longitudinal/panel approach, which will be discussed below). However, the approach's downside is that it is only as useful as the amount of information available in the sampling frame, and unfortunately, the richness of student administrative records is typically limited. Indeed,

most record systems have a plethora of information about student demographics, admissions test scores, course-taking and grades, but very little, if any, information student behaviors, personality and attitudes. As a consequence, the extent to which administrative data can be used to accurately differentiate responders and nonresponders will always be restricted if behaviors, personality, and attitudes are important factors in survey response decisions.

Another downside of the administrative record linking approach is that samples used in such research are typically limited in size. Virtually all of the research of the record-linking type is limited to studies using data from only one campus, as it is much easier to obtain student records from one institution than from many, especially if researchers already have a relationship with that institution. Nevertheless, the approach can tell us much about the demographic and academic differences of college survey respondents and nonrespondents, especially when findings are replicated across many different samples.

Within the administrative record linking family can be found two primary approaches to studying nonresponse: descriptive and inferential. For descriptive approaches, only univariate or bivariate statistics are examined, and no controls for confounding characteristics are employed. Researchers using the descriptive method tend to find differences in response rates across various demographic groups. One of the commonly examined groups is race/ethnicity, and virtually every study has found that White students respond to surveys at higher rates than other groups (Couper, Traugott, & Lamias, 2001; McCabe, et al., 2002; McCabe, et al., 2006; Woosley, 2005).

Another commonly examined demographic group is gender, as this is another variable available in most administrative datasets. Across the board, almost every descriptive study has shown that females have higher response rates to surveys than do males (McCabe, et al., 2002;

Porter & Whitcomb, 2005b; Porter, Whitcomb, & Weitzer, 2004; Woosley, 2005). How much higher female response rates are across groups depends on the particulars of the survey and how it was administered (McCabe, et al., 2002; Porter, et al., 2004), and there seems to be great variation in this difference. For example, McCabe et al. (2002) found response rate differentials between women and men of 12 to 18 percentage points, while Porter et al. (2004) found differences of 1 to 25 percentage points.

Academic variables are also commonly examined in descriptive comparisons of administrative data between respondents and nonrespondents. Researchers have looked at response rates across students' college GPA (Porter, et al., 2004; Woosley, 2005; Yu, Jannasch-Pennell, DiGangi, Kim, & Andrews, 2007), SAT scores (Woosley, 2005; Yu, et al., 2007), high school class rank (Woosley, 2005), and academic course loads (McCabe, et al., 2002). All of these comparisons have shown that students who have demonstrated higher degrees of academic success (i.e., those with higher GPAs, ranks, or SAT scores), as well as those who have taken on heavier academic course loads, have, on average higher response rates than their less well-achieving peers.

Several other administrative variables have been used descriptively to examine response rates. Porter & Whitcomb (2005b), for example, looked at financial aid status and found that students receiving financial aid were less likely to respond to surveys on their campus than students not receiving aid (the type of aid was not specified). McCabe, Boyd, Cranford and colleagues (2007) obtained higher response rates from students living in residential learning communities than from their non-residential learning community peers. Sills & Song (2002) and Yu et al. (2007) both compared response rates by major to two different web surveys conducted at Arizona State University (ASU). Both groups of researchers observed higher response rates

for students majoring in computer science and engineering, although these findings may have been due to an interactive effect of the survey mode (web), the survey topic (which in one case was use of online resources) and the "tech-savviness" of students majoring in computer science and engineering fields.

An interesting alternative approach involving the use of administrative records to study nonresponse was described by Porter, Whitcomb and Weitzer (2004). These three researchers used administrative records and several survey administrations during one school year to study the effects of survey fatigue on students at a small, private, highly-selective liberal arts college. Two experiments are reported in the 2004 study, one on seniors (N = 649), who were asked to complete either one survey or two back-to-back surveys during their senior spring, and one on first-years (N = 576), who were asked to complete zero, one, or two surveys during the first term they were enrolled, and then one in the spring term of the same academic year. Students were assigned randomly to each condition.

For all students, a decline in response rates was seen as more and more surveys were administered. For example, the seniors who had been asked recently to complete a survey responded at lower rates to the subsequent survey than those who did not experience the recent survey request (57% vs. 67%). Similarly, first-years who were administered only one survey in the spring had a higher response rate to that survey than did students who had been asked to take three surveys during the previous fall (60% vs. 47%). An even more striking decline in response rates over repeated requests was shown for the first three surveys administered to first-years back-to-back in the fall. The response rate among students who were not administered any previous surveys before the final fall survey was 68%, compared to 58% among those who had received one previous survey and 46% among those who had received two.

Disturbingly, among Porter et al.'s (2004) group of first-years, the depressive effect of prior surveys on subsequent survey response rates was stronger for the students least likely to respond to the survey in the first place. (Note, only the results relating to the three back-to-back first-year surveys are discussed here.) Response rate differentials among those administered no prior surveys and two prior surveys were larger for males (-25 percentage points) than for females (-20 percentage points), were even larger for those whose GPA was a B or less (-24 percentage points) compared to those with an A average (-17 percentage points), and were larger still among students who were non-White (-31 percentage points) compared to those who were White (-17 percentage points). To illustrate this last rather stark decline, the response rate to the third fall survey among students who had received no previous surveys was 69% for White students and 66% for non-White students. For the students administered two previous surveys, the response rate was 52% for Whites, and 35% for non-Whites—this latter figure is almost half that of their non-survey-fatigued counterparts!

One question remains after reviewing the aforementioned studies that employ descriptive comparisons across groups. Namely, do observed differences in response rates remain after controlling for correlated characteristics? To answer this question, some researchers have used administrative data in multivariate inferential statistical equations that predict response/nonresponse. For example, McCabe et al. (2002) performed a logistic regression predicting response propensity for the 2001 Student Life Survey at the University of Michigan. They found significant effects for gender, race, and number of credit hours a student was enrolled in, even after controlling for these characteristics as well as class year. Females were almost two times as likely to respond to the survey than were males, and Black students were less than half as likely to respond than were White students. They also observed a significant

effect of having a heavier academic load, with those enrolled in 18+ credit hours 1.6 times as likely to participate in the survey than those enrolled in 12-13 hours.

In a similar analysis, Porter and Whitcomb (2005b) used administrative data in an ordered logistic regression that predicted how many surveys a student completed over the course of one academic year. In Porter and Whitcomb's sample of 462 students at a small highly-selective private liberal arts college who received four surveys during academic year 2002-2003, 14% responded to all four, 16% responded to three, 18% responded to two, 23% responded to one, and 29% responded to none. Employing as predictors race, gender, financial aid status, first generation status, class year and college GPA, Porter and Whitcomb found significant effects of being female, receiving financial aid, and cumulative college GPA. All of these effects were in the direction expected—being female was positively related to the number of surveys completed, as was cumulative college GPA. Receiving financial aid, in agreement with the descriptive results, was negatively related to the number of surveys completed.

Porter and Whitcomb's (2005b) study was performed on a small sample from only one college, so the generalizability of its findings are not assured. Perhaps because of this, Porter and Umbach (2006) published another, similar study with data from many different institutions—the second-largest-scale use of administrative record linking in the higher education nonresponse literature. These researchers used participation in the 2003 administration of the NSSE as the outcome of their study (student N = 167,375; institutional N = 321, overall response rate approximately 43%), and they employed hierarchical generalized linear modeling to predict survey response from a variety of administrative data, both institutional and student-level. Separate analyses were done for institutions that administered the NSSE via mail and those that administered it via the web, and institutions self-selected into these administration modes.

Separate models were also run for first-years and seniors, as the NSSE is a cross-sectional survey of these two groups. Student-level predictors included only gender, race, international student status, and SAT score; this was evidently all Porter and Umbach received from institutions participating in the NSSE. At the institution level there were a greater variety of variables available for the model; these were culled from the Integrated Postsecondary Educational Data System (IPEDS) as well as Peterson's college guidebook, and included urbanicity, density, selectivity, control, proportion of part time students, ratio of graduates to undergraduates, institutional expenditures, and number of computers per undergrad.

From the four total models that were run, several sets of findings emerged. In terms of institution-level predictors, different factors were significant for response to web and paper versions of the NSSE. Among schools using the mail mode, only two significant predictors emerged. First, a significant negative effect for public schools was shown, with public schools having, on average, response rates 5 to 6 percentage points lower than their private counterparts. Second, average institutional selectivity had a significant (although small) positive effect on average institutional mail survey response rate. For every 102-point (one standard deviation) increase in institutional selectivity, institutional response rates were expected to increase 2 to 3 percentage points. For the web survey mode, three institution-level predictors reached significance. Institutional urbanicity had a negative effect, with institutions in urban areas expected to have response rates approximately 10 percentage points lower than those located in rural areas. Institutional density, measured by the number of students per acre of campus, was also negatively related to institutional web survey response rates; for every one-standard deviation increase in density, average institutional response rates decreased 4-5 percentage points. Finally, the number of computers per undergraduate was positively associated with web

survey response rates; on campuses with more computers per undergraduate, web response rates were higher.

The most consistent set of findings of the Porter and Umbach (2006) study concerned the effect of student-level variables. In all models (web and paper, first-year and senior), students' entering SAT scores positively predicted NSSE response. Being female was also positively related to student response propensity in all four models, as was being an international student. African Americans showed significantly lower probabilities of response in all four of Porter & Umbach's models as well, although the negative effect of being African American was larger for seniors than for first-years. For first-years given NSSE via the web, African Americans had an expected probability of response 3 percentage points lower than White students; for seniors this figure was 5 percentage points. Similarly, for first-years given the mail survey, African Americans had an expected probability of response 6 percentage points lower than White students, and seniors had a response propensity 10 percentage points lower. Although such differences across freshmen and seniors are relatively minor, they dovetail with Porter, Whitcomb and Weitzer's (2004) findings of a disproportionate effect of survey fatigue on non-White students over the course of a year. It could be possible that African American and other underrepresented minority students, who are typically less likely to cooperate with survey requests in the first place, are more sensitive than other students to over-surveying (or other influences over four years of college). If this is the case, there are troubling implications for the representativeness of survey samples collected from African American and/or other racial/ethnic minority students over the course of a multi-year college career.

Although the Porter and Umbach (2006) study described above is one of the better studies on student survey nonresponse prediction that has been conducted to date—it is the only

one that has used hierarchical modeling, for example—there are several limitations to the study that restrict comfortable generalization of its findings to other samples. First, institutions self-selected into survey administration mode, and Porter and Umbach did not examine differences between schools electing each option. Thus their institution-level effects are spurious, and could be confounded with the self-selection. In addition, Porter and Umbach did not report on the proportion of variance their model accounted for at the institutional level. Therefore, it is difficult to say whether the institution-level effects they discovered will be replicated in other studies, nor whether the model predicted a significant proportion of the variance in response rates across schools. Finally, the student-level predictors were limited in number and scope, coming as they did from institutional administrative databases. It is likely that many important student characteristics were omitted from the model.

Perhaps the largest-scale use of administrative records to predict survey nonresponse can be found in a study conducted by Tracy Hunt-White at the National Center for Education Statistics (2007). In this study, Hunt-White used a sample of approximately 69,000 students at 1,400 two- and four-year institutions to predict response to the 2003-2004 National Postsecondary Student Aid Study (NPSAS). Employing variables drawn from institutional databases, federal financial aid databases, IPEDS, and the College Board, Hunt-White used logistic regression to classify students into responders (70% of her sample) and nonresponders (30%). Predictors in the model included respondent demographics (gender, age, race), enrollment status (full-time, year of study, degree program), institutional characteristics (type, control, urbanicity, enrollment), number of computers on campus, and student financial aid status. To check model fit, Hunt-White performed her initial modeling using 80% of the available data, reserving the remaining 20% for cross-classification purposes.

Some of Hunt-White's findings were similar to those previously reported. For example, she found that women were significantly more likely to respond to NPSAS than were men, and that students attending school in large urban areas were less likely to respond to the survey than those in rural areas. However, she found some other less concordant effects as well. For example, students who did not apply for federal financial aid were less likely to respond to the NPSAS (as compared to those who applied for and received federal aid), and students who applied for but did not receive aid were more likely to respond than those who applied and received aid. This is somewhat at odds with Porter and Whitcomb's (2005b) finding that receiving financial aid is negatively related to response propensity. However, it may not be fair to directly compare such results because Hunt-White's survey was explicitly about federal postsecondary aid, and student aid status may have motivated students in a different way when deciding to respond to the NPSAS as compared to Porter and Whitcomb's surveys.

In terms of race/ethnicity, Hunt-White found some unique effects that also contrast with previous research. Specifically, she found that African American students were equally as likely as White students to participate in NPSAS, while Latino/a, Asian American, and other/multiracial students were more likely than Whites to do so. The only racial/ethnic group significantly less likely to participate in NPSAS than White students were American Indians. While somewhat puzzling, these results may be explained by the fact that Hunt-White's sample included a great many students enrolled at two-year institutions, and it is likely that students enrolled at two-year schools—who are typically different in many important respects from those enrolled at four-year schools (Cohen & Brawer, 2008)—have different factors motivating their survey response decisions than do students enrolled in more traditional four-year programs.

Additional student characteristics that were significantly associated with response in Hunt-White's (2007) study included class year, with sophomores, juniors, seniors, and other upperclassmen significantly more likely than first-years to participate in NPSAS than freshmen. In good news for researchers surveying traditional college students at four-year institutions, Hunt-White found that those students enrolled in a bachelor's degree program were significantly more likely to respond to the survey than those in a program that yielded less than a bachelor's degree; students enrolled full-time were also more likely than part-timers to respond. Other significant findings included institutional characteristics, such as type and technological environment. Relative to public two-year schools, she found that students attending four-year schools were significantly more likely to complete the NPSAS, and this was true for both private and public four-years. In addition, she found that the number of computers on campus (per 100 students) was a significant positive predictor of response.

One last study used administrative record linking to examine survey nonresponse for college students, this time at the institutional level only (Jans & Roman, 2007). This study used information from IPEDS and other administrative sources to predict average institutional response rates to 2001 College Alcohol Survey using ordinary least-squares (OLS) regression. The College Alcohol Survey was administered at 120 randomly-selected colleges across the country, and institutional response rates ranged from 14% to 83%. Variables considered for the regression model included institutional location, urbanicity, control, whether tuition varies by state residence, whether athletic-related financial aid is offered, whether Ph.D.s are granted at the institution, whether the school has a transfer mission, and many others. Additional predictors intended to describe the student body were also employed, such as the proportion of students

receiving financial aid, the proportion receiving various types of aid, the racial/ethnic diversity of the student body, and admissions information.

Jans and Roman (2007) describe their OLS modeling process as exploratory, and they tried several different methods of selecting which variables to include in the final models. In the end, the researchers reported the results of stepwise-, forward-, and backward-entry OLS methods, and their final analytical sample size was 98 due to listwise deletion of cases with missing data. In all three of the final models, institutional transfer mission significantly and negatively predicted response rates—those schools with transfer missions had, on average, 5 to 6 percentage-point lower average institutional response rates than those who did not. Further, all models also showed that institutional location significantly predicted response rates—compared to institutions located in the west, institutions located in the Midwest had higher predicted response rates. Finally, the proportion of the student body receiving loan aid predicted institutional response rates as well. This predictor was negative, and the regression equations showed that for each percentage-point increase in the proportion of the student body receiving student loans, a 1.0 to 1.3 percentage point decrease in institutional response rate was expected. Approximately 14 to 15% of the variation in institutional response rates could be explained using these and a few other variables.

The primary downside to the administrative record linkage method of examining nonresponse is the limited nature of the data available about respondents and nonrespondents. As mentioned above, administrative data for college students is usually restricted to gender, race, academic status, financial aid, admissions test scores, and other information that the college collects for its routine business. As a result, the predictive power of models run using only administrative data is usually very small. For example, Hunt-White (2007) correctly classified

only 5% of nonrespondents in her cross-classification sample (although 98% of respondents were correctly classified), and McCabe et al. (2002) obtained a Negelkerke R^2 of only .052 in their logistic regression predicting response. The maximum R^2s reported using the administrative methods were under .15 (Jans & Roman, 2007; Porter & Whitcomb, 2005b). Thus, while results from the administrative method can be doubtlessly be used to inform research on nonresponse, it seems clear that other factors impact students' response decisions outside of what can be found in administrative databases.

Longitudinal Panel (Attrition) Analysis

The last major approach to studying nonresponse is longitudinal/panel attrition analysis, in which respondents to an initial survey are treated as a baseline sample from which samples for future surveys are drawn. In the longitudinal approach, comparisons are made between responders and non-responders to the follow-up survey(s), based on baseline survey data. In different fields, the practice of administering multiple surveys over time to the same group of people is called either longitudinal research or panel research (Warnecke & Parsons, 2001), and survey respondent dropout over time is called attrition or longitudinal nonresponse (Gravlee, Kennedy, Godoy, & Leonard, 2009). The panel approach to studying nonresponse is very similar to the administrative data-linking approach, and the two are often combined. However, the longitudinal approach boasts one great benefit, which is the richness of the data available for comparison and modeling purposes. Typically, baseline surveys used in longitudinal research in higher education contain questions that not only cover demographics, test scores, financial aid, and other variables available in administrative databases, but also student behaviors, attitudes, personality characteristics, opinions, and more. These additional data are extremely useful for exploring reasons behind survey nonresponse and for differentiating responders and

nonresponders. The downside of the approach, of course, is that its ultimate usefulness is heavily dependent on how representative the baseline survey respondents are of the population to which researchers wish to generalize.

Like researchers using administrative data, those using panel data usually study nonresponse using descriptive and/or inferential approaches. Unlike the administrative linking research, however, the longitudinal panel research more often uses data from multiple institutions, because survey data are much easier to obtain from students at multiple campuses than are administrative data. Nevertheless, there is still a great deal of research in the longitudinal family that employs data from only one institution. In the review below, the terms "panel attrition" and "longitudinal nonresponse" will be used interchangeably to discuss the proportion of students in a cohort who filled out an initial survey but neglected to participate in one or more follow-up surveys. It should be noted that while many follow-up surveys are designed explicitly to follow-up with a group of students who have already been surveyed, students are not always aware that the surveys are part of a larger research design because the follow-up surveys are often administered years after the initial survey. If unaware of the nature of the longitudinal design, students are likely to treat follow-ups as independent stand-alone surveys, and therefore, the factors that affect response to such surveys are likely similar to those that affect other kinds of surveys.

In descriptive analyses of panel attrition among college student samples, researchers have replicated many previous findings: females are more likely to respond to follow-up surveys than males (Burkam & Lee, 1998; Dey, 1997; Rogelberg, et al., 2003; Rogelberg, Spitzmüller, Little, & Reeve, 2006; Sax, Gilmartin, Lee, & Hagedorn, 2008; Spitzmüller, Glenn, Barr, Rogelberg, & Daniel, 2006; Szelényi, Bryant, & Lindholm, 2005; Thistlethwaite & Wheeler, 1966); White

students are more likely to respond than are non-White students (Dey, 1997), particularly African American students (Burkam & Lee, 1998; Dey, 1997; Sax, Gilmartin, & Bryant, 2003; Szelényi, et al., 2005); engineering majors are more likely to respond to surveys than are other majors (Nielsen, et al., 1978); and academically successful students are more likely to respond to surveys than are those less successful (Burkam & Lee, 1998; Dey, 1997; Nielsen, et al., 1978; Thistlethwaite & Wheeler, 1966). Not every study replicates these findings, however. For example, one study found that attrition rates for a cohort study of college freshmen were actually higher among women than among men (McCoy et al., 2009). Another found no difference in the distribution of students of various racial/ethnic groups among responders and nonresponders (Spitzmüller, et al., 2006), and several recent studies have found Asian American students to have similar response rates to those of White students, if not higher ones (McCoy, et al., 2009; Sax, Gilmartin, et al., 2003; Szelényi, et al., 2005). Finally, in a sample of community college students in Los Angeles, one set of researchers discovered that White students had lower rates of response than some other racial/ethnic groups (Sax, et al., 2008). This last finding echoes that of Hunt-White (2007), and further supports the suggestion that community colleges are environments distinct from four-year institutions, and that survey response dynamics are unique in each environment.

Additional descriptive differences in longitudinal survey response rates across various groups of undergraduate students have also been noted. Dey (1997) reported a positive association between follow-up survey response and academic self-confidence, and a negative association between response and desire to be financially successful in life. Dey also found a negative association between response rates and the amount of time students typically spent partying each week; this was indirectly echoed by McCoy et al. (2009) and Nielsen et al. (1978),

both of whom found that students who dropped out of their longitudinal panels were significantly more likely to drink alcohol, and more likely to drink it often and in great quantities. These latter two sets of researchers also found that students who more often dated and socialized with friends were less likely to respond to follow-up surveys (Nielsen, et al., 1978), and that students who smoked more often were also less likely to respond to the follow-ups (McCoy, et al., 2009).

Researchers descriptively examining differences between follow-up responders and nonresponders also generally find that students who are more engaged and satisfied with their institution, and who are more engaged in their academic career, have higher response rates than those less engaged or satisfied. For example, students who enter college aspiring to degrees higher than a bachelor's have been found to be more likely to respond to follow-up surveys (Dey, 1997). Students who are more satisfied with their university's administration have also been found to be more likely to respond to follow-up surveys (Rogelberg, et al., 2003), as have students who are more involved in the life of their university, as measured by behaviors such as reading university newspapers and attending non-mandatory university functions (Spitzmüller, et al., 2006). Further, in one study, students who lived on campus had higher response rates than those who lived off campus (Rogelberg, et al., 2003). However, not all student involvement has been shown to have positive effects; as reported earlier, partying and drinking behaviors tend to be associated with lower probabilities of response, and at least one researcher has shown that students who participate in athletics have lower rates of follow-up survey return (Nielsen, et al., 1978).

Other descriptive differences that have been found between follow-up responders and nonresponders revolve around socioeconomic status. In a large multi-institutional study, Szelényi et al. (2005) found that students from households with annual family incomes greater

than $150,000 were less likely to respond to their follow-up survey than those from households with lower incomes, an interesting finding in light of the fact that Porter and Whitcomb (2005b) found lower response rates among students on financial aid (which those from households with incomes over $150,000 are less likely to be). To add further confusion to the relationship between socioeconomic status and survey response, Burkam and Lee (1998) found that students who dropped out of the 1980 High School and Beyond panel study had lower SES, on average, than those who stayed in the study. From these and previous studies, it seems that there is no clear direction of effects of socioeconomic indicators on survey response. Some researchers have found that students who come from more well-off backgrounds have higher response rates, and some have found that this same group has lower response rates. In part this may be due to the different indicators used to represent socioeconomic status (parental education, parental income, financial aid status), in part it may be due to the differences in composition of the samples that different researchers have used, and in part it may be due to differences in survey topic.

Many of the descriptive findings in the panel attrition literature are borne out in the multivariate analyses that researchers have done to predict response propensity from baseline survey data. In almost all of these studies, logistic regression has been used to discern the independent effects on response of demographic, attitudinal, behavioral, and other characteristics, while controlling for confounding factors. Interestingly, only one of the five exemplary studies in which researchers modeled longitudinal nonresponse using logistic regression did not employ baseline data from CIRP's freshman survey (TFS). The popularity of the TFS in longitudinal nonresponse research is likely due to several factors. First, many institutions have a long history (up to 40+ years) of administering the TFS every fall to their

entering freshmen (Pryor, Hurtado, Saenz, Santos, & Korn, 2007). Thus, at the institutional level many researchers are quite familiar with TFS data, and at the CIRP level a significant amount of baseline information is available from students at hundreds of institutions. In addition, the TFS is designed explicitly to be part of a longitudinal research design, and many institutions use it as such, following up with their TFS participants either with CIRP's YFCY and/or CSS, or their own institutional surveys. Therefore, longitudinal data is readily available to many institutions and to researchers from CIRP. Finally, response rates to the TFS are typically very high—it is not uncommon for some institutions to achieve close to 100% response rate (Pryor & Sharkness, 2008)—and this makes it an ideal survey to use as the basis for longitudinal nonresponse research.

The only exemplary longitudinal nonresponse study that did not use the TFS as a primary data source instead employed the High School and Beyond (HS&B) survey administered by the government in 1980 (Burkam & Lee, 1998). In this study, Burkam and Lee examined 11,500 respondents who participated in the 1980 HS&B baseline survey when they were seniors in high school; these students were administered three follow-up surveys in 1982, 1984, and 1986 as they either progressed through the educational pipeline or did something else (thus, this study does not analyze only college students, but it is closely related). Burkam and Lee distinguished between two types of longitudinal nonresponse: monotone, in which study participants dropped out after one or more waves permanently (for the remainder of the surveys), and nonmonotone, in which nonrespondents from one of the follow-up surveys were recontacted and successfully interviewed in a subsequent follow-up. Overall, 81.5% of their sample had data from all waves (full-time participants), 11.1% dropped out of the study after one or more waves of data

collection and did not return (monotone attrition), and the remaining 7.4% were missing data from one or two of the follow-up surveys, but not all three (nonmonotone attrition).

Predictors of attrition in Burkam and Lee's study were somewhat different for the two types of attrition. Being female negatively predicted both monotone and nonomonote attrition, while being African American and coming from a non-English-speaking home positively predicted both types. SES was significantly related only to nonmonotone attrition, with lower SES students more likely to drop out of the study but then return. A few additional student characteristics significantly predicted the likelihood of monotone attrition only. Specifically, students who were college-bound in 1980 were significantly less likely than other students to drop out of the study permanently, as were students who came from rural areas. Further, students who attended high school in the northeastern or western U.S. were more likely to display monotone attrition than were those from other areas. But perhaps the most interesting predictors employed in Burkam and Lee's study were indicators of missingness for SES and achievement. In the models predicting both types of attrition, having missing data for SES and achievement test scores significantly predicted attrition. Students who had missing data for one or both of these sets of variables were much more likely to drop out of the study temporarily and permanently. This suggests that item-nonresponse and unit nonresponse may be linked phenomena, a suggestion that has recently been theoretically and empirically confirmed (Ting & Curtin, 2010).

Before the TFS-related longitudinal nonresponse research is examined, one unique attribute of much of this literature must be mentioned—specifically the use of personality typologies as predictors of response. Several longitudinal nonresponse studies have used TFS data to create factors representing Astin's (1993a) personality types of *status striver*, *leader*,

hedonist, *social activist*, *artist*, and *scholar*; these factors have then been used in regressions predicting response. One additional study used the TFS to create variables corresponding to a similar personality typology developed by Holland (1966, 1985), in which student personalities are broken down into four general types, *investigative*, *social*, *artistic* and *enterprising*. The *scholar* (Astin) and *investigative* (Holland) personality factors are intended to measure students' "academic-ness," and include student self-ratings of academic ability, intellectual self-confidence, mathematical ability and other academic-related items. The *social activist* (Astin) and *social* (Holland) personality types reflect how involved in society students would like to be, and include students' self-rated importance of participating in a community action program, helping others in difficulty, influencing social values, influencing the political structure, and so on. Astin's *artist* and Holland's *artistic* personality scales describe the extent to which students believe themselves to be artistic and the extent to which they want to achieve success in the arts, and both scales encompass student self-ratings of artistic and writing ability, as well as personal goals of achieving in performing arts or of writing original works. *Status strivers* (Astin) and *enterprising* personality types (Holland) are students who are primarily concerned with achieving status and wealth, although Holland's conceptualization of the construct also encompasses Astin's *leaders*—students who rate themselves as popular, socially self-confident, and possessing high leadership ability. Finally, Astin's *hedonism* scale describes students who spent more time in high school partying, drinking, and smoking cigarettes.

Two of the four studies that employ CIRP's TFS instrument as a baseline survey, Porter and Whitcomb (2005b) and Clarkberg, Robertson and Einarson (2008), use data drawn from one institution only. Both of these institutions were highly selective, but Porter & Whitcomb's was a small private liberal arts college, while Clarkberg et al.'s was a large private university. Rather

than examining nonresponse to only one follow-up survey, both studies used ordinal logistic regression to examine a cohort of students' survey response behavior over a period of time. Specifically, Clarkberg et al. predicted how many surveys their 2002 freshmen class responded to (after the TFS) over four years (N = 3,003); their dependent variable ranged from zero to four. Porter and Whitcomb also had a dependent variable ranging from zero to four, but these numbers indicated how many surveys their enrolled upperclassmen responded to (after the TFS) over the course of one year (2002) rather than four (N = 462).

Because Porter and Whitcomb (2005b) used the TFS to create factors, while Clarkson, Robertson and Einarson (2008) used it for individual items only, it is somewhat difficult to compare their results to one another. Porter and Whitcomb's analyses employed both administrative data (described above), the four Holland personality scales derived from TFS variables, and two high school engagement scales also derived from TFS variables, *social* (reflecting the extent to which students discussed issues with others, participated in student groups, did volunteer work, and went to concerts or museums) and *academic*, (reflecting both how much students studied and how often they interacted with their teachers). Controlling for gender, race, class standing, GPA, first-generation status, and financial aid status, Porter and Whitcomb found significant effects for four predictors. Social engagement and having an investigative personality type significantly and positively predicted survey response behavior. Having an artistic personality type and/or an enterprising personality type, by contrast, negatively predicted survey response behavior. Supporting the idea that student behavioral and personality data can significantly contribute to response prediction above and beyond administrative data, in Porter and Whitcomb's study the addition of the personality and engagement scales to a model that already included administrative variables increased the

"pseudo-R^2" by 43%, from 14% to 20%. Which specific statistic the "pseudo-R^2" referred to was not mentioned, but the increase in R^2 was corroborated by a statistically significant decrease in the -2 log likelihood value from the first to the second model (p. 143).

Clarkberg et al. (2008) used no multi-item predictors, and instead treated individual predictors in their model as ordinal variables. Like Porter and Whitcomb (2005b), their response prediction model used both administrative data (gender, race, international student status, freshman GPA, and Greek membership) as well as TFS data (covering high school behaviors, plans for college, and student self-ratings), although it did so all at once rather than in stages. In terms of administrative data, these researchers, like many before them, found a positive effect on response of being female and of having a higher GPA, and a negative effect of being African American (they also tested for an interaction between gender and race but this was not significant). Interestingly, unlike Porter and Umbach (2006), Clarkberg et al. found that being an international student negatively predicted responding to follow-up surveys; they also found a negative effect of being a Greek member.

Clarkberg et al.'s (2008) TFS-related results provide an interesting profile of students most likely to respond to surveys at their institution. High school behaviors that had a positive effect on response behavior included average hours per week spent volunteering, frequency of tutoring another student, and frequency of attending concerts. Behavioral predictors that had a negative effect on survey response included hours per week spent partying, frequency of studying with other students, and frequency of smoking and/or drinking alcohol. These predictors seem to agree with most previous research, suggesting that students who are more engaged in academics and who are more involved in the life of their school or community are

more likely to respond to surveys, while students who spend their time socializing, partying and drinking are less likely.

Student expectations for college also predicted the number of surveys responded to in Clarkberg et al.'s (2008) model. The more that students expected to make close friendships with other students, the more likely they were to respond to follow-up surveys throughout their college career. Expectations of joining a fraternity or sorority had a negative effect on response behavior—although this was after controlling for actual Greek membership. Students who expected to transfer colleges (but who presumably did not) were less likely to respond to future surveys, and interestingly, the same was true of students who expected to be satisfied. This last result is somewhat surprising because research has found that expectations of satisfaction are highly related to actual satisfaction (Pryor & Sharkness, 2010), and that satisfaction is related to student survey response rates (Rogelberg, et al., 2003). The surprising negative effect of expectations of satisfaction may be an artifact of the fact this variable was highly correlated with the variable representing expectations of making close friends ($r = .42$).

The final two studies that use TFS baseline data to predict nonresponse were published by researchers from the Higher Education Research Institute and CIRP at UCLA. One of these studies focuses on administration method (paper/web) and response (Sax, Gilmartin, et al., 2003), while the other focuses on the effect of pre-paid incentives on response (Szelényi, et al., 2005). However, both studies use logistic regression to model student response using a large number of variables representing demographics, high school activities, personality types, major, location, institutional type, and so on.

The Sax, Gilmartin and Bryant (2003) study employed a sample of 4,498 CIRP TFS participants from 14 schools, and it modeled whether students responded to CIRP's Your First

College Year follow-up survey (YFCY, response rate = 22%). Separate models were run for four experimental administration conditions to which students were randomly assigned (paper only, paper with web option, web only with no incentive, and web only with incentive), and regression results were different for each model. Below, only variables found to be significant in two or more models are discussed. In the Szeléni, Bryant and Lindholm (2005) study, 11,547 TFS respondents at 47 institutions were mailed a TFS follow-up survey during their junior year called the College Student Beliefs and Values survey (CSBV, response rate = 32%). Students at various institutions were randomly assigned to receive a pre-paid incentive of $2, $4, or $0, and CSBV response was modeled using the incentive condition as one of the predictors.

While the Széleni et al. (2005) regression model employed more variables than the Sax et al. (2003) model, and both models used predictors not found in the other, the significant predictors in the two studies were similar in many respects. Not surprisingly, in both studies, women were significantly more likely to respond to the relevant follow-up surveys than were men. Also in both studies, follow-up response was significantly less likely for students scoring higher on scales measuring whether they were status strivers, leaders and/or hedonists. Sax et al. found an additional positive effect of achievement measures (high school GPA and SAT scores) on probabilities of follow-up survey response; Széleni et al. did not include these measures in their model but did find a positive effect for students scoring higher on the scholar personality scale. Sax et al.'s results further showed that students who scored higher on the social activism scale were more likely to respond to the YFCY, but Széleni et al. found no effect of social activism on follow-up response to the CSBV. However, Széleni and her colleagues did find a significant positive effect of performing volunteer work on response propensity, and this variable

may have taken the predictive power away from the social activist factor in their model (Sax et al. did not include a volunteer indicator in their model).

Race was included only in the Széleni et al. (2005) model. These researchers noted a significantly lower probability of response to the CSBV for African American and Latino/a students, relative to White students (Asian American students had equal probabilities of response as White students). Széleni et al. also included in their model a measure of institutional location, and they found that students attending college in the eastern part of the country (compared to the west) were significantly less likely to respond to the CSBV. Finally, disparate results concerning the impact of socioeconomic background on follow-up response were observed in Széleni et al. and Sax et al.'s (2003) models. For both studies, the SES measure was comprised of indicators of mother's and father's highest levels of education, as well as estimated parental income. Széleni and her colleagues observed a significant negative effect of SES, with students of higher SES having lower response propensities, while no relationship was observed by Sax et al. However, in two of Sax's models, being more concerned about financing college did positively predict response to the YFCY.

Overall, the picture that emerges from the small collection of studies that examine nonresponse using the longitudinal follow-up/panel attrition method is quite interesting and is largely in line with previous research, especially in terms of the "types" of students who are more and less likely to respond to surveys in college. Female students, White students, and, to some extent, Asian American students, are most likely to respond to follow-up surveys; male students, African American students, and Latino/a students are least likely. Students who spent time in high school drinking and partying are, in general, less likely to participate in follow-up surveys in college; the same is true for students who pride themselves on being social and

popular and for those who prize status and financial success. Students who are focused on academics as a source of personal pride and students who achieve high grade point averages in high school and in college are more likely to respond to follow-up surveys.

Unfortunately, neither the studies lead by Sax (2003) nor Széleni (2005) provided measures of model fit in their data, so the extent to which the included variables explained student response behavior is unclear, as is the extent to which the models could correctly classify students as respondents or nonrespondents. In addition, neither study provided or controlled for baseline TFS response rates, so we do not know the extent to which initial baseline survey nonresponse affected their results. Even more damaging, both studies suffered from a severe loss of information due to listwise deletion (i.e. omitting cases from the analyses if they are missing information on one or more variables)—Sax et al. lost 1,415 cases (32% of the total) and Széleni et al. lost 2,759 (24%). Such a large proportional loss of data is especially concerning in light of the fact that Burkam and Lee (1998) found significant relationships between nonresponse to follow-up surveys and omission of information at the baseline survey, specifically involving item nonresponse on SES indicators and test scores. Unfortunately, SES indicators and test scores are the two variables that are most often missing in educational data, especially TFS data (Sharkness & DeAngelo, 2010). Finally, the studies led by Sax and Széleni are limited by the fact that they did not account for the nested nature of their data. Because students are "clustered" within colleges, it is likely that students within each college are similar to one other in many respects. If this is the case, it is a violation of the assumptions of linear regression to treat each student as independent from every other student. As a result, standard errors may have been misestimated, and the results of the studies may not accurately mirror reality.

Survey Design Characteristics and Survey Mode

The studies reviewed above look at response rates across different groups of students, as well as differences in characteristics among responders and nonresponders. In addition to such studies, there are also a number of studies in the higher education and related literature that largely ignore demographic and personality issues and instead focus on survey administration and design issues, such as the use of incentives, the use of mail versus web modes, the use of pre-notifications and reminders, and so on. Many of these studies randomly assign sample members to various administration conditions, and examine response rates across the assignments. Occasionally the studies will examine differences in the response rate for each administration method by gender or race; some others use statistical modeling to examine why students choose one mode over another or to control for confounding factors. Below, a brief review is provided of the studies that have been done on the effects of survey design features on student survey nonresponse.

Pre-paid incentives. One of the student survey design characteristics that researchers have examined is pre-paid monetary incentives. At least three sets of researchers have performed randomized experiments in which the presence and/or amount of a pre-paid incentive is manipulated; for the current purposes, the term "pre-paid incentive" is used to mean a token amount of cash included with the initial request for survey participation. Because sample members can keep this cash regardless of whether they complete the survey or not, it is thought that including it with the survey invitation gives potential respondents a good feeling about the survey sponsor, and also invokes in them societal norms of reciprocity (Dillman, 2007).

Across the board, all studies examining the use of pre-paid cash incentives for college student samples have shown a significant and positive effect of the practice. Zusman & Duby

(1984) performed a mail survey of 371 undergraduate transfer students who dropped out of a large, public four-year school after one term. A random selection of 200 students got $1 with their mailed survey invitation; these students had a significantly higher response rate than the students who received no incentive (64% vs. 45%). Similarly, Hegelson, Voss & Terpening (2002) randomly assigned 270 students from several undergraduate business classes at a private university to a $1 prepaid incentive condition versus no incentive condition, and those receiving the incentive had a significantly higher response rate (although the specific rate was not reported). In the largest and most comprehensive look at pre-paid monetary incentives, Szelényi, Bryant and Lindholm (2005) used a sample of over 11,000 students at 47 institutions to look at the impact of including with their survey invitation either $0, $2, or $5. They controlled for student background characteristics and institutional characteristics in a logistic regression predicting response versus nonresponse, and found a substantial and positive effect of including the prepaid monetary incentives. Interestingly, this effect seemed primarily to be between the $2 and $0 conditions; the effect of raising the incentive from $2 to $5 was not as large as effect of raising it from $0 to $2. The response rate among students who received no money was 23%, compared to 36% for the $2 recipients and 41% for the $5 recipients.

Lottery and other post-paid incentives. Due to factors such as budgetary constraints, logistical considerations and increasing reliance on web surveys, pre-paid incentives are not commonly used in student survey administration. Much more common are post-paid incentives, or incentives that are given contingent upon completion of the survey. Sometimes these incentives are guaranteed, so that every student who fills out the survey will receive the incentive, and sometimes the incentives are distributed via lottery, so that every student who fills out the survey has a *chance* to receive the incentive. Anecdotal evidence as well as a few

published studies support the notion that post-paid incentives are often used in student survey research. For example, Porter & Whitcomb (2003) surveyed institutional researchers in the spring of 2000, and found that at least one-third of the surveys administered by these professionals involved a lottery incentive. Further, in the 2007 and 2008 iterations of the Wabash Study, a multi-institutional longitudinal study of the liberal arts, the most common incentive offered to students for study completion was a raffle incentive, followed by small but guaranteed post-paid incentives (Martin & Loes, 2010).

Two recent studies have used quasi-experimental methods to examine the effectiveness of lottery incentives for boosting student response rates to web surveys. The first was conducted by Heerwegh (2006) using the cohort of first-time first-year students enrolled at the Katholieke Universiteit Leuven (in Belgium) in academic year 2003-2004. Based on the university enrollment database, a sample of 2,304 students was randomly drawn for a survey of "attitudes toward immigrants and refugees" (p. 211). Half of the sample was randomly selected for the incentive condition, and these students received communications that mentioned that participating in the survey gave them a chance to win one of ten €25 gift certificates to a popular store called "Fnac" (an entertainment store selling music, books and electronics). The other half of the sample was not offered an incentive in their survey invitation, but aside from this, all survey-related communications were identical between the two groups. The incentivized students responded at a rate of 59%, compared to 54% of the students in the no-incentive condition, a difference that achieved statistical significance. Notably, when the sample was broken out by gender, it was found that men who were offered an incentive did not respond at a significantly higher rate than those to whom it was not offered (52% vs. 48%), but females offered the incentive did respond at significantly higher rates than their non-incentivized

counterparts (64% vs. 58%). Although the difference between incentivized and non-incentivized groups was only two percentage-points greater for women than men, the findings indicate that there may be differential effects of lottery incentives between genders.

The second study to experimentally look at the effect of incentives on web response rates was performed by Laguilles, Williams and Saunders (2010) at a large, four-year, public research university in the Northeast with a predominately White undergraduate enrollment. Between spring 2008 and spring 2009, Laguilles and colleagues performed four experimental studies examining the impact of three different incentives (an iPod Nano, a $50 dining gift card, and an iPod Touch) over four different survey administrations (an iPod Touch was the incentive for two surveys). In each experiment, a random sample of undergraduate students was selected to receive the survey via the web; half of these students were assigned to the incentive condition and half to the no incentive condition. It was possible for students to be in several experiments, in either the incentive and/or the no incentive condition. Each survey covered a different topic; two related to the university (dining and information technology services), and two were more general in nature (covering politics and the economy).

In all four of Laguilles et al.'s (2010) experiments, students offered a chance to win a prize responded at significantly higher rates than students who were not offered such a chance, although no incentive condition prompted students to respond at rates higher than 41%, and the differences between the incentive and control conditions were not large. The difference in response rates between students who were offered the chance to win a prize and those who were not ranged from 5 percentage points in the second experiment (41% of students in incentive condition responded, vs. 36% of those in the control condition) to 9 percentage points in the third experiment (38% vs. 29%). The two experiments that involved the same incentive—the iPod

Touch—achieved response rates higher than the control condition by a magnitude of 9 and 6 percentage points.

The most interesting component of the Laguilles et al. (2010) study involved the investigation of gender differences in the impact of the lottery incentive on response rates. Like many researchers before them, they found that females responded at higher rates than males to each of the four surveys. However, in two experiments, the female/male gap in response rates was substantially larger in the control condition than it was in the incentive condition; indeed, for these two surveys (involving campus information technology services and economic issues, respectively) the incentive (an iPod Nano in the first case and an iPod Touch in the other) significantly increased response rates *only* for males. In one experiment—a dining survey offering a chance to win one of several $50 gift certificates to the dining halls—the incentive significantly increased response rates only for females. Finally, in the last survey, which covered the presidential election, the offer of a chance to win an iPod Touch significantly increased response rates for males and females an approximately equal amount (8.6 and 9.3 percentage points, respectively).

Laguilles et al. (2010) interpret the finding of differential effects of incentives across genders as evidence that different incentives can have different "leveraging" effects for males and females, based on different "value orientations" that share "some degree of commonality along demographic lines" (p. 549). This is particularly interesting in light of the fact that, at least for the gift certificate incentive, Heerwegh (2006) showed similar effects to Laguilles et al., namely, a significant effect for females but not males. It could be that different lottery incentives motivate males and females in different ways, with raffles for one of several gift certificates relatively more attractive to females, and raffles for one large prize more attractive to males.

However, both Heerwegh and Laguilles et al. performed their studies at one institution only, and Heerwegh's institution was in Belgium. Further, in the Laguilles study, no attempt was made to prevent "contamination" of their findings. That is, students were allowed to be selected into multiple experiments, in either the incentive and/or no incentive condition, and students could of course have communicated to one other about whether or not they were offered an incentive in any given study. Therefore it is unclear whether the results of either study will generalize to other situations, though the results are tantalizing.

One final study examined the impact of different post-paid incentives on longitudinal response rates (Martin & Loes, 2010). This study involved the 2006, 2007 and 2008 administrations of the Wabash study, a longitudinal study in which students were administered a pre-college assessment battery (taking approximately 90 minutes to complete), and then 11 follow-up assessment batteries two years later (taking approximately 2 hours to complete, Pascarella, 2007). Nineteen institutions participated in the study in 2006, eight participated in 2007, and twenty-seven participated in 2008. In the initial study year (2006), the organization funding the study offered to all students who completed each wave of the study $50 after each assessment data collection day. In 2007 and 2008, institutions participating in the study were responsible for their own incentive. In these latter two years, 5 schools provided guaranteed cash incentives similar to those offered in 2006, 9 schools offered a raffle incentive, 7 schools offered small token incentives of low monetary value, such as food, $5 gift certificates, or priority status in the housing lottery, 5 schools offered both token incentives and raffle prizes, 2 schools made the study required for all students and offered no other incentive, and 4 schools provided no incentive whatsoever.

The proportion of Wabash study participants in each of the above incentive conditions who completed more than half of the final 11 assessment batteries was different across each condition (Martin and Loes provided no information about initial response rates). At institutions offering guaranteed cash payments, 99% of initial respondents completed more than half of the final batteries. At raffle-only institutions, 84% completed six or more of the follow-up batteries. Among institutions offering both raffle incentives as well as token incentives for all participants, 96% completed more than half of the batteries, while institutions offering a token incentive only saw 98% of initial participants fill out half or more of the final assessments. At the two schools that required students to participate in the study, 91% completed at least half the batteries. Finally, at the schools that offered no incentives only 58% of students filled out half or more of the final instruments. Martin and Loes (2010) conclude from these findings that "incentives appear to matter in reducing the quantity of missing data in longitudinal studies" (p. 26), and that cash incentives seem to work best. It also seems clear from their study that guaranteeing an incentive for everyone—either one of substantial monetary value (i.e. $50) or one of token monetary value ($5)—impacted response/completion rates more than raffles, and that any kind of incentive increased rates over the no incentive condition. Unfortunately, the researchers did not provide any information about the institutions that chose to offer each type of incentive, the number of students sampled at each institution, nor initial response rates. Therefore the possibility exists that the observed "effects" of incentives in the Wabash Study are confounded with other effects. The researchers also, regrettably, did not report response rates by gender for each incentive condition.

Other design characteristics. Other survey design characteristics that have been examined in the student survey response rate literature include length, personalization of e-

mailed survey invitations, and subject lines of e-mailed survey invitations. Adams and Gale (1982) performed an experiment looking at how the length of a survey (in pages) affects response rate. These researchers randomly sampled three groups of 550 undergraduates at Brigham Young University, and sent a questionnaire about student participation in campus activities to all groups. The first group got a one-page survey, the second a three-page survey, and the last a five-page survey; all three groups were sent the survey via U.S. mail and had the same number of reminders. The response rate for the shortest two surveys was significantly higher than that for the five-page survey: 41% and 47% of those who received a one- and three-page survey returned it, respectively, compared to just 22% of those who received the five-page survey.

Two sets of researchers have looked at how attributes of e-mail survey invitations affect participation in surveys. Porter and Whitcomb (2005a) examined the effect of e-mail subject lines on response rates to a survey that "asked respondents to rate their abilities on various capabilities and types of knowledge" (p. 381); this survey was given to all students enrolled at a selective liberal arts college in 2004. Students were randomly assigned to one of eight experimental conditions that varied in terms of the information provided in the subject line. Subject lines could include one or more of the following: reason for the e-mail, mention of the survey sponsor, plea for help, or no subject. Although there were minor variations in response rates across conditions, no differences reached statistical significance. Porter and Whitcomb attributed this result to the fact that "students are likely to open all e-mail originating from within their university as it may contain important information" (p. 384); in other words, e-mail subject lines did not seem to have any impact on response rates.

Heerwegh (2005) examined whether including a personal salutation in a survey invitation e-mail (i.e. "Dear Jesssica Sharkness") boosted response rates over a generic salutation ("Dear student"). To do this, Heerwegh drew a random sample from the 2003-2004 student database of the Katholieke Universiteit Leuven, Belgium, and randomly assigned the subjects in the sample to receive a personalized or non-personalized survey invitation e-mail (the survey covered "adolescent attitudes toward marriage and divorce," p. 592). Heerwegh found a significant effect of the personalized salutation, with those students receiving an e-mail addressed to them responding at a rate of 61%, compared to 53% for those who received a generic salutation. However, this study was done in Belgium, so it is unclear whether the results would be the same for an American student population.

Survey mode: Web versus mail. Several sets of researchers have also looked at differences in response rates to student surveys across different modes, usually comparing web and mail survey modes. Many of these studies have focused on whether answers to survey questions vary as a function of mode (that is, they have focused on measurement error, something out of the scope of the current discussion). However, some researchers have examined the impact of mode (web vs. mail) on response rates, and others have looked at the preferences of various demographic groups for one mode over the other. Such studies began to be published in the late 1990's and early 2000's when web surveys were first introduced. Since that time, web surveys have exploded in popularity—going from being considered a novelty in the late 1990's to being in routine use today (Couper, 2000; Dillman, 2007). For surveys of college students, web surveys became popular rather quickly because college students were one of the populations who first had virtually universal web access (Crawford, et al., 2001; Dillman, 2007), and research in web versus mail versions of student surveys followed apace. Early

research on web versus mail surveys must be examined with caution however, as it cannot be assumed that students in the early 2000's had as much familiarity with the web, on average, as students do today. That is, early research comparing web and mail surveys could conceivably be affected by differences in students' familiarity with technology (Kwak & Radler, 2002). While such a caveat no doubt also applies to research published more recently, as time passes more and more people, college students especially, have integrated the internet into their daily lives, so the technology familiarity issue has likely become less of a problem today than it was in earlier time periods. Unfortunately, whether or not predictors of—or preference for—mail versus web survey modes has changed over time is unclear, because the vast majority of studies looking at response rates and nonresponse in the two types of surveys were done using data collected in the early 2000's when web survey technology was just taking off.

The research that has been published comparing web and mail versions of the same survey has taken one of several approaches. Some studies have involved quasi-experiments, in which students are randomly assigned to receive web or mail versions of the same survey, and response rates are compared across the different conditions. These types of experiment have been done using samples at single institutions (Kaplowitz, Hadlock, & Levine, 2004; Kwak & Radler, 2002; McCabe, et al., 2002; McCabe, et al., 2006; Pealer, Weiler, Pigg, Miller, & Dorman, 2001), as well as at multiple institutions (Sax, Gilmartin, et al., 2003). Another set of studies have described situations in which students had the option of completing a survey via the web or via the mail; these studies have modeled the factors that predict selection of the web over the mail versions (Carini, Hayek, Kuh, Kennedy, & Ouimet, 2003; Sax, Gilmartin, et al., 2003; Sax, et al., 2008). Finally, a few studies have examined predictors of response for web and mail versions of the same survey separately, and have examined whether predictors are consistent

across modes (McCabe, et al., 2002; Porter & Umbach, 2006; Sax, Gilmartin, et al., 2003). Among all these studies, no clear consensus has emerged in terms of which modality will achieve higher response rates for college students. Some researchers have found lower response rates for web surveys compared to mail surveys (Kaplowitz, et al., 2004; Kwak & Radler, 2002; Sax, Gilmartin, et al., 2003), while others have shown higher response rates for web surveys (McCabe, et al., 2002; McCabe, et al., 2006; Sax, et al., 2008). Yet others have demonstrated approximately equal response rates for the two modes (Pealer, et al., 2001).

On the other hand, one clear trend has emerged from almost every study comparing web and mail survey modes: male college students prefer web surveys over mail surveys. Indeed, although males are less likely than females to respond to both types of surveys, males seem more willing to respond to web surveys than to those given via the mail. When researchers examine gender distributions among their web and mail survey respondents, it is not unusual to find that 60% to 70% of mail survey respondents are female, compared to only 50% to 60% of web respondents (Carini, et al., 2003; Kwak & Radler, 2002; McCabe, et al., 2006). Similarly, when response rates by gender are broken out, female response rates to web and mail surveys are general more similar to one another than are male response rates to the two types of surveys. For example, McCabe et al. (2002) found that the response rate among female students to their mail survey was 49% for mail and 69% for web survey, a 20 percentage point difference. By contrast, male students' response rate to the mail survey was 31%, compared to 57% for the web survey—a difference of 26 percentage points. Sax et al. (2003) and Sax et al. (2008) also noticed similar patterns in response rate differentials across men and women given web and mail surveys. Further supporting the male web preference, in logistic regressions predicting self-selection into web survey modes, being female is usually a negative predictor—that is, being male positively

predicts responding via the web versus mail (Carini, et al., 2003; Sax, Gilmartin, et al., 2003). Finally, in the studies that have performed separate regressions predicting web and mail responses, the positive effect on response propensity of being female is almost always less strong for web survey response than mail (McCabe, et al., 2002; Porter & Umbach, 2006; Sax, Gilmartin, et al., 2003); in one study, being female significantly predicted response for mail surveys only, not web (Sax, et al., 2008).

In terms of preferences for web versus mail across races/ethnicities, the picture is not so clear. One group of researchers at NSSE found that when given the option, White students were more likely to take NSSE online than were African American students; the same was true for Latino/a students compared to African American students (Carini, et al., 2003). Another study suggested that Asian American students were more likely to respond to the web version of a survey, and that Latinos were more likely to respond to the mail version (Pealer, et al., 2001). Yet other researchers found essentially no preference of various racial/ethnic groups for one survey modality over the other (McCabe, et al., 2002; McCabe, et al., 2006; Porter & Umbach, 2006; Sax, Gilmartin, et al., 2003). On the whole, it is entirely unclear whether choice of modality—web versus mail—affects the likelihood of survey response of students of different race/ethnicities in different ways.

Web and non-mail paper surveys. One final study, a descriptive one presented at a conference, examined response rates by administration mode at an institutional level (Pryor & Sharkness, 2008). Examining the 2007 administrations of CIRP's TFS, YFCY, and CSS, Pryor and Sharkness used data provided by institutions to examine the response rates that resulted from various administrative practices. To do this, they employed data drawn from institutional Administrative Report Forms (ARFs), which were filled out by 87% or more of the hundred-plus

institutions that participated in each survey. These forms provided details about institutional survey administration practices as well as institutional response rates. Of note, the 2007 TFS was offered on paper only, while the YFCY and CSS were offered on paper or via web; institutions could elect to give students one or both modality options. Interestingly, most of the institutions that employed paper versions of the surveys administered them via avenues other than mail; for example they distributed the surveys to students in large proctored groups, in classes, or in advising situations.

Across the board, the paper administrations of each of the three surveys had the highest average response rates. The TFS, which was given on paper only, achieved an average institutional response rate of 77% (institutional N = 473), while the institutions that administered the YFCY (n = 58) and CSS (n = 58) on paper only averaged response rates of 64% and 73%, respectively. Institutions that elected to use web-only options had very low response rates on average—web-only YFCY institutions (n = 44) averaged a response rate of 23%, and CSS web-only institutions (n = 19) averaged a response rate of 29%. The few institutions that gave students both web and paper options had the most variation in their response rates, but these schools had more success than the web-only institutions, averaging a 37% response rate for the YFCY (n = 7) and a 47% response rate for the CSS (n = 18).

The most successful administration practices for the TFS involved administering the survey in a proctored group, in particular during orientation sessions, at matriculation, or in classes; 60% of the 391 institutions that employed this method achieved response rates above 80%, and another 33% achieved response rates between 51% and 80%. Administering the TFS survey to students individually, for example in advising sessions or residence halls, was also fairly successful—60% of the 39 institutions that used this distribution method achieved

response rates above 50%. Similarly, CSS and YFCY paper-only administrations achieved the highest response rates in proctored settings like in classes (YFCY), at commencement (CSS), or during "assessment days"; 72% of the 46 YFCY institutions and 94% of the 34 CSS institutions who proctored their survey administrations achieved response rates over 50%.

Pryor and Sharkness (2008) also examined whether incentives boosted response rates for paper-only, paper-and-web, and web-only administration methods, although they performed no statistical tests. Incentives offered at each school were different and varied substantially, but many employed a raffle-type incentive. For all three surveys, the institutions that offered incentives in conjunction with their paper-only administration methods had slightly lower response rates than those that did not (this finding is likely due to the fact that the paper-only administrations without incentives almost always involved proctored settings). The opposite was true for institutions that administered the YFCY or CSS on the web; for web-only and paper-and-web institutions, those that offered an incentive had slightly higher average response rates than those that did not. However, incentives did not appear have a large impact for any mode, a finding that corroborates both Laguilles et al.'s (2010) and Heerwegh's (2006) findings, as well as the results of a 2003 study by Porter and Whitcomb that showed that lottery incentives, regardless of how large, had no effect on response rates for prospective students (potential applicants) at a small liberal arts institutions.

Summary of the Literature

On the whole, the literature on student survey nonresponse is rather disjointed and somewhat difficult to synthesize. Research on the topic has been done using different methods, for different reasons, and has been published in journals of disciplines as disparate as organizational psychology and public opinion research. Even among studies that resemble one

another in terms of approach or purpose, no two sets of researchers have examined nonresponse using the same student- and institution-level correlates. Further, almost every study was done using different student populations, who were given surveys that covered different topics, so it is difficult to know which factors are significant in predicting response, and in which situations. Many studies employed small samples from single institutions, so generalizability of these studies is not assured, and even those studies that used data from many institutions have limitations that affect their generalizability. For example, only one employed hierarchical modeling (the most appropriate approach), and several confounded institutional self-selection into administration mode with institution-level effects. Perhaps not surprisingly, few consistent findings have emerged in the literature in terms of institutional effects.

Nevertheless, despite difficulties in synthesizing the literature, there have been some results that are quite consistent across studies. By the same token, of course, there are also a series of findings that are either observed in one or two studies only, or that are inconsistent across studies. Below, both the consistent and inconsistent findings in the student survey literature are summarized; this summary is followed by a review of some important unanswered questions.

Student-level Correlates of Survey Response

There are several student-level characteristics that have consistently been shown to relate to survey response. First, women are more likely to respond to student surveys than are men, regardless of the topic of the survey. Some studies have shown smaller differences in response rates between men and women; these are typically studies that use a web survey mode, as such surveys seem to elicit much higher response rates from males than mail surveys. In addition, a few recent studies have suggested that males may respond to surveys at higher rates when certain

kinds of incentives are offered, while females may respond at higher rates in response to different incentives.

Another consistent correlate of student survey response in the literature has been race/ethnicity. Specifically, White students have been shown to be generally more likely to respond to student surveys than students of other race/ethnicities, with the possible exception of Asian Americans, who have responded to surveys at equal rates as White students in several recent studies. Students who are academically-oriented, academically successful, and/or academically ambitious have also been shown to be more likely to respond to surveys, as have students who are more conscientious, cooperative, and who care about making a difference in the world and their communities. By contrast, students who pride themselves on being socially self-confident or popular, who have goals of achieving money and status, and who spend more of their time socializing, drinking, partying, and/or smoking, have been shown to be less likely to respond to surveys.

In terms of less consistent findings, the most unclear relationship between student-level characteristics and survey response propensity involves students' socioeconomic status. Notably, this is not a problem unique to student surveys—in the general U.S. population, the effects of household income on survey response is equally uncertain (Groves & Couper, 1998). For example, income has been found to be negatively associated with response rates to the government's Current Population Survey (Korinek, Mistiaen, & Ravallion, 2006), but positively associated with willingness to participate in a national survey about the environment (Hite, Haab, Hudson, & Seah, 2004). Thus it is perhaps not surprising that in the student survey literature, students from lower socioeconomic backgrounds have been shown to respond to surveys at both lower rates (Burkam & Lee, 1998; Jans & Roman, 2007; Porter & Whitcomb, 2005b), and higher

rates (Hunt-White, 2007; Szelényi, et al., 2005) than those from higher socioeconomic backgrounds. However, it is not entirely fair to compare the results of the existing studies to one other; each had a different survey sponsor, a different topic, and most importantly, a different measure of SES. It is therefore difficult to say whether the studies truly disagree or whether the effect of income/SES on student response rates is a function of the topic of the survey and/or the operationalization of the variable.

Another less consistent finding regarding student characteristics and response propensity concerns the effect of students' majors on response propensity. Some studies have found that students with engineering, computer science, or technology majors are more likely to respond to surveys (Nielsen, et al., 1978; Sills & Song, 2002; Yu, et al., 2007), but some of these studies have also been on topics that may be more attractive to such majors, like use of technology (Yu, et al., 2007). However, there may be something to the finding that science and engineering majors respond at higher rates to surveys, as researchers have also found that students with "investigative" personality types—who may be more likely to major in fields such as science, engineering, and math (Smart, 2010)—are more likely to respond to surveys, while students with "artistic" personality types—who may be more likely than other students to major in fields in the arts and humanities (Feldman, Ethington, & Smart, 2001)—are less likely to respond (Porter & Whitcomb, 2005b; Sax, Gilmartin, et al., 2003). On the whole, however, very little research has been done on the connections—if any—of students' majors to their survey response rate propensities.

Similarly inconsistent findings have been found regarding the impact of international student status and likelihood of responding to student surveys. Only two studies have included citizenship status in their models, and each showed opposite results. Clarkberg et al. (2008)

found that international students had lower likelihoods of responding to student surveys than domestic students, while Porter and Umbach (2006) found that these students were more likely to respond to the NSSE than their domestic counterparts. In part, this may be due to the fact that the definition of "international student" is not well specified in either case, an issue not limited to these two studies. For example, in research using CIRP TFS data (for example, the yearly norms studies), international students are usually grouped into whatever racial/ethnic category they chose on the survey (Chinese students, for example, would be included in the Asian category if they checked "Asian" on the survey, S. Tran, personal communication, March 22, 2011), while in other data these students are not assigned a race and are rather treated as nonresident aliens (this is how IPEDS treats international students, for example, Broh & Minicucci, 2008). It is possible, then, that race/ethnicity and citizenship status has been confounded in the limited research that connects it to survey nonresponse. Overall, however, the presence of these students has been largely ignored in the student survey literature, so at the very least future research on the topic should disentangle the effect of international student status from race/ethnicity.

Institution-level Correlates of Survey Response

In terms of institution-level correlates of response, the picture is not as clear as that for student-level correlates. How characteristics of institutions relate to response rates has not been thoroughly investigated; only one study used hierarchical modeling to tease out institution-level effects from student-level effects (Porter & Umbach, 2006), but this study performed separate modeling procedures for institutions that self-selected into paper and web administrations and the findings suffer from confounding due to institutional self-selection as a result. The only other two studies to explicitly examine response rates at the institution level either suffered from methodological inadequacies—for example, the use of exploratory forward/backward/stepwise

OLS regressions (Jans & Roman, 2007)—or a lack of multivariate modeling (Pryor & Sharkness, 2008). All other studies that included institutional characteristics did so by treating them as student-level data.

There are a few sets of institutional characteristics that have predicted response in more than one study. First, location of an institution has been shown to impact response rates, with students attending schools in the midwestern part of the country more likely to respond to surveys than those in the west (Jans & Roman, 2007), those in the west more likely to respond than those in the east (Szelényi, et al., 2005), and those who attended high school in the northeast or the west less likely to complete surveys than those who attended school in other areas of the country (Burkam & Lee, 1998). The reasons behind differences in response rates across institutions in different locations have not been made clear, although the phenomenon may be related to the urbanicity of institutions, as studies have shown that students attending institutions in urban areas tend to have lower response rates than those in rural areas (Hunt-White, 2007; Porter & Umbach, 2006). However, there may also be something unique about the survey-taking culture in certain regions of the United States, as response rate differences across various regions of the U.S. have been observed in surveys of the general population as well. For example, Koch and Cebula (2004) found that, controlling for ethnicity, education, civic involvement, income, and homeowner status, households in the Midwest census region (states ranging from Ohio and Michigan in the east to Kansas and North Dakota in the west) had significantly higher census return rates than those in the Northeast, South, and West. This suggests that there may be differences in norms of survey cooperation in different regions in the U.S., and these might affect college students.

As far as survey administration techniques are concerned, pre-paid incentives have been shown to work well in encouraging student response, as have guaranteed post-paid incentives, but lottery incentives have been shown to be less successful. In-person administrative techniques, such as administering a survey in a large proctored setting, seem to work well in terms of getting students to respond, while mail and web administrations work less well. No clear positive or negative effect has been shown for web versus mail administration modes. Personalizing e-mail survey invitations has been shown to positively impact response rate, but the content of e-mail subject lines has been shown to have no effect. On the whole, the literature covering the effects of survey administration practices on college student response propensity is relatively scant, and it is not clear what methods work best for stimulating student response rates. Nor is it clear whether such effects are different for students attending different type of institutions, nor whether response rate differences across institutions are related to how well various administration methods are implemented.

Unanswered Questions

Clearly, one of the major unanswered questions in the literature revolves around institutional differences in response rates. Simply put: why do institutional response rates vary, especially across schools that have similar characteristics? Are institutional differences in survey response rates explained entirely by differences in administrative practices? Or does institutional location, setting, or culture additionally impact response rates? No studies published to date have been able to answer these questions, as none has used appropriate multilevel statistical modeling techniques along with data on both administrative and institutional characteristics.

Another unanswered question concerns the reasons behind differences in response propensities of different groups of students. For example, there is a plethora of evidence that

female college students participate in surveys at higher rates than males, yet no one has examined *why* females are more likely to respond than males (aside from suggesting that it may be due to females' greater willingness to participate in research or to females' higher levels of conscientiousness). The same questions exist for findings that concern response rates of students of different race/ethnicities. Study after study has shown differences in student survey response rates among students of different race/ethnicities, yet none has examined why this is the case, nor what factors predict response rates across groups. Along the same lines, there are open questions about whether survey administration techniques differentially affect different groups of students. Do different administration practices differentially affect men and women or students of different race/ethnicities? There is some indication that the answer to this question is yes for men and women, but evidence is scarce in terms of race/ethnicity.

Finally, the literature to date contains no examination of the effect of institutional characteristics on different groups of students' response propensities. There is a substantial body of literature that links institutional environments to student outcomes (Astin, 1993b; Pascarella & Terenzini, 1991, 2005), as well as a literature demonstrating differential effects of institutional environments across different groups of students, including men and women and students of different race/ethnicities (Allen, 1988; Baker, 2008; Hurtado & Carter, 1997; Sax, 2008). Similarly, in the literature concerning surveys of the general population, links have been made between general social environments of households and household survey response rates (Groves & Couper, 1998), as well as between respondent culture and response rates (Johnson, O'Rourke, Burris, & Owens, 2002). Therefore, it is possible that the environment at an institution may affect different groups of enrolled students' likelihoods of responding to surveys in different ways. No research thus far has examined this possibility.

Theories of Survey Response and Nonresponse

In order to put the college student survey nonresponse literature into perspective, it is necessary to turn to the theories social scientists have employed to understand survey response and nonresponse. A number of theories have been applied to the survey response process. The two most commonly used are social exchange theory (SET) and leverage-salience theory (LST), although survey response has also been studied within an organizational context using the theory of organizational citizenship behavior (OCB) and within a psychological context using the Theory of Reasoned Action (TRA) and/or its successor, the Theory of Planned Behavior (TPB). Viewed one way, each of these theories compete with one another to explain survey response, but viewed another way they are all simply different takes on the same overall concept. Below, each theory is explained in sequence, after which the theories are integrated and applied to the unique context of student surveys. Special attention will be paid to the role that theory can play in suggesting explanations for both consistent and inconsistent findings in the college student survey research.

Social Exchange Theory (SET)

Social exchange theory originated in the field of sociology in the late 1950's (Cook, 2001). At its most basic level, SET explains human interactions in terms of the costs and benefits that the interactions will incur to each party. SET assumes that all human behavior "is motivated by the desire to increase gain and to avoid loss…or to increase outcomes that are positively valued and to decrease outcomes that are negatively valued" (Cook, 2001, p. 5045). Under a SET framework, the request for a sample member to respond to a survey is akin to a request for that sample member to enter into an exchange relationship with the person or organization sponsoring the survey (Dillman, 1978). SET predicts that when confronted with a

survey request, sample members will evaluate the rewards they hope to obtain from filling out the survey, the costs such behavior will likely incur to them, and the difference between the two. Whether or not a person will respond to a survey, then, "is a function of the ratio between the perceived costs of doing that activity and the rewards one expects the other party to provide, either directly or indirectly" (Dillman, 2007, p. 14). Such rewards need not necessarily come at the time that a respondent fills out the survey. Indeed, social exchanges are usually typified by "unspecified obligations such that when an individual does another party a favor, there is an expectation of some future return. When the favor will be returned, and in what form, is often unclear" (Shore, Tetrick, Lynch, & Barksdale, 2006, p. 839). Because of the diffuse nature of social exchange, another key component of SET is trust. Each party must trust that the other will, somehow, eventually, repay the favor (Dillman, 2007).

Don Dillman popularized SET as a framework for survey response in his series of books advocating the Tailored (née Total) Design Method (TDM, see Dillman, 1978, 2007), and SET has become one of most common theories of survey response in use (Goyder, Boyer, & Martinelli, 2006). Administering surveys according to Dillman's TDM has reportedly garnered response rates upwards of 80%, a result that Dillman suggests comes from "survey procedures that create respondent trust and perceptions of increased rewards and reduced costs for being a respondent, [and] that take into account the features of the survey situation" (2007, p. 4). Maximum response rates, according to Dillman, are obtained by (1) minimizing the costs of responding, (2) maximizing the rewards for responding; and (3) establishing trust that the rewards will be delivered (1978). If each of these three things is done well, "effective social exchange" will occur (2007, p. 29), and people will respond.

The obvious questions posed at this point revolve around the rewards and costs of taking a survey. In a recent review of social exchange theory, Cropanzano and Mitchell (2005) note that anthropologists tend to discuss six types of resources that can be exchanged: love, status, information, money, goods and services. However, in more applied/practical disciplines, these six resources are usually collapsed into two broad categories: economic and socioemotional. Economic exchange goods are those that relate to financial needs, and these are generally tangible (i.e. money). Socioemotional goods, by contrast, relate to individuals' social and esteem needs, and these generally "send the message that a person is valued and/or treated with dignity" (Cropanzano & Mitchell, 2005, p. 881). Obviously, socioemotional goods are intangible, but this does not mean that they are unimportant. Indeed, outside of offering a reward for survey participation, the guiding principles for increasing rewards to survey respondents under Dillman's TDM all revolve around socioemotional issues.

The socioemotional rewards that SET hypothesizes survey respondents receive from taking surveys primarily involve making respondents feel good about themselves—"enhancing [the] ego," as some researchers have put it (Cavusgil & Elvey-Kirk, 1998, p. 1168). Accordingly, Dillman (2007) suggests that to increase rewards to survey participants, survey sponsors should do things like show positive regard (by personalizing communications), ask for advice (because people tend to feel good after helping someone), say thank you (because being thanked is rewarding), give social validation (make people feel part of a "group"—that comprised of responders), and support group values (appeal to values shared widely by those surveyed, so that individuals can support their values by responding, an inherently rewarding feeling). Some researchers have additionally suggested that people may respond to surveys simply because they see it as helpful behavior, either to the survey sponsor or to society,

although whether or not participating in such "prosocial" behavior is ultimately a result of expectations of psychological rewards (praise, feeling good about oneself) is a matter of debate (Monroe, 2001; Piliavin, 2001).

In terms of costs incurred to survey-takers under the SET framework, primarily socioemotional concerns again come into play, although economic goods are not completely irrelevant. Time—potentially seen as a tangible economic good—is an obvious cost of filling out surveys. Taking surveys takes time, and if a respondent does not inherently enjoy the experience of filling out a survey, he or she may feel that time is better spent in other activities. Other costs may include feelings of exploitation, worries about confidentiality or identification, the cognitive burden required to answer the survey questions, the physical effort required to fill out the survey (and mail it back in the case of mail surveys), general lack of interest, and discomfort arising from being asked about sensitive information (Childers & Skinner, 1996; Gordoni & Schmidt, 2010; Groves & Couper, 1998; Johnson, et al., 2002; Roose, Lievens, & Waege, 2007; Tourangeau, Rips, & Rasinski, 2000). Dillman (2007) suggests the following for minimizing costs to survey respondents: avoid inconvenience (for example by including with a mail survey a pre-addressed stamped envelope), make questionnaires appear short and easy (to lessen the perceived burden of responding), avoid subordinating language (because people do not like to be subordinated to others), avoid embarrassment and anxiety (from inability to fill out overly complicated questionnaires or questions that address complex issues) and minimize requests to obtain sensitive information (which cause discomfort and embarrassment).

Although SET has been a popular theory used to explain survey nonresponse, on the whole it is not very useful. Almost anything that relates to costs, rewards, or trust can be incorporated into the theory, and the theory makes no specific predictions about which

respondents will respond to surveys, under what conditions, and why. The success of the TDM rests upon the combination of many different administrative factors, including the number, form and content of survey invitations and reminders; the design of the questionnaire; the ordering of questions in the questionnaire; the look and feel of all communication, and so on (Dillman, 1978, 1991, 2007). Little is known about how manipulation of any one of these factors will affect response propensities, either in conjunction with or in the absence of other factors. TDM and SET also implicitly posit that the effect of any given attribute of the survey, positive or negative, is the same for every sample member (Roose, et al., 2007), something unlikely to be true.

Another limitation of SET is that it rests on the assumption that human beings are rational actors who carefully weigh the pros and cons of all decisions, and that human beings respond only to "reward and punishment, pleasure and pain cost and benefit, gain and loss, pay-off and the like" (Zafirovski, 2005, p. 12). Neither of these assumptions is necessarily true (LeBoeuf & Shafir, 2005; van der Pligt, 2001). Indeed, it is unlikely that when confronted with a survey request, sample members consciously weigh the potential rewards and costs of responding at all (Groves, Cialdini, & Couper, 1992). It is much more likely they make a quick decision on the matter, based on situational constraints, past experience, or some decision heuristic. That is, it is likely they take a "shortcut" to decision-making, potentially based on "minor components of the survey that become disproportionately salient in specific survey interactions" (Groves & Couper, 1998, p. 122). How decision heuristics—"strategies of simplifying judgments that allow individuals to make decisions under suboptimal circumstances" (Strack, 2001, p. 6679)—factor into SET and the TDM is unclear.

Leverage-Saliency Theory

Perhaps responding to some of the criticisms of SET, Groves, Singer and Corning introduced the Leverage-Saliency Theory (LST) of survey participation in 2000. LST rests upon the assumption that people use heuristics when they make decisions about whether or not to respond to a survey (Groves & Couper, 1998), and that the information that such heuristics act upon is based on "the brief encounters in which interviewers present the survey requests" (Groves, Singer, & Corning, 2000, p. 299). While this theory was initially posited to deal with in-person survey requests, in which interviewers arrive on a respondents' doorstep and request survey participation, the theory generalizes to many other contexts, including self-administered surveys (Groves et al., 2006). It is an improvement upon SET because it not only does away with the rational cost/benefit analysis assumed by the theory, but also because it explicitly hypothesizes the existence of interaction effects between population characteristics and survey administration characteristics—something lacking in the general one-size-fits-all approach advocated by Dillman's TDM.

Groves, Singer, and Corning (2000) describe the basic premise of LST as follows:

> …how potential influences manifest their effects [on the survey response decision] is dependent upon what happens when the survey request is made. The achieved influence of a particular feature is a function of how important it is to the potential respondent, whether its influence is positive or negative, and how salient it becomes to the sample person during the presentation of the survey request. (p. 301)

In other words, if a survey request were presented to two different people in the same way—for example by emphasizing an incentive and mentioning the topic of the survey (making these items salient)—the two people may make opposite decisions about responding to the survey based on (a) how important each feels the incentive and/or the survey topic is (the leverage of these elements), and (b) whether these features are evaluated positively or negatively.

In the context of self-administered surveys, one obvious problem with LST is that it is not very useful for predicting future behavior, only for explaining past behavior. This is due to the fact that surveyors rarely have measures of the leverage that aspects of the survey have on different people before the survey request is made (in an in-person situation, interviewers can adapt their survey introduction based on observations of how sample member are responding to the pitch; for self-administered surveys this is clearly not possible). Groves et al. (2000) suggest that this limitation be overcome by relying on "a group or characteristic," such as church membership, or "a measure of the magnitude of some attribute," such as age, which many people share and which may be related to the leverage of a specific aspect of the survey (p. 301). If information about this characteristic is available before the survey is administered—if the survey administrators have a respondents' age or church membership status in administrative records, for example—the survey request can be "tailored" for certain groups to emphasize the aspects of the survey most likely to positively influence respondent decisions.

As mentioned above, one of the most important components of LST involves interaction effects (Roose, et al., 2007), and researchers have suggested that these effects might help explain inconsistent findings in the literature. As Groves, Singer and Corning (2000) write, LST "allows us to speculate on why the effectiveness of some design features on survey cooperation fails to replicate…the present theory expects the effects to vary by subgroup (because of different leverages) and across designs (because of different salience exhibited during the survey request)" (p. 302). The suggestion that different groups of people have different motivations for cooperating with a survey request, and will therefore respond differently to various aspects of the survey design has been confirmed experimentally (Groves, et al., 2000; Roose, et al., 2007), and offers new insight into why certain groups of students may respond to surveys at different rates

than others, as well as why aspects of administration, like incentives, may have different effects on different people.

The influence of sociodemographic and other characteristics of sample members is not direct, however. As Groves and Couper (1998) write, "we do not believe these factors are directly *causal* to the participation decision. Instead, they tend to produce a set of psychological predispositions that affect the decision" (p. 32, emphasis in the original). Such predispositions are both general and enduring (reactions to strangers, attitudes towards surveys in general) as well as situation- or state-specific (feelings of efficacy, embarrassment, or helpfulness, moods of depression, happiness or anger). They are also based on past experiences and the survey-taking environment; all of these factors will combine to influence both the leverage of and reactions to salient survey features.

The Theory of Organizational Citizenship Behavior: An Extension of SET

One particular kind of past experience that may be relevant for college students' survey response decisions is their experiences with the university that they attend. Student surveys can be seen as a specific type of *organizational survey*, a survey given by an organization to its members on a topic relating to some aspect of the organization. Surveys are one of the most important methods by which organizations find out information about their functioning (Rogelberg, et al., 2006), and they are also one of the most important sources of data in the organizational behavior literature (Spitzmüller, Glenn, Sutton, Barr, & Rogelberg, 2007). Rogelberg and his colleagues (2006) note that surveys given by and within organizations have a special context, and should be treated differently than general household and polling studies. They write:

> …in organizational surveys there is a relatively closer connection between the potential respondent and the survey sponsor, a perceived track record of inaction or action with

> past organizational survey data…and potential respondents may also perceive greater psychological risk associated with completing or not completing an organizational survey…Organizational commitment and satisfaction with the survey sponsor and perceptions of social exchange relationships with the survey sponsoring organization appear [particularly] relevant for response decisions in organizational settings. (pp. 904-905)

While the "organization" referred to in the organizational survey literature is oftentimes a business of some sort and the "members" are typically employees, there is no reason to restrict studies of organizational surveys to these populations. Indeed, students at a university have explicitly been studied in the literature relating organizational surveys to organizational behavior (McNally & Irving, 2010; Rogelberg, et al., 2006); the only difference between studies involving student populations and employee populations is that students have a more vaguely-defined relationship with their institution. As McNally and Irving (2010) note, students can be considered both as customers of the university and as organizational members; in some cases, they are also employees. What is critical here, though, is not the specific type of relationship that students have with their university, but rather the fact that there *is* a relationship, however defined. Organizational theory suggests an individual's relationship with an organization is based on accumulated interactions with it (McNally & Irving, 2010), and student surveys can be seen as one of the many ways that students and institutions interact. As a result, students may make a decision to respond or not respond to student surveys in the context of their relationship with their institution.

Researchers and theorists have identified two distinct types of relationships between organizations and their members: *transactional* (or *economic*), which describe economic exchanges (for example when an employee fulfils his or her job requirements in return for payment from the organization), and *relational* (or *social*), which describe exchanges of intangible or socioemotional goods between the organization and its members (for example when

an employee provides better service to customers in exchange for special information or status, Deckop, Cirka, & Andersson, 2003; Stamper, Masterson, & Knapp, 2009). Transactional behaviors are usually clear-cut and well-specified while relational behaviors are less so; these latter types of behaviors almost always involve actions that are above and beyond basic specified expectations. Participating in a survey is an example of a relational or social type of organizational activity because it is discretionary, "neither explicitly enforced nor required by formal contracts or descriptions" (McNally & Irving, 2010, p. 204).

A good deal of research has been dedicated to understanding why members of an organization might go "beyond the call of duty," volunteering their time and effort without the security of knowing these resources will be returned (Konovsky & Pugh, 1994). This research primarily revolves around Organ's (1988) theory of Organizational Citizenship Behavior (OCB), which is deeply rooted in the theory of social exchange (Deckop, et al., 2003; Konovsky & Pugh, 1994; Organ & Konovsky, 1989; Shore, Coyle-Shapiro, Chen, & Tetrick, 2009; Shore, et al., 2006). OCB posits that over time, members of an organization will develop a relationship with the organization based on a series of transactional and relational exchanges that occur between each party. If members perceive the organization as treating them fairly and favorably over the course of these exchanges, they will be inclined to "repay" the organization with cooperative and helpful behaviors outside their normal duties (Cardona, Lawrence, & Bentler, 2004; LePine, Erez, & Johnson, 2002; Shore, et al., 2009). Such behaviors have been termed Organizational Citizenship Behaviors, or OCBs, and are defined as "individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and in the aggregate promotes the efficient and effective functioning of the organization" (Organ, 1988, p. 4). Student survey

response naturally fits into the OCB framework, especially if institutions use the data to improve the student experience.

Clearly, the most meaningful addition of OCB to theories on survey participation is the explicit incorporation of the relationship of individuals to the organization to which they belong. In effect, OCB puts SET in a well-defined context (the organization), and as a result many more specific hypotheses can be proposed about who responds to surveys and why. The theory of OCB posits that students attending a university will comply with a request to participate in a student survey about their university if they perceive the university as supportive and their long-term relationship with the university as positive. That is, the theory posits that students who are more satisfied with their institution will be more likely to participate in surveys because they see it as contributing to the organization, while students who have an unfavorable opinion about their institutions may decide to not respond to the survey as a form of "payback" for their negative experiences (Spitzmüller, et al., 2007). At least one study has directly supported these suggestions, demonstrating a link between student satisfaction and survey response (Rogelberg, et al., 2003), and another has shown that students' commitment to their university is highly related to discretionary behaviors that exhibit loyalty toward the university (McNally & Irving, 2010). A third, qualitative study at the University of Delaware found that students often cited having a desire to help the institution and/or optimism about changes that might be made based on their opinions as reasons for responding to the university's surveys (Ohme, Isaacs, & Trusheim, 2005).

One more aspect regarding the link between OCB and survey response must be noted. The theory does not require that *all* nonrespondents be dissatisfied organizational members. Indeed, it is very likely that a large proportion of any given survey's nonrespondent population is

not dissatisfied at all, a point noted by Rogelberg et al. (2003), who have pursued a line of research distinguishing between what they call "active nonrespondents" and "passive nonrespondents." *Active nonrespondents* are sample members who make "a conscious decision to not respond to the survey as soon as the survey is received," while *passive nonrespondents* are those who may have intended to complete the survey, "but because of circumstances or happenstance, could not or did not" (p. 1105). People who do not respond to a survey out of overt dissatisfaction are most likely to be active nonrespondents, those who are busy or forgetful, passive nonrespondents.

Unfortunately, it is very difficult to distinguish between active and passive nonrespondents to any given survey, as no information about either group is available. To research the difference between active and passive nonrespondents, what Rogelberg and colleagues (2003) call a "population profiling" methodology is needed (p. 1105). Essentially, this approach boils down to using a captive setting—Rogelberg et al. (2003) used a business class—to survey a group of students about their experiences and satisfaction with the institution as well as about their intentions to participate in hypothetical (but specific) follow-up surveys. Assuming an almost 100% response rate to this initial survey, the group of respondents can be surveyed again with the follow-up surveys proposed in the initial survey. Based on (a) whether participants said they would respond to those surveys, and (b) whether they actually respond or not, the original sample can be broken out into responders (those who responded), passive responders (those who said they would participate but did not), and active nonrespondents (those who said they would not participate and did not). Comparisons can then be made based on data collected with the initial survey.

In the limited research that has been done in this vein on college students (all of which has been done using data from small samples of students at single institutions), it has been found that active nonrespondents are less satisfied with their university administration than are passive nonrespondents and respondents (Rogelberg, et al., 2003), that active respondents are more likely than the other two groups to perceive their university as unsupportive and unjust in terms of resource allocation (Spitzmüller, et al., 2006), and that active nonrespondents are less likely than the other two groups to engage in behaviors that support the life of the organization (Spitzmüller, et al., 2007). Interestingly, in all of these studies the only differences found between passive nonrespondents and respondents related not to organizational experiences but rather to personality traits like conscientiousness (Rogelberg, et al., 2003) and altruism (Spitzmüller, et al., 2007). Such findings echo the literature concerning personality differences between college student respondents and nonrespondents, as well as between early and late respondents. Also echoing this literature, males have been shown to be most likely to be active nonrespondents, while females have been shown to be most likely to be respondents—in one study, females made up 88% of respondents, 69% of passive nonrespondents, and 63% of active nonrespondents (Rogelberg, et al., 2003; see also Spitzmüller, et al., 2006; Spitzmüller, et al., 2007).

Theory of Reasoned Action/Theory of Planned Behavior

One component that is missing from the three theories just discussed is an explanation of how various factors are integrated to form a decision. That is, with the possible exception of OCB, the theories neglect to explicitly relate relevant aspects of the survey request to mechanisms that cause response or nonresponse. The theories also largely ignore how the social environment in which surveys are administered impacts response behavior. To address such issues, many survey researchers have turned to the psychology literature, employing either the

theory of reasoned action and/or its successor, the theory of planned behavior, to study survey response decisions.

The theory of reasoned action (TRA) is a psychological theory proposed initially by Fishbein and Ajzen (1975). The theory was developed as a general model for all human behavior, and it focuses on the social factors and individual attitudes that precede behavior. The central tenet of the TRA is that behavioral intentions are the immediate predictors of behavior, and that other factors—such as attitudes toward the behavior and subjective norms—influence behavior indirectly by affecting intentions. *Intentions* "capture the motivational factors that influence a behavior; they are indicators of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior" (Ajzen, 1991, p. 181). *Attitudes* reflect an individual's evaluation of the behavior in question, while *subjective norms* refer to the "individual's belief that important others expect him or her to perform (or not perform) the behavior" (Manstead, 2001, p. 910).

One area not covered in the TRA concerns situations in which individuals are not in control of the behavior in question. As a consequence, the theory of planned behavior (TPB) was developed by Ajzen in 1985 to address behaviors over which people do not have complete volitional control (Ajzen, 1991). The TPB expands upon the original TRA model by positing that there is an additional mechanism affecting behaviors called perceived behavioral control. *Perceived behavioral control* encompasses "beliefs regarding the possession of requisite resources and opportunities for performing a given behavior," (Madden, Ellen, & Ajzen, 1992, p. 4); such resources and opportunities can include time, money, skills, or cooperation of others (Ajzen, 1991). Figure 2.1 presents a diagram of both the TRA (depicted with solid lines) as well as its extensions, the addition of which form the TPB (depicted with dotted lines).

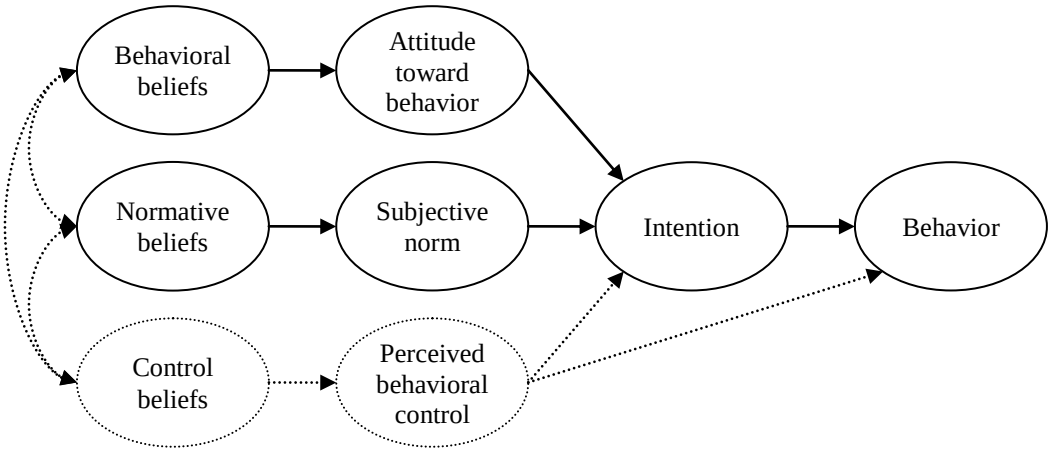

Figure 2.1. Theory of reasoned action/theory of planned behavior
Note. The Theory of Reasoned action is represented above by solid circles and arrows. Dotted circles and arrows represent the extensions to the Theory of Reasoned Action, which form the Theory of Planned Behavior. Adapted from Madden, Ellen & Ajzen (1992) and Ajzen (n.d.)

Either the TRA or TBP can be used to examine people's behavior. The choice of model to use depends on whether the behavior requires "skills, resources or opportunities not freely available" (Conner & Armitage, 1998, p. 1430); if it does, the TPB is most appropriate. Although it may seem that the TRA is more applicable to survey response decisions among college students, as it is likely that the act of completing a student survey is under volitional control of the student, it is useful to also consider the TPB's incorporation of factors that affect students' abilities to complete the survey. After all, there may be issues that students have with surveys—difficulty logging in to a web survey, for example, or confusion over questions—that might affect their decisions to return the instruments.

Unfortunately, research testing the TRA and TPB in relation to survey response is difficult to conduct, as the "intentions" component of the model needs to be specific in order to be maximally predictive (Hox, de Leeuw, & Vorst, 1995; Madden, et al., 1992). That is, in order to accurately predict response to a survey, one needs information regarding the intention to

respond to that *specific* survey. Therefore, as with research on active/passive nonresponse, a prospective research design is needed to assess TRA/TPB. Under such a design, survey data would need to be collected from close to 100% of a sample, about specific survey response intentions and attitudes, as well as other more general factors. Following this initial survey, the survey that was proposed needs to be sent out to the sample, and response behavior to the second survey needs to be recorded. Using initial survey data on attitudes and intentions, one can then see whether the TPB/TRA explains whether sample members responded to the second survey or not.

Although such a research design is somewhat difficult to implement, the TRA and TPB have been used to examine survey response decisions generally, with substantial success (Bosnjak, Tuten, & Wittmann, 2005; Fang, Shao, & Wan, 2007; Heerwegh & Loosveldt, 2009; Hox, et al., 1995; Rogelberg, et al., 2006). Three TRA/TPB studies have been looked at survey response behavior among college students specifically (Bosnjak, et al., 2005; Hox, et al., 1995; Rogelberg, et al., 2006). Interestingly, while one of these studies found that general attitudes towards surveys significantly impacted response intention (Rogelberg, et al., 2006), the other two did not replicate this finding. Likely this is due to the fact that Rogelberg et al. (2006) combined in their measure of "attitudes towards surveys" indicators encompassing both general attitudes towards surveys *and* perceptions of survey completion norms. The other two studies employed separate measures of attitudes and norms, and found that students' general attitudes towards participating in surveys did not have a significant effect on their intention to participate in a specific hypothetical future survey, while attitudes towards participating in that specific survey (or, in one case, a specific set of surveys) *did* significantly affect students' intentions to respond (Bosnjak, et al., 2005; Hox, et al., 1995). Further, in the latter two studies, subjective norms

about the particular survey (operationalized as opinions about whether friends would participate in the survey and/or whether friends would think the student should participate in the survey) were also related to response intentions. Intentions to respond to the hypothetical future survey(s), as predicted by TRA/TPB, were significantly related to actual return of the survey in all three studies, but it should be noted that the observed relationships between intention and actual behavior were relatively weak.

Weak relationships between intentions and behavior are not unique to TRA/TPB research on survey nonresponse—in a meta-analysis of almost 200 studies evaluating the theory of planned behavior, Armitage and Conner (2001) found that, on average, only 27% of the variance in behavior can be explained by behavioral intentions. Ajzen, Czasch and Flood (2009) suggest that low intention-behavior correlations may be explained by people's tendency to overestimate their readiness to perform behaviors that are socially desirable. For student survey response this could well be the case; it is relatively easy for a student to *say* that he or she plans to complete a future survey, whether or not this is actually the case. It is also easy to forget that such an intention has been formed. To deal with low intention-behavior correlations, extensions to the TPB have been suggested that incorporate specific plans for the completion of the behavior and commitment to this course of action, as well as respondent personality, in particular respondent conscientiousness (Ajzen, et al., 2009). In addition, Conner and Armitage (1998) have suggested that intentions and behaviors may be meaningfully linked only when individuals are highly motivated to think in a deliberate fashion about their decision to participate in the behavior. Absent such motivation, they suggest, a more automatic process may play out—bypassing the TPB altogether. This bears similarity to the suggestion of heuristic decision-making discussed above, as well as the theory underlying active and passive nonresponse.

Integration of the Theories of Survey Response

Although markedly different in many respects, all four of the theories discussed above—SET, LST, OCB and TRA/TPB—can be seen as different perspectives on the same issue. At heart, any theory of survey response is a theory of decision-making, and in this respect each theory can be seen as offering different suggestions regarding the important factors that influence response decisions. Such suggestions complement rather than obfuscate one another, as each elaborates on areas not addressed in the others.

SET is the most general theory, positing that respondents weigh the costs and benefits of survey response in a rational way before deciding whether to respond or not. While it is possible that some students do go through this process when confronted with a survey request, it is unlikely that most students do so, as rational decision-making is computationally taxing and not the norm for most everyday decisions (Gilovich, Griffin, & Kahneman, 2002). LST narrows the scope of SET, suggesting that students consider only some of the costs and benefits when deciding whether to respond to a survey—in particular those that are made salient in the survey introduction or invitation. LST also expands upon SET by suggesting that different groups of students will give different leverages to various features of a survey. Depending on whether these features are made salient when the survey is introduced, and whether members of a group feel positively or negatively about those features, response decisions will be positively or negatively affected. LST also specifies that individual characteristics factor into the leverage given to salient survey features. Specifically, LST suggests that the origins of positive or negative feelings about certain survey features are based upon transient and enduring individual characteristics, including mood, personality, or time constraints, as well as situational or environmental characteristics that are shared by groups of people, for example culture. Past

experiences, both shared and individual, may factor into the leverage given to certain survey aspects as well.

OCB expands upon LST by focusing specifically on the past experiences that students have within their institutions, and it suggests that these experiences relate directly to survey response. The theory of OCB suggests that students who feel that their institution treats them fairly, and who are satisfied with their experiences at the institution, will respond to surveys given by the institution because they want to help an organization they like. Students who have had more negative experiences with the institution will likely choose to not respond because they have no motivation to. Thus, OCB provides ideas about what kind of group characteristics may be important to consider when examining student survey response decisions. Specifically, it suggests that attention be paid to groups of students that share similar experiences with their institution (for example, underrepresented minority students who may feel marginalized at a primarily White institution, or students participating in campus government, who may feel extremely connected to their institution). Groups of students who share certain positive or negative experiences may be systematically more or less likely to respond to student surveys.

Finally, the TRA fills in some holes left by the other three theories. This theory provides a mechanism by which student response behavior is affected, suggesting that student attitudes, beliefs, and perceived norms factor into decisions to fill out a survey or not. Such influences are not direct, however; they affect behavior by influencing intentions. Empirical work has shown that the relationship between intentions and behavior is not one-to-one, which suggests that only a fraction of students who form intentions to respond to a survey will actually follow through. This means that many students will fail to respond to the survey not because they decided not to, but because they simply didn't get around to it. Mediators of the intention-to-behavior link most

likely include student personality (in particular, conscientiousness), as well as situational constraints (such as competing time pressures). The presence of mediators between intentions and behavior is probably the reason for empirical findings regarding the difference (or lack thereof) between respondents and "passive" nonresponders to student surveys.

The four response theories reviewed above are consistent with the literature on student survey nonresponse. The theories accommodate many of the findings regarding which groups of students are most likely to respond to surveys, and they also suggest reasons for such findings. For example, students with higher GPAs may respond to student surveys at higher rates because these students are more conscientious—although such a supposition rests on the assumption that a large part of academic success is a result of "staying on top of things." Females may respond to surveys at higher rates than males because they are more likely to be involved on campus (Kinzie et al., 2007), because they are more likely to be conscientious (Schmitt, Realo, Voracek, & Allik, 2008), or because they are more likely to want to help others (Feingold, 1994). Students who spend a large portion of their time drinking or partying may respond at lower rates because such students tend to be more hedonistic and less altruistic or cooperative than students who drink less or do not drink at all (McAdams & Donnellan, 2009). Finally, students who belong to underrepresented racial/ethnic groups may respond to student surveys at lower rates (particularly at primarily White institutions) because they have negative perceptions of the campus environment based on accumulated marginalizing experiences (Alvarez et al., 2007; Fischer, 2007). If this is true, it may also explain why some underrepresented minority students have been shown to have decreasing survey response propensities over time—this would be expected if students experience more and more marginalizing experiences over their college career.

The mixed relationship of socioeconomic status and survey response can be explained in several ways. First, students of different socioeconomic statuses might simply have different experiences with and perceptions of their institution, which could affect their survey response propensities. For example, students who do not receive financial aid will not have to interact with the financial aid office on their campus, and will therefore have no reason to incorporate this department into their evaluations of the institution (perhaps leading to more positive perceptions). Higher SES students will also be less likely to hold a job while taking classes, leaving more time for "fun" interactions with students and the campus. On the other hand, well-off students may feel that their transactional relationship with the institution is of greater importance—they may, for example, expect more from their institution because they perceive themselves as spending more money than others on their college experience. Along the same lines, lower SES students, who may depend on a job and/or financial aid to fund their education, may experience stressors not encountered by their more well-off counterparts; such stressors could uniquely affect how lower SES view their experiences at their institution, and thus how they view student surveys. A related but more simple explanation could be more situational in nature; lower SES students, if they are more likely to have jobs, may simply have less free time to fill out surveys. A final relevant factor may be survey topic. Indeed, some survey topics might be more salient to students from less affluent backgrounds because they relate to college costs, satisfaction with the financial aid office, or some other important concern. A salient topic may cause such students to respond at different rates to a specific survey than would be otherwise expected.

The theories on survey response reviewed in this chapter also suggest possible reasons for the (few) institutional characteristics that have been consistently linked to student survey

response rates. Differences in response rates across institutions are likely a product of several factors, including institutional survey climates as well as institutional resources and culture. For example, institutional structures or characteristics that in the aggregate affect students' involvement and/or psychosocial outcomes may, because they affect students' opinions about the school as an organization, impact the average student's response propensity. Such factors may include institutional control, size, student-faculty ratio, Carnegie classification, or selectivity, among others (c.f. Astin, 1993b; Hu & Kuh, 2002; Porter, 2006).

Finally, many of the theories of survey response reviewed here suggest reasons why various administration practices influence response rates. If a survey is too long, for example, students may decide the costs are too high to take it. If a desirable incentive is offered, on the other hand, students may answer the survey because it will provide them with a prized reward. Some groups of students may have different perceptions of survey administration practices, as well. For example, men may find taking surveys on the web to be less time consuming or more fun than taking surveys on paper, and females may be attracted to certain incentives more than men. Many of the survey response theories suggest that some of the effects of administrative techniques are interactive in nature, with the same technique having different effects on different groups of students, or different effects in different institutional environments. This could explain the lack of consistent evidence in the literature regarding the effectiveness of specific administration practices as well as institutional characteristics.

Conclusion

Student survey nonresponse is a complex phenomenon with no single cause. The research and theories reviewed in this chapter have provided a thorough understanding of the correlates of student survey nonresponse, demonstrating that influential factors occur at both the

student and institutional level. Because the causes of student survey nonresponse occur at multiple levels, the most appropriate way to examine nonresponse is in a multi-level modeling context. The next chapter elaborates upon the multi-level modeling approach that will be employed in this study. It also covers the specific hypotheses driving the study, the data sources employed, and the variables that will be used to model student survey nonresponse.

CHAPTER 3: METHODOLOGY

Five approaches have been used by researchers to study college student survey nonresponse: early/late responder comparisons, nonresponse follow-ups, administrative record linking, longitudinal panel analysis, and quasi-experiments evaluating different administration methods. Employing one or more of these approaches, researchers have separately examined the impact on nonresponse of student demographics, student personality characteristics, institutional characteristics, and administrative techniques. No researchers to date have yet investigated all of these areas in a single model that accounts for the clustering of students within institutions. The broad purpose of the current study is to help institutions improve their survey assessments of students by filling a gap in the literature, bringing some consistency to the evidence concerning student- and institutional-level predictors of survey nonresponse. To accomplish these goals, this study examined survey nonresponse among traditionally-aged students attending four-year colleges and universities in a longitudinal context, using hierarchical generalized linear modeling (HGLM).

The longitudinal/panel approach to studying nonresponse is ideal for the current study. Not only does the baseline survey employed here typically garner very high response rates (Pryor et al., 2006; Pryor & Sharkness, 2008), but it also contains a plethora of questions that can describe students in detail—including, but not limited to, items representing student self-perceptions, personality, academic experiences and achievements, socioeconomic background, and expectations for college. Further, the rich student database can be supplemented by a number of institution-level variables that are likely related to student nonresponse, including administrative techniques and institutional characteristics; nonresponse will be modeled using a

multilevel modeling technique that parses out the separate impact of student- and institution-level effects.

The more specific aim of this study was to investigate the student- and institution-level correlates of longitudinal non-response to two surveys given to students one and four years after matriculation. This was done for aggregated groups of students as well as separately for males and females, and Asian American, African American, Latino/a, and White students. While a good number of researchers have examined student survey nonresponse for groups of students as a whole, almost no work has been done examining nonresponse by gender or race/ethnicity. Given the theories and evidence discussed in the previous chapter, which have demonstrated differences in nonresponse by race and gender, the current study greatly expands the knowledge base by providing evidence on the causes of nonresponse across these important groups.

This chapter contains a detailed description of the data and samples employed in the current study, the statistical modeling technique used, the variables included in the models, and the limitations of the investigation. Before such details are discussed however, the chapter reiterates the research questions guiding the study and presents both the conceptual framework and working hypotheses underlying the analyses.

Research Questions

The research questions guiding this study are as follows:

1. What demographic, attitudinal, behavioral, and institution-level factors (including administration methods) predict response to student surveys?
2. How do predictors of response differ at the end of the first year in college and the end of the fourth year in college?
3. Do predictors of response differ for males and females and for students of different race/ethnicities, in comparison to the general population, to each other, and to surveys administered one and four years after matriculation?

Up until this point, student survey nonresponse has been discussed as the motivation underlying the current analysis. However, the research questions above reflect a concern with survey *response* as the key issue. This is intentional—although the current study is primarily concerned with the problem of nonresponse, all statistical models are run predicting survey response (as opposed to its lack) in order to avoid signage confusion and double negatives in the results and discussion. Of course, the fundamental nature of the results are not changed by keying the dependent variables to reflect response rather than nonresponse; all effects are simply inverted.

Conceptual Model

The conceptual model underlying the analyses in this study is shown in Figure 3.1. This model is based on the empirical findings and theories of nonresponse discussed in Chapter 2, and it suggests that both student- and institution-level factors impact student decisions to respond to surveys administered by the university they are attending. On the student level, three main areas are hypothesized to influence survey response decisions: pre-college characteristics, including demographics and personality; student experiences at and perceptions of the institution they are attending; and situational and normative factors, including topic interest and competing time pressures at the time the survey request is made. At the institutional level, there are also three main areas hypothesized to impact average student response rates: "enduring" characteristics of the institution and its environs like location and size; the climate for students at the institution, including survey-taking climate; and the method and mode of survey administration. This conceptual model allows for students to make different response decisions depending on different situational constraints, different experiences with the institution, and/or different personality characteristics. The model also allows for change over time in response propensity,

as students' relationships with their institution can evolve as they accumulate more time and more experiences there. Finally, the model allows for different factors to affect different groups of students in different ways, both at the institution and student level, by allowing certain groups to give more weight to one component of the model—members of a given group may share positive or negative perceptions of the environment, for example, or have similar feelings about a survey topic.

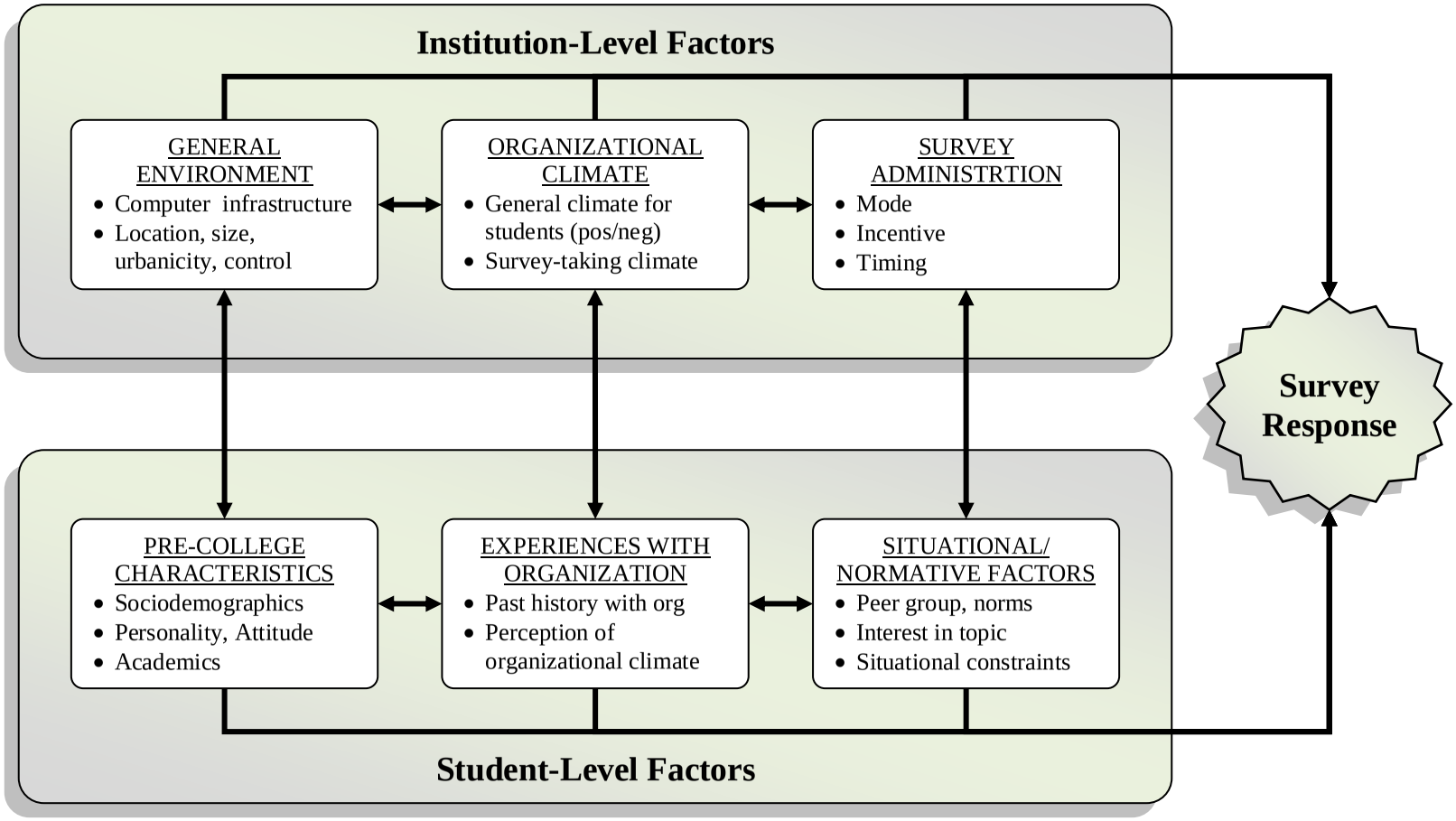

Figure 3.1. Conceptual model of student- and institution-level influences on student survey response

Working Hypotheses

Based on the literature and theories reviewed in Chapter 2 and the conceptual model shown in Figure 3.1, the following working hypotheses guided this study.

Research Question 1: Student- and institution-level factors predicting student survey response

Working Hypothesis 1-1: Student-level predictors of longitudinal survey response propensity will include: sociodemographic characteristics and personality type; predictors of academic success, engagement, and satisfaction with the institution attended; propensity to be civically engaged; attitudes towards surveys; and the extent to which items are left blank on the TFS.

***Hypothesis 1-1a: Gender, race and personality type*.** It was hypothesized that predictors of both CSS and YFCY response would include all previously empirically-identified student-level response correlates, including gender (with females responding at higher rates), race (with Whites responding at higher rates), and personality type. In terms of this latter point, it was more specifically predicted that students with "scholarly" personality types—those who are more academically self-confident—would have higher rates of response, while "hedonist" personality types—those who spend more time partying, and those who drink more—would have lower rates. It was further thought that students who can be considered "social activists"—those who are concerned about making a difference in the world—as well as those who rated themselves as more cooperative, would have higher rates of response, while those who are "leaders"—in the sense that they have higher social self-confidence and self-rated leadership ability—and those who are "status strivers"—with concerns about being financially successful—would have lower response rates. "Artists" were predicted to have lower response rates as well. The rationale for

all of these hypotheses was simply that many studies before this one have found gender, race and personality type to be important and significant predictors of survey response. This study represents an attempt to replicate these results in a more comprehensive model than previously used.

Hypothesis 1-1b: Major, SES and international student status. As the literature to date is unclear on the impact of students' major, SES, and international student status on response rates, it is unclear whether these variables should be expected to impact student response propensities in this study. Based on the limited and mixed evidence covering these areas, it seems that major, parental income and international student status may be significantly related to response propensity only under certain conditions; what these conditions are has not been explicated. Therefore, the general working hypothesis that guided this study was the null hypothesis: that there would be no effect of students' likely college major, students' family SES as defined by parental income, and students' citizenship status. These variables were included in the model, however, since methods and findings from previous studies have been inconsistent.

Two additional aspects of SES were hypothesized to affect response propensities in specific ways. First, first generation status—whether or not a student is the first in their family to go to college—was hypothesized to negatively affect student survey response propensities because first-generation students typically have lower levels of engagement in college (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006; Pike & Kuh, 2005), and lower levels of engagement, as discussed below, are likely associated with lower response propensities. Further, response rates were expected to be lower among students who expect to get a job to pay for college expenses, because working means students may have many competing time pressures, as well as

decreased engagement on campus and more negative academic outcomes (Astin, 1993b; Leppel, 2002).

Hypothesis 1-1c: Correlates of academic success, engagement, and satisfaction. As many of the theories of survey response discussed in Chapter 2 suggested, and as empirical studies have confirmed, there is most likely a link between response to student surveys and student satisfaction with their institution, academic success, and engagement in college. Therefore, this study hypothesized that student background characteristics and high school behaviors that have been shown to be predictive of academic success, engagement, and/or satisfaction, would also predict student survey response. The specific characteristics and behaviors examined along these lines included high school academic achievement (high school GPA and SAT score), academic and social engagement behaviors in high school, and students' expectations for college in terms of success, engagement, and/or satisfaction.

Hypothesis 1-1d: Propensity to be civically/organizationally engaged; attitudes towards surveys/research. As many of the theories outlined in Chapter 2 as well as the conceptual model guiding this study suggest, student attitudes towards surveys, as well as their propensities to be civically- or organizationally-engaged, are likely related to decisions to respond to student surveys. This study thus hypothesized that students who have a higher survey propensity to be involved civically and/or in organizations would have higher response propensities than those less likely to be involved. Similarly, it was thought that students who hold attitudes more friendly towards surveys and research would have higher response propensities as well.

Hypothesis 1-1e: Item-missing data. Several studies have suggested that there is a link between item nonresponse and unit nonresponse on surveys, more specifically that respondents who have a higher rate of item-missingness on baseline surveys will have lower probabilities of

responding to follow-up surveys (Burkam & Lee, 1998; Ting & Curtin, 2010). Therefore, this study hypothesized that students missing baseline data on key indicators like SAT/ACT scores and parental income will have lower rates of follow-up survey nonresponse. It was further hypothesized that the overall amount of item-missingness on the TFS—operationalized as the number of survey questions not answered by respondents—would also be negatively related to the likelihood of response to follow-up surveys.

Working Hypothesis 1-2: Institution-level correlates of longitudinal survey nonresponse will include selectivity, structural characteristics that impact the climate for students, the institutional survey-taking climate, administration mode, and use of incentives.

***Hypothesis 1-2a: Selectivity*.** This study hypothesized that institutional selectivity, measured by the average SAT scores of entering first-years at an institution, would positively predict average institutional response rates. Selectivity was hypothesized to be positively associated with response rates not only because previous studies have shown such a link, but also because students with higher academic achievement tend to respond to surveys at higher rates so it would naturally be expected that schools with high concentrations of high-achievers would have higher average student response rates.

***Hypothesis 1-2b: Institutional climate*.** Several of the theories of survey response, as well as the conceptual model described above emphasize the institutional climate as an important factor for student decisions of whether to respond to surveys or not. Unfortunately, few, if any, studies have empirically connected institutional climate to student survey response, so there are no clear guidelines about what types of climate indicators are most important to include in modeling efforts. However, if the conceptual model guiding this study is valid, structural

characteristics of institutions that affect the overall satisfaction and engagement of undergraduates are likely most important. In this study, a focus was placed on aspects of the campus environment that relate to undergraduate student-centeredness and student success, as well as the climate for diversity, as these were thought most likely to impact student response propensities.

Another aspect of the campus climate that the conceptual model suggests may be important to students' decisions about whether to respond to surveys is the survey-taking climate at the institution. For example, some institutions may survey their students more often than others, and students at these institutions may have different perceptions of surveys as a result. This study hypothesized that indicators of the survey-taking climate at an institution, for example an institution's history of being in the CIRP norms sample, would impact student response propensities.

***Hypothesis 1-2c: Survey administration techniques*.** Based on the existing literature connecting administrative techniques to student survey response, this study hypothesized that institutions that administered the CSS and YFCY surveys in proctored groups would obtain higher response rates than those who survey their students in other ways. Institutions that gathered their students in one place and administered the survey in a single proctored group, on paper, were predicted to have the highest average response rates, not only because this administration technique reduces the opportunity costs of taking the survey (students will likely have nothing better to do while their peers take the survey), but also because it ensures that students receive the survey from a human being, and are as a result assured that the survey is legitimate and important. Along the same lines, institutions that administered their surveys through a live person but not in a single large proctored group, for example in classes or

individually in advising sessions, were hypothesized to have lower response rates than the single proctored group institutions, but higher response rates than institutions that administer their surveys via web or the mail. These last two administration methods—mail and web—were hypothesized to garner the lowest response rates because these methods have the highest potential for students to forget or lose the survey invitation, to have competing time pressures when they receive the invitation, or to consider the request spam.

***Hypothesis 1-2d: Incentives*.** Based on the literature concerning incentives and student surveys, this study hypothesized that incentives will positively impact student survey response rates, but only under certain conditions. Specifically, it was predicted that incentives would have a positive effect only when surveys are administered in settings other than proctored groups. The rationale behind this hypothesis is that incentives are not needed if surveys are given in situations in which there is nothing to do but take the survey—the prospect of sitting around doing nothing while everyone else takes the survey is (dis)incentive enough. However, if the survey is given in a manner in which students must choose between taking the survey and doing something else—if the survey is given on the web or via mail, for example—an incentive should increase student response propensity at least a little bit because it encourages students to spend their time on the survey rather than another activity. Based on the limited literature covering type of incentive and response rates, lottery incentives are hypothesized to work less well than small incentives that are guaranteed for all, whether the latter are provided before or after taking the survey.

Research Question 2: Predictors of response at the end of the first year and fourth year in college

Working Hypothesis 2: In general, predictors of response will not be different for surveys given at the end of the first year and at the end of the fourth year in college.

However, to the extent that predictors *are* different at these different time points, students will differ in their propensity to respond to student surveys based on their perceptions of their relationship with their institution, and whether these develop positively or negatively.

***Hypothesis 2a: Positive relationships*.** The rationale driving working hypothesis 2 is largely theoretical, based on the theory of OCB. It was hypothesized that over time students will accumulate experiences with their institution that they interpret either positively or negatively. If students consider their interactions with their institution as being largely positive, over time they should have increasing—or at least not decreasing—rates of response to student surveys sponsored by their institution. This study did not have available any measures of student perceptions of their institution over time, so unfortunately this hypothesis could not be tested directly. However, if working hypothesis 2 is true, it would be expected that positive student-level predictors of satisfaction with and engagement at the institution would be equally important (and positive) predictors of student survey response one and four years after matriculation, if not more important in four-year models. Similarly, it would be expected that institution-level structures that in the aggregate promote student satisfaction with and engagement in their institution (like selectivity), would be equally important predictors of average institutional response rates to surveys given one and four years after matriculation, if not more important for four-year response rates.

***Hypothesis 2b: Negative relationships*.** It was further hypothesized that negative student- and institution-level predictors of satisfaction and engagement would be of increasing importance over the course of a students' career in college. This hypothesis rests on the assumption that dissatisfaction and disengagement become magnified in importance in terms of student outcomes over time, and suggests that factors that predict lack of satisfaction,

engagement and success—whether for students as a whole or for specific groups of students—will be stronger predictors of four-year longitudinal survey nonresponse than they will be of one-year longitudinal survey nonresponse.

Research Question 3: Predictors of response for males and females and for students of different race/ethnicities

Working Hypothesis 3: Males and females will have largely similar predictors of response, but will differ in terms of administrative techniques and personality. White students and students of non-White race/ethnicities will also have largely similar predictors of response. To the extent that students of non-White race/ethnicities share experiences in college not experienced by White students, their response predictors will be similar to one another but dissimilar to those of Whites, and will change in the same ways one and four years into college.

Working hypothesis 3-1a: Males and females, compared to each other and the general population. The literature on student survey nonresponse has suggested that several factors may explain the observed differences in response rates to student surveys among males and females. For example, it has been suggested that survey administration techniques like incentives and modality may differentially impact males and females. Therefore, this study hypothesized that survey mode and use and type of incentives would impact average response rates for males and females in different ways, with males relatively more likely to respond to web surveys than females, all else being equal. The literature has also suggested that certain personality traits may be the underlying cause of differential response rates among the genders. Therefore, this study further hypothesized that for the models employing data from aggregated groups of students, controlling for personality traits associated with conscientiousness or cooperativeness will

moderate the impact of gender on response rate. In the gender-specific models, these same personality traits should have equivalent impact.

Working hypothesis 3-1b: Males and females, one and four years after matriculation. No empirical research to date has suggested that men and women might change in different ways over time in terms of their propensity to respond to student surveys. However, there has been research comparing how men and women are differentially impacted by their college environments, and the factors found to be significant in this research, which include institutional selectivity and major choice (Sax, 2008), could impact response rates of different genders in different ways. In addition, some research has suggested that females are more likely to be academically and socially involved in college, and to have more positive perceptions of the campus environment (Pike, Kuh, & Gonyea, 2003). To the extent that this is true, females should become more likely to respond to surveys, relative to males, four years into college compared to one year into college.

Working hypothesis 3-2a: Students of different race/ethnicities, compared to each other and the general population. Because of research that demonstrates the differential impact of college environments on student of different races/ethnicities' satisfaction and involvement, this study hypothesized that factors that uniquely impact the satisfaction and engagement of students of different races/ethnicities will impact these same students' response propensities while failing to impact those of White students. Such factors were hypothesized to include institutional structural diversity, institutional selectivity, and college major choice (Chang, Eagan, Lin, & Hurtado, 2009; Fischer, 2007; Kugelmass & Ready, 2010).

Working hypothesis 3-2b: Students of different race/ethnicities, one and four years after matriculation. A few empirical studies have suggested that underrepresented minority

students may become decreasingly likely to respond to student surveys over their four years in college. The conceptual model guiding this study suggests such a phenomenon would be observed if students of different races/ethnicities have more negative experiences at their institution than do students of other race/ethnicities—this is discussed in Hypotheses 2a and 2b. Therefore, this study hypothesized that the factors that predict the satisfaction and engagement of students of different races/ethnicities would become stronger predictors of response rate among non-White students for four-year survey response prediction compared to one-year survey response prediction.

Data

Description of Data Sources

The data used in this study were drawn from five different sources—four surveys administered by CIRP, and one survey administered by the U.S. Department of Education. A description of each is given below.

The Freshmen Survey (TFS). The baseline student-level data used for this study come from CIRP's 2003, 2004 and 2005 administrations of The Freshmen Survey (TFS), a survey developed by the American Council on Education in the 1960's. The TFS has been administered annually since 1966 by CIRP to entering (fall) freshmen at colleges and universities across the country. Since 1973, CIRP has been housed at the Higher Education Research Institute at the University of California, Los Angeles (About CIRP, n.d.), and in the falls of 2003, 2004 and 2005, the TFS was offered as a paper survey only (in recent years, a web version has been developed). TFS participation is institutionally-based, with institutions signing up to give the survey to their students. Although the specific set of institutions that participate in the TFS is not

identical across years, the overall sample of institutions participating in any yearly TFS is very large and diverse, and is representative of the national four-year institutional population.

A typical year's TFS institutional sample is drawn in several ways, and is partly self-selected and partly purposively-selected (S. Hurtado, personal communication, March 22, 2011). In terms of the purposive component of the sample, CIRP has included 150 core institutions in their institutional sample every year since 1966 to ensure representation of all types of four-year institutions in the country. These schools were selected based on type, control, affiliation with a religion, status as a historically black college/university (HBCU), and level of selectivity (low, medium, high, and very high). In the earliest years, all core TFS institutions participated free of charge, but with disinvestment of federal funds in 1985, these institutions became expected to contribute something toward the cost of participation. Since 1985, core institutions have paid a discounted rate.

The self-selected group of institutions participating in the TFS each year include all those institutions beyond the 150 that sign up and pay the full participation rate. In most years, the core sample of institutions and the self-selected sample comprise the entire TFS institutional sample. However, there are also rare years in which additional institutions are fully- or partially-subsidized to participate in the TFS (as well as the YFCY and CSS follow-up surveys) with grant money awarded to scholars at HERI. 2004 was one such year, and the 2004 institutional sample (as well as the 2005 YFCY and 2008 CSS sample) included schools whose participation was subsidized by a grant designed to include a more diverse set of institutions based on race and ethnicity.

Regardless of how they are selected for sampling, institutions are in charge of their own TFS survey administrations. CIRP provides administrative guidelines and questionnaire forms to

institutions, and it also scans the forms and processes the data collected at each institution, but it does not assist in survey distribution. Once institutions have administered the TFS on their campus, CIRP obtains response rate information from institutional representatives and compiles what it calls its "norms" sample, a sample that consists of institutions that meet minimum response rate requirements, typically over 75%, though the criterion varies depending on institutional type. The norms selection criteria is designed to ensure national representation of first-time, full-time students at the various institutional types comprising the national institutional sample. Detailed information about the 2003 TFS institutional, student and norms sample can be found in Sax, et al. (2003), this same information about the 2004 TFS can be found in Sax, et al. (2004) and information about the 2005 TFS can be found in Pryor et al. (2006).

The TFS instrument contains questions that cover a broad range of topics. In addition to questions on student demographics and socioeconomic background, the survey asks about behaviors in high school, grades and test scores, reasons for going to college, expectations for college, methods of financing college, goals and values, and student self-perceptions. Although the instrument varies somewhat from year to year, the large majority of questions are the same on every TFS survey. A copy of the 2004 TFS instrument can be found in Appendix A; the 2003 and 2005 TFS instruments were extremely similar and copies of these forms can be found in Sax, et al. (2003) and Pryor et al. (2006). Specifics on the questions asked across years can be found in CIRP's TFS trends item list (Cooperative Institutional Research Program, 2010a).

The Your First College Year Survey (YFCY). One of the dependent variables examined in this study is a dichotomous variable representing whether or not students responded to the 2004, 2005 or 2006 Your First College Year Survey (YFCY), as applicable (the 2004 YFCY corresponds to the 2003 TFS, the 2005 YFCY to the 2004 TFS, and the 2006 YFCY to

the 2005 TFS). The YFCY was developed by staff at HERI and the Policy Center on the First Year of College in 2000, and has been administered by CIRP since that time to first-year students in the spring following their college matriculation (Ruiz, Sharkness, Kelly, DeAngelo, & Pryor, 2010). The YFCY was the first national survey designed to examine the experiences and development of students over their first year in college, and its questions cover academic engagement and college adjustment; residential, employment, curricular and co-curricular experiences; interactions with faculty, staff and peers on campus; satisfaction; goals and values; self-perceptions; and other pertinent areas. The YFCY instrument is largely the same from year to year, although questions are added and removed in every administration. Approximately one-third of the items on the YFCY are designed as explicit post-tests to those on the TFS (Ruiz, et al., 2010). Copies of the YFCY instruments can be found on the CIRP website (Cooperative Institutional Research Program, 2010c).

Unlike the TFS, the YFCY institutional sample is an entirely self-selected group that must pay for participation in the survey. By and large, far fewer institutions participate in the YFCY than the TFS, and those that do are typically schools with more resources available for assessment—particularly smaller, private institutions (see A. Liu, Sharkness, & Pryor, 2008; Ruiz, et al., 2010, for descriptions of typical institutional YFCY samples). In 2004, 2005 and 2006, institutions could choose whether to administer the YFCY on paper, on the web, or both. Based on information obtained from institutional representatives who administered the survey in each of these years (the data source for this information is described below), approximately two-thirds of the institutions that participated in 2004, 2005 and 2006 elected to have a paper-only YFCY administration, 20% chose the web-only option, and 14% used both modes (Table 3.1).

Table 3.1
Mode Used by Institutions for YFCY and CSS Administrations, by Year

		% using			
Survey	**Year**	**Paper**	**Web**	**Both**	**N**
YFCY	2004	59.3%	17.6%	23.1%	91
	2005	64.8%	23.4%	11.7%	128
	2006	72.1%	18.3%	9.6%	104
	Total	**65.6%**	**20.1%**	**14.2%**	**323**
CSS	2007	67.7%	17.2%	15.1%	93
	2008	47.9%	42.6%	9.6%	94
	2009	56.3%	37.9%	5.7%	87
	Total	**57.3%**	**32.5%**	**10.2%**	**274**

Source: 2004, 2005 and 2006 YFCY ARF data; 2007, 2008 and 2009 CSS ARF data

The College Senior Survey (CSS). The other dependent variable employed in this study is a dichotomous measure representing whether or not students responded to the 2007, 2008 or 2009 College Senior Survey (CSS), as applicable (the 2007 CSS is designed longitudinally to correspond to the 2003 TFS, the 2008 CSS to the 2004 TFS, and the 2009 CSS to the 2005 CSS). The CSS was developed by staff at HERI in 1992 for use as an "exit" survey—a survey given to students upon completion of college. The CSS instrument contains questions about college experiences and outcomes, including academic engagement, satisfaction, cognitive and affective development, attitudes, goals, career plans, values, and immediate post-college plans. Like the YFCY, the CSS can be administered as a stand-alone instrument or as a four-year follow-up to the TFS, and approximately one-third of items on the CSS directly post-test TFS items (Spinosa, Sharkness, Pryor, & Liu, 2008). The CSS instrument is markedly similar from year to year, and copies of the 2007, 2008 and 2009 forms can be found on the CIRP website (Cooperative Institutional Research Program, 2010c).

The population of institutions that use the CSS on their campuses is self-selected, and is typically similar to the group that uses the YFCY (see Spinosa, et al., 2008, for a description of a typical institutional CSS sample). In 2007, 2008 and 2009, institutions could elect whether to

administer the CSS via web or paper. Based on information from institutions that administered the survey in each of these years (again, the source of this information is described below), approximately 57% of those that participated in the CSS elected to have a paper-only administration, 33% chose to use the web only, and 10% used both modes (Table 3.1).

Administrative Report Forms (ARFs). Because TFS, YFCY and CSS survey administrations are in the hands of institutions, every time an institution administers one of these surveys they are asked by HERI staff to fill out an Administrative Report Form (ARF) to record exactly how they surveyed their students. The ARFs ask institutions to report on the population they attempted to survey; the sampling methods employed; how, when and where the survey was administered; how the survey was "marketed"; whether incentives were used, and if so, what specific incentives were offered; and whether any particular problems were encountered during administration. CIRP uses this information to calculate institutional response rates, as well as to build a database that can be used to help institutions improve their administrative practices. The response rates to the ARFs are typically very high, but they are never 100%. Table 3.2 shows the number of institutions participating in each year of the YFCY and CSS used in this study, the number of those who participated in the ARFs, and the ARF response rates. Appendices B and

Table 3.2
ARF Participation, by Survey and Year

Survey	Year	# Institutions participating in survey	# Institutions submitting ARF	ARF Response Rate
YFCY	2004	130	91	70.0%
	2005	133	128	96.2%
	2006	118	104	88.1%
CSS	2007	109	93	85.3%
	2008	149	94	63.1%
	2009	111	87	78.4%

Source: 2004, 2005 and 2006 YFCY ARF data; 2007, 2008 and 2009 CSS ARF data

C contain copies of the 2006 YFCY ARF and the 2008 CSS ARF, respectively.[1]

Integrated Postsecondary Data Analysis System (IPEDS). In addition to ARF data, the other institution-level data employed in the current study comes from the U.S. Department of Education's IPEDS survey. On an annual basis, IPEDS gathers data from every college and university that participates in the federal student financial aid program; in effect, this is the entire universe of American postsecondary institutions (About IPEDS, n.d.). The IPEDS survey covers a broad range of areas, asking institutions to report on enrollments, graduation rates, faculty and staff characteristics, finances, degrees awarded, admissions criteria, and more. For the current study, all institutional data are drawn from the 2004-2005 administration of IPEDS, with the exception of institutional graduation rates, which were from the 2009 IPEDS survey so that they reflect the graduation rates of the 2003 entering class.

Sample

Institutional Eligibility Criteria. As discussed above, the primary data used for this investigation came from the 2003, 2004 and 2005 administrations of the CIRP TFS. As initially conceptualized, this study was to use 2004 TFS data only because the 2004 survey was administered to more institutions than any other TFS in the last ten years (Cooperative Institutional Research Program, 2010c). However, in order to accurately examine the longitudinal nonresponse of students at these institutions, institutions had to meet several eligibility criteria to be included in this study. First, the institution had to have participated in the 2005 YFCY and/or 2008 CSS, as applicable for the relevant analysis. Second, a representative of the institution had to have filled out the ARF for the YFCY/CSS, as applicable. Third, on the

[1] 2006 and 2008 were the only years for which copies of the ARF instruments were still available (either online or in another format) for the YFCY and CSS, respectively. The ARF was re-modeled for both surveys in 2007, so the YFCY ARFs and CSS ARFs used in this study are not identical. Fortunately, they contain enough of the same information to be able to create identical variables for use in analyses.

ARF, institutions had to indicate that they attempted to survey all students who completed the TFS. This is important, because some institutions randomly sampled their freshman/senior populations for the YFCY or CSS, and these institutions needed to be removed from the sample because it cannot be assumed that all TFS participants had an equal chance to participate in the follow-up. Finally, institutions with low response rates to the TFS had to be eliminated in order to reduce the impact of baseline nonresponse on the final analyses in this study. This elimination was done by removing institutions not included in CIRP's 2004 TFS "norms," because all those included in the norms achieved high response rates (see Sax, et al., 2004, for norms inclusion criteria).

After the above eligibility criteria had been applied to the 2004 TFS, fewer than 50 institutions remained to be included in the analysis for the current YFCY/CSS investigation, an unacceptably low number. Therefore, the baseline TFS years were expanded to include 2003 and 2005, first by supplementing the 2004 data with 2005 data from institutions not included in the final 2004 sample, and then by supplementing the 04/05 data with 2003 data from institutions not yet included in the sample. All of these additional institutions had to meet the same four eligibility requirements—they had to have participated in the YFCY or CSS for the relevant year, they had to have ARF data, they had to have indicated on the ARF that they attempted to survey everyone who took the TFS, and they had to have been included in the TFS norms for the relevant year. In the end, 94 institutions were eligible for inclusion in the YFCY study, and 94 were eligible for the CSS study (these are not the same 94 institutions). The specific years of TFS data used to examine YFCY and CSS response are shown in Table 3.3.

Table 3.3
Data Sources for Overall Samples Used to Examine YFCY and CSS Response

YFCY					
Survey Year		**Students**		**Institutions**	
TFS	YFCY	N	%	N	%
2003	2004	10,894	17.4%	17	18.1%
2004	2005	33,510	53.6%	48	51.1%
2005	2006	18,061	28.9%	29	30.9%
Total		**62,465**	**100%**	**94**	**100%**

CSS					
Survey Year		**Students**		**Institutions**	
TFS	CSS	N	%	N	%
2003	2007	9,871	17.0%	15	16.0%
2004	2008	20,471	35.3%	45	47.9%
2005	2009	27,691	47.7%	34	36.2%
Total		**58,033**	**100%**	**94**	**94**

Source: 2003, 2004 and 2005 TFS data; 2004, 2005 and 2006 YFCY data; 2007, 2008 and 2009 CSS data

First-year sample (YFCY response study). Table 3.4 shows the racial and gender distribution of students included in the sample that was used to predict YFCY response, as well the number of institutions attended by each of these groups. The sample was overwhelmingly White (73%) and majority female (57%). While there were 94 institutions represented in the sample as a whole, Asian Americans were enrolled in only 89 schools and Latino/as in 92. Nine schools saw no male TFS responders; these schools were all single-sex institutions.

Reduction of the White sample size for separate-group analyses. In order to more confidently and accurately compare predictors across groups in the analyses run separately by race, a stratified random sample of White students was selected for use. Specifically, within each of the institutions included in the YFCY sample, between 5 and 200 White students were randomly selected, up to 5,000; this sample size was approximately equivalent to that of the next-largest YFCY student sample, Asian American students (Table 3.4). It was decided to reduce the sample size in this way in order to avoid a situation in which p-values associated with each predictor were much smaller for White students due simply to their extremely large sample

size compared to other groups. Because the selection of these 5,000 White students was done using simple random selection, the selected students should be representative of the original group of 45,771. However, to ensure that the random selection did not bias the sample in some way, distributions of all survey variables were compared between the original White sample and the smaller random White sample. Nothing of note was observed.

Institutional sample. Table 3.5 describes the institutional sample used for the YFCY study. Most of the institutions included in the sample were private four-year colleges (71%), although 15% were public four-year institutions, 7% were private universities, and 6% were public universities. Compared to national figures, there were far fewer universities in this sample (14%) than would be expected if the sample were drawn randomly (58% of non-profit institutions nationwide are universities); there were also far more private four-year schools in this sample than nationally (71% vs. 36%, Carnegie Foundation for the Advancement of Teaching, 2001). The average institutional selectivity of the institutions included was relatively

Table 3.4
YFCY Student Sample by Gender and Race

	Aggregate Data		**Used for separate-race analyses**		**# Institutions**
	N	**%**	**N**	**%**	**Attended**
American Ind.	100	0.2%			47
Asian	5,478	8.8%	5,478	33.4%	89
Black	3,466	5.5%	3,466	21.1%	94
Latino/a	2,450	3.9%	2,450	14.9%	92
White	45,771	73.3%	5,000	30.5%	94
Multiracial	3,245	5.2%			94
Other	1,150	1.8%			92
Missing	805	1.3%			86
Male	26,733	42.8%	7,046	41.8%	85
Female	35,732	57.2%	9,826	58.2%	94
Total	**62,465**	**100%**	**16,872**	**100%**	**94**

Source: 2003, 2004, and 2005 TFS data (final YFCY HGLM analysis sample)

Table 3.5
Institutional Sample for YFCY Response Prediction

		N	%	Mean	SD
Type & Control	University, Public	6	6.4%		
	University, Private	7	7.4%		
	4-year, public	14	14.9%		
	4-year, private	67	71.3%		
Selectivity		94		1130	126
Survey mode	Web only	27	28.7%		
	Paper only	54	57.4%		
	Web & Paper	13	13.8%		
Total		**94**	**100%**		

Source: 2004-2005 IPEDS; 2007, 2008, 2009 YFCY ARF

high, 1130 (standard deviation 126). In terms of survey administration most institutions administered the YFCY on paper (57%), though about one in three schools administered the YFCY on the web only (29%), and 14% used both paper and the web. Appendix D contains a list of all 94 institutions included in the YFCY sample.

Senior sample (CSS response study). Table 3.6 shows the racial and gender distribution of students in the sample used to predict CSS response, as well the number of institutions attended by each of these groups. Again, the sample was overwhelmingly White (73%) and majority female (56%). Ninety-four institutions were represented in the sample as a whole, though Asian Americans only attended 90 of these and African Americans and Latino/as 93. Eight schools saw no male TFS responders; these schools were single-sex institutions.

Reduction of the White sample size for separate-group analyses. Again, in order to avoid disproportionate sample size differences between the White sample and those of other groups, a stratified random sample of 4,186 of the 42,249 White students was chosen for the separate-race CSS analyses. This sample size is again approximately equivalent to that of the next-largest CSS student sample, Asian American students (Table 3.6), and as with the YFCY White sub-sample, the CSS White subsample was selected using a stratified random sampling

Table 3.6
CSS Student Sample by Gender and Race

	Aggregate data		Used for separate-race analysis		# Institutions
	N	**%**	**N**	**%**	**Attended**
American Ind.	87	0.1%			47
Asian	4,370	7.5%	4,370	29.2%	89
Black	2,606	4.5%	2,606	17.4%	93
Latino/a	3,790	6.5%	3,790	25.3%	92
White	42,249	72.8%	4,186	28.0%	94
Multiracial	3,303	5.7%			94
Other	1,104	1.9%			92
Missing	524	0.9%			86
Male	25,298	43.6%	6,564	43.4%	85
Female	32,735	56.4%	8,572	56.6%	94
Total	**58,033**	**100%**	**15,136**	**100%**	**94**

Source: 2003, 2004, and 2005 TFS data (final CSS HGLM analysis sample)

procedure that randomly sampled 5 to 200 White students within each institution. Distributions of all TFS variables were again compared between the original White sample and the smaller random White sample to make sure the selection was not biased in any way. The two groups were virtually identical.

Institutional sample. Table 3.7 shows the institutional sample for the CSS study. Eight in ten institutions were four-year private schools (80%), and another 11% were private universities. Public schools made up 9% of the sample, with 2 universities (2% of the total) and 7 four-year schools (7%). Again, this sample was more heavily weighted towards private four-year schools than are national samples (80% of institutions in this sample were private four-year schools vs. 36% of non-profit schools nationally) and there were far fewer universities in this sample than nationally (13% vs. 58%, Carnegie Foundation for the Advancement of Teaching, 2001). The average institutional selectivity was high, with a mean of 1143 (standard deviation 124). The most popular mode of survey administration for the CSS was web, with 48% of

Table 3.7
Institutional Sample for CSS Response Prediction

		N	%	Mean	SD
Type & Control	University, Public	2	2.1%		
	University, Private	10	10.6%		
	4-year, public	7	7.4%		
	4-year, private	75	79.8%		
Selectivity				1143	124
Survey mode	Web only	45	47.9%		
	Paper only	38	40.4%		
	Web & Paper	11	11.7%		
Total		**94**			

Source: 2004-2005 IPEDS; 2007, 2008, 2009 CSS ARF

institutions using this mode only. The web was followed closely by paper surveys (40%), and finally by a mix of web and paper modalities (12%).

Variables

The variables selected for use in this study included both student and institutional characteristics. Guided by the conceptual framework and working hypotheses described earlier in this chapter, the selected variables came from the following general categories: student background characteristics; correlates of academic achievement, engagement and satisfaction; missingness indicators; volunteering propensity; personality and other individual differences; probable major; proxy indicators of attitudes towards surveys; institutional characteristics; survey administration mode; and use of incentives. In order to facilitate comparisons across models, the same set of variables was used for all of the analyses run.

Table 3.8 and Table 3.11 list the variables that were included in the study, along with their response coding. Many more student-level than institution-level variables appear in this list for the simple reason that the minimum institutional sample size available for this study is 85 (males, YFCY sample), and therefore no more than 8 institution-level variables could be employed simultaneously in one model—one for every ten cases. A minimum of 10 cases per

predictor variable is a rule of thumb that "will generally allow good estimates," (Babyak, 2004, p. 415). Using the same rule of thumb, no more than 24 student-level variables could be employed because the smallest student sample size in this study is 2,450 (Latino/as, YFCY).

Dependent Variables. The two dependent variables in this study were indicators of whether or not students responded to the CSS and/or YFCY, and were coded 1 = responded, 0 = did not respond. The creation of these variables required several steps. First, a list of institutions meeting all of the eligibility criteria outlined above was obtained, and a database containing all TFS data from these eligible institutions was created. Next, YFCY and CSS databases for the appropriate years were matched with the relevant TFS data. Every YFCY and CSS dataset created by CIRP contains indicators of whether TFS data are available for each student; if such data are available, the TFS subject ID will be included in the YFCY or CSS data (CIRP matches TFS, YFCY and CSS data based on student ID, name, date of birth, e-mail, and permanent address). Based on the sample of students who took the TFS at eligible institutions, all students who had TFS subject IDs for the relevant year of the YFCY or CSS data were coded as "responding" to that survey.

Independent Variables. The independent variables employed in this study are shown in Table 3.8 and Table 3.11. For ease of discussion, these variables have been arranged into groups of conceptually similar predictors at the student and institutional level. Each group and its component variables are briefly described below. Note that due to constraints imposed by sample size, not all of the institution-level variables described could be included in the final modeling efforts. The analysis section that follows this one contains more details on the process of predictor selection for the institution-level variables.

Student-level: Background characteristics. For reasons discussed in hypotheses 1-1 and 1-2, this study's models included a variety of student background characteristics that previous research has linked to response. These included race, gender, and international student status, along with several different indicators of SES: estimated parental income, first-generation student status, and self-rated likelihood of getting a job to pay for college expenses, which is associated with actually obtaining a job while enrolled (Spinosa, et al., 2008). Previous researchers have combined parental income with parental education to form an SES composite variable (Sax, Gilmartin, et al., 2003; Szelényi, et al., 2005), but these items were kept separate in this study because the working hypotheses necessitate looking at whether individual indicators influence response propensity in different ways.

Student-level: Correlates of academic achievement. Because virtually every study on student nonresponse that incorporates academic achievement has found that students with higher academic aspirations, achievement and orientations have higher response propensities, this study included a series of variables thought to be predictive or antecedent of academic motivation and success in college. In particular, this study included high school GPA and SAT score (or converted ACT composite score), as both have been linked to academic success in college (Fischer, 2007; Kugelmass & Ready, 2010; Pascarella & Terenzini, 2005). An indicator representing students' motivation for going to college—to learn—was also included in the form of a factor representing whether students decided to go to college in order to learn new things (see Table 3.9 for more details on this factor).

Student-level: Missingness indicators. As indicated in hypothesis 1-1d, links have been made between item missingness on baseline surveys and response rates to follow-up surveys, in particular between missing SES and test score indicators and survey response (Burkam & Lee,

1998), as well as between overall response rate and overall item missingness (Ting & Curtin, 2010). Therefore, missingness indicators for parental income and SAT/ACT score were included in this study, as was an indicator of the overall number of missing items on the survey. This latter indicator was capped at 20 in order to avoid an extremely skewed distribution, as the vast majority of students had 20 or fewer missing pieces of survey information (91% of first years and 92% of seniors), but some had well over 100. Students who were missing SAT/ACT or parental income were given a mean score on the relevant indicators, and also a score of 1 on a dummy indicator of missingness (students not missing this information were coded 0 on the dummy variable). Variables were coded this way in order to avoid multicollinearity issues in the modeling efforts.

Student-level: Correlates of academic and social engagement. Several empirical studies and theories discussed in Chapter 2, as well as the conceptual model shown in Figure 3.1, suggest that students who are more engaged in college, academically and socially, will have higher survey response propensities than will those who are less engaged. In the models in this study, both past behavior thought to be indicative of future behavior, as well as self-rated likelihood of future behavior, were included as potential predictors or antecedents of academic and social engagement. In terms of future behavior, the model included the self-assessed likelihood of participating in student clubs/groups in college. The high school behaviors that were used included asking a teacher for advice after class, tutoring another students, hours per week spent socializing, and hours per week spent studying or doing homework.

Student-level: Correlates of satisfaction. Along the same lines, the conceptual model driving this study suggests that student satisfaction with their college experience will be related to their propensity to respond to student surveys. While all the data employed in this analysis

came from students who have just entered college and who can therefore not really rate their college experience, there were three variables on the TFS that have been linked to actual student satisfaction in college. These include items regarding whether an institution is students' first choice, students' self-rated likelihood of being satisfied with college, and self-rated likelihood of transferring to a different college before graduating. All of these variables have been shown to be related to satisfaction in the expected ways (Pryor & Sharkness, 2010), and were included in the analyses in this study

Student-level: Propensity to be engaged with/involved in organizations, volunteering. The theories and conceptual model driving this study suggest that a students' propensity to be engaged with organizations of which they are a member, and their propensity to volunteer, are likely related to their survey response propensities. To assess whether this is the case, the models in this study employed two variables that served as indicators of students' propensity to be involved in organizations, as well as one that reflected students' history of volunteering. These were the frequency with which students voted in student elections in high school, the likelihood that they place on becoming involved in student government in college, and the frequency with which they volunteered while in high school.

Student-level: Potential proxies of attitudes towards surveys, research. The conceptual model guiding this study suggests student attitudes towards surveys and research in general might be significantly linked to survey response propensity. No TFS questions asked specifically about how students feel about filling out surveys, but there were two questions on the survey that may reasonably serve as proxies for such attitudes, and these were included in the models in this study. The first of these was a question that asked students to rate the extent to which they agree with the statement, "realistically, an individual can do little to bring about

changes in our society." This variable was included under the assumption that the more a person believes he or she can, as an individual, make a difference, the higher the likelihood they would take the time to fill out surveys designed to assist the functioning of an organization. The other question on the TFS that was used as a proxy of attitudes towards research is a question that asks whether students will allow HERI to include their ID number (typically a student ID number, but sometimes a social security number) with their survey data when this data is given to their institution. It is assumed that students who say "yes" to this question have a more positive view of the value of their survey data, and more trust that the results will be put to good use, than do students who say "no" or neglect to answer the question.

Student-level: Personality and other individual differences. In addition to student self-ratings of cooperativeness, a personality trait that has been linked to survey response (Nielsen, et al., 1978), this study will employ the personality typologies developed by Astin (1993a), which have been used by previous nonresponse researchers from CIRP (Sax, Gilmartin, et al., 2003; Szelényi, et al., 2005). Factor analyses were run to make sure that each of the previously-identified personality type factors fit with this study's data and to create "factor scores." The analyses were done using SPSS 15.0 and principal axis factor extraction methods; the scores were created using the regression option. Rather than run factor analyses separately by each sample used in this study (YFCY, CSS), the factor analyses for this study were run on the aggregated group of students who were included in either or both of this study's samples. Factor loadings, item-total correlations and communalities, along with the Cronbach's alpha statistic associated with each factor, are shown in Table 3.9. Table 3.8 shows the range of the scored factors' minimum and maximum scores.

Table 3.8
Student-level Variables Used in Study and Variable Coding

Category	Variable	Coding
Dependent Variable (DV)		
	Responded to YFCY/CSS	1 = Responded, 0 = Did not respond
Background Characteristics		
Race	White	Reference group
	Black/African American	1 = Marked, 0 = Not Marked
	Latino/a	*Same as above*
	Asian American	*Same as above*
	Other (includes multiracial, other, and Native American)	*Same as above*
	Female	1=female, 0 = male
	Citizenship status: Foreign	1 = Not U.S. citizen, no green card, 0 = U.S. citizen or green card holder
SES	Parental income	1 = Less than $10,000 to 14 = $250,000 or more
	First generation status: Not first generation	0 = No parent with college education, 1 = At least one parent with some college
	Future Act: Get a job to pay for college expenses	1 = No chance, 2 = Very little chance, 3 = Some chance, 4 = Very good chance
Correlates of academic achievement		
	High school GPA	1 = D, 2 = C, 3 = C+, 4 = B-, 5 = B, 6 = B+, 7 = A-, 8 = A or A+
	SAT verbal/critical reasoning + math, or ACT composite equivalent[a]	Continuous, 100-point increments: Min = 4.00, Max=16.00
	Reason for going to college: Learning (Factor)[b]	Min = -2.93, Max=0.76
Missingness Indicators		
	Parental income	1 = Missing, 0 = Not missing
	SAT/ACT Score	1 = Missing, 0 = Not missing
	Number of Missing items	0 to 20, where 20=20 or more
Correlates of academic and social involvement		
	Future Act: Participate in student clubs/groups	*Same as above*
	HS Act: Asked a teacher for advice after class	1 = Not at all, 2 = Occasionally, 3 = Frequently
	HS Act: Tutored another student	*Same as above*
	HS Act: Socialized w/ someone of another racial/ethnic group	*Same as above*
	Hours per week (HPW) in HS: Socializing with friends	1 = None, 2 = < 1, 3 = 1-2, 4 = 3-5, 5 = 6-10, 6 = 11-15, 7 = 16-20, 8 = 20+
	HPW in HS: Studying/homework	*Same as above*

(continued)

Category	Variable	Coding
Correlates of satisfaction		
	Future Act: Transfer to another college before graduating	1 = No chance, 2 = Very little chance, 3 = Some chance, 4 = Very good chance
	Future Act: Be satisfied with your college	*Same as above*
	Is this institution your 1st choice?	1 = Yes, 0 = No
Propensity to be engaged with, participate in organizations		
	HS Act: Performed volunteer work	1 = Not at all, 2 = Occasionally, 3 = Frequently
	HS Act: Voted in a student election	*Same as above*
	Future Act: Participate in student government	1 = No chance, 2 = Very little chance, 3 = Some chance, 4 = Very good chance
Personality and other individual differences		
	Scholar (Factor)[b]	Continuous, Min = -4.12, Max=1.64
	Leader (Factor)[b]	Continuous, Min = -2.86, Max=1.64
	Hedonist (Factor)[b]	Continuous, Min = -1.05, Max=2.56
	Status Striver (Factor)[b]	Continuous, Min = -2.09, Max=1.83
	Artist (Factor)[b]	Continuous, Min = -0.95, Max=2.88
	Social Activist (Factor)[b]	Continuous, Min = -1.72, Max=2.59
	Self Rating: Cooperativeness	1 = Lowest 10%, 2 = Below Average, 3 = Average, 4 = Above Average, 5 = Highest 10%
Potential Proxies of attitudes towards surveys, research		
	Realistically, an individual can do little to bring about changes in our society	1 = Disagree Strongly, 2 = Disagree Somewhat, 3 = Agree Somewhat, 4 = Agree Strongly
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?	Yes – *Reference group* No: 1 = marked, 0 = not marked Missing: 1 = Did not answer the question, 0 = answered
Probable Major[c]		
	Undecided	Reference group
	Arts and Humanities	1 = Marked, 0 = Not Marked
	Business	*Same as above*
	Engineering	*Same as above*
	Education	*Same as above*
	Natural Sciences	*Same as above*
	Social Sciences	*Same as above*
	Professional	*Same as above*
	Other or Technical	*Same as above*

Source: TFS Codebook

[a] See ACT (n.d.) for ACT to SAT conversion criteria.

[b] See Table 3.9 for factor information.

[c] See Table 3.10 for individual majors included in each category.

Table 3.9
Factors and Component Items

Factor, component items, Cronbach's alpha	Factor Loading	Commun-ality	Corrected item-total correlation
Scholar (α = .63)			
Self Rating: Academic ability[a]	0.79	0.62	0.55
Self Rating: Self-confidence (intellectual)[a]	0.52	0.27	0.42
Self Rating: Mathematical ability[a]	0.53	0.28	0.38
Self Rating: Drive to achieve[a]	0.42	0.17	0.33
Leader (α = .72)			
Self Rating: Leadership ability[a]	0.77	0.59	0.59
Self Rating: Public speaking ability[a]	0.67	0.45	0.54
Self Rating: Self-confidence (social)[a]	0.60	0.36	0.49
Hedonist (α = .70)			
View: Marijuana should be legalized[b]	0.45	0.20	0.40
Hours per Week: Partying[c]	0.63	0.40	0.56
Act in Past Year: Smoked cigarettes[d]	0.50	0.25	0.44
Act in Past Year: Drank beer[d]	0.88	0.77	0.69
Act in Past Year: Drank wine or liquor[d]	0.83	0.70	0.66
Status Striver (α = .72)			
Goal: Becoming an authority in my field[e]	0.69	0.47	0.53
Goal: Obtaining recognition from my colleagues for contributions to my special field[e]	0.75	0.56	0.57
Goal: Having administrative responsibility for the work of others[e]	0.58	0.34	0.50
Goal: Being very well off financially[e]	0.48	0.23	0.42
Artist (α = .70)			
Goal: Becoming accomplished in one of the performing arts (acting, dancing, etc.)[e]	0.53	0.28	0.45
Goal: Writing original works (poems, novels, short stories, etc.)[e]	0.56	0.32	0.45
Goal: Creating artistic work (painting, sculpture, decorating, etc.)[e]	0.81	0.66	0.61
Self Rating: Artistic ability[a]	0.56	0.31	0.45
Social Activist (α = .79)			
Goal: Influencing the political structure[e]	0.66	0.44	0.58
Goal: Influencing social values[e]	0.69	0.48	0.60
Goal: Helping others who are in difficulty[e]	0.50	0.25	0.43
Goal: Participating in a community action program[e]	0.65	0.42	0.57
Goal: Helping to promote racial understanding[e]	0.66	0.43	0.58
Goal: Keeping up to date with political affairs[e]	0.59	0.35	0.52

(continued)

Factor, component items, Cronbach's alpha	Factor Loading	Commun-ality	Corrected item-total correlation
Reason for going to college: To learn (α = .66)			
Reason Attend: To gain a general education and appreciation of ideas[f]	0.67	0.45	0.50
Reason Attend: To make me a more cultured person[f]	0.66	0.43	0.50
Reason Attend: To learn more about things that interest me[f]	0.59	0.34	0.46

Source: 2003, 2004, 2005 TFS Overall Sample

[a] Self-ratings questions: Rate yourself on each of the following traits as compared with the average person your age. 1 = lowest 10%, 2 = Below Average, 3 = Average, 4 = Above Average, 5 = highest 10%

[b] Views questions: Mark one: 1 = Disagree Strongly, 2 = Disagree Somewhat, 3 = Agree Somewhat, 4 = Agree Strongly

[c] Hours per week questions: During your last year in high school, how much time did you spend during a typical week doing the following activities? 1 = None, 2 = less than an hour, 3 = 1-2, 4 = 3-5, 5 = 6-10, 6 = 11-15, 7 = 16-20, 8 = Over 20

[d] Act in Past Year questions: For the activities below, indicate which ones you did during the past year. 1 = Not at all, 2 = Occasionally, 3 = Frequently

[e] Goal questions: Please indicate the importance to you personally of each of the following. 1 = Not Important, 2 = Somewhat Important, 3 = Very Important, 4 = Essential

[f] Reason attend questions: In deciding to go to college, how important to you was each of the following reasons? 1 = Not Important, 2 = Somewhat Important, 3 = Very Important

Student-level: Probable major. Too few studies have accounted for students' majors when looking at student survey response rates. Unfortunately, because only pre-college characteristics were employed in this study, no information on actual major was available for the current study. However, the TFS did contain information about students' probable major, and indicators of the general categories/disciplines of these probable majors were included in this study's models. Although the correlation between probable major and actual majors is not one-to-one (Chang, Han, Sàenz, & Cerna, 2008), there is an association between what students think they will major in and what they will actually major in (Feldman, et al., 2001). Table 3.10 lists the disciplines/categories into which individual majors were coded.

Table 3.10

Major Categories Coding (Reference group is undecided/missing)

Arts and Humanities:

- Art, fine and applied
- English (language and literature)
- History
- Journalism
- Language and Literature (except English)
- Music
- Philosophy
- Speech
- Theater or Drama
- Theology or Religion
- Other Arts and Humanities

Business:

- Accounting
- Business Admin. (general)
- Finance
- International Business
- Marketing
- Management
- Secretarial Studies
- Other Business

Engineering:

- Aeronautical/Astronautical Engineering
- Civil Engineering
- Chemical Engineering
- Computer Engineering
- Electrical or Electronic Engineering
- Industrial Engineering
- Mechanical Engineering
- Other Engineering
- Computer Science

Education:

- Business Education
- Elementary Education
- Music or Art Education
- Physical Education or Recreation
- Secondary Education
- Special Education
- Other Education

Technical:

- Building Trades
- Data Processing/Computer Programming
- Drafting or Design
- Electronics
- Mechanics
- Other Technical

Natural Sciences:

- Biology (general)
- Biochemistry or Biophysics
- Botany
- Environmental Science
- Marine (Life) Science
- Microbiology or Bacteriology
- Zoology
- Other Biological Science
- Astronomy
- Atmospheric Science (incl. Meteorology)
- Chemistry
- Earth Science
- Marine Science (incl. Oceanography)
- Mathematics
- Physics
- Statistics
- Other Physical Science

Social Sciences:

- Anthropology
- Economics
- Ethnic Studies
- Geography
- Political Science (gov't., international relations)
- Psychology
- Social Work
- Sociology
- Women's Studies
- Other Social Science

Professional:

- Architecture or Urban Planning
- Home Economics
- Health Technology
- Library or Archival Science
- Medicine, Dentistry, Veterinary Medicine
- Nursing
- Pharmacy
- Therapy (occupational, physical, speech)
- Other Professional

Other:

- Agriculture
- Communications
- Forestry
- Kinesiology
- Law Enforcement
- Military Science
- Other Field

Institution-level: Administration methods. Table 3.11 lists the institution-level variables of interest to this study, chosen based on previous literature and the conceptual framework driving this study. In terms of survey administration methods, the two most studied in the literature have been administration mode and use of incentives; variables representing both of these concerns were included as institution-level predictors. Although working hypothesis 2-1d suggested that incentives may only have an effect when surveys are not administered in proctored groups, the data available did not permit this interaction effect to be tested because sample sizes in many of the crossed conditions were extremely small. Therefore, only an indicator of mode (web, paper, both) and type of incentive (lottery, small incentive for all, or no incentive) were included in the study's models.

Institution-level: Structural/climate characteristics. A number of structural/climate characteristics were considered for inclusion in this study. Note that, as discussed briefly above, there are more institutional structural/climate variables listed in Table 3.11 than could reasonably be accommodated in the final models in this study (recall that the maximum number of institution-level variables that can be included is eight due to the limitations of institutional sample sizes, and several were already chosen to represent administration methods). Because of the lack of empirical work connecting institution-level characteristics to response rates, there was no clear guidance in the literature about which specific predictors—beyond institutional selectivity—will be most important. The two structural/climate characteristics that were of key interest in this study and that were selected for definite inclusion were selectivity and proportion of undergraduates that were non-foreign and non-White. These two indicators were addressed in the working hypotheses driving the analyses; schools of higher selectivity were hypothesized to have higher response rates, and the proportion of non-White students was thought to be an

indicator of the campus climate for underrepresented racial/ethnic minority students. As for the selection of the final institution-level variables for this study, a preliminary institution-only modeling approach, described below, was undertaken to decide which to include. The variables shown in Table 3.11 that were vying for contention were selected because they were thought to be indicative of either the climate for students in terms of mobility (graduation and retention rates), the external environment (urbanicity), or student-centeredness (ratio of graduate to undergraduate enrollment, student services expenses per FTE).

Institution-level: Survey-taking climate. The conceptual model shown in Figure 3.1 suggests that an institution's survey-taking climate may play a role in student response decisions. Unfortunately, this study cannot obtain any direct measures of institutional survey-taking climate because none exist; the development of a tool or method to obtain such information would be a study in and of itself. However, there are two pieces of information available from the HERI website that can potentially serve as proxies for an institution's survey climate in this study. The first of these is the number of times an institution has participated in the TFS between 1985 and 2009 (1985 because this is when federal funds were divested and all institutions became expected to pay to participate in the TFS; 2009 because it is the most recent year included in this study). The HERI website contains a list of all institutions that have participated in the TFS since 1966, along with the years that they participated (Cooperative Institutional Research Program, 2010b). The number of TFS administrations in which an institution has participated can be considered a crude approximation of the "survey-savviness" of the campus; if nothing else it is an indicator of how much "practice" the institution has had administering CIRP surveys. The other survey-taking climate proxy that is available from the HERI website is a measure of institutional "success" in administering the TFS. Namely, a measure can be derived of the

proportion of times a campus has achieved “norms status,” that is, the proportion of TFS administrations in which an institution has achieved high enough response rates to be included in the norms sample. This can be considered as a potential indicator of a climate of high response rates, at least for the entering freshman survey.

Table 3.11

Institution-level Variables Considered for Study and Variable Coding

Category	Variable	Coding
DV		
YFCY, CSS response rates		CSS: Min = .01, Max=.89 YFCY: Min =.02, Max=.82
Institution-level variables		
Administration Methods		
Mode	Paper, in-person distribution	Reference group
	Web only	1 = Yes, 0 = No
	Paper & Web	1 = Yes, 0 = No
	Mail only	1 = Yes, 0 = No
Incentives	No incentive	Reference group
	Small incentive for all	1 = Yes, 0 = No
	Larger lottery incentive	1 = Yes, 0 = No
Survey-taking climate		
	# years participating in TFS, 1985-2009	Min = 2, Max = 44
	% of above years in norms sample	Min = 1.4, Max = 10.0
Other Climate characteristics		
	% of undergraduate students non-White, in 10-point increments	Min = 0.1, Max = 9.2
	Graduation rate (6 year, 2003 cohort), in 10-point increments	Min = 2.8, Max = 9.6
	Full-time undergraduate retention rate, in 10-point increments	Min = 2.6, Max = 9.8
	Ratio of grad to undergrad enrollment	Min = 0.00, Max = 1.59
	Natural log of Student services expenses per FTE	Original variable: Min = $310, Max = $12,830; Natural log: Min = 5.74, Max = 9.46
Structural characteristics		
	Natural log of Size (undergraduate enrollment)	Original variable: Min = 330, Max = 39,340; Natural log: Min = 5.80, Max = 10.58
	Selectivity, in 100-point increments	Min = 8.99, Max = 14.80
Urbanicity	Rural	Reference group
	Small town	1 = Yes, 0 = No
	Large town	1 = Yes, 0 = No
	Urban fringe of mid-size city	1 = Yes, 0 = No
	Mid-size city	1 = Yes, 0 = No
	Urban fringe of large city	1 = Yes, 0 = No
	Large city	1 = Yes, 0 = No

Source: ARF Codebook, IPEDS

Analyses

Hierarchical Generalized Linear Modeling (HGLM)

To answer the research questions driving this study, a special case of hierarchical linear modeling (HLM) called hierarchical generalized linear modeling (HGLM) was employed. HLM is a multi-level statistical modeling technique that was developed in the mid-1980's to deal with data in which subjects or observations are "clustered" within natural groupings (J. de Leeuw & Meijer, 2008), for example when students are clustered within colleges and universities as in this study. While some researchers believe that clustered data can be analyzed appropriately using Ordinary Least Squares (OLS) regression (Astin & Denson, 2009), in reality doing so is a violation of the OLS assumption of independence, which states that each observation in a dataset must be independent of every other (J. de Leeuw & Meijer, 2008). When using data collected from students attending educational organizations, it has long been virtually "axiomatic" that multilevel models are most appropriate because of the naturally hierarchical organizational structures of educational institutions (Raudenbush, 1989, p. 722). Failing to account for multilevel data structures in effect ignores the homogeneity of standard errors among students within an institution or cluster (Astin & Denson, 2009), a consequence of which is an inflated Type I error rate (Raudenbush & Bryk, 2002).

HGLM is a special case of HLM appropriate for modeling binary outcomes. The extension of HLM to HGLM is very similar to the extension of OLS to logistic regression in that it includes a logit transformation that accommodates the fact that the outcome cannot be less than zero or greater than one (in HGLM parlance this is called a *link function*, Luke, 2004). The extension of HLM to HGLM also involves the adjustment of the dependent variable's error distribution to reflect its binary character (Raudenbush & Bryk, 2002). Given the focus of the

current study on survey response (vs. nonresponse) and the nested nature of the data employed, HGLM was the most appropriate statistical analysis to employ. A note about terminology should be made here. The "hierarchical" nature of HGLM implies that there will be many levels of analysis, with lower levels clustering within higher levels. Below, the terms "student-level" and "level 1" will be used interchangeably to refer to the "lowest" level of analysis, and the terms "institution-level" and "level 2" will be used interchangeably to refer to the "higher" level of analysis.

The general case of HLM. A hierarchical linear model with a continuous outcome at level 1, can be written as follows:[2]

Level 1: $$Y_{ij} = \beta_{0j} + \beta_{1j}X_{1ij} + \beta_{2j}X_{2ij} + \cdots + \beta_{Qj}X_{Qij} + r_{ij} \quad \text{(Eq. 1)}$$

Level 2: $$\beta_{Qj} = \gamma_{q0} + \gamma_{q1}\mathrm{W}_{1j} + \gamma_{q2}\mathrm{W}_{2j} + \cdots + \gamma_{qS_q}\mathrm{W}_{S_qj} + u_{qj} \quad \text{(Eq. 2)}$$

where Y_{ij} is the outcome of interest, there are $i = 1, \ldots, I$ level-1 units (students) nested within $j = 1, \ldots, J$ level-2 units (institutions), and there are Q predictors at level 1 and Sq predictors at level 2. Notationally, there are Q + 1 coefficients at level 1, and Sq + 1 coefficients at level 2, and

β_{0j} is the intercept at level 1,
γ_{q0} is the intercept at level 2;
β_{Qj} are level-1 coefficients for
X_{Qij} level-1 predictor variables;
γ_{qS_q} are level-2 coefficients for
W_{S_qj} level-2 predictor variables; and
r_{ij} $\sim N(0, \sigma^2)$.

It is assumed that each random component u_{qj} is multivariate normally distributed, such that for any q:

[2] All notation used here is borrowed from Raudenbush & Bryk (2002), as are Equations 1 through 14.

$$\mathrm{Var}(u_{qj}) = \tau_{qq} \quad \text{(Eq. 3)}$$

and for any pair q and q',

$$\mathrm{Cov}(u_{qj}, u_{q'j}) = \tau_{qq'}. \quad \text{(Eq. 4)}$$

For an ordinary two-level HLM, it is assumed that the level 1 outcome Y_{ij} is normally distributed with an expected value of μ_{ij} and a constant variance σ^2.

HGLM. When dichotomous outcomes at level-1 are of interest, Y_{ij} will not be normally distributed. Accommodating a non-normal binary outcome in HLM necessitates the use of a link function. An *identity link function*, in which no transformation is applied, can be written

$$\eta_{ij} = \mu_{ij}, \quad \text{(Eq. 5)}$$

so that the predicted value at level 1 will be:

$$\eta_{ij} = \beta_{0j} + \beta_{1j}X_{1ij} + \beta_{2j}X_{2ij} + \cdots + \beta_{Qj}X_{Qij}. \quad \text{(Eq. 6)}$$

Assuming Y_{ij} is a binary variable taking on a value of either zero or one, and that the observation of a one can be called a "success," we can denote the probability of success over m_{ij} trials as φ_{ij}, where

$$Y_{ij}|\varphi_{ij} \sim B(m_{ij}, \varphi_{ij}). \quad \text{(Eq. 7)}$$

Equation 7 shows that Y_{ij} has a binomial distribution with m_{ij} trials and probability of success per trial φ_{ij}. The expected value and variance of Y_{ij} are

$$\mathrm{E}(Y_{ij}|\varphi_{ij}) = m_{ij}\varphi_{ij} \quad \text{(Eq. 8)}$$

$$\mathrm{Var}(Y_{ij}|\varphi_{ij}) = m_{ij}\varphi_{ij}(1 - \varphi_{ij}). \quad \text{(Eq. 9)}$$

In the special case of m_{ij} = 1, Y_{ij} can take on values of only zero or one; this is called the *Bernoulli distribution*. In the current study, it is assumed that the outcomes of interest have such a distribution, as each student has one observation, responded = 1 versus did not respond = 0.

When the level-1 outcome variable is binomial and can be assumed to have a Bernoulli distribution, the most commonly employed link function is the *logit link*, notated as

$$\eta_{ij} = \log\left(\frac{\varphi_{ij}}{1 - \varphi_{ij}}\right). \quad \text{(Eq. 10)}$$

Under Equation 10, η_{ij} represents the log of the odds of success; in the current study "success" means that a student responds to the survey. η_{ij} can take on any real value, while φ_{ij} is constrained to be in the interval (0, 1). Assuming a logit link function as written above, the level-1 model that will be employed in this study can be written as in Equation 6, or

$$\log\left(\frac{\varphi_{ij}}{1 - \varphi_{ij}}\right) = \beta_{0j} + \beta_{1j}X_{1ij} + \beta_{2j}X_{2ij} + \cdots + \beta_{Qj}X_{Qij}. \quad \text{(Eq. 11)}$$

The level-2 model has the same form as specified above in Equation 2.

Model Building

The models examined in this study all contain the same predictor variables (as outlined above), and the model-building process occurred in several stages, which are described below.

Step 1: Preliminary institution-only regression analysis. To select the final few institution-level variables for the hierarchical models in this study, two preliminary institution-only OLS regression analyses were run before HGLM modeling was commenced. These OLS analyses predicted institutional response rates for the YFCY and CSS, using as large a sample of institutions as possible—more than could be included in the hierarchical models. As discussed above, due to the unique nature of CIRP data, the hierarchical models in this study could only include institutions that met four eligibility criteria: (a) participated in the YFCY or CSS for the corresponding year of a TFS administration, (b) presence of ARF data (c) indication on the ARF that all students who took the TFS in the relevant year were surveyed, and (d) inclusion in the TFS norms for the relevant year. Only 94 institutions met these criteria for both the CSS and

YFCY analysis, but these were not the only institutions for which information on administration methods and response rates were available. Thus, it was decided that a preliminary institution-only regression analysis predicting institutional response rate should be run using data from *all* those institutions that had ARF data for 2005 (YFCY) or 2008 (CSS), plus additional unique institutions who had ARF data for 2006 (YFCY) or 2009 (CSS), plus additional unique institutions that had ARF data for 2004 (YFCY) or 2007 (CSS).

The samples of institutions used for the OLS analyses differ from the samples used in the hierarchical analyses in several ways. First, although the vast majority of the institutions included in the OLS sample participated in the TFS for the relevant year, not all YFCY or CSS institutional participants were also TFS participants. In addition, among institutions that were TFS participants, not all were in the norms sample for the relevant year, and not all attempted to sample every student who took the TFS. Appendix F contains descriptive statistics for the institutions used in the preliminary institution-only OLS regression analysis. Overall, 207 YFCY institutions and 181 CSS institutions were included in the preliminary institution-only regression analyses.

Table 3.11 shows all of the variables considered for the preliminary institution-only regression analyses, and Appendix G shows associated descriptive statistics. Based on the working hypotheses guiding the study and the set of variables already slated for inclusion, CSS and YFCY response rates were modeled in several steps/blocks (the process was the same for both YFCY and CSS analyses). First, average institutional response rates were modeled using predictors representing administration methods and incentive use only; following this selectivity and proportion of the study body that is non-White were entered in a second block. In the third block, a stepwise forward entry method (probability of entry = .05) was used to allow the

remaining climate/structural characteristics to enter. Based on the set of variables that entered one or both of the YFCY and CSS regressions, the final set of variables were chosen for the hierarchical modeling efforts.

Step 2: Fully unconditional model. Although there is a clear theoretical justification for the use of multilevel modeling in this study, the empirical need for such an approach should be examined before the modeling commences (Luke, 2004; Raudenbush & Bryk, 2002). In order to provide empirical justification for the necessity of HLM, a *null model*, also called a *fully unconditional model*, needs to be run. The fully unconditional model is called such because there are no conditions applied to the data—in other words, the data are modeled using no predictor variables. Without predictor variables, the results of the unconditional model provide a measure of the magnitude of the variation between schools in survey response rates (Raudenbush & Bryk, 2002). The level-1 unconditional model is

$$\eta_{ij} = \beta_{0j} \qquad \text{(Eq. 12)}$$

and the level-2 unconditional model is

$$\beta_{0j} = \gamma_{00} + u_{0j}, \qquad u_{0j} \sim n(0, \tau_{00}). \qquad \text{(Eq. 13)}$$

In the current study, fully unconditional models were run for aggregate student models (predicting YFCY and CSS response, overall) as well as for disaggregated groups of students by gender and race, in order to ensure that there is sufficient variation between schools in survey response rates in the aggregate and among the sub-population of institutions attended by males and females and students of different race/ethnicities. In all of these unconditional models, both the estimated parameters $\hat{\gamma}_{00}$ and $\hat{\tau}_{00}$ were examined in order to (1) determine the "typical" probability of response at the included institutions, calculated as

$$\frac{1}{(1+e^{\hat{\gamma}_{00}})} \quad \text{(Eq. 14)}$$

as well as (2) calculate a 95% confidence interval around this figure, given as

$$\frac{1}{(1+e^{\hat{\gamma}_{00}})} \pm 1.95\sqrt{\hat{\tau}_{00}}\,. \quad \text{(Eq. 15)}$$

As Raudenbush and Bryk (2002) suggest (p. 298), plots of the institution-specific probability of response as a function of institution-specific log-odds of response, along with the upper and lower bounds of the associated 95% confidence intervals, were also inspected for confirmation of sufficient variation between schools in response rate.

Step 3: Level-1 conditional model. After the unconditional models specified above are run, level-1 models were built following the general model in Equation 11. More specifically, the level-1 models for all analyses were given by:

$$\begin{aligned}
&\eta_{ij} = \beta_{0j} \\
&+ \beta_{1j}(\text{background characteristics}) \\
&+ \beta_{2j}(\text{personality and other individual differences}) \\
&+ \beta_{3j}(\text{correlates of academic achievement}) \\
&+ \beta_{4j}(\text{missingness indicators}) \\
&+ \beta_{5j}(\text{correlates of academic and social involvement}) \\
&+ \beta_{6j}(\text{correlates of satisfaction}) \\
&+ \beta_{7j}(\text{propensity to be engaged with, participate in organizations}) \\
&+ \beta_{8j}(\text{probable major}) \\
&+ \beta_{9j}(\text{proxies of attitudes towards surveys/research}) + r_{ij}
\end{aligned} \quad \text{(Eq. 16)}$$

For the sake of simplicity, rather than list every variable in the model only the general categories of each predictor in the model are presented in Equation 16. Table 3.8 lists each individual variable that was incorporated.

With the exception of the gender-specific models, the level 1 conditional models were built in three steps in order to test working hypothesis 3-1a, which suggested that personality traits will moderate the impact of gender on response rates. To test this, the level 1 conditional

models were first run with just the $\beta_{1j}(\text{background characteristics})$ in the model, and the direction and significance of the gender effect was noted. After this, the $\beta_{2j}(\text{personality/ individual differences})$ was added, and the gender effect was again observed. Finally, the remainder of the level-1 variables were added to the models.

Step 4: Level-2 conditional model. After the level-1 models specified above were run, level-2 models were built following Equation 2. It was assumed that with the exception of the level-1 intercept, each of the level-1 effects were fixed, meaning that the coefficients associated with each level-1 predictor variable were constant across level-2 units. However, the intercept of level 1, representing the average response rate at the institutional level, was allowed to vary because theory and empirical evidence has shown response rates do vary depending on the institutional context and the mode of survey administration. The level-2 models for this study's analyses were given by:

$$
\begin{aligned}
\beta_{0j} &= \gamma_{00} \\
&\quad + \gamma_{01}(\text{mode})_j \\
&\quad + \gamma_{02}(\text{incentive})_j \\
&\quad + \gamma_{03}(\text{structural and climate characteristics})_j \\
\beta_{1j} &= \gamma_{10} \\
\beta_{2j} &= \gamma_{20} \\
\beta_{3j} &= \gamma_{30} \\
\beta_{4j} &= \gamma_{40} \\
\beta_{5j} &= \gamma_{50} \\
\beta_{6j} &= \gamma_{60} \\
\beta_{7j} &= \gamma_{70} \\
\beta_{8j} &= \gamma_{80} \\
\beta_{9j} &= \gamma_{90}
\end{aligned}
\qquad \text{(Eq. 17)}
$$

Where the structural and climate characteristics were chosen based on the results of the preliminary institution-only regression run described above.

Again for the sake of simplicity, only the general categories of each predictor in the level-2 model are presented in Equation 17. Table 3.11 lists each individual variable that was included or considered for inclusion in the level-2 conditional models.

Centering

When employing multilevel modeling techniques, it is important to specify how variables are centered in the analysis. This is due to the fact that the intercepts at level 1 (and often the slopes at level 1 as well, although not in this analysis) are outcome variables at level 2, and it is essential that the meaning of these level-2 outcome variables is clear. The meaning of the intercept at level 1 depends on what is called the "location," or choice of centering, of the level-1 predictor variables. If level-1 variables are left in the metric in which they were collected, the intercept can be interpreted as the expected outcome in the case in which all predictor variables have a value of zero. If a value of zero is not meaningful for some of the predictor variables, then the intercept is also not meaningful. In OLS analyses this is often not a problem, for it is the predictors and their slopes that are of most interest, and the intercept is often ignored. However, in multilevel modeling, particularly in multilevel modeling applications which involve the modeling of the level-1 intercept with level-2 variables, it is important to have an interpretable intercept at level 1. To create an interpretable intercept, appropriate locations for the level-1 predictors must be chosen—the variables must be centered in some way (Raudenbush & Bryk, 2002). Similarly, interpretations regarding the intercepts in the level-2 models must also be considered, and attention must be paid to the centering of predictors at this level as well.

For the current study, all predictor variables were grand-mean centered, which involved subtracting from the observed value of any given predictor the overall ("grand") mean of the entire sample on this variable. Centering in this way made the level-one intercept interpretable

as the expected outcome for a student who has an average value on all continuous predictors (Raudenbush & Bryk, 2002). To ease interpretation of level-2 results, all level-2 variables were also grand-mean centered.

Missing Data

Finally, before any modeling could commence, missing data for variables other than SAT/ACT, parental income, and giving permission to HERI to release student ID needed to be addressed. To maximize the sample available for analysis, missing data were replaced via imputation wherever appropriate. The missing data replacement process was completed in several steps. First, the extent to which missing data occurred was examined to ensure that the imputation procedure would not affect a large proportion of the data. It was found that aside from SAT/ACT and parental income, there was very little missing data on the whole—no variables had more than 6% of cases missing. Given the relatively few instances of missing data across the variables used in the analysis, step two of the process was commenced, in which missing data were imputed using the expectation maximization (EM) algorithm in SPSS 17.0. The EM algorithm employs maximum likelihood estimation techniques to compute values for cases with missing data, and because it uses most of the information available in the dataset to produce these values, it is a more robust method of dealing with missing data than listwise deletion or mean replacement (Allison, 2002; Dempster, Laird, & Rubin, 1977; McLachlan & Krishnan, 1997). In the final step of the data replacement process, distributions of variables were compared before and after missing values were imputed, and were found to be virtually identical.

Limitations

While this study will make an important and unique contribution to the literature on student survey nonresponse, it does have some limitations that limit its generalizability. One of

the primary limitations of this study is the relatively small number of institutions included in the analyses. With only 94 institutions in both the YFCY and CSS samples, only a limited number of institution-level variables can be included in the models, and these doubtlessly do not include all institution-level considerations that have a significant bearing on average institutional survey response rates. Nevertheless, this study is still worthwhile to complete, as it is the first to take such a comprehensive approach to examining survey nonresponse, it is the first to examine nonresponse among gender and race/ethnicity groups separately, and it provides a good foundation for future work on the issue.

A related limitation concerns the composition of the institutional samples and hence the students included in the analyses. As described in the data section above, the population of institutions that participates in the TFS, YFCY, and/or CSS is a self-selected group. In the main, this group of institutions—particularly those that participate in the YFCY and CSS—consists of private, four-year liberal arts schools. Although there are some other institutional types represented as well, the distribution of institutional types does not match national figures (Carnegie Foundation for the Advancement of Teaching, 2001). Although the current study was conceptualized as a study of traditionally-aged college students attending four-year colleges and universities, it is important to note that the sample of students and institutions included in the analyses does not represent all students attending all four-year colleges and universities in the country. Therefore, the extent to which the results can be generalized to other samples of students or institutions may be limited.

Another limitation of this study concerns the dependent variables examined. It is most likely the case that the indicators of response used as outcomes in this study conflate both nonresponse and non-matching. CIRP does not have a 100% match rate of its CSS to TFS and

YFCY to TFS data, so it is possible that some students who are counted here as "nonresponders" did actually respond to the YFCY or CSS but could not be counted a such because their data could not be matched. For the purposes of generalization to other survey situations, this is a limitation that must be seriously kept in mind. However, for the purposes of longitudinal research, particularly using CIRP data, this is perhaps not such a severe limitation. After all, the distinction between students who did not respond to the survey and those that were not able to be matched is irrelevant in terms of the data available for longitudinal research. Non-matches and non-responders will all be missing for any research that attempts to link TFS to YFCY or CSS data. Nevertheless, the confounding of non-matching and nonresponse in the dependent variables limits the extent to which causality can be inferred from the results of this study, and thus the extent to which this study's results will apply to other situations.

A further limitation of the current investigation is the fact that initial nonresponse to the TFS is ignored, albeit by necessity. Using TFS data from only those institutions that achieved response rates qualifying them for the norms (the response rate cutoff for the norms is around 75%, though it depends on the institution type) does mitigate the initial nonresponse issue. However, the issue is not eliminated because the baseline survey data used was not collected from 100% of the intended sample. To the extent that the sample of students included in this sample are already biased towards responding to surveys—because they responded to the TFS—the generalizability of the study's results are not assured.

Finally, as with all analyses using secondary data sources, this study is limited by several features outside the control of the researcher. First, this study is necessarily limited by the variables available on the 2003, 2004 and 2005 TFS, the IPEDS database, and the HERI website. The conceptual model driving this study is broad, and many aspects of it are survey-specific.

Such aspects cannot be fully operationalized using the TFS data other publically available data, as these were collected for a different purposes. Second, because the data employed in this study were in part collected during an economic downturn, there may have been an effect of the economic climate on the observed data and/or results of the analyses. For example, retention and completion rates may have been affected by the declining economic conditions over the period 2004-2009, and response rates to surveys would naturally be affected by that. Therefore, the results of this study must be interpreted carefully and should be replicated with samples from other years.

Remainder of the Study

The next chapter of this study has six parts. First, the preliminary OLS regressions, designed to select the final institution-level variables for the HGLM analyses, will be presented and discussed. Second, the chapter will delve into descriptions of all variables and samples used, paying attention to similarities and differences across groups. Third, results of the models examining whether the impact of gender on response rates can be mitigated by personality characteristics, will be examined. Fourth, the models predicting YFCY and CSS response for aggregated groups of students will be presented, followed by the models run for men and women separately, and White, Asian American, Latino/a, and African American/Black students separately. Lastly, the results of all fourteen models will be synthesized into a coherent summary. Chapter 5 will conclude the study with a discussion of how Chapter 4's findings an align with working hypotheses, and will end with implications and suggestions for future research.

CHAPTER 4: RESULTS

This chapter presents and discusses the results from the analyses previously described. The chapter begins by presenting the results of the institution-only OLS regression analyses designed to select the final institution-level variables for the HGLM models. It then proceeds to discuss null hierarchical model runs for all analyses groups. Next, the results of conditional HGLM models that investigate the impact of personality (student typology) on response rate differentials between men and women are examined; following this the final HGLM models are presented and discussed. The chapter ends with a summary and synthesis of results from all models.

Preliminary Institution-Only Analyses

In order to select the key variables for the institution level of the HGLM analyses in this study, and also to begin to understand institutional variation in student response, two preliminary institution-only OLS regressions were run to predict average institutional YFCY and CSS response rates. As discussed in the previous chapter, these analyses used data from all institutions for which information was available, including those that were not part of the final (hierarchical) analysis samples employed in this study. In total, the YFCY sample included 207 institutions that participated in either the 2004, 2005 or 2006 YFCY, and the CSS sample included 181 institutions that participated in either the 2007, 2008 or 2009 CSS. Appendix F contains more information about the two institution-only samples, and Appendix G contains descriptive statistics for both samples, for all variables considered for inclusion in the analyses.

The OLS analyses were performed using PASW (SPSS) 18.0. Because of several specific working hypotheses (described in the previous chapter), variables representing survey mode, use and type of incentives, selectivity, and proportion of the undergraduate student body

that is non-White were force-entered into the regressions. After these variables were in the models, all other variables were given the opportunity to enter the models via a forward stepwise procedure with an entry probability of 0.05. It was decided not to incorporate interaction variables between administration mode and use of incentives because there were not enough instances of the use of each modality, with and without incentives, to accurately detect whether an interaction effect existed.

Table 4.1 and Table 4.2 show the results of the OLS modeling of YFCY and CSS response rates, respectively. As can be seen, few variables were significant in either set of analyses. Administration methods and use of incentives accounted for the largest proportion of variance in response rates—40% of the variation in YFCY response rates and 33% of the variation in CSS response rates could be accounted for by these variables alone. In neither regression were selectivity or the proportion of the campus student body that is non-White significant predictors of institutional response rates. Of the remaining structural/climate institutional characteristics considered, only size (YFCY and CSS) and six-year graduation rate (CSS) were significant in the final regressions. In addition, one survey climate-related variable—the proportion of times that an institution has made the TFS norms (out of the number of times that they participated)—was a significant predictor in the CSS regression.

Table 4.1

Institution-Only OLS Regression Predicting YFCY Response (N = 207)

		1 (R^2 = 37.9%)			2 (R^2 = 40.2%)			3 (R^2 = 40.4%)			4 [c] (R^2 = 43.1%)			5[d] (R^2 = 43.1%)		
Step		B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.
1[a,d]	Paper, many proctored sessions	3.93	.06		5.47	.09		5.42	.09		7.44	.12		--	--	
	Paper, other in person method	3.00	.03		3.90	.04		3.39	.04		5.39	.06		--	--	
	Web only	-34.04	-.49	*	-34.21	-.49	*	-35.23	-.50	*	-31.50	-.45	*	-37.72	-.54	*
	Mail only	-44.75	-.36	*	-45.46	-.37	*	-45.19	-.36	*	-44.07	-.35	*	-50.04	-.40	*
	Paper & Web, multiple	-25.67	-.30	*	-26.16	-.31	*	-26.61	-.31	*	-22.43	-.26	*	-28.51	-.33	*
2[b]	Small incentive for all				11.72	.16	*	11.71	.16	*	9.80	.13	*	9.39	.13	*
	Lottery incentive				4.58	.07		4.49	.06		6.22	.09		6.17	.09	
3	Selectivity (100-point increments)							0.52	.02		0.87	.04		1.00	.04	
	% of student body that is non-White (10-point increments)							-0.63	-.04		-0.33	-.02		-0.27	-.02	
4	Log (Size-undergrad FTE)										-5.31	-.18	*	-5.11	-.17	*
	Constant	59.17		*	55.26		*	51.27		*	87.12		*	90.00		*

Note. Non-significant variables are shaded in gray

[a] Reference groups for steps 1-4 is: Paper, single proctored session(s)

[b] Reference group is: No incentive

[c] Variables not entered: Log(Student services FTE), Graduation Rate (6 year), Retention Rate, Federal grant aid, Percent foreign, # times participating in TFS since 1985, % of times in TFS norms since 1985, ratio of undergraduate to graduate, location (urbanicity)

[d] Step 5 repeats the analysis in step 4, removing two mode variables (paper, many proctored sessions, paper, in person method). Reference group for step 5 is all paper, in person survey administration methods

*p < .05

Table 4.2

Institution-Only OLS Regression Predicting CSS Response (N = 181)

Step		1 (R^2 = 32.3%)			2 (R^2 = 33.4%)			3 (R^2 = 33.7%)			4 [c] (R^2 = 41.1%)			5 (R^2 = 43.8%)			6 (R^2 = 45.4%)			7 [d] (R^2 = 45.4%)		
		B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.
1[a, d]	Paper, many proctored sessions	-9.2	-.08		-9.9	-.09		-9.2	-.08		-2.9	-.03		-2.4	-.02		-2.1	-.02		--	--	
	Paper, other in person method	-4.4	-.06		-4.6	-.07		-3.8	-.05		-1.1	-.02		-.40	-.01		-.62	-.01		--	--	
	Web only	-35.0	-.63	*	-34.0	-.61	*	-34.3	-.62	*	-32.0	-.58	*	-27.3	-.49	*	-28.2	-.51	*	-27.7	-.50	*
	Mail only	-34.3	-.24	*	-32.2	-.23	*	-31.5	-.22	*	-31.3	-.22	*	-30.8	-.22	*	-31.3	-.22	*	-30.8	-.22	*
	Paper & Web, multiple	-24.4	-.25	*	-24.9	-.26	*	-24.6	-.26	*	-25.1	-.26	*	-22.7	-.24	*	-23.0	-.24	*	-22.4	-.23	*
2[b]	Small incentive for all				2.9	.04		2.5	.03		.17	.00		.74	.01		1.4	.02		1.5	.02	
	Lottery incentive				-5.6	-.09		-5.6	-.09		-8.3	-.13	*	-7.8	-.12	†	-8.0	-.13	*	-7.9	-.13	*
3	Selectivity (100-pt increments)							.97	.05		-.81	-.04		-.06	.00		-2.6	-.14		-2.6	-.14	
	% of student body that is non-White (10-point increments)							-.37	-.02		-.01	.00		.76	.05		1.4	.09		1.4	.08	
4	% of times in norms (10-point increments)										.31	.30	*	.27	.27	*	.24	.24	*	.24	.24	*
5	Log (Size-ugrad FTE)													-5.3	-.19	*	-5.8	-.21	*	-5.8	-.21	*
6	Graduation rate																3.6	.21	*	3.6	.21	*
	Constant	67.5		*	68.2		*	58.1		*	55.4		*	87.7		*	97.9		*	97.3		*

Note. Non-significant variables are shaded in gray

[a] Reference group for steps 1-6 is: Paper, single proctored session(s)

[b] Reference group is No incentive

[c] Variables not entered: Log(Student services FTE), Retention Rate, Federal grant aid, Percent foreign, # times participating in TFS since 1985, ratio of undergraduate to graduate, location (urbanicity)

[d] Step 7 repeats the analysis in step 6, removing two mode variables (paper, many proctored sessions, paper, in person method). Reference group for step 7 is all paper, in person survey administration methods

*p < .05, † p = .05

The fact that variables representing administration methods and use of incentives accounted for the largest amount of variance in average institutional response rates, along with the fact that these same variables were the largest predictors in each model (as measured by standardized beta coefficients), demonstrates that choices regarding survey administration are of critical importance for student survey response rates. In particular, survey administration methods appear to be key—in both the YFCY and CSS models, all administration methods other than those involving a paper modality with in-person delivery were significant negative predictors of response rates with standardized beta (β) coefficients among the highest in each model. Indeed, in the final YFCY model (Table 4.1, Step 5), institutions that administered their surveys on the web only were predicted to have average response rates *38 percentage points* lower than those that administered their surveys on paper only (β = −0.54), those that administered their surveys via the mail were predicted to have response rates *50 percentage points* lower (β = −0.40), and those using paper/web mixed survey administrations were predicted to have response rates 29 percentage points lower (β = −0.33). In the final CSS models (Step 7, Table 4.2), those using web surveys were predicted to have response rates 28 percentage points lower than those using paper only (β = −0.50),[3] those using mail surveys were predicted to have response rates 31 percentage points lower (β = −0.22), and those using paper/web mixed survey administrations are predicted to have response rates 22 percentage points lower (β = −0.23). These predicted differences in response rate across administration modes are quite substantial, and suggest administration choices could easily impact the quality of data collected with the survey instruments.

[3] Note, standardized betas should only be compared to one another within models; comparisons across models should be made using unstandardized coefficients.

Incentives had less of an effect on institutional response rates in both the YFCY and CSS models, but they still significantly predicted response. Interestingly, different types of incentives had different impacts in each survey. In the YFCY analysis, offering a small incentive guaranteed for all students predicted a boost in response rates of approximately 9 percentage points (relative to offering no incentive, $\beta = 0.13$), and offering a lottery incentive predicted no difference in response rates. By contrast, in the CSS analysis, offering a lottery incentive predicted a *decrease* in response rates of approximately 8 percentage points (again relative to no incentive, $\beta = -0.13$), while offering a small incentive guaranteed for all predicted no difference.

It is not entirely clear why a differential impact of incentives was observed in the CSS and YFCY models. As can be seen in Figure 4.1, the broad pattern of institution-level response rates among schools using different incentive types was more or less the same for the YFCY and CSS, with institutions offering an incentive to all students having a marginally higher average response rate than those offering no incentive (4 to 5 percentage points higher), and institutions offering a lottery incentive having much lower response rates (16 to 24 percentage points lower). Most likely, the differential impact observed in the final YFCY and CSS regressions is

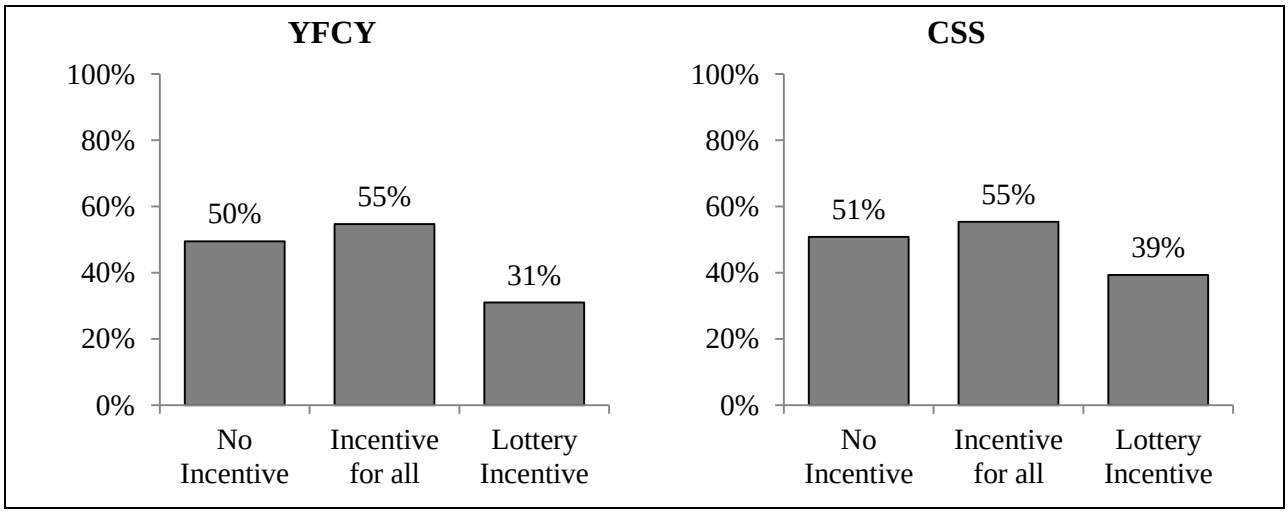

Figure 4.1. Average YFCY and CSS institutional response rates, by incentive use/type
Source: Preliminary institution-only OLS regression samples (See Appendix G for more details)

attributable to two interrelated factors: aggregate differences in survey modalities employed in the two samples, and an unaccounted-for interaction between survey modality and incentive use/type. In the aggregate, institutions offered the YFCY and CSS somewhat differently: over half of the YFCY institutional sample (57%) administered this survey using an in-person paper administration strategy, while 23% administered it on the web. By contrast, 46% of the CSS institutions surveyed their students using an in-person paper survey, while 41% used the web. Furthermore, among the paper/web survey modality groups, different proportions of CSS and YFCY institutions offered incentives (Table 4.3). Specifically, more on-paper YFCY institutions offered no incentive than did on-paper CSS institutions (74% vs. 66%), and more CSS web institutions offered no incentive than did YFCY web institutions (52% vs. 34%).

Finally, along with differences in survey modalities and use of incentives came differences in the type of incentives that were offered by the CSS and YFCY schools within the paper and web modalities. Specifically, small incentives guaranteed for all students were relatively more common for paper surveys, while lottery incentives were more common for web surveys. Lottery incentives were most commonly offered by YFCY web-only institutions (51% of this group offered a lottery incentive), and next most commonly offered among CSS web-only institutions (36% offered this type of incentive). As can be seen in Table 4.3 and perhaps more

Table 4.3
Incentive Use and Response Rates, by Paper (in Person) and Web Administration Modes

	YFCY						**CSS**					
	On paper, in person (57% of sample)			**Web (23% of sample)**			**On paper, in person (46% of sample)**			**Web (41% of sample)**		
	%	**#**	**RR**	**%**	**#**	**RR**	**%**	**#**	**RR**	**%**	**#**	**RR**
No Incentive	74%	87	.60	34%	16	.24	66%	55	.67	52%	39	.51
Incentive for all	19%	23	.64	15%	7	.39	17%	14	.63	12%	9	.59
Lottery Incentive	7%	8	.61	51%	24	.22	17%	14	.53	36%	27	.41
Total	**100%**	**118**		**100%**	**47**		**100%**	**83**		**100%**	**75**	

Source: Preliminary institution-only OLS regression samples (See Appendix G for more details)
Note. RR = Average institutional response rate, % = % offering each incentive, # = # offering each incentive

clearly in Figure 4.2, patterns of different incentive types being used by modality are notable because different incentive types appear to yield different patterns of response rates depending on the survey mode (paper or web). Indeed, the pattern of average response rates across web surveys using different incentive types is striking: among both the web-only YFCY and CSS institutional samples, institutions that offered an incentive for all survey takers had noticeably higher response rates than did those who offered no incentive or who offered a lottery incentive. Paper-only institutions, by contrast, saw no such pattern; among paper-only YFCY institutions, response rates were equivalent in all incentive conditions, while among paper-only CSS institutions, only those that offered lottery incentives had different response rates—and these were lower than those of their counterparts that used no incentive or offered an incentive for all.

It is interesting to note that very few of the structural/climate institutional characteristics considered were significant predictors of YFCY and CSS response rates in the preliminary OLS regressions. Indeed, only size (YFCY and CSS) and six-year graduation rate (CSS) were significant in the final regressions. In addition, only one survey climate-related variable was a

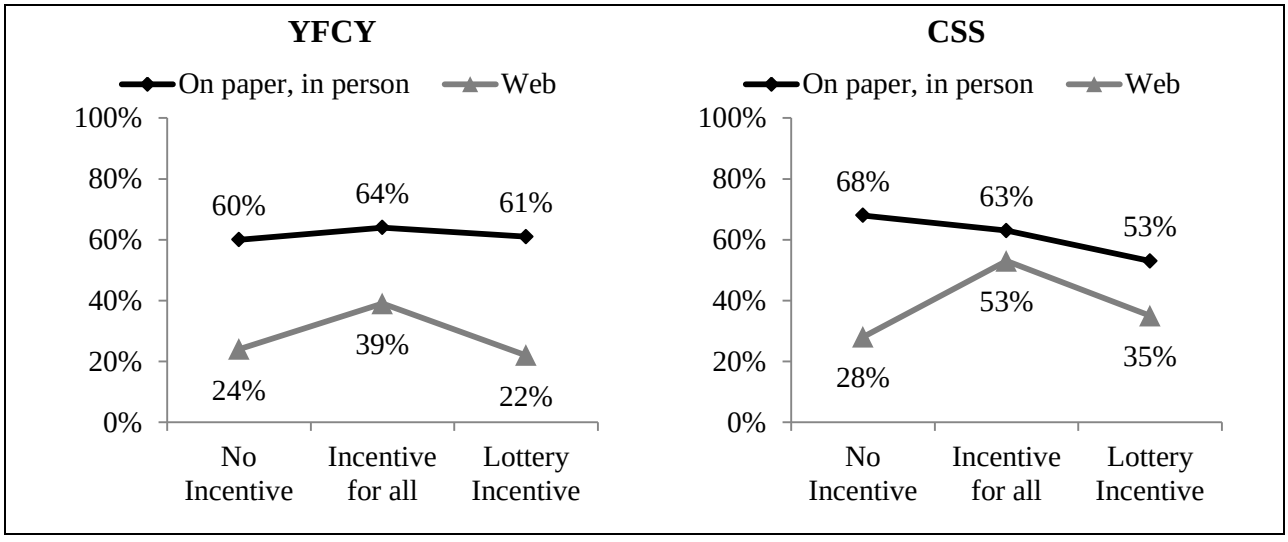

Figure 4.2. Average YFCY and CSS institutional response rates, by paper (in person) and web survey modes and incentive use/type

Source: Preliminary institution-only OLS regression samples (See Appendix G for more details)

significant predictor in either regression (CSS only), namely the proportion of times that an institution has made the TFS norms (out of the number of times that they participated). Both significant climate-related predictors, graduation rate and proportion of times achieving norms status, were positive predictors of CSS response rates only, supporting the notion that structures associated with positive institutional climates are also associated with higher student response propensities. Because these same variables were not significant in the YFCY model, the results also indicate that the impact of these climate-related characteristics is not uniform across students' college careers. Instead, the pattern of results suggests that the impact of institutional climate on student response decisions rate might be cumulative, and that it may not be observable until students have had several years of experience at their institution. Bolstering this interpretation, only in the CSS analysis did the addition of structural and climate-related institutional characteristics improve the explanatory power of the OLS model a considerable amount: the final R^2 for the CSS analysis was 45.4%, 11.7 percentage points higher than the R^2 of the CSS model including only mode and incentive. By contrast, the addition of structural and climate-related institution-level characteristics to the YFCY model increased the R^2 of the from 40.2% to just 43.1%.

The significant negative impact of institutional size (number of undergraduate students) on response rates, observed in both the YFCY and CSS analyses, is interesting but not unexpected. There are a variety of ways that institutional size might impact response rates. First, there are logistical considerations that impact the ability of larger institutions to achieve high response rates—namely, institutions with larger populations of undergraduates have many more students to survey, and the more students that need to be surveyed, the harder it is to find everyone, especially if more resources (in terms of people, time, and money) are not put into the

survey administration process. It is particularly difficult (and expensive) to administer in-person, paper-only surveys (which garner the highest response rates) at large institutions, due simply to the fact that there are so many students involved (it might be impossible to get the entire first-year or graduating class into one room for a survey administration session, for example). Additionally, the institutional climate or culture at larger institutions could also contribute to lower predicted response rates. For example, institutional size has been linked to lower student engagement (Porter, 2006), and lower engagement may lead to lower survey response propensities. Alternately, larger institutions could be seen by students as more impersonal, a view that may also contribute to lower survey response propensities.

Most likely, it is some combination of logistics and climate that account for the observed impact of institutional size on response rates in this study. Both explanations receive further support when the data are examined more carefully. The logistical explanation is bolstered by the fact that in both samples examined, larger institutions were more likely to employ web surveys than were smaller ones (18% of YFCY institutions with undergraduate populations under 2,000 administered the survey on the web, compared to 29% of institutions with undergraduate populations over 4,000; for the CSS these figures were 23% and 63%, respectively). Further supporting the link between size and choice of survey mode, in both stepwise OLS regression analyses the entry of institutional size into the model (Step 4, Table 4.1; Step 4, Table 4.2) was associated with a noticeable decrease in the beta coefficient associated with web survey mode. This indicates that the two variables are highly correlated, and that part (but not all) of the negative impact of web modality observed in the data was due to institutional size, rather than the modality itself.

The decrease in beta coefficients observed for the web variable when size entered the models does not simply suggest logistical considerations, however. The climate explanation also comes into play, in particular to explain the additional observation that institutional size and institutional response rates were correlated more strongly for schools using web surveys (correlation of size and response rate = −.376 for the YFCY, −.339 for the CSS) than for schools using paper surveys (−.204 for the YFCY, −.243 for the CSS). Such patterns of correlations suggests that there may be a link between response rates and climate—namely, if larger institutions are seen by students as more impersonal or less engaging, then survey response decisions by students attending larger institutions may be particularly impacted by web survey methodology, which is much more impersonal than in-person paper methods. The use of web modality at larger institutions may thus reinforce the lack of connection between students and the institution, leading to student decisions to not respond.

Table 4.4 displays the final models for the preliminary YFCY and CSS institution-only regressions side by side. These models include all predictors that entered either regression in the preliminary stage, and the results are virtually identical to those of the previous models. Based on the final regressions, the following climate and structural characteristics were selected for inclusion in the institution-level of the hierarchical models that lie at the heart of this study: selectivity and proportion of the student body that is non-White (though not significant, these were included to test specific working hypotheses); proportion of times that the institution has been in the TFS norms sample from 1985-2008 (of the number of times participating in the TFS); undergraduate student enrollment (natural log of undergraduate FTE); and six-year graduation rate.

Table 4.4
Final Institution-Only OLS Regressions predicting YFCY and CSS Response

		YFCY (R^2 = 43.0%)			CSS (R^2 = 45.4%)		
		B	Beta	Sig.	B	Beta	Sig.
Mode[a]	Web only	-37.04	-0.53	*	-27.68	-.50	*
	Mail only	-51.24	-0.41	*	-30.79	-.22	*
	Paper & Web, multiple	-27.58	-0.33	*	-22.44	-.23	*
Incentive[b]	Small incentive for all	9.25	0.12	*	1.52	.02	
	Lottery incentive	6.35	0.09		-7.93	-.13	*
Institutional Characteristics	Selectivity (100-pt increments)	-2.00	-0.09		-2.63	-.14	
	% of student body that is non-White (10-point increments)	-0.20	-0.01		1.38	.08	
	% of times in norms (10-point increments)	2.67	0.03		0.24	.24	*
	Log (Size-undergraduate FTE)	-5.04	-0.17	*	-5.79	-.21	*
	Graduation rate (10-point increments)	2.09	0.13		3.63	.21	*
Constant		107.6		*	97.3		*

Note. Non-significant variables are shaded in gray
[a] Reference group is all paper, in person survey administration methods
[b] Reference group is no incentive
* $p < .05$

Descriptive Statistics

Appendix H (Table H.1H.1 through H.14) contains descriptive statistics for each variable used in the final hierarchical analyses, for aggregated groups and by gender and race/ethnicity (note, these latter two groups are occasionally referred to as "analysis groups"). To get a general sense of the similarities and differences across samples, a selection of the descriptive statistics are discussed below. Particular attention is paid to differences in sample composition and response rates across groups.

Dependent Variables

Figure 4.3 shows the outcome variable (response rate) by each analysis group. In the aggregate, response rate was lower for the CSS than the YFCY (25% vs. 30%), and this five percentage-point difference was fairly consistent across gender and racial/ethnic groups. The only exception to this pattern was for Black and Latino students, who showed much larger differences in response rates between the YFCY and the CSS: rates of response were 11 percentage points lower on the CSS in the case of Black students (the YFCY response rate for this group was 25%, compared to 14% CSS response rate) and 12 percentage points lower in the case of Latino students (27% YFCY response rate vs. 15% CSS response rate). However, it must be remembered that the two survey samples do not contain the same students, so it cannot be necessarily be said that Blacks' and Latinos' response propensities decline over four years of

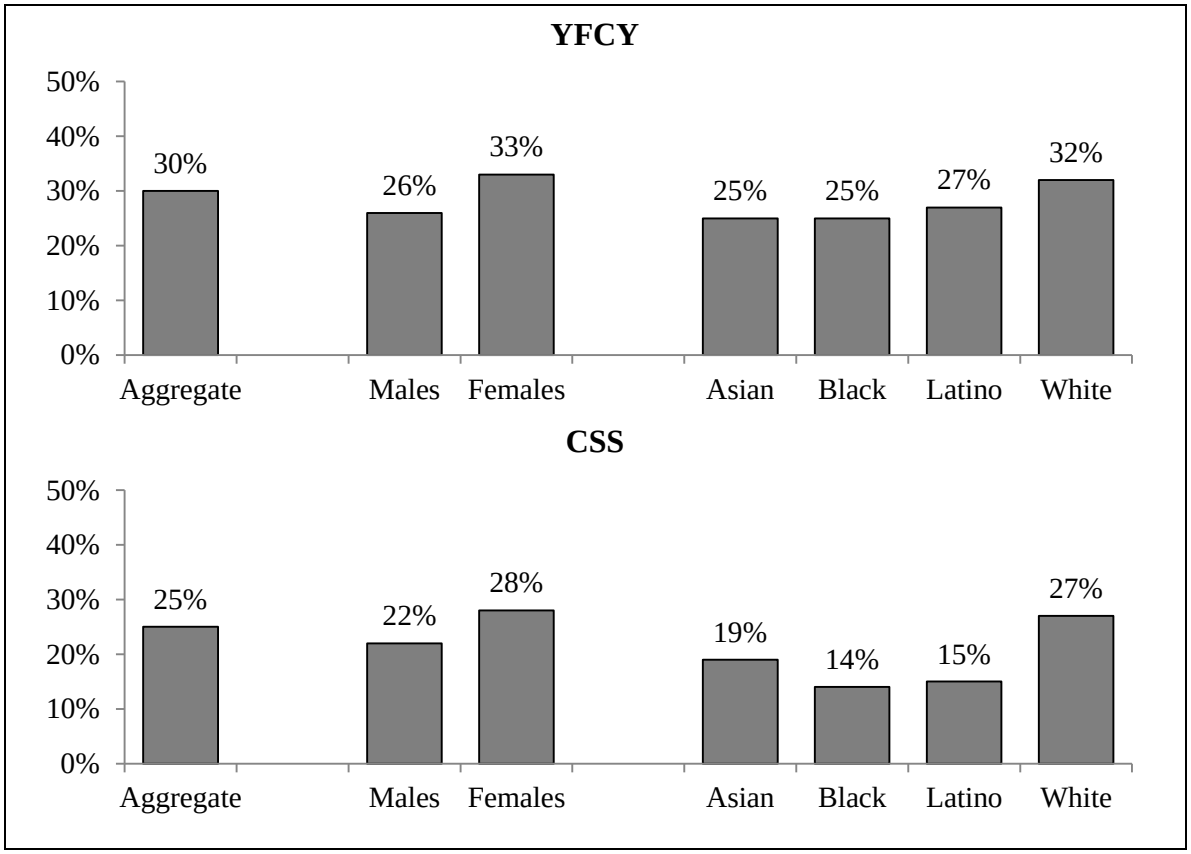

Figure 4.3. YFCY and CSS response rates, by analysis group
Source: Final YFCY and CSS HGLM analysis samples (see Appendix G for more details)

college. It could be that unique characteristics of each sample account for the observed differences rather than any particular change; the numbers described above must thus be interpreted cautiously.

As expected, females had higher response rates than males on both the YFCY and the CSS—7 percentage points higher on the YFCY and 6 percentage points higher on the CSS. Also as expected, White students had higher response rates than students of other race/ethnicities—5 to 7 percentage higher in the case of YFCY response, and 8 to 13 percentage points higher in the case of CSS response. Interestingly, on the YFCY, Asian Americans, Blacks, and Latino/as had fairly similar YFCY response rates to one another (25% to 27%), while on the CSS the response rates of Black and Latino/a students were somewhat lower than that of Asian American students (14%-15% vs. 19%).

Student-Level Variables: Aggregate YFCY and CSS samples

Table H.1 and Table H.8 show descriptive statistics for the aggregate YFCY and CSS analysis samples. Demographically, the groups are very similar to one another. Just under three-quarters of both groups are White (74% YFCY, 73% CSS), and similar proportions of each group identified as Black, Asian American, Latino/a and foreign. Over half of both groups are female (56% YFCY, 57% CSS). Compared to the sample used to predict YFCY response, the sample used to predict CSS response had slightly higher average SES indicators; specifically, this group had slightly higher parental income levels, were somewhat less likely to report expectations of getting a job to help pay for college, and were slightly less likely to be the first in their family to attend college. The CSS sample was also less likely, on average, to have parental income missing on the TFS. In terms of Astin's student typologies/student personality, the aggregate YFCY and CSS groups had the same average scores.

Examining the academic achievement indicators used in this study, the sample used to predict CSS response had higher high school GPAs and higher SAT scores than did the YFCY sample. The CSS sample was also less likely to have test scores missing on the TFS than was the YFCY sample. In terms of academic and social involvement in high school, the YFCY and CSS samples reported very similar frequencies of socializing with someone of another race/ethnicity, similar numbers of hours per week socializing with friends, and similar frequencies of tutoring another student and/or asking a teacher for advice after class. However, the students in the CSS sample were a bit more likely to report a future expectation of participating in student clubs/groups in college, and they also reported spending more hours per week in high school studying or doing homework.

Along similar lines, the CSS sample was also slightly more likely than the YFCY sample to indicate that they expected to be satisfied with college, marginally less likely to expect to transfer colleges, and more likely to indicate that they were attending their first choice. The CSS sample was also somewhat more likely to report involvement in volunteer work in high school and/or an expectation of being involved in student clubs/groups in college. Finally, the students in the sample used to predict CSS response were slightly more likely to say "yes" to the question requesting release of their identification number with their data.

Student-level Variables: By Gender

Tables H.2, H.3, H.9 and H.10 show descriptive statistics for the male and female samples used in this study's analyses. For most of the variables employed, males and females responded very similarly; there were few large differences between groups. This was true both of the samples used for the YFCY analyses and the samples used for the CSS analyses. A few small yet notable differences could be seen across genders however, and these differences were

consistent in both the CSS and YFCY samples. For example, in both groups males had higher average scores on the personality typology factors of Scholars, Hedonists, and Leaders. By contrast, females scored higher on the personality factors of Artist and Social Activist. Perhaps not surprisingly then, males were also more likely in both samples to agree that "realistically, an individual can do little to bring about changes in our society," while females were more likely to report having done volunteer work in high school. In addition to volunteering, females were also more likely to report having been involved in activities in high school like tutoring another student or asking a teacher for advice after class, and they were also more likely to report the expectation of being involved in college in student clubs/groups and/or in student government. Males, on the other hand, reported spending more time per week in high school socializing with friends than did females.

In terms of academic achievement, males in the CSS and YFCY samples reported higher average SAT scores than females, but females reported higher high school GPAs. Females also reported spending more hours per week studying or doing homework and scored higher on the "reason for going to college: to learn" factor. Males were more likely than females to indicate a planned major in engineering; oddly, they also reported a higher average parental income than did females. Females were more likely to expect to be satisfied with their college, and to get a job to help pay for college expenses.

Student-level Variables: By Race/Ethnicity

Tables H.4 through H.7 and H.11 through H.14 give descriptive statistics for each of the racial/ethnic samples used in the current study. For both the YFCY and CSS samples, students of all race/ethnicities tended to respond similarly to many of the questions. However, there were some notable differences between Asian Americans, Black/African Americans, Latino/as and Whites, specifically in terms of socioeconomic demographics, academic achievement indicators, and personality. First, in both the YFCY and CSS samples, Whites reported the highest parental income of any of the racial/ethnic groups, while Blacks reported the lowest. However, Latino/a students were by far the most likely of any racial/ethnic group to report the expectation of getting a job to pay for college expenses. In terms of family educational background, Latino/as were the most likely of any group to report being the first in their family to attend college—in both the CSS and YFCY baseline samples, these students were almost three times as likely to indicate being a first-generation student than were White students. African American students were the second most likely to report being the first in their family to go to college; the proportion of these students that were first-generation college attendees was about twice as high as Whites. Asian Americans were about one-and-a-half times as likely as Whites to report being first-generation students.

Turning to academic indicators, in both the CSS and YFCY analysis samples Asian American and White students reported both the highest SAT scores as well as the highest high school GPAs, though the differences between Whites/Asians and Blacks/Latinos were larger for SAT than for GPA. Such a result is interesting, because it is likely that differences in SAT scores between Whites/Asians and Blacks/Latinos were underestimated in these descriptive statistics. Black and Latino students were approximately twice as likely as their White

counterparts to omit SAT (or ACT) scores on the TFS, and omission of standardized test scores on the TFS instrument is associated with lower actual scores (Sharkness & DeAngelo, 2010).[4] In terms of other academic indicators, Asian Americans tended to report spending more hours per week studying in high school than students of other race ethnicities, while Latino students had the highest average scores on the "reason for going to college: to learn" factor.

On the student personality typologies, there were several interesting differences between racial/ethnic groups, and these differences were again consistent across the YFCY and CSS samples. First, Black students had the lowest average scores on the Hedonist factor, followed by Asian Americans, while Whites had the highest. On the other hand, White students scored by far the lowest on the Status Striver factor, while Black/African American students scored the highest. African American students also had the highest average scores on the Leader construct; Asian American students scored the lowest on this factor. In terms of Social Activism, African Americans again had the highest average scores, followed somewhat closely by Latino/a students; White students scored the lowest on this construct. Finally, African American and Latino/a students had the lowest average scores on the Scholar factor, while Asians had the highest.

[4] The difference in test score missingness (and by extension the difference in observed scores) between Whites/Asians and Blacks/Latinos is likely *not* due to differences among these groups in terms of the proportion attending schools that did not require SAT or ACT test scores for admission. Only eight of the YFCY institutions in the final hierarchical analysis sample (at which 2,015 students, or 3.2% of the total, were enrolled), and only five of the CSS institutions (at which 2,334 students, or 4.1% of the total, were enrolled), did not require SAT or ACT scores for admission. (Note: institutions that do not require these test scores could "recommend" them or "not recommend" them; they could also be open-access institutions.) Very few Black and Latino students in the sample attended these institutions—in the YFCY sample only 92 Black and 79 Latino students were enrolled at institutions at which SAT scores were not required (2.7% and 3.4% of the overall samples, respectively); the figures for the CSS sample were 69 Black and 41 Latino students (2.7% and 1.1%). While rates of SAT score missingness were somewhat higher for Blacks and Latinos attending YFCY institutions that did not require test scores, as compared to Blacks and Latinos attending schools that did, the same was not true for Black and Latino students in the CSS sample. Overall, it is likely that too few students attended institutions at which test scores were not required to alter the sample-wide mean of SAT score, and the suggestion stands that the difference in scores between White/Asian American and Black/Latino students is underestimated.

Interestingly, Asian American and African American students were the least likely groups in both samples to indicate that they were attending their first choice institution; these students were also the least likely to expect to be satisfied with their college and the most likely to expect to transfer schools before graduating. However, Asian and Black students had high levels of expected involvement in college, as they entered college with the highest average self-rated likelihoods of participating in student government; Asian American students in both samples also entered college having performed the most volunteer work in high school.

There is a possibility that some Asian American students reported volunteering at high levels in high school for reasons other than wanting to make a difference, as Asian Americans in both the CSS and YFCY samples had the highest average agreement levels to the opinion that an individual *cannot* make a difference in society. They were also most likely to indicate a distrust in the research process by specifying that *no*, their student ID number could not be given back to their school and tied to survey results. African American students also indicated some mistrust in the research process, as these students were most likely to skip the ID permission question on both surveys.

Finally, there were some differences between the racial/ethnic groups in the YFCY and CSS samples in terms of intended majors. White students were far more likely than any other groups to expect to major in the arts/humanities or in education. Latino students were most likely to see a business major or social science major in their future. Asian Americans, on the other hand, were by far the most likely to expect to major in the natural sciences or engineering. Finally, Black students were the most likely to indicate a planned major in a professional or technical field.

Institution-Level Variables

Descriptive statistics for the institutional samples included in each analysis are shown at the bottom of Tables H.1 through H.14. Because the students included in the YFCY and CSS analysis samples came from more or less the same schools, there were very few differences in institutional characteristics across the YFCY and CSS samples when examined separately by gender or race. This section therefore only discusses the notable differences between the aggregate YFCY and CSS institutional samples.

Few differences emerged when comparing the structural and climate-related characteristics across the two institutional samples. However, there were some large differences between the two samples in terms of how each survey was administered (Figure 4.4). Specifically, almost half of CSS institutions administered the CSS on the web only, while only a third of YFCY institutions used solely this method. By contrast, far more YFCY institutions—over half, compared to fewer than two in five CSS institutions—chose to administer the survey on paper only. Similar numbers of YFCY and CSS schools used mail or mixed paper/web administrations.

Lastly, there were some differences in incentive use and type across the YFCY and CSS

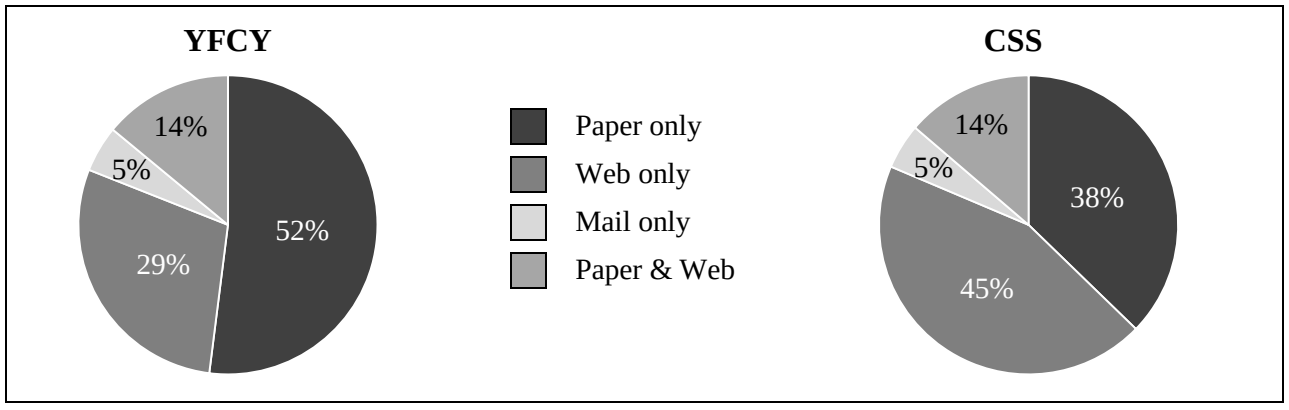

Figure 4.4. Institutional administration methods, aggregate YFCY and CSS samples
Source: Final Aggregate YFCY & CSS HGLM analysis samples (see Appendix G for more details)

sample institutions (Figure 4.5). Perhaps because institutions administering the YFCY were more likely to use paper administration methods, which were associated with lower use of incentives, slightly more YFCY institutions than CSS institutions offered no incentive to take the survey. Among the YFCY institutions that did offer an incentive, about half offered a larger lottery-type incentive for one or a few randomly chosen students, and the other half offered a smaller incentive to all students. By contrast, two-thirds of the CSS institutions that offered an incentive chose to offer a lottery (67% of incentive-offering CSS schools, 31% of all CSS schools), while only one-third guaranteed a smaller incentive for all participants (33% of incentive-offering schools; 15% of all CSS schools).

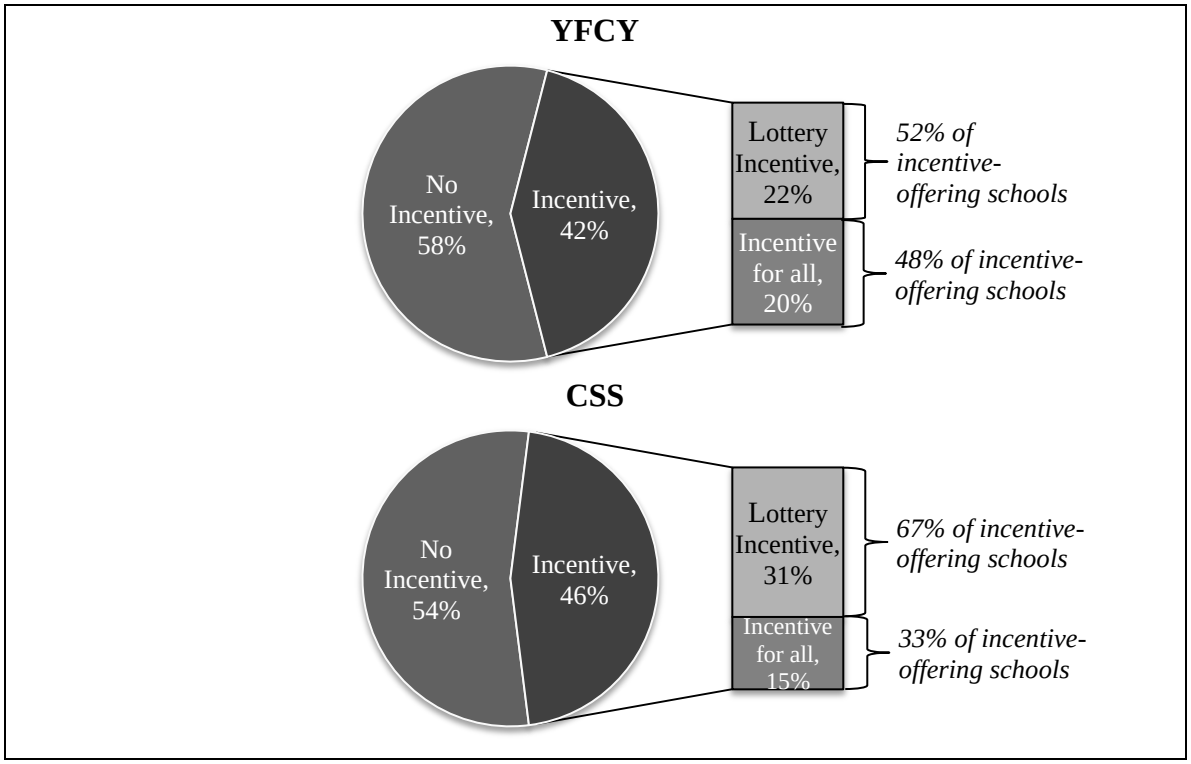

Figure 4.5. Incentive use and type, YFCY and CSS aggregate samples
Source: Final Aggregate YFCY & CSS HGLM analysis samples (see Appendix G for more details)

Hierarchical Generalized Linear Model Results

The following section presents and discusses the results from the hierarchical generalized linear models that predicted YFCY and CSS response propensities from student and institution-level variables. The section begins with a discussion of the null modeling runs, followed by the results of conditional models examining the impact of personality/typology variables on gender. Finally, the results of each of the full hierarchical models are presented and discussed. All of the final HGLM models are shown in two stages: first without institutional characteristics in the model (i.e. with level-one predictors only), and then with these covariates in the model (with predictors at levels one and two). Because the student-level effects changed only negligibly from the first to the second model, only the final models—the ones with both student- and institution-level predictors—are interpreted below. Results are considered by analysis group and by category of predictors.

For ease of comprehension, the HGLM results in this chapter are discussed in terms of odds ratios rather than coefficients. Odds ratios for a given independent variable can be interpreted as the expected change in odds of response to the YFCY or CSS (as applicable) that is associated with a one-unit change in that variable. Odds ratios greater than one indicate a positive predictor, where higher values on the independent variable are associated with higher response propensities; odds ratios of less than one indicate a negative predictor, where higher values on the independent variable are associated with lower response propensities. Odds ratios of or near one indicate no significant effect, with changes in the independent variable having no impact on the likelihood of response. In this chapter, odds ratios are shown for significant predictors only ($p < .05$), and although not always stated, should always be interpreted in the context of all other predictors in the model held constant.

Note that odds ratios are *not* equivalent to probabilities, and should not be interpreted as such. While odds, which are simply the ratio of the probability of an event occurring to the probability of the same event *not* occurring, can themselves be converted to probabilities fairly easily,[5] odds ratios cannot because they deal with *relative* odds. As an example, suppose females have a probability of responding to a survey of 0.30, and males have a probability of responding of 0.20. We can then say that the odds of females responding are .30 to .70, and the odds of males responding are .20 to .80. The ratio of these odds is $\frac{0.30/.70}{0.20/.80}$, or approximately 1.71. This odds ratio cannot be interpreted as an indication that the probability that a female will respond is 70% higher than that of a male, but rather that the *odds* a female will respond to the survey are 1.7 times larger than the *odds* a male will respond to the survey. The 1.7 odds ratio can also be interpreted more generally as a simple indication that females are more likely to respond to the survey than are males.

Null Models

In the first step of the hierarchical modeling process, fully unconditional (null) models were run with each analytic sample in order to confirm that response rates vary across institutions sufficiently for HGLM. Table 4.5 shows the output of these null model runs, all of which demonstrate that significant variation does exist in CSS and YFCY response rates across schools, for aggregated and disaggregated groups of students. Plots of institution-specific probabilities of response as a function of institution-specific log-odds of response were also

[5] Specifically, the probability of an outcome can be calculated as the ratio of its odds to one plus its odds $\left(\frac{odds}{(1+odds)}\right)$. To illustrate: the odds of rolling a six on a standard six-sided die are 1 to 5, or 1/5 (because there is 1 way to roll a six and 5 ways to not roll a six); the probability of rolling a six is $\frac{1/5}{(1+1/5)}$, or $\frac{0.20}{1+.20}$, or $\frac{1}{6}$. Probabilities can be converted back to odds using the formula $\frac{probability}{(1-probability)}$

inspected (as suggested by Raudenbush & Bryk, 2002); these also demonstrated sufficient variation and indicated it was appropriate to proceed with the modeling process.

A series of 95% confidence intervals were calculated around the expected odds of response for all groups, and were transformed into expected probabilities of response as per Equation 14 in Chapter 3. These can be seen at the bottom of the YFCY and CSS sections of Table 4.5. Corroborating the basic descriptive statistics for the dependent variable (discussed earlier in this chapter), the expected probability of response for the YFCY is higher than that of the CSS, and this is true across all of the disaggregated groups. Also corroborating descriptive results, females have higher expected response probabilities than males for both surveys. For the YFCY, Asian American and White students have the highest expected probabilities of response (30% and 31% respectively), but these figures are not more than five percentage points higher than the expected probabilities for Black and Latino/a students (26% and 28% respectively). By contrast, on the CSS, Black students are expected to respond with a much lower probability (16% vs. 20%-27% for all other groups).

Given that sufficient variation in response rates across institutions was demonstrated for all groups, the hierarchical modeling process proposed for this study was deemed appropriate, and modeling of YFCY and CSS response probabilities for both the aggregated and disaggregated samples was commenced.

Table 4.5

Results of Null/Fully Unconditional HGLM Models, All Analytic Groups

	All Students	By Gender		By Race/Ethnicity			
		Males	Females	Whites	Asian	Latino/a	Black
YFCY							
Reliability(β_{00})	0.99	0.96	0.98	0.86	0.70	0.66	0.78
γ_{00} (Level-2 intercept)							
Point Estimate	-0.88	-1.20	-0.71	-0.81	-0.86	-0.92	-1.04
SE	0.13	0.15	0.13	0.13	0.15	0.13	0.15
Sig.	*	*	*	*	*	*	*
τ_{00} (Variance component)							
Point Estimate	1.62	1.91	1.53	1.40	1.43	1.08	1.72
SD	1.27	1.38	1.24	1.18	1.20	1.04	1.31
X^2	10054.7	4953.3	5632.9	955.7	703.0	439.4	694.6
X^2df	93	86	93	93	88	91	93
Sig.	*	*	*	*	*	*	*
Expected odds of response: exp(γ_{00})							
Odds	0.41	0.30	0.49	0.44	0.42	0.40	0.35
95% CI lower bound	0.32	0.22	0.38	0.34	0.31	0.31	0.26
95% CI upper bound	0.54	0.41	0.63	0.58	0.57	0.52	0.48
Expected probability of response (1/(1+exp(γ_{00}))							
Point estimate	29%	23%	33%	31%	30%	28%	26%
95% CI lower bound	24%	18%	28%	26%	24%	23%	21%
95% CI upper bound	35%	29%	39%	37%	36%	34%	32%
CSS							
Reliability(β_{00})	0.98	0.95	0.97	0.83	0.68	0.67	0.63
γ_{0} (Level-2 Intercept)							
Point estimate	-1.10	-1.43	-0.90	-1.01	-1.33	-1.38	-1.65
SE	0.12	0.14	0.12	0.12	0.17	0.16	0.15
Sig.	*	*	*	*	*	*	*
τ_{00} (variance component)							
Point estimate	1.34	1.65	1.28	1.20	1.83	1.67	1.37
SD	1.16	1.28	1.13	1.10	1.35	1.29	1.17
X^2	10989.9	5481.9	6019.3	905.3	890.8	737.5	443.5
X^2df	93	87	93	93	88	91	92
Sig.	*	*	*	*	*	*	*
Expected odds of response exp(γ_{00})							
Odds	0.33	0.24	0.41	0.37	0.26	0.25	0.19
95% CI lower bound	0.26	0.18	0.32	0.29	0.19	0.18	0.14
95% CI upper bound	0.42	0.32	0.51	0.47	0.37	0.35	0.26
Expected probability of response (1/(1+exp(γ_{00}))							
Point estimate	25%	19%	29%	27%	21%	20%	16%
95% CI lower bound	21%	15%	24%	22%	16%	15%	12%
95% CI upper bound	30%	24%	34%	32%	27%	26%	21%

Source: Final YFCY & CSS Aggregate HGLM analysis samples (see Appendix H for more details)

Note. SE = Standard Error; SD = Standard Deviation; CI = Confidence Interval; df = degrees of freedom

* $p < .05$

Conditional Models Examining Gender and Personality/Student Typologies

For the aggregate YFCY and CSS analyses, as well as the separate-race analyses, a series of conditional models at level 1 were run in order to test working hypothesis 3-1a, which suggested that student personality type would moderate the impact of gender on response rates. The results of these conditional models are shown in Tables 4.6 through 4.9. As can be seen in all of the tables, the addition of personality characteristics to each model did little to change the effect of gender on response rates. None of the significant gender effects disappeared when personality characteristics were added to the model, and the changes that were observed in the gender coefficient (and associated t-values) were quite small and in both positive and negative directions.

Only Latino/as showed somewhat larger changes in the effect of gender across models, but even these made little difference in terms of the change in regression coefficients (absolute change in YFCY gender coefficient = 0.05, CSS = 0.03). Not surprisingly, then, odds ratios associated with the Latino/a gender coefficient did not change meaningfully when personality covariates were added to the model; the odds ratio associated with being female went from 1.49 in the model without personality measures to 1.42 in the model with personality measures in the case of the YFCY, and 1.63 to 1.59 in the case of the CSS. Such changes are not particularly large, and because they occurred in only one analysis group, it cannot be concluded that personality is the source of the difference in response propensities between males and females.

Table 4.6

Results of Models Examining the Impact of Background Characteristics and Personality on Likelihood of YFCY Response, Entire YFCY Sample

		All YFCY Students (N = 62,465)							
		Model 1				Model 2			
Cat.	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Background Characteristics									
Race	Black/African American	-0.17	0.08	-2.29*	0.84	-0.21	0.07	-2.83*	0.81
	Latino/a	-0.16	0.06	-2.83*	0.85	-0.14	0.06	-2.32*	0.87
	Asian American	-0.07	0.04			-0.10	0.04	-2.30*	0.91
	Other	-0.16	0.04	-4.55*	0.85	-0.15	0.04	-3.89*	0.86
	Female	0.44	0.04	11.43*	1.55	0.45	0.04	10.91*	1.56
	Citizenship status:								
	Foreign	-0.29	0.09	-3.20*	0.75	-0.32	0.09	-3.37*	0.73
SES	Parental income	0.00	0.01			0.00	0.00		
	Income missing	-0.08	0.03	-2.78*	0.92	-0.08	0.03	-2.69*	0.92
	Not first generation	0.12	0.03	3.75*	1.13	0.11	0.03	3.31*	1.11
	Future Act: Get a job	0.06	0.01	4.89*	1.06	0.04	0.01	3.90*	1.05
Personality and other individual differences									
	Scholar (Factor)					0.16	0.02	7.99*	1.17
	Leader (Factor)					-0.07	0.01	-4.96*	0.94
	Hedonist (Factor)					-0.18	0.01	-13.40*	0.83
	Status Striver (Factor)					-0.03	0.02		
	Artist (Factor)					-0.09	0.01	-8.36*	0.91
	Social Activist (Factor)					-0.01	0.01		
	Self Rating:								
	Cooperativeness					0.05	0.01	3.85*	1.05
Intercept		-0.90	0.13	-6.79*	0.41	-0.89	0.13	-6.80*	0.41

Source: Final Aggregate YFCY HGLM analysis sample

Note. Non-significant variables are shaded in gray, odds ratios and t-statistics shown for significant variables only.

SE = Standard Error; OR = Odds Ratio

* $p < .05$

Table 4.7

Results of Models Examining the Impact of Background Characteristics and Personality on Likelihood of YFCY Response, By Race/Ethnicity

		Asian American students (N = 4,945)							
		Model 1				Model 2			
Cat.	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Background Characteristics									
Gender	Female	0.47	0.13	3.76*	1.60	0.48	0.13	3.65*	1.61
SES	Parental income	0.01	0.01			0.02	0.01		
	Income missing	0.08	0.19			0.07	0.19		
	Not first generation	-0.04	0.07			-0.02	0.08		
	Future Act: Get a job	0.05	0.04			0.06	0.05		
Personality and other individual differences									
	Scholar (Factor)					0.14	0.05	2.78*	1.15
	Leader (Factor)					-0.16	0.05	-3.60*	0.85
	Hedonist (Factor)					-0.19	0.05	-4.01*	0.82
	Status Striver (Factor)					-0.08	0.05		
	Artist (Factor)					-0.08	0.04		
	Social Activist (Factor)					0.05	0.04		
	Self Rating: Cooperativeness					0.00	0.04		
Intercept		-0.89	0.15	-5.79*	0.41	-0.86	0.16	-5.51*	0.42

		African American students (N = 3,405)							
		Model 1				Model 2			
Cat.	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Background Characteristics									
Gender	Female								
SES	Parental income	0.22	0.12			0.16	0.12		
	Income missing	0.02	0.02			0.02	0.02		
	Not first generation	0.08	0.15			0.09	0.15		
	Future Act: Get a job	0.12	0.12			0.13	0.12		
Personality and other individual differences									
	Scholar (Factor)					0.03	0.06		
	Leader (Factor)					-0.12	0.05	-2.20*	0.89
	Hedonist (Factor)					-0.18	0.08	-2.21*	0.84
	Status Striver (Factor)					-0.01	0.06		
	Artist (Factor)					-0.19	0.06	-3.44*	0.82
	Social Activist (Factor)					0.06	0.06		
	Self Rating: Cooperativeness					0.04	0.06		
Intercept		-1.04	0.15	-6.80*	0.35	-1.04	0.16	-6.68*	0.35

(continued)

		Latino/a students (N = 2,344)							
		Model 1				Model 2			
Cat.	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Background Characteristics									
Gender	Female								
SES	Parental income	0.40	0.10	4.18*	1.49	0.35	0.10	3.67*	1.42
	Income missing	-0.03	0.02			-0.02	0.02		
	Not first generation	0.13	0.17			0.12	0.17		
	Future Act: Get a job	0.19	0.10			0.20	0.10		
Personality and other individual differences									
	Scholar (Factor)					0.01	0.06		
	Leader (Factor)					-0.05	0.08		
	Hedonist (Factor)					-0.21	0.05	-3.98*	0.81
	Status Striver (Factor)					-0.13	0.06	-2.35*	0.88
	Artist (Factor)					-0.05	0.06		
	Social Activist (Factor)					0.04	0.06		
	Self Rating: Cooperativeness					0.00	0.07		
Intercept		-0.95	0.13	-7.04*	0.39	-0.94	0.13	-7.07*	0.39

		White students (N = 5,000)							
		Model 1				Model 2			
Cat.	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Background Characteristics									
Gender	Female	0.48	0.07	6.88*	1.61	0.49	0.07	6.55*	1.63
SES	Parental income	0.01	0.02			0.02	0.02		
	Income missing	-0.11	0.11			-0.08	0.11		
	Not first generation	0.01	0.10			-0.03	0.11		
	Future Act: Get a job	0.06	0.04			0.03	0.04		
Personality and other individual differences									
	Scholar (Factor)					0.20	0.05	4.10*	1.22
	Leader (Factor)					-0.07	0.04		
	Hedonist (Factor)					-0.21	0.03	-6.01*	0.81
	Status Striver (Factor)					0.03	0.04		
	Artist (Factor)					0.01	0.05		
	Social Activist (Factor)					-0.04	0.05		
	Self Rating: Cooperativeness					0.09	0.05		
Intercept		-0.83	0.13	-6.31*	0.44	-0.84	0.13	-6.32*	0.43

Source: Final YFCY HGLM analysis samples, by race

Note. Non-significant variables are shaded in gray, odds ratios and t-statistics shown for significant variables only.

SE = Standard Error; OR = Odds Ratio

* $p < .05$

Table 4.8

Results of Models Examining the Impact of Background Characteristics and Personality on Likelihood of CSS Response, Entire CSS Sample

		All CSS Students (N = 57,509)							
		Model 1				Model 2			
Cat.	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Background Characteristics									
Race	Black/African American	-0.60	0.07	-4.78*	0.55	-0.61	0.08	-4.61*	0.54
	Latino/a	-0.30	0.09	-8.30*	0.74	-0.27	0.09	-8.09*	0.77
	Asian American	-0.30	0.06	-3.41*	0.74	-0.32	0.07	-3.08*	0.73
	Other	-0.23	0.04	-5.17*	0.80	-0.21	0.05	-4.53*	0.81
	Female	0.51	0.04	12.68*	1.66	0.52	0.04	12.63*	1.68
	Citizenship status:								
	Foreign	-0.26	0.09	-2.96*	0.77	-0.25	0.09	-2.92*	0.78
SES	Parental income	0.00	0.00			0.01	0.00		
	Income missing	-0.05	0.03			-0.04	0.03		
	Not first generation	0.22	0.04	6.12*	1.25	0.21	0.04	5.93*	1.24
	Future Act: Get a job	0.06	0.01	4.56*	1.06	0.05	0.01	3.34*	1.05
Personality and other individual differences									
	Scholar (Factor)					0.21	0.03	7.85*	1.23
	Leader (Factor)					-0.05	0.02	-2.97*	0.95
	Hedonist (Factor)					-0.15	0.02	-8.13*	0.86
	Status Striver (Factor)					-0.07	0.02	-3.57*	0.93
	Artist (Factor)					-0.11	0.02	-7.11*	0.89
	Social Activist (Factor)					0.03	0.02	2.14*	1.03
	Self Rating:								
	Cooperativeness					0.04	0.02	2.47*	1.04
Intercept		-1.14	0.12	-9.42*	0.32	-1.15	0.12	-9.54*	0.32

Source: Final Aggregate CSS HGLM analysis sample

Note. Non-significant variables are shaded in gray, odds ratios and t-statistics shown for significant variables only.

SE = Standard Error; OR = Odds Ratio

* $p < .05$

Table 4.9

Results of Models Examining the Impact of Background Characteristics and Personality on Likelihood of CSS Response, By Race/Ethnicity

		Asian American students (N = 3,980)							
		Model 1				Model 2			
Cat.	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Background Characteristics									
Gender	Female								
SES	Parental income	0.22	0.15			0.21	0.16		
	Income missing	0.02	0.02			0.02	0.02		
	Not first generation	0.14	0.15			0.14	0.15		
	Future Act: Get a job	0.01	0.16			0.02	0.16		
Personality and other individual differences									
	Scholar (Factor)					0.04	0.10		
	Leader (Factor)					-0.03	0.08		
	Hedonist (Factor)					-0.08	0.06		
	Status Striver (Factor)					-0.10	0.06		
	Artist (Factor)					-0.05	0.07		
	Social Activist (Factor)					0.01	0.06		
	Self Rating: Cooperativeness					0.04	0.08		
Intercept		-1.35	0.17	-7.75*	0.26	-1.36	0.18	-7.65*	0.26

		African American students (N = 2,543)							
		Model 1				Model 2			
Cat.	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Background Characteristics									
Gender	Female	0.66	0.17	3.96*	1.94	0.68	0.17	4.10*	1.98
SES	Parental income	0.05	0.02	2.21*	1.05	0.05	0.02	2.23*	1.05
	Income missing	-0.17	0.20			-0.13	0.20		
	Not first generation	-0.07	0.16			-0.07	0.16		
	Future Act: Get a job	0.13	0.09			0.12	0.09		
Personality and other individual differences									
	Scholar (Factor)					0.30	0.09	3.48*	1.35
	Leader (Factor)					-0.17	0.08	-2.24*	0.84
	Hedonist (Factor)					-0.02	0.09		
	Status Striver (Factor)					-0.13	0.11		
	Artist (Factor)					-0.04	0.07		
	Social Activist (Factor)					0.05	0.07		
	Self Rating: Cooperativeness					0.09	0.08		
Intercept		-1.67	0.16	-10.57*	0.19	-1.68	0.16	-10.33*	0.19

(continued)

		Latino/a students (N = 3,647)							
		Model 1				Model 2			
Cat.	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Background Characteristics									
Gender	Female	0.49	0.11	4.55*	1.63	0.46	0.11	4.11*	1.59
SES	Parental income	0.02	0.01			0.03	0.01	2.03*	1.03
	Income missing	0.08	0.19			0.11	0.19		
	Not first generation	0.11	0.12			0.12	0.13		
	Future Act: Get a job	-0.01	0.07			-0.01	0.07		
Personality and other individual differences									
	Scholar (Factor)					0.07	0.09		
	Leader (Factor)					-0.01	0.07		
	Hedonist (Factor)					-0.18	0.06	-2.90*	0.83
	Status Striver (Factor)					-0.06	0.06		
	Artist (Factor)					-0.04	0.08		
	Social Activist (Factor)					0.03	0.07		
	Self Rating: Cooperativeness					-0.01	0.07		
Intercept		-1.40	0.17	-8.39*	0.25	-1.41	0.17	-8.45*	0.24

		White students (N = 4,186)							
		Model 1				Model 2			
Cat.	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Background Characteristics									
Gender	Female	0.48	0.08	5.98*	1.61	0.47	0.08	5.73*	1.60
SES	Parental income	0.00	0.02			0.00	0.02		
	Income missing	-0.21	0.16			-0.21	0.16		
	Not first generation	-0.04	0.12			-0.03	0.12		
	Future Act: Get a job	0.01	0.05			0.00	0.05		
Personality and other individual differences									
	Scholar (Factor)					0.19	0.05	3.63*	1.21
	Leader (Factor)					-0.12	0.04	-3.02*	0.89
	Hedonist (Factor)					-0.16	0.05	-3.40*	0.85
	Status Striver (Factor)					0.02	0.05		
	Artist (Factor)					-0.14	0.05	-2.92*	0.87
	Social Activist (Factor)					0.04	0.05		
	Self Rating: Cooperativeness					0.00	0.06		
Intercept		-1.03	0.13		0.36	-1.03	0.13		0.36

Source: Final CSS HGLM analysis samples, by race

Note. Non-significant variables are shaded in gray, odds ratios and t-statistics shown for significant variables only.

SE = Standard Error; OR = Odds Ratio

* $p < .05$

Overall (Aggregate) Hierarchical Models

Table 4.10 and Table 4.11 display the results of the models predicting YFCY and CSS response for the aggregate (overall) samples.

Background characteristics. In both the YFCY and CSS models, gender was a significant predictor of student response propensity, with females 1.41 times as likely to respond as males to the YFCY, and 1.45 times as likely to respond to the CSS. Also in both surveys, students who marked "other" as their race/ethnicity were slightly less likely than White students to respond—0.90 times as likely on both the YFCY and CSS. In the YFCY analysis only, citizenship status was a significant (negative) predictor, with non-U.S. citizens 0.79 times as likely to respond to the YFCY as Whites.

While Black, Latino/a, and Asian American students were equally likely as Whites to respond to the YFCY, Black and Asian American students were significantly less likely than White students to respond to the CSS—0.74 times as likely in the case of Black students and 0.78 times as likely in the case of Asian American students. Such findings corroborate most of the descriptive results discussed above, with one exception: Latino/a students appeared to have lower CSS response rates than Whites in the descriptive statistics, but such differences did not prove significant in the final HGLM results. Entering variables into the model one by one revealed that Latino/a students *were* predicted to have significantly lower rates of CSS response when only background characteristics were in the model (as well as when both background and personality factors were in the model, see Table 4.9); and that it was only after high school GPA entered the model that this effect disappeared. Therefore, the lower observed response rates for Latino/a students on the CSS can be attributed to differences in high school achievement, which, as will be revealed shortly, is a significant positive predictor of response for almost all students.

Lastly, only one SES indicator significantly predicted student response propensities in the aggregate models, though this was the case only for the CSS. Students who were not first-generation college students were 1.17 times as likely as those who were first-generation to respond to the CSS (conversely, first-generation students were 0.85 times as likely to respond than non-first -generation students[6]). Parental income had no significant effect in either sample, nor did expectations of getting a job to help pay for college expenses.

Personality/Student typology. In both aggregate models, personality significantly predicted student response propensities. More of the personality factors were significant in the YFCY analysis than in the CSS, but among the predictors that were significant in both models, the impact of each was very similar. In the YFCY sample only, for every one-unit increase in the Scholar factor, students were approximately 1.04 times as likely to respond, while for every one-unit increase in the Social Activist factor, students were 0.97 times as likely to respond. On both surveys, a one-unit increase in the Leader factor was associated with a slightly lower response propensity (odds ratios 0.95-0.96), as was a one-unit increase in the Status Striver factor (odds ratios 0.95-0.97) and Artist factor (odds ratios 0.91-0.94). In both analyses, a one-unit increase in the Hedonism factor was also associated with a decrease in odds of response, and this decrease was larger than that associated with the other personality factors—the odds ratios associated with the hedonism scale were 0.88 in the YFCY analysis and 0.91 in the CSS analysis. Lastly, students' self-ratings of cooperativeness were associated with higher odds of response, with a one-unit increase in this variable expected to increase the odds of response 1.03-1.04 times in both surveys.

[6] The odds of A vs. B are the inverse of the odds of B vs. A, or 1/(odds ratio). Here, 1/1.17 = 0.85

Table 4.10

Final Hierarchical Models Predicting Likelihood of YFCY Response, Aggregate Sample (N = 62,465)

		Model 1 Student-Level Variables Only				Model 2 Student & Institution-Level Variables			
Category	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Student Level									
Background Characteristics									
Race	Black/African American	-0.06	0.07			-0.06	0.07		
	Latino/a	-0.08	0.05			-0.08	0.05		
	Asian American	-0.07	0.05			-0.07	0.05		
	Other	-0.11	0.04	-3.01*	0.90	-0.11	0.04	-3.00*	0.90
	Female	0.35	0.04	8.02*	1.41	0.35	0.04	8.03*	1.41
	Citizenship status: Foreign	-0.23	0.09	-2.51*	0.79	-0.23	0.09	-2.52*	0.79
SES	Parental income	0.00	0.00			0.00	0.00		
	Not first generation	0.07	0.04			0.07	0.04		
	Future Act: Get a job to pay expenses	0.02	0.01			0.02	0.01		
Personality and other individual differences									
	Scholar (Factor)	0.04	0.02	2.26*	1.04	0.04	0.02	2.27*	1.04
	Leader (Factor)	-0.05	0.01	-3.74*	0.95	-0.05	0.01	-3.74*	0.95
	Hedonist (Factor)	-0.13	0.01	-9.86*	0.88	-0.13	0.01	-9.89*	0.88
	Status Striver (Factor)	-0.03	0.02	-2.06*	0.97	-0.03	0.02	-2.04*	0.97
	Artist (Factor)	-0.07	0.01	-5.53*	0.94	-0.07	0.01	-5.55*	0.94
	Social Activist (Factor)	-0.03	0.01	-2.38*	0.97	-0.03	0.01	-2.39*	0.97
	Self Rating: Cooperativeness	0.04	0.01	2.77*	1.04	0.04	0.01	2.77*	1.04
Correlates of academic achievement									
	High school GPA	0.09	0.01	6.56*	1.09	0.09	0.01	6.58*	1.09
	SAT score	0.03	0.01	2.31*	1.03	0.03	0.01	2.32*	1.03
	Reason for going to college: Learning (Factor)	0.03	0.02			0.03	0.02		
Missingness Indicators									
	Parental income	0.05	0.03			0.05	0.03		
	SAT/ACT Score	-0.17	0.04	-4.54*	0.85	-0.17	0.04	-4.58*	0.85
	Number of Missing items	-0.02	0.00	-5.78*	0.98	-0.02	0.00	-5.78*	0.98
Correlates of academic and social involvement									
	Future Act: Participate in student clubs/groups	0.07	0.01	5.05*	1.08	0.07	0.01	5.04*	1.08
	HS Act: Asked a teacher for advice after class	-0.01	0.02			-0.01	0.02		
	HS Act: Tutored another student	0.00	0.01			0.00	0.01		
	HS Act: Socialized w/ someone of another racial/ethnic group	-0.05	0.02	-2.63*	0.95	-0.05	0.02	-2.64*	0.95
	Hours per week (HPW) in HS: Socializing with friends	-0.02	0.01	-2.45*	0.98	-0.02	0.01	-2.46*	0.98
	HPW in HS: Studying/ homework	0.03	0.01	3.54*	1.03	0.03	0.01	3.53*	1.03
Correlates of satisfaction									
	Future Act: Transfer to another college before graduating	-0.11	0.01	-8.02*	0.89	-0.11	0.01	-8.02*	0.89
	Future Act: Be satisfied with college	0.04	0.02	2.59*	1.05	0.04	0.02	2.58*	1.05
	Is this institution your 1st choice?	0.00	0.03			0.00	0.03		

(continued)

Category	Variable	Model 1 Student-Level Variables Only β	SE	t	OR	Model 2 Student & Institution-Level Variables β	SE	t	OR
Propensity to be engaged with, participate in organizations									
	HS Act: Performed volunteer work	0.04	0.02	2.40*	1.05	0.04	0.02	2.39*	1.05
	HS Act: Voted in a student election	0.00	0.02			0.00	0.02		
	Future Act: Participate in student government	0.01	0.01			0.01	0.01		
Potential Proxies of attitudes towards surveys, research									
	Realistically, an individual can do little to bring about changes in society	0.00	0.01			-0.01	0.01		
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?								
	No	-0.14	0.03	-4.39*	0.87	-0.14	0.03	-4.37*	0.87
	Missing	-0.14	0.05	-3.07*	0.87	-0.14	0.05	-3.05*	0.87
Probable Major									
	Arts and Humanities	0.00	0.04			0.00	0.04		
	Business	0.12	0.04	3.19*	1.13	0.12	0.04	3.20*	1.13
	Engineering	0.03	0.07			0.03	0.07		
	Education	-0.03	0.04			-0.03	0.04		
	Natural Sciences	0.02	0.05			0.02	0.05		
	Social Sciences	0.05	0.03			0.05	0.03		
	Professional	0.04	0.04			0.04	0.04		
	Other or Technical	0.02	0.07			0.02	0.07		
Institution-Level									
Intercept (γ_{00})		-0.89	0.13	-6.72*	0.41	-0.89	0.11	-8.27*	0.41
Administration Methods									
Mode	Web only					-1.00	0.28	-3.63*	0.37
	Mail only					-1.59	0.28	-5.71*	0.20
	Paper & Web					-1.26	0.46	-2.77*	0.28
Incentive	Incentive for all					0.60	0.23	2.63*	1.82
	Lottery					0.31	0.32		
Structural characteristics									
	Selectivity, in 100-point increments					-0.08	0.16		
	Natural log of Size (undergraduate enrollment)					-0.40	0.13	-3.13*	0.67
Climate									
	% of undergraduate students non-White, 10-point increments					-0.04	0.07		
	Graduation rate, 10-point increments					0.08	0.12		
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments					-0.06	0.07		
Level-2 Variance component (u_0)							1.21		
Proportion of variance accounted for at Level 2							25.2%		

Source: Final Aggregate YFCY HGLM analysis sample

Note. Non-significant variables are shaded in gray, odds ratios and t-statistics shown for significant variables only.
SE = Standard Error; OR = Odds Ratio

* $p < .05$

Table 4.11
Final Hierarchical Models Predicting Likelihood of CSS Response, Aggregate Sample (N = 57,509)

		Model 1 Student-Level Variables Only				Model 2 Student & Institution-Level Variables			
Category	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Student Level									
Background Characteristics									
Race	Black/African American	-0.30	0.08	-3.58*	0.74	-0.30	0.08	-3.58*	0.74
	Latino/a	-0.15	0.09			-0.14	0.09		
	Asian American	-0.25	0.07	-3.36*	0.78	-0.25	0.07	-3.33*	0.78
	Other	-0.11	0.05	-2.33*	0.90	-0.10	0.05	-2.28*	0.90
	Female	0.37	0.04	8.87*	1.45	0.37	0.04	8.88*	1.45
	Citizenship status: Foreign	-0.15	0.09			-0.15	0.09		
SES	Parental income	0.01	0.00			0.01	0.00		
	Not first generation	0.16	0.04	4.34*	1.17	0.16	0.04	4.32*	1.17
	Future Act: Get a job to pay expenses	0.01	0.01			0.01	0.01		
Personality and other individual differences									
	Scholar (Factor)	0.00	0.02			0.00	0.02		
	Leader (Factor)	-0.04	0.02	-2.87*	0.96	-0.04	0.02	-2.89*	0.96
	Hedonist (Factor)	-0.09	0.02	-4.99*	0.91	-0.09	0.02	-5.02*	0.91
	Status Striver (Factor)	-0.06	0.02	-2.99*	0.95	-0.06	0.02	-2.95*	0.95
	Artist (Factor)	-0.10	0.02	-5.81*	0.90	-0.10	0.02	-5.80*	0.91
	Social Activist (Factor)	-0.01	0.02			-0.01	0.02		
	Self Rating: Cooperativeness	0.03	0.01	2.05*	1.03	0.03	0.01	2.07*	1.03
Correlates of academic achievement									
	High school GPA	0.20	0.01	15.48*	1.22	0.20	0.01	15.43*	1.22
	SAT score	0.07	0.01	4.99*	1.07	0.07	0.01	4.89*	1.07
	Reason for going to college: Learning (Factor)	0.04	0.01	2.74*	1.04	0.04	0.01	2.74*	1.04
Missingness Indicators									
	Parental income	0.05	0.03			0.05	0.03		
	SAT/ACT Score	-0.16	0.05	-3.32*	0.86	-0.15	0.05	-3.27*	0.86
	Number of Missing items	-0.02	0.00	-6.29*	0.98	-0.02	0.00	-6.26*	0.98
Correlates of academic and social involvement									
	Future Act: Participate in student clubs/groups	0.10	0.02	5.80*	1.11	0.10	0.02	5.79*	1.11
	HS Act: Asked a teacher for advice after class	0.01	0.02			0.01	0.02		
	HS Act: Tutored another student	-0.01	0.02			-0.01	0.02		
	HS Act: Socialized w/ someone of another racial/ethnic group	-0.05	0.02	-2.43*	0.95	-0.05	0.02	-2.41*	0.95
	Hours per week (HPW) in HS: Socializing with friends	-0.02	0.01			-0.02	0.01		
	HPW in HS: Studying/ homework	0.03	0.01	3.73*	1.03	0.03	0.01	3.68*	1.03
Correlates of satisfaction									
	Future Act: Transfer to another college before graduating	-0.16	0.01	-11.53*	0.85	-0.16	0.01	-11.54*	0.85
	Future Act: Be satisfied with college	0.04	0.02			0.04	0.02		
	Is this institution your 1st choice?	0.03	0.03			0.03	0.03		

(continued)

Category	Variable	Model 1 Student-Level Variables Only β	SE	t	OR	Model 2 Student & Institution-Level Variables β	SE	t	OR
Propensity to be engaged with, participate in organizations									
	HS Act: Performed volunteer work	0.07	0.02	3.33*	1.07	0.07	0.02	3.33*	1.07
	HS Act: Voted in a student election	0.04	0.02			0.04	0.02		
	Future Act: Participate in student government	0.02	0.01			0.02	0.01		
Potential Proxies of attitudes towards surveys, research									
	Realistically, an individual can do little to bring about changes in society	-0.01	0.01			-0.01	0.01		
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?								
	No	-0.09	0.03	-3.17*	0.91	-0.09	0.03	-3.21*	0.91
	Missing	-0.15	0.03	-4.52*	0.86	-0.16	0.03	-4.57*	0.86
Probable Major									
	Arts and Humanities	-0.08	0.05			-0.08	0.05		
	Business	0.03	0.05			0.02	0.05		
	Engineering	-0.16	0.08	-1.99*	0.85	-0.16	0.08	-2.00*	0.85
	Education	-0.07	0.06			-0.07	0.06		
	Natural Sciences	-0.14	0.04	-3.28*	0.87	-0.14	0.04	-3.30*	0.87
	Social Sciences	-0.09	0.04	-2.20*	0.91	-0.09	0.04	-2.21*	0.91
	Professional	-0.36	0.09	-4.17*	0.70	-0.35	0.09	-4.16*	0.70
	Other or Technical	-0.08	0.05			-0.08	0.05		
Institution-Level									
Intercept (γ_{00})		-1.14	0.11	-9.89*	0.32	-1.13	0.09	-12.74*	0.32
Administration Methods									
Mode	Web only					-0.87	0.21	-4.20*	0.42
	Mail only					-1.17	0.44	-2.66*	0.31
	Paper & Web					-0.68	0.37		
Incentive	Incentive for all					0.19	0.29		
	Lottery					-0.18	0.20		
Structural characteristics									
	Selectivity, in 100-point increments					-0.01	0.11		
	Natural log of Size (undergraduate enrollment)					-0.23	0.11	-1.99†	0.80
Climate									
	% of undergraduate students non-White, 10-point increments					-0.01	0.07		
	Graduation rate, 10-point increments					0.21	0.11		
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments					0.12	0.04	2.76*	1.12
Level-2 Variance component (u_0)						0.79			
Proportion of variance accounted for at Level 2						41.1%			

Source: Final Aggregate CSS HGLM analysis sample

Note. Non-significant variables are shaded in gray, odds ratios and t-statistics shown for significant variables only.
SE = Standard Error; OR = Odds Ratio

* $p < .05$, † $p = .05$

Correlates of academic achievement. Consistent with previous literature and expectations, correlates of academic achievement significantly and positively predicted student response propensity in both surveys. Interestingly, the effects of each of the achievement measures were stronger in the CSS analysis than YFCY. For every one-unit increase in the high school GPA variable, students were 1.09 times as likely to respond to the YFCY and 1.22 times as likely to respond to the CSS. Similarly, for every 100-point increase in students' SAT scores students were 1.04 times as likely to respond to the YFCY and 1.07 times as likely to respond to the CSS. Finally, the "Reason for going to college: To learn" factor significantly predicted response to the CSS only; the odds ratio associated with a one-unit change in this variable was 1.04.

Missingness indicators. Two of the three missingness indicators—all but the indicator of missing parental income—significantly predicted student response likelihood in both the YFCY and CSS analyses. In terms of overall missingness, each additional missing item on the TFS decreased students' odds of responding a small but significant amount (odds ratios 0.98 in both surveys). Although this odds ratio is very close to 1, implying that the predictor has almost no effect on response odds, it should be kept in mind odds ratios are always associated with one-unit changes in the predictor. Therefore, larger increases in the number of missing items are associated with much larger changes in the predicted odds of response. For example, compared to students who had no items missing on the TFS, students who had 20 or more missing items were 0.67 times as likely to respond to both the YFCY and the CSS.[7] Or, put another way, students with no missing TFS items were almost one and a half (1.49) as likely as those with 20 or more missing items to respond to each survey.[8] Lastly, the indicator of SAT/ACT

[7] Calculated as $e^{20\beta}$, or $e^{(20*-0.02)} = e^{-0.4} = 0.67$
[8] Calculated as 1/0.67 = 1.49

missingness was also a significant negative predictor of response for the YFCY and CSS, with students missing test scores on the TFS 0.86 times as likely to respond to the YFCY and 0.85 times as likely to respond to the CSS.

Correlates of academic and social involvement. Of the six correlates of academic and social involvement included in the models, three were significant in both the YFCY and CSS analysis and one additional variable was significant in the YFCY analysis only. In both samples, students who indicated on the TFS that they expected to participate in student clubs or groups in college had higher odds of response to the follow-up survey (odds ratios were 1.08 for the YFCY and 1.11 for the CSS). Students who spent more hours per week studying or doing homework in high school also had higher odds of response to both follow-up surveys (odds ratios were 1.03 for both the YFCY and CSS). By contrast, students who spent more time socializing with their friends each week in high school were less likely to respond to the YFCY (odds ratio 0.98), and students who more frequently socialized with students of other race/ethnicities in high school were also less likely to respond, this time to both surveys (odds ratios of 0.95 for both YFCY and CSS analyses). The negative impact of socializing with diverse others is unexpected, as it was initially thought that this variable would positively predict engagement in college, and thus positively predict survey response. Several factors could explain this counter-intuitive finding. First, it could be the case that the frequency of socializing with students of other race ethnicities in high school is a proxy for coming from a diverse neighborhood, which may be connected to SES and through this to response. Alternately, the variable could be functioning as another measure of socializing in high school in general, which is negatively linked to college survey response (at least in the case of the YFCY).

Correlates of satisfaction. Although attending an institution that was a students' first choice had no impact on the odds of responding to either of the two TFS follow-up surveys, the two other correlates of satisfaction did impact YFCY and/or CSS response odds. Entering college with the expectation of being satisfied with the institution positively impacted response propensities, though for the YFCY only (odds ratio 1.05). On the other hand, entering college with the expectation of transferring to another school (thought to be negatively related to ultimate satisfaction) had a significant negative impact on response to both of the surveys, with each one-unit increase in transfer expectation levels associated with decreases in YFCY and CSS response propensities (odds ratios 0.89 for YFCY, 0.85 for CSS).

Propensity to be engaged with, participate in organizations. Three variables representing propensity to be engaged with and participate in organizations were included in the hierarchical models, but only one significantly predicted YFCY and CSS response. Specifically, the reported frequency with which students performed volunteer work in high school positively predicted response to both surveys; for every one-unit change in this variable students were 1.05 times as likely to respond to the YFCY, and 1.07 times as likely to respond to the CSS.

Proxies of attitudes towards surveys/research. In both aggregate analyses, students' opinions about whether or not an individual can realistically bring about change in society had no impact on response propensities. However, how and whether students answered the question regarding giving HERI permission to include their ID number should their college request data for additional research analyses did have significant impact on the odds of response. Compared to students who responded "yes" to this question, students who responded "no" were significantly less likely to respond to both the YFCY and CSS (the odds ratio associated with this response was 0.87 in the case of the YFCY and 0.91 in the case of the CSS). Interestingly,

providing no response at all to this question was also associated with lower odds of response. Compared to students who answered "yes," students who neglected to answer the question at all were 0.87 times as likely to respond to the YFCY and 0.86 times as likely to respond to the CSS. It appears that answering "yes" is associated with more openness to the survey research process, while the opposite is true for answering "no" and skipping the question entirely.

Probable major. Students indicated on the TFS the area in which they thought their major would be, and these choices significantly predicted response to the YFCY and CSS in different ways. For the YFCY, only one major had a significant impact on response odds: compared to students who were undecided, students who planned to major in business-related fields were 1.13 times more likely to respond to the survey. This effect is puzzling, as aspiring business majors had approximately equal YFCY response rates as undecided students (28% response rate for business majors, 27% for undecided majors, see Figure 4.6), and its surprising positive impact may be due to two interrelated factors. First, in the YFCY sample males were more likely than females to plan to major in business (20% of males planned to major in business compared to 13% of females), while males and females were equally likely to be undecided (13%-14%). Second, the difference in response rates between undecided majors and planned business majors was nonexistent among females (31% for both groups), but five percentage points for males (26% response rate among business majors, 21% response rate among undecided majors). Corroborating this interpretation, in the hierarchical modeling process, controlling for gender significantly impacted the coefficient for business, taking it from negative (but not significant) to positive (and significant).

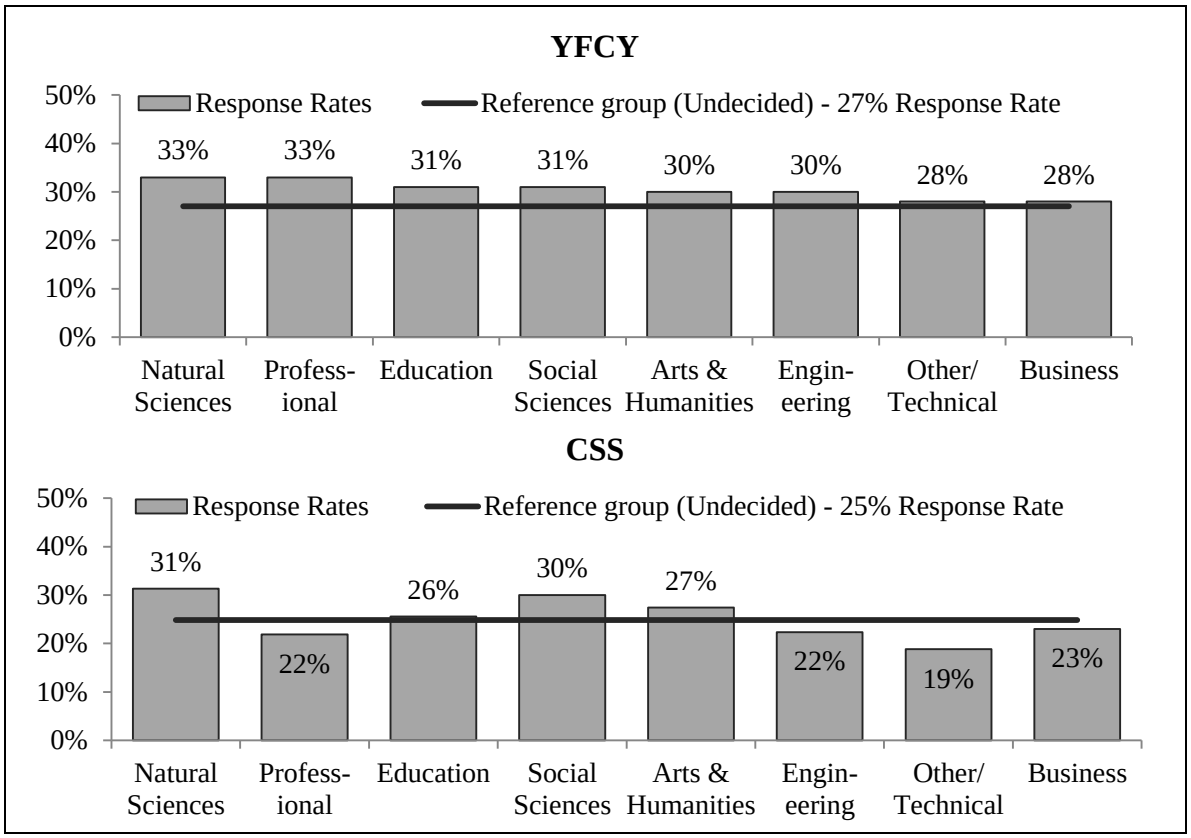

Figure 4.6. YFCY and CSS response rates by probable major
Source: Final Aggregate HGLM analysis samples

On the CSS a different group of majors significantly predicted student response propensities. Compared to students entering college undecided about their major, students entering college planning to major in engineering, natural sciences, social sciences, or a professional field, were significantly less likely to respond. In terms of professional and engineering majors, such results are in line with descriptive results (Figure 4.6), but for social science and natural science majors the results are puzzling. These latter two groups actually had the highest CSS response rates out of any major group (30-31% vs. 27% or lower), yet the HGLM results suggest that compared to undecided majors, students planning to major in the social or natural sciences will have lower response rates. It is unclear why this is the case; no explanation could be found by examining correlations between variables, nor by entering

variables into the model one by one. Potentially, the counter-intuitive results could simply be the result of 'noise' in the measure of major, as four years had elapsed between the time when students selected their major and when they took the survey.

Institution-level: Survey administration mode. More survey administration method variables were significant in the YFCY analysis than CSS, but those that were significant in both analyses were consistent in magnitude and direction. In terms of administration mode, compared to students at institutions that gave the surveys only on paper (using an in-person distribution method), those at schools using web or mail modalities had significantly lower predicted odds of response (odds ratios 0.37 (web) and 0.20 (mail) in the case of the YFCY, and 0.42 (web) and 0.31 (mail) in the case of the CSS). For the YFCY, students at schools that employed mixed web and paper administration methods also had substantially lower odds of response (odds ratio 0.30); on the CSS those using this mixed type of mixed modality were predicted to have lower odds of response as well (odds ratio 0.51), but this result was not significant using an $\alpha = .05$ criterion ($p = .07$ for this variable).

Of note, the odds ratios associated with each model's administration method variables are quite small in magnitude—all under 0.50—indicating that administration method can have a very large impact on the odds of student survey response. To put these numbers in perspective, Figure 4.7 shows average institution-level response rates for YFCY and CSS institutions by administration method, and Table 4.12 shows the odds of responding to (non-mail) paper surveys, compared to all other methods. As can be seen in both the table and the figure, students had a drastically higher chance of responding to surveys given on paper only than surveys given via each other modality. Indeed, the HGLM results show that students were at a minimum twice as likely to respond to paper surveys than to surveys given any other way.

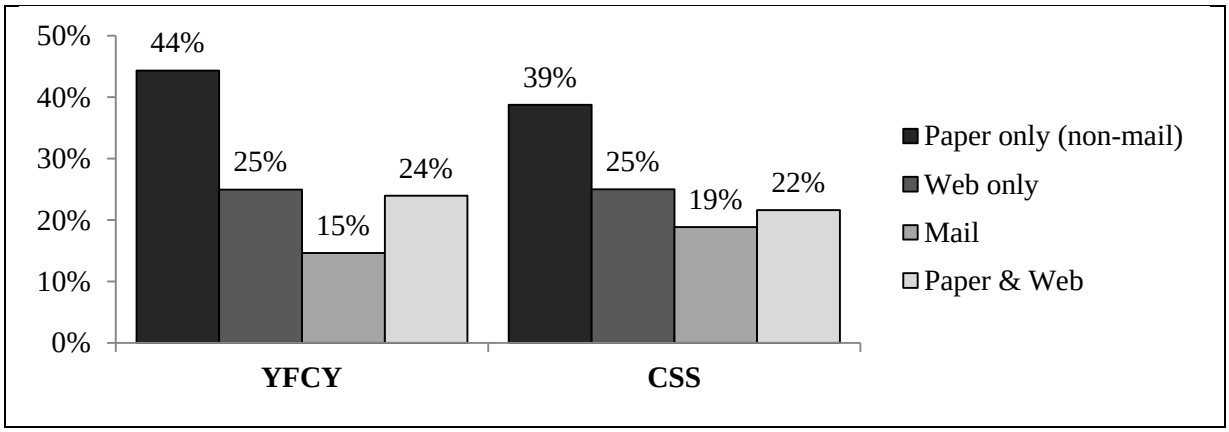

Figure 4.7. Average institution-level YFCY and CSS response rates, by survey administration method
Source: Final HGLM analysis samples

Institution-level: Incentives. Variables representing use and type of incentives significantly predicted response rates for the YFCY only. For this survey, compared to students attending institutions that did not provide a survey incentive, those at institutions providing a small incentive for every survey-taker were almost two times as likely to respond (odds ratio 1.82). Lottery incentives had no impact on YFCY response propensities, and no type of incentive significantly impacted CSS response propensity. These results differ from those in the preliminary institution-only OLS regressions, where a significant impact of lottery incentives on response rates was observed for the CSS. Likely, the discrepancy is due to the composition of the sample of CSS institutions used for the HGLM; twice as many institutions were included in

Table 4.12
Odds of Responding to Paper Surveys Versus Surveys Given in Other Modes, Aggregate YFCY and CSS Analyses

		YFCY		CSS	
		OR	**Sig.**	**OR**	**Sig.**
Odds of responding to* <u>non-mail, paper-only surveys</u>*, compared to…					
Administration Mode	Web only	2.70	*	2.38	*
	Mail only	5.00	*	3.23	*
	Paper & Web	3.33	*	1.97	

Source: Aggregate YFCY and CSS HGLM results
Note. OR = Odds Ratio
* $p < .05$

the CSS OLS analysis than were included in the CSS HLM analysis.

Institution-level: Structural characteristics. In neither the YFCY nor CSS analyses did selectivity significantly predict response rates. In both analyses however, institutional size had a negative impact on odds of response (although this variable was not significant in the CSS analysis ($p = .05$ rather than $< .05$). For the YFCY, every one-point increase in the natural log of undergraduate enrollment FTE was associated with an odds ratio of 0.67, indicating that larger enrollments predict lower institutional response rates. (For the CSS, the odds ratio associated with institutional size was 0.80.)

Because the HGLM models contained the natural log of enrollment rather than enrollment itself, the effect of student body size on student response propensities is not linear. To get a sense of how the odds of YFCY and CSS response are predicted to change with student body size, consider the following example. An increase of 1 unit in the natural log of these variables, from 6 to 7, would be equivalent to an increase in undergraduate enrollment of roughly 403 to 1097 (e^6 to e^7). Compared to students attending the larger institution (enrollment 1097), those attending the smaller one (with enrollment of 403) are predicted to be 1.49 times as likely to respond to the YFCY, and 1.25 times as likely to respond to the CSS.

Institution-level: Climate characteristics. None of the climate-related variables included in the analyses had a significant impact on YFCY response. In the CSS analysis, one climate variable was significant—the proportion of times that institutions had been included in the TFS norms since 1985—and one other was close to significant, the six-year graduation rate at the institution ($p < .08$; because this variable did not reach significance it will not be discussed further). In terms of the proportion of times an institution was included in the TFS norms from 1985-2009, for every ten-percentage point increase in this measure students were 1.12 times as

likely to respond to the CSS, indicating that the more successful an institution has proven itself in administering the TFS, the higher the likelihood is that students will respond to the CSS. Most likely, this effect reflects the impact of an institutional culture of assessment. Institutions that foster a culture of assessment create environments in which students are accustomed to being surveys, and thus have lower levels of resistance to taking any given survey. In addition, institutions with established cultures of assessment likely have practitioners who are more adept at surveying their students in effective manners. The fact that the survey-taking culture significantly predicts CSS response only indicates that it may take some time for an assessment culture to impact students.

Institution-level: Proportion of variance explained. The institution-level variables included in each aggregate model accounted for more of the variation across schools in CSS response rates (41%) than YFCY response rates (25%). Such a discrepancy could indicate that choice of administration method has more of an impact for graduating seniors than for first-year students—that mode matters more for older students—or that the same is the case for institutional culture. Alternately, the difference could simply be a product of the sample composition. Future research will need to replicate and investigate the matter.

Largest predictors. In order to determine which variables contributed most to the prediction of student response propensity within each model, the t-statistics associated with significant predictors were examined and compared. Table 4.13 displays the five predictor variables with the largest t-statistics (in terms of absolute value) from the YFCY and CSS aggregate models. Interestingly, four predictors are the same in both lists: gender (female), self-rated likelihood of transferring, high school GPA, and number of missing items on the TFS. It appears that these four variables play a large role in student decisions to respond to surveys

Table 4.13

Significant Predictor Variables With the Largest t-statistics, Aggregate YFCY and CSS Analyses

Rank	YFCY Aggregate Sample		CSS Aggregate Sample	
(abs.)	**Predictor**	**t**	**Predictor**	**t**
1	Hedonist (factor)	-9.89	High school GPA	15.43
2	Female	8.03	Future act: Transfer	-11.54
3	Future act: Transfer	-8.02	Female	8.88
4	High school GPA	6.58	Number of missing items	-6.26
5	Number of missing items	-5.78	Artist (factor)	-5.80

Source: Aggregate YFCY and CSS HGLM analyses

Note. abs. = absolute value; t-statistics are ranked in descending order of absolute value.

t = t-statistic associated with each predictor

throughout their entire college career. The fifth top variable in both the YFCY and CSS lists is a personality typology factor, though the particular factors are different for each survey (Hedonist in the case of the YFCY and Artist in the case of the CSS). Both of these factors are negative predictors, indicating that there may be a qualitative difference in the types of students who are apt to fill out student surveys compared to those that are not.

Hierarchical Models by Gender

Results predicting YFCY and CSS response for the samples disaggregated by gender can be found in Tables 4.14 through 4.17.

Background characteristics. Some consistent and some inconsistent results were shown for males and females when examining the impact of background characteristics on YFCY and CSS response propensities. In the YFCY models, different sets of background variables predicted response for the two genders. For females, those who had a race/ethnicity characterized as "other" were significantly less likely to respond to the YFCY than were White students (odds ratio 0.91); the same was true of non-U.S. citizens (odds ratio 0.73). For males, only self-identifying as Latino negatively predicted response (again, this was compared to those identifying as White; odds ratio 0.86).

More background variables predicted CSS response than YFCY for males and females. First, for both groups, students who self-identified as African American were significantly less likely to respond to the CSS than were those who identified as White (odds ratios were 0.77 and 0.70 for females and males, respectively). Among females, self-identifying as Asian American was also associated with a lower likelihood of CSS response compared to White students (odds ratio 0.71), while among males, those who self-identified as "other" or as non-U.S. Citizens were less likely to respond than Whites (odds ratios 0.87 and 0.78, respectively). Lastly, for both males and females, students who were not first-generation college students were more likely to respond to the CSS than were those who were first generation (odds ratios 1.14 and 1.18 among females and males, respectively).

Personality/Student typology. Many of the personality factors included in the YFCY and CSS models had a negative predictive effect for both genders. For males and females, scoring higher on the Artist factor was associated with a lower response propensity to both the YFCY and CSS (odds ratios 0.88-0.94), and the same was true of the Hedonist factor (odds ratios 0.87-0.95). Scoring higher on the Leader factor was associated with lower odds of responding to the YFCY for both males and females (odds ratios 0.94-0.96), but higher scores on the this factor were associated with lower odds of responding to the CSS for females only (odds ratio 0.95).

Students who scored higher on the Status Striver factor were significantly less likely to respond to the CSS but not YFCY; this was true of both females and males (odds ratios 0.94-0.95). Self-rated cooperativeness was associated with a higher odds of responding to the YFCY for females only (odds ratio 1.04); on the CSS this variable approached significance for females (odds ratio 1.04, $p = .05$) and was again not significant for males. Finally, a curious reversal of effect was shown for the Scholar factor for males in the YFCY and CSS analyses. Higher scores

on the scholar factor were positively related to male students' probability of YFCY response (odds ratio 1.06), but negatively related to response to the CSS (odds ratio 0.93). A step-by-step investigation of this phenomenon revealed that in a model containing only personality characteristics, the Scholar variable was a significant *positive* predictor of male CSS response propensity. After high school GPA entered the model however, the scholar predictor turned negative—a classic "suppressor effect" (Astin, 1991; Pedhazur, 1997).

It is not clear why GPA exerted a suppressor effect on the Scholar factor in the male CSS analysis only, but it could be due to the confrontation of male students' expectations of achievement with the reality of their actual achievement over the course of four years in college. It initially appeared as if self-rated academic ability (the scholar factor) positively predicted CSS response, something we would expect because actual academic ability (High School GPA) positively predicts response. However, after GPA enters the model, the scholar factor becomes a significant negative predictor for males. This sign reversal happens because *actual* ability is now controlled for, and at this point the Scholar factor likely becomes a measure of unmet expectations. That is, for students with the same GPA, those who had higher self-ratings of academic ability are somewhat more off-base. The reason this happens for male students in the CSS analysis only is most likely due to three interrelated reasons. First, male students tend to earn lower GPAs than females with the same entering characteristics (Sax, 2008). Second, differences in expected college GPA and actual college GPA likely become more exaggerated over time. Finally, the impact of personality and expectations on achievement is potentially quite different for males and females (Nguyen, Allen, & Fraccastoro, 2005).

Correlates of academic achievement. Of the three correlates of academic achievement included in each model, one—high school GPA—was significant for both genders and both

surveys. Higher high school GPAs were associated with significantly higher odds of response among males and females for both the YFCY and CSS (odds ratios 1.08-1.29). The high school GPA variable had a stronger effect on the probability of CSS response than it did for YFCY response; odds ratios for this predictor were 1.18 and 1.29 for females and males on the CSS, and 1.08 and 1.10 for females and males on the YFCY. Students' SAT score had a positive impact on YFCY and CSS response propensities as well, but this impact was similar across the two surveys (odds ratios 1.04-1.08). However, SAT score was not a predictor of YFCY response among males. Finally, the "reason for going to college: to learn" factor did not significantly predict response to either survey, though for both males and females this variable approached significance (odds ratios 1.04-1.05, $p < .08$).

Missingness indicators. Several of the missingness indicators significantly impacted CSS and YFCY response propensities for males and females. Omitting SAT/ACT scores was negatively associated with YFCY response propensities for both females and males, and with CSS response propensity for females. Among these groups, students who provided SAT/ACT scores were approximately 1.18 times as likely as those who omitted these scores to respond to the CSS/YFCY. Similarly, the total number of missing items on the TFS was significantly and negatively associated with response rates for females and males to both the YFCY and CSS; for every one additional missing item, both males and females were expected to be 0.98 times as likely to respond both the CSS and YFCY.

Correlates of academic and social involvement. Of the six correlates of academic and social involvement included in the model, only one—representing the frequency of tutoring other students in high school—was not significant for either gender, in either model. One, representing a students' self-rated likelihood of participating in student clubs/groups, was a

significant and positive predictor for both genders in both the CSS and YFCY models; for every one-unit increase in this variable students were predicted to be 1.07-1.12 times as likely to respond to the YFCY/CSS. The hours per week students reported studying or doing homework each week in high school was a significant positive predictor of response to both surveys for males only, with a one-unit increase in this variable predicting an increase in the odds of responding to the YFCY of 1.04 and to the CSS of 1.06. In the model predicting CSS response among females, the frequency of asking a teacher for advice after class in high school positively predicted response (odds ratio 1.04), but this variable was not significant for any other group. Finally, two variables representing high school socializing activities significantly and negatively predicted YFCY response only. These predictors were different for males and females. For females, the frequency of socializing with students of another racial/ethnic group negatively predicted response (odds ratio 0.95), while for males the hours per week students reported socializing with friends negatively predicted response (odds ratio 0.96). It is possible that these two variables are tapping into the same underlying construct—general high school socializing propensity.

Correlates of satisfaction. Students who entered college with expectations of transferring to another college before graduating were significantly less likely to respond to both the YFCY and CSS. For every one-unit increase in self-rated likelihood of transfer, male and female students were 0.85-0.90 times as likely to respond to each survey. Beyond this, only one other correlate of satisfaction—self-rated likelihood of being satisfied with college—predicted student response, this time for males in the YFCY analysis only. For every one-unit increase in expected satisfaction, males were 1.06 times more likely to respond to the YFCY.

Propensity to be engaged with, participate in organizations. Of the three indicators meant to represent students' propensities for being involved or engaged in organizations, two significantly predicted YFCY or CSS response—but for females only. First, the frequency with which students performed volunteer work in high school was a significant and positive predictor of YFCY and CSS response for females (odds ratios 1.05-1.07). Second, whether or not students voted in student elections significantly predicted CSS response among females, with females who reported this behavior slightly more likely to respond than females who did not (odds ratio 1.05). These results suggest that female propensity to be engaged in organizations may be more predictive of response than male propensity to do the same, or that these variables better tap into female propensity for organizational engagement (and that other variables might be more appropriate for males).

Proxies of attitudes towards surveys/research. Although a student's opinion regarding whether or not an individual can bring about changes in society had no significant effect on YFCY or CSS response propensity among either gender, responses (and lack of responses) to the question asking for permission for HERI to release IDs to schools did significantly impact response odds for both genders and both surveys. With the exception of females in the YFCY analysis, students who either answered "no" to the permission question or who left the question blank were significantly less likely than those who answered "yes" to respond to either survey (odds ratios 0.82-0.92). For females in the YFCY analysis, only answering "no" significantly predicted response (odds ratio 0.90).

Probable major. An interesting pattern of significant effects were shown for the variables representing students' probable major. In terms of predicting YFCY response, males who expected to major in business were 1.18 times as likely to respond to the YFCY than those

who were undecided about their major; the same was not true of females (the business major variable was not significant). This result aligns with the result from the aggregate YFCY model, discussed earlier. On the CSS, males and females who entered college expecting to major in the natural sciences or in a professional field were less likely to respond than those who entered undecided about their future major (natural science odds ratios 0.84-0.88, professional field odds ratios 0.60-0.75). Finally, males who entered college expecting to major in engineering were 0.80 times as likely to respond to the CSS as males who were undecided about their major, but females expecting to major in engineering were equally as likely as their undecided counterparts to respond to the CSS.

Table 4.14

Final Hierarchical Models Predicting Likelihood of YFCY Response, Females Only (N = 35,708)

		Model 1 Student-Level Variables Only				Model 2 Student & Institution-Level Variables			
Category	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Student Level									
Background Characteristics									
Race	Black/African American	-0.11	0.07			-0.11	0.07		
	Latino/a	-0.04	0.07			-0.04	0.07		
	Asian American	-0.06	0.05			-0.06	0.06		
	Other	-0.10	0.04	-2.42*	0.91	-0.10	0.04	-2.41*	0.91
	Female	-0.31	0.11	-2.74*	0.73	-0.31	0.11	-2.75*	0.73
	Citizenship status: Foreign	0.01	0.01			0.01	0.01		
SES	Parental income	0.05	0.04			0.05	0.04		
	Not first generation	0.01	0.02			0.01	0.02		
	Future Act: Get a job to pay expenses	-0.11	0.07			-0.11	0.07		
Personality and other individual differences									
	Scholar (Factor)	0.03	0.02			0.03	0.02		
	Leader (Factor)	-0.04	0.02	-2.27*	0.96	-0.05	0.02	-2.27*	0.96
	Hedonist (Factor)	-0.14	0.02	-8.56*	0.87	-0.14	0.02	-8.58*	0.87
	Status Striver (Factor)	-0.04	0.02			-0.04	0.02		
	Artist (Factor)	-0.07	0.02	-4.35*	0.93	-0.07	0.02	-4.37*	0.93
	Social Activist (Factor)	-0.03	0.02	1.95†	0.97	-0.03	0.02	1.96†	0.97
	Self Rating: Cooperativeness	0.04	0.02	1.98*	1.04	0.04	0.02	1.99*	1.04
Correlates of academic achievement									
	High school GPA	0.08	0.02	5.29*	1.08	0.08	0.02	5.32*	1.08
	SAT score	0.04	0.02	2.68*	1.04	0.04	0.02	2.70*	1.04
	Reason for going to college: Learning (Factor)	0.03	0.02			0.03	0.02		
Missingness Indicators									
	Parental income	0.04	0.04			0.04	0.04		
	SAT/ACT Score	-0.17	0.04	-4.10*	0.84	-0.17	0.04	-4.17*	0.84
	Number of Missing items	-0.02	0.00	-5.00*	0.98	-0.02	0.00	-4.99*	0.98
Correlates of academic and social involvement									
	Future Act: Participate in student clubs/groups	0.08	0.02	3.85*	1.09	0.08	0.02	3.84*	1.09
	HS Act: Asked a teacher for advice after class	-0.01	0.02			-0.01	0.02		
	HS Act: Tutored another student	-0.01	0.02			-0.01	0.02		
	HS Act: Socialized w/ someone of another racial/ethnic group	-0.06	0.03	-2.18*	0.95	-0.06	0.03	-2.18*	0.95
	Hours per week (HPW) in HS: Socializing with friends	0.00	0.01			0.00	0.01		
	HPW in HS: Studying/ homework	0.02	0.01	1.95†	1.02	0.02	0.01		
Correlates of satisfaction									
	Future Act: Transfer to another college before graduating	-0.12	0.02	-8.08*	0.88	-0.12	0.02	-8.08*	0.88
	Future Act: Be satisfied with college	0.03	0.02			0.03	0.02		
	Is this institution your 1st choice?	0.00	0.03			0.00	0.03		

(continued)

Category	Variable	Model 1 Student-Level Variables Only β	SE	t	OR	Model 2 Student & Institution-Level Variables β	SE	t	OR
Propensity to be engaged with, participate in organizations									
	HS Act: Performed volunteer work	0.05	0.02	2.03*	1.05	0.05	0.02	2.02*	1.05
	HS Act: Voted in a student election	-0.01	0.02			-0.01	0.02		
	Future Act: Participate in student government	0.02	0.02			0.02	0.02		
Potential Proxies of attitudes towards surveys, research									
	Realistically, an individual can do little to bring about changes in society	-0.02	0.02			-0.02	0.02		
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?								
	No	-0.11	0.04	-2.61*	0.90	-0.11	0.04	-2.57*	0.90
	Missing	-0.11	0.06			-0.11	0.06		
Probable Major									
	Arts and Humanities	-0.03	0.05			-0.03	0.05		
	Business	0.07	0.04			0.07	0.04		
	Engineering	0.09	0.08			0.10	0.08		
	Education	-0.04	0.05			-0.04	0.05		
	Natural Sciences	-0.01	0.05			-0.01	0.05		
	Social Sciences	0.04	0.04			0.04	0.04		
	Professional	0.01	0.05			0.01	0.05		
	Other or Technical	-0.04	0.06			-0.04	0.06		
Institution-Level									
Intercept (γ_{00})		-0.71	0.13	-5.53*	0.49	-0.71	0.11	-6.58*	0.49
Administration Methods									
Mode	Web only					-0.83	0.27	-3.03*	0.44
	Mail only					-1.40	0.27	-5.18*	0.25
	Paper & Web					-1.13	0.44	-2.58*	0.32
Incentive	Incentive for all					0.60	0.22	2.73*	1.83
	Lottery					0.31	0.31		
Structural characteristics									
	Selectivity, in 100-point increments					-0.09	0.16		
	Natural log of Size (undergraduate enrollment)					-0.37	0.12	-3.00*	0.69
Climate									
	% of undergraduate students non-White, 10-point increments					-0.07	0.07		
	Graduation rate, 10-point increments					0.08	0.12		
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments					-0.07	0.07		
Level-2 Variance component (u_0)							1.19		
Proportion of variance accounted for at Level 2							22.4%		

Source: Final Female YFCY HGLM analysis sample

Note. Non-significant variables are shaded in gray, odds ratios and t-statistics shown for significant variables only.

SE = Standard Error; OR = Odds Ratio

* p < .05, † p = .05

Table 4.15

Final Hierarchical Models Predicting Likelihood of YFCY Response, Males Only (N = 26,757)

		Model 1 Student-Level Variables Only				Model 2 Student & Institution-Level Variables			
Category	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Student Level									
Background Characteristics									
Race	Black/African American	0.01	0.10			0.01	0.10		
	Latino/a	-0.15	0.07	-2.08*	0.86	-0.15	0.07	-2.07*	0.86
	Asian American	-0.09	0.08			-0.09	0.08		
	Other	-0.13	0.08			-0.13	0.08		
	Citizenship status: Foreign	-0.12	0.14			-0.12	0.14		
SES	Parental income	0.00	0.01			0.00	0.01		
	Not first generation	0.09	0.05			0.09	0.05		
	Future Act: Get a job to pay expenses	0.03	0.02			0.03	0.02		
Personality and other individual differences									
	Scholar (Factor)	0.06	0.03	2.09*	1.06	0.06	0.03	2.11*	1.06
	Leader (Factor)	-0.07	0.02	-2.86*	0.94	-0.07	0.02	-2.86*	0.94
	Hedonist (Factor)	-0.12	0.02	-5.89*	0.89	-0.12	0.02	-5.90*	0.89
	Status Striver (Factor)	-0.02	0.02			-0.02	0.02		
	Artist (Factor)	-0.06	0.02	-2.92*	0.94	-0.06	0.02	-2.95*	0.94
	Social Activist (Factor)	-0.02	0.02			-0.02	0.02		
	Self Rating: Cooperativeness	0.03	0.02			0.03	0.02		
Correlates of academic achievement									
	High school GPA	0.09	0.02	6.16*	1.10	0.09	0.02	6.20*	1.10
	SAT score	0.02	0.02			0.02	0.02		
	Reason for going to college: Learning (Factor)	0.02	0.02			0.02	0.02		
Missingness Indicators									
	Parental income	0.07	0.06			0.07	0.06		
	SAT/ACT Score	-0.16	0.06	-2.77*	0.85	-0.16	0.06	-2.80*	0.85
	Number of Missing items	-0.02	0.00	-4.58*	0.98	-0.02	0.00	-4.58*	0.98
Correlates of academic and social involvement									
	Future Act: Participate in student clubs/groups	0.06	0.02	3.23*	1.07	0.06	0.02	3.23*	1.07
	HS Act: Asked a teacher for advice after class	-0.01	0.02			-0.01	0.02		
	HS Act: Tutored another student	0.03	0.03			0.03	0.03		
	HS Act: Socialized w/ someone of another racial/ethnic group	-0.04	0.03			-0.04	0.03		
	Hours per week (HPW) in HS: Socializing with friends	-0.04	0.01	-3.94*	0.96	-0.04	0.01	-3.95*	0.96
	HPW in HS: Studying/ homework	0.04	0.01	3.74*	1.04	0.04	0.01	3.74*	1.04
Correlates of satisfaction									
	Future Act: Transfer to another college before graduating	-0.11	0.03	-4.13*	0.90	-0.11	0.03	-4.14*	0.90
	Future Act: Be satisfied with college	0.06	0.02	2.51*	1.06	0.06	0.02	2.49*	1.06
	Is this institution your 1st choice?	0.01	0.05			0.01	0.05		

(continued)

Category	Variable	Model 1 Student-Level Variables Only β	SE	t	OR	Model 2 Student & Institution-Level Variables β	SE	t	OR
Propensity to be engaged with, participate in organizations									
	HS Act: Performed volunteer work	0.04	0.03			0.04	0.03		
	HS Act: Voted in a student election	0.02	0.03			0.02	0.03		
	Future Act: Participate in student government	-0.01	0.02			-0.01	0.02		
Potential Proxies of attitudes towards surveys, research									
	Realistically, an individual can do little to bring about changes in society	0.01	0.02			0.01	0.02		
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?								
	No	-0.19	0.04	-4.35*	0.82	-0.19	0.04	-4.32*	0.82
	Missing	-0.20	0.06	-3.52*	0.82	-0.19	0.06	-3.49*	0.82
Probable Major									
	Arts and Humanities	0.07	0.08			0.07	0.08		
	Business	0.16	0.05	2.99*	1.18	0.16	0.05	2.99*	1.18
	Engineering	0.09	0.09			0.10	0.09		
	Education	0.01	0.10			0.01	0.10		
	Natural Sciences	0.06	0.09			0.07	0.09		
	Social Sciences	0.07	0.07			0.07	0.07		
	Professional	0.13	0.07			0.13	0.07		
	Other or Technical	0.12	0.12			0.12	0.12		
Institution-Level									
Intercept (γ_{00})		-1.17	0.15	-7.74*	0.31	-1.16	0.12	-9.81*	0.31
Administration Methods									
Mode	Web only					-1.40	0.33	-4.23*	0.25
	Mail only					-2.28	0.36	-6.34*	0.10
	Paper & Web					-1.39	0.51	-2.70*	0.25
Incentive	Incentive for all					0.58	0.28	2.08*	1.79
	Lottery					0.43	0.38		
Structural characteristics									
	Selectivity, in 100-point increments					-0.04	0.18		
	Natural log of Size (undergraduate enrollment)					-0.45	0.14	-3.11*	0.64
Climate									
	% of undergraduate students non-White, 10-point increments					0.02	0.08		
	Graduation rate, 10-point increments					0.07	0.15		
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments					-0.03	0.08		
Level-2 Variance component (u_0)							1.33		
Proportion of variance accounted for at Level 2							30.5%		

Source: Final Male YFCY HGLM analysis sample

Note. Non-significant variables are shaded in gray, odds ratios and t-statistics shown for significant variables only.
SE = Standard Error; OR = Odds Ratio

* $p < .05$

Table 4.16

Final Hierarchical Models Predicting Likelihood of CSS Response, Females Only (N = 32,479)

		Model 1 Student-Level Variables Only				Model 2 Student & Institution-Level Variables			
Category	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Student Level									
Background Characteristics									
Race	Black/African American	-0.27	0.10	-2.79*	0.77	-0.27	0.10	-2.80*	0.77
	Latino/a	-0.13	0.10			-0.12	0.10		
	Asian American	-0.34	0.10	-3.31*	0.71	-0.34	0.10	-3.27*	0.71
	Other	-0.09	0.05			-0.09	0.05		
	Citizenship status: Foreign	-0.08	0.14			-0.08	0.14		
SES	Parental income	0.01	0.01			0.01	0.01		
	Not first generation	0.13	0.04	3.30*	1.14	0.13	0.04	3.28*	1.14
	Future Act: Get a job to pay expenses	0.00	0.02			0.00	0.02		
Personality and other individual differences									
	Scholar (Factor)	0.04	0.03			0.04	0.03		
	Leader (Factor)	-0.05	0.02	-2.61*	0.95	-0.05	0.02	-2.65*	0.95
	Hedonist (Factor)	-0.05	0.02	-2.38*	0.95	-0.05	0.02	-2.40*	0.95
	Status Striver (Factor)	-0.06	0.02	-2.60*	0.95	-0.05	0.02	-2.54*	0.95
	Artist (Factor)	-0.09	0.02	-5.45*	0.92	-0.09	0.02	-5.41*	0.92
	Social Activist (Factor)	-0.02	0.02			-0.02	0.02		
	Self Rating: Cooperativeness	0.03	0.02			0.04	0.02	1.95†	1.04
Correlates of academic achievement									
	High school GPA	0.16	0.02	10.11*	1.18	0.16	0.02	10.00*	1.18
	SAT score	0.08	0.02	4.86*	1.09	0.08	0.02	4.68*	1.08
	Reason for going to college: Learning (Factor)	0.04	0.02			0.04	0.02		
Missingness Indicators									
	Parental income	0.08	0.04	1.95†	1.08	0.08	0.04	1.96†	1.09
	SAT/ACT Score	-0.17	0.05	-3.47*	0.85	-0.16	0.05	-3.38*	0.85
	Number of Missing items	-0.02	0.00	-5.14*	0.98	-0.02	0.00	-5.06*	0.98
Correlates of academic and social involvement									
	Future Act: Participate in student clubs/groups	0.10	0.02	3.99*	1.10	0.10	0.02	3.95*	1.10
	HS Act: Asked a teacher for advice after class	0.04	0.02	1.98*	1.04	0.04	0.02	1.94†	1.04
	HS Act: Tutored another student	-0.01	0.02			-0.01	0.02		
	HS Act: Socialized w/ someone of another racial/ethnic group	-0.04	0.03			-0.04	0.03		
	Hours per week (HPW) in HS: Socializing with friends	-0.02	0.01			-0.02	0.01		
	HPW in HS: Studying/ homework	0.02	0.01			0.02	0.01		
Correlates of satisfaction									
	Future Act: Transfer to another college before graduating	-0.16	0.02	-8.55*	0.85	-0.16	0.02	-8.59*	0.85
	Future Act: Be satisfied with college	0.03	0.03			0.03	0.03		
	Is this institution your 1st choice?	0.05	0.04			0.05	0.04		

(continued)

Category	Variable	Model 1 Student-Level Variables Only β	SE	t	OR	Model 2 Student & Institution-Level Variables β	SE	t	OR
Propensity to be engaged with, participate in organizations									
	HS Act: Performed volunteer work	0.07	0.03	2.70*	1.07	0.07	0.03	2.70*	1.07
	HS Act: Voted in a student election	0.05	0.02	1.97*	1.05	0.05	0.02		
	Future Act: Participate in student government	0.00	0.02			0.00	0.02		
Potential Proxies of attitudes towards surveys, research									
	Realistically, an individual can do little to bring about changes in society	-0.01	0.02			-0.01	0.02		
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?								
	No	-0.10	0.03	-3.02*	0.90	-0.10	0.03	-3.08*	0.90
	Missing	-0.13	0.04	-3.13*	0.88	-0.13	0.04	-3.19*	0.88
Probable Major									
	Arts and Humanities	-0.05	0.06			-0.05	0.06		
	Business	0.06	0.07			0.06	0.07		
	Engineering	-0.12	0.09			-0.12	0.09		
	Education	-0.06	0.06			-0.06	0.06		
	Natural Sciences	-0.12	0.05	-2.20*	0.89	-0.12	0.05	-2.22*	0.88
	Social Sciences	-0.06	0.05			-0.06	0.05		
	Professional	-0.29	0.09	-3.32*	0.75	-0.29	0.09	-3.29*	0.75
	Other or Technical	-0.05	0.07			-0.04	0.07		
Institution-Level									
Intercept (γ_{00})		-0.92	0.11	-8.34*	0.40	-0.91	0.09	-10.52*	0.40
Administration Methods									
Mode	Web only					-0.73	0.20	-3.63*	0.48
	Mail only					-1.06	0.47	-2.26*	0.34
	Paper & Web					-0.62	0.38		
Incentive	Incentive for all					0.17	0.29		
	Lottery					-0.21	0.20		
Structural characteristics									
	Selectivity, in 100-point increments					0.00	0.11		
	Natural log of Size (undergraduate enrollment)					-0.23	0.11	-2.07*	0.79
Climate									
	% of undergraduate students non-White, 10-point increments					0.01	0.07		
	Graduation rate, 10-point increments					0.20	0.11		
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments					0.12	0.04	3.01*	1.13
Level-2 Variance component (u_0)						0.75			
Proportion of variance accounted for at Level 2						41.8%			

Source: Final Female CSS HGLM analysis sample

Note. Non-significant variables are shaded in gray, odds ratios and t-statistics shown for significant variables only.
SE = Standard Error; OR = Odds Ratio

* $p < .05$, † $p = .05$

Table 4.17

Final Hierarchical Models Predicting Likelihood of CSS Response, Males Only (N = 25,030)

		Model 1 Student-Level Variables Only				Model 2 Student & Institution-Level Variables			
Category	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Student Level									
Background Characteristics									
Race	Black/African American	-0.35	0.15	-2.29*	0.70	-0.35	0.15	-2.30*	0.70
	Latino/a	-0.19	0.12			-0.18	0.13		
	Asian American	-0.08	0.07			-0.07	0.07		
	Other	-0.15	0.08			-0.14	0.08		
	Citizenship status: Foreign	-0.25	0.14			-0.25	0.14		
SES	Parental income	0.00	0.01			0.00	0.01		
	Not first generation	0.16	0.06	2.51*	1.18	0.16	0.06	2.49*	1.18
	Future Act: Get a job to pay expenses	0.02	0.02			0.02	0.02		
Personality and other individual differences									
	Scholar (Factor)	-0.07	0.03	-2.25*	0.93	-0.07	0.03	-2.22*	0.93
	Leader (Factor)	-0.03	0.02			-0.03	0.02		
	Hedonist (Factor)	-0.14	0.03	-5.57*	0.87	-0.14	0.03	-5.63*	0.87
	Status Striver (Factor)	-0.07	0.03	-2.55*	0.94	-0.06	0.03	-2.47*	0.94
	Artist (Factor)	-0.13	0.03	-3.99*	0.88	-0.12	0.03	-3.96*	0.88
	Social Activist (Factor)	0.00	0.03			0.00	0.03		
	Self Rating: Cooperativeness	0.02	0.02			0.02	0.02		
Correlates of academic achievement									
	High school GPA	0.25	0.02	12.13*	1.29	0.25	0.02	12.09*	1.29
	SAT score	0.05	0.02	2.51*	1.05	0.05	0.02	2.37*	1.05
	Reason for going to college: Learning (Factor)	0.05	0.03			0.05	0.03		
Missingness Indicators									
	Parental income	-0.02	0.06			-0.02	0.06		
	SAT/ACT Score	-0.12	0.10			-0.12	0.10		
	Number of Missing items	-0.02	0.01	-3.70*	0.98	-0.02	0.00	-3.67*	0.98
Correlates of academic and social involvement									
	Future Act: Participate in student clubs/groups	0.11	0.03	3.91*	1.12	0.11	0.03	3.90*	1.12
	HS Act: Asked a teacher for advice after class	-0.04	0.03			-0.04	0.03		
	HS Act: Tutored another student	0.00	0.04			0.00	0.04		
	HS Act: Socialized w/ someone of another racial/ethnic group	-0.07	0.03			-0.06	0.03		
	Hours per week (HPW) in HS: Socializing with friends	-0.01	0.01			-0.01	0.01		
	HPW in HS: Studying/ homework	0.06	0.01	4.02*	1.06	0.06	0.01	3.96*	1.06
Correlates of satisfaction									
	Future Act: Transfer to another college before graduating	-0.14	0.02	-6.61*	0.87	-0.14	0.02	-6.58*	0.87
	Future Act: Be satisfied with college	0.06	0.04			0.06	0.04		
	Is this institution your 1st choice?	-0.01	0.05			-0.01	0.05		

(continued)

Category	Variable	Model 1 Student-Level Variables Only β	SE	t	OR	Model 2 Student & Institution-Level Variables β	SE	t	OR
Propensity to be engaged with, participate in organizations									
	HS Act: Performed volunteer work	0.06	0.04			0.06	0.04		
	HS Act: Voted in a student election	0.02	0.03			0.02	0.03		
	Future Act: Participate in student government	0.04	0.02			0.04	0.02		
Potential Proxies of attitudes towards surveys, research									
	Realistically, an individual can do little to bring about changes in society	0.01	0.02			0.01	0.02		
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?								
	No	-0.08	0.04	-2.05*	0.93	-0.08	0.04	-2.10*	0.92
	Missing	-0.18	0.07	-2.76*	0.83	-0.18	0.07	-2.80*	0.83
Probable Major									
	Arts and Humanities	-0.14	0.07			-0.14	0.07		
	Business	-0.01	0.06			-0.01	0.06		
	Engineering	-0.23	0.10	-2.29*	0.80	-0.22	0.10	-2.28*	0.80
	Education	-0.05	0.10			-0.05	0.10		
	Natural Sciences	-0.18	0.06	-2.89*	0.84	-0.18	0.06	-2.92*	0.84
	Social Sciences	-0.14	0.08			-0.14	0.08		
	Professional	-0.50	0.11	-4.59*	0.60	-0.50	0.11	-4.61*	0.60
	Other or Technical	-0.18	0.09	-1.99*	0.84	-0.17	0.09	-1.94†	0.84
Institution-Level									
Intercept (γ_{00})		-1.45	0.13	-10.97*	0.23	-1.46	0.09	-16.01*	0.23
Administration Methods									
Mode	Web only					-1.21	0.23	-5.26*	0.30
	Mail only					-1.43	0.38	-3.79*	0.24
	Paper & Web					-1.10	0.32	-3.38*	0.33
Incentive	Incentive for all					0.26	0.30		
	Lottery					-0.04	0.21		
Structural characteristics									
	Selectivity, in 100-point increments					0.08	0.15		
	Natural log of Size (undergraduate enrollment)					-0.25	0.12	-2.10*	0.78
Climate									
	% of undergraduate students non-White, 10-point increments					-0.14	0.07	-2.00*	0.87
	Graduation rate, 10-point increments					0.16	0.14		
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments					0.11	0.04	2.40*	1.11
Level-2 Variance component (u_0)							0.77		
Proportion of variance accounted for at Level 2							53.3%		

Source: Final Male CSS HGLM analysis sample

Note. Non-significant variables are shaded in gray, odds ratios and t-statistics shown for significant variables only.
SE = Standard Error; OR = Odds Ratio

* p < .05, † p = .05

Institution level: Survey administration mode. At the institution level, consistent effects across genders (in terms of significance and direction) were shown for several of the survey administration variables. Specifically, both males and females who attended institutions that administered the YFCY or CSS via any method other than paper were far less likely to respond to either survey than were students given the survey on paper. The only exception with this was for paper and web mixed-mode administrations among females in the CSS analysis; there was no significant effect of this mode for this group.

All of the odds ratios associated with the administration method variables in the gender-specific analyses were quite large in terms of absolute magnitude, ranging from 0.10 to 0.44. Because such small odds ratios can be difficult to interpret, Table 4.18 puts the odds ratios associated with survey modalities in perspective by displaying the odds of responding to paper surveys compared to the other methods (i.e., the inverted odds ratios). As can be seen, students were much more likely—two to ten times as likely—to respond to paper (non-mail) surveys than they were to surveys given in any other modality. This was true for both males and females, although the impact of administration method was much larger for males than for females. Specifically, females given either the YFCY or CSS on paper were 2.08 to 2.27 times as likely to respond than were females given the survey on the web, while males given either survey on

Table 4.18
Odds of Responding to Paper Surveys Versus Surveys Given in Other Modes, YFCY and CSS Analyses by Gender

		YFCY				CSS			
		Female		Male		Female		Male	
		OR	Sig.	OR	Sig.	OR	Sig.	OR	Sig.
***Odds of responding to* non-mail, paper-only surveys, *compared to*…**									
Administration Mode	Web only	2.27	*	4.00	*	2.08	*	3.33	*
	Mail only	4.00	*	10.00	*	2.94	*	4.17	*
	Paper & Web	3.13	*	4.00	*	1.86		3.03	*

Source: YFCY and CSS HGLM analyses by Gender
Note. OR = Odds Ratio
* $p < .05$

paper were 3.33 to 4.00 times as likely to respond than they were to the surveys given on the web. For the mail survey modality, the difference in impact between males and females was even starker. Specifically, females given the YFCY on paper (in peson) were 4.00 times as likely to respond than were those given the survey by mail, while males given the YFCY on paper were *10.00 times* as likely to respond as were those given it in the mail. In the CSS, the odds ratios associated with paper (in person) surveys versus mail surveys were 2.94 for females and 4.17 for males. Perhaps due to the varied and mixed nature of paper/web mixed-mode administrations, the difference in impact between males and females was not as stark for mixed-mode surveys (odds of responding to YFCY paper-only surveys compared to YFCY paper & web surveys were 3.14 for females and 4.00 for males). However, the paper/web mixed modality had a significant negative impact on CSS response rates for males only (odds ratio 3.03). Corroborating the suggestion made by these odds ratios—that male response propensity is affected more by administration variables than female response propensity—the t-statistics associated with the mode variables were much larger (relative to other predictors within each model) for males than females in all cases.

Institution-Level: Incentives. Incentives had no significant effect on CSS response rates for males or females, but they did have an impact for both genders on the YFCY. Specifically, compared to students attending institutions that offered no incentive, both males and females attending institutions that offered a small incentive for every survey-taker were approximately 1.8 times as likely to respond to the YFCY. Lottery incentives had no significant impact on YFCY response rate. These results align with those seen in the aggregate analyses, and indicate that there is no difference in the impact of incentives across gender.

Institution-Level: Structural characteristics. In terms of the structural characteristics examined in this model, only institutional size had a significant impact on student response propensity for students considered separately by gender. Among both males and females, a one-unit increase in the natural log of student enrollment was associated with odds ratios of 0.64-0.69 in the YFCY analysis, and 0.78-0.79 in the CSS analysis. Institutional selectivity had no impact on response propensities.

Institution-Level: Climate characteristics. Lastly, two climate-related variables significantly predicted CSS response propensity only. Among males, the proportion of undergraduate students who were non-White was negatively associated with response probabilities; for every 10 percentage-point increase in this variable males were 0.87 times as likely to respond to the CSS. The proportion of times that the institution achieved TFS norms status, on the other hand, significantly and positively predicted CSS response for both males and females. For every 10 percentage-point increase in this variable, students were 1.11-1.13 times as likely to respond to the CSS.

Institution-Level: Proportion of variance explained. The proportion of variance in response rates at the institution level that was explained by the institution-level variables was, as with the aggregate analyses, larger in the CSS models than the YFCY models. The proportion of variance explained was also larger for males than females in both the YFCY and CSS models. In the YFCY analysis the proportion of variance explained at level 2 was 31% for males and 22% for females; in the CSS analysis these figures were 53% for males and 42% for females. In both cases, approximately ten percentage points more variance in institution-level rates of response could be explained for males than females, a discrepancy that indicates that institution-level characteristics have a stronger impact on males than females. Likely, this stronger effect can be

in part explained by the differential impact of survey modality between the two genders. It seems that choice of administration mode matters more for male response rates than female—a point particularly interesting in light of the fact that males respond at much lower rates than females.

Largest predictors. T-statistics associated with significant predictors within each gender-specific model were examined and ranked in order to determine which variables contributed most to the prediction of student response propensity. Table 4.19 displays the five predictor variables with the largest t-statistics (in terms of absolute value) from the YFCY and CSS models disaggregated by gender. In terms of YFCY prediction, four variables appeared in the top five predictors for both males and females: high school GPA, Hedonist (factor), number of missing items, and mail survey administration mode. The only variables that differed in the two groups were self-rated likelihood of transferring (which was in the top five YFCY predictors for females only), and saying "no" to the ID permission question (which was in the top five YFCY predictors for males only). There was more variation in the top predictors across males and females for the CSS survey. Only two predictors were shared across groups, high school GPA and self-rated likelihood of transferring—though, noticeably, these were the top two predictors for both groups. A personality factor appeared in both lists, although it was different for females (Artist) and males (Hedonist). Two future-related variables also appeared in both lists, although again these were different for females (likelihood of participating in student clubs/groups in college) and males (planning to major in a professional field). Finally, the number of missing items on the TFS was a top CSS response predictor for females only, while web survey modality was a top CSS response predictor for males only.

Table 4.19

Significant Predictor Variables With the Largest t-statistics, YFCY and CSS Analyses by Gender

	YFCY			
Rank	**Females**		**Males**	
(abs.)	**Predictor**	**t**	**Predictor**	**t**
1	Hedonist (factor)	-8.58	Mode: Mail	-6.34
2	Future act: Transfer	-8.08	High school GPA	6.20
3	High school GPA	5.32	Hedonist (factor)	5.90
4	Mode: Mail	-5.18	Number of missing items	-4.58
5	Number of missing items	-4.99	ID permission: No	-4.32

	CSS			
Rank	**Females**		**Males**	
(abs.)	**Predictor**	**t**	**Predictor**	**t**
1	High school GPA	10.00	High school GPA	12.09
2	Future act: Transfer	-8.59	Future act: Transfer	-6.58
3	Artist (factor)	-5.41	Hedonist (factor)	-5.63
4	Number of missing items	-5.06	Mode: Web	-5.26
5	Future act: Student clubs/groups	3.95	Planned major: Professional	-4.62

Source: Final YFCY and CSS HGLM analyses, by gender

Note. abs. = absolute value; t-statistics are ranked in descending order of absolute value. t = t-statistic

Examining the top predictors of YFCY versus CSS response among males and females, we observe that several of the same variables appear in the top-five lists for the YFCY and the CSS. Among females, the top five predictors for both surveys include high school GPA, the number of missing items on the TFS, and self-rated likelihood of transfer; a personality variable also appears on the two lists, though this is different for the YFCY (Hedonist) than CSS (Artist). Among males, high school GPA also appears in both the YFCY and CSS list, as does the Hedonist personality factor. Two mode variables appear in the top five predictors for males as well, though these were different for the YFCY (mail) and CSS (web).

Overall, across all four models, it appears that students' individual characteristics are relatively more important for females, while modality is relatively more important for males. However, for all groups, the same key variables appear repeatedly: high school GPA, likelihood of transfer, personality, and baseline survey missingness. These are the same variables that are

most important for student response propensity in the aggregate models, and as suggested above, should thus be included in future research on survey response propensity.

Hierarchical Models by Race/Ethnicity

Results predicting YFCY and CSS response for the samples disaggregated by race/ethnicity can be found in Tables 4.20 through 4.27.

Background characteristics. Only one background characteristic, gender, significantly predicted YFCY and CSS response propensity for students of different race/ethnicities. With two exceptions, in each of the separate-race analyses, females were significantly more likely than males (1.30 to 1.63 times as likely) to respond to both the YFCY and the CSS. The exceptions to this pattern were found in the models predicting YFCY response among African American students and CSS response among Asian American students. Among no groups did any of the SES indicators significantly predict response propensities.

Personality/Student typology. Mixed results were seen in terms of the impact of personality on response propensities among students disaggregated by race/ethnicity. In general, personality was more likely to significantly predict YFCY response than CSS. In terms of YFCY response, having higher scores on the Status Striver factor negatively impacted response rates for Asian American, Black, and Latino/a students, but not White students (odds ratios 0.84-0.91). Higher scores on the Hedonist factor negatively impacted response propensities for Asian American, Latino/a, and White students (odds ratios 0.84-0.86), but not Black students. Meanwhile, higher scores on the Leader factor were associated with lower response odds for Asian American students only (odds ratio 0.84).

In the CSS analyses, only White students showed any significant impact of personality on response odds. Specifically, White students who scored higher on the Leader factor, the Artist

factor and/or the Scholar factor, were significantly less likely to respond to the CSS than those who scored lower on these factors (odds ratios of 0.90, 0.89, and 0.90, respectively). In addition, one personality variable—the Status Striver variable—was on the cusp of significance in the Asian American model ($p = .05$). Higher scores on this factor negatively predicted Asian American CSS response propensities (odds ratio 0.91). Among no group did the Social Activist factor nor self-rated cooperativeness significantly predict YFCY or CSS response odds.

Correlates of academic achievement. High school GPA was a significant predictor of both YFCY and CSS response for all racial/ethnic groups except Asian Americans in the YFCY analysis. Among all but this latter group, a one-unit increase in the high school GPA variable was associated with an increase in the odds of responding to the YFCY/CSS of 1.11 to 1.36. Interestingly, higher scores on the "Reason for going to college: To Learn" factor significantly predicted response propensity only for Black students on the YFCY (odds ratio 1.21).

Missingness indicators. Of the three missingness indicators included in each model, the variable representing a lack of response to the parental income variable did not prove significant among any group, for either survey. In fact, none of the missingness indicators significantly predicted response propensities for students of different races/ethnicities in the CSS analyses. In the YFCY analyses, the indicator representing SAT/ACT missingness significantly and negatively predicted response for Asian American and African American students, with those missing their test scores in the TFS dataset 0.72-0.73 times as likely to respond as those who provided this information. The total number of missing items also negatively predicted YFCY response, this time for Asian American and White students only. For every additional variable left blank on the TFS, these two groups of students were 0.98 times as likely to respond to the YFCY.

Correlates of academic and social involvement. Very few of the correlates of academic and social involvement proved significant in predicting YFCY or CSS response among students of different race/ethnicities. Among Black students, none of the variables in this section predicted response propensity for either survey, and for Latinos only, hours per week spent studying significantly predicted response—though for the YFCY only (odds ratio 1.08). Among White students, hours per week spent studying was almost but not quite a significant predictor in the YFCY model (odds ratio 1.05, $p < .08$) and in the CSS model (odds ratio 1.07, $p = .05$). Finally, among Asian American students, different involvement correlates predicted YFCY and CSS response. Specifically, Asian American students who reported more frequently socializing with someone of another racial/ethnic group in high school were more likely to respond to the YFCY (odds ratio 1.23), while those who reported spending more hours per week socializing with friends in general were less likely to respond (odds ratio 0.96). In the CSS analysis, on the other hand, only one variable, the self-rated likelihood of participating in student clubs and groups, significantly (and positively) predicted Asian American students' response odds (odds ratio 1.15).

Table 4.20

Final Hierarchical Models Predicting Likelihood of YFCY Response, Asian American Students Only (N = 4,945)

		Model 1 Student-Level Variables Only				Model 2 Student & Institution-Level Variables			
Category	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Student Level									
Background Characteristics									
Gender	Female	0.46	0.14	3.26*	1.59	0.47	0.14	3.40*	1.61
SES	Parental income	0.01	0.01			0.01	0.01		
	Not first generation	-0.05	0.08			-0.06	0.08		
	Future Act: Get a job to pay expenses	0.03	0.05			0.03	0.05		
Personality and other individual differences									
	Scholar (Factor)	0.07	0.06			0.07	0.06		
	Leader (Factor)	-0.17	0.05	-3.16*	0.84	-0.17	0.05	-3.12*	0.84
	Hedonist (Factor)	-0.15	0.05	-2.80*	0.86	-0.15	0.05	-2.90*	0.86
	Status Striver (Factor)	-0.10	0.04	-2.24*	0.90	-0.10	0.05	-2.18*	0.91
	Artist (Factor)	-0.05	0.04			-0.05	0.04		
	Social Activist (Factor)	0.02	0.04			0.02	0.04		
	Self Rating: Cooperativeness	-0.02	0.04			-0.02	0.04		
Correlates of academic achievement									
	High school GPA	0.02	0.03			0.02	0.03		
	SAT score	0.01	0.03			0.02	0.03		
	Reason for going to college: Learning (Factor)	-0.06	0.05			-0.06	0.05		
Missingness Indicators									
	Parental income	0.24	0.20			0.23	0.20		
	SAT/ACT Score	-0.32	0.11	-2.93*	0.73	-0.33	0.11	-2.90*	0.72
	Number of Missing items	-0.02	0.01	-2.76*	0.98	-0.02	0.01	-2.72*	0.98
Correlates of academic and social involvement									
	Future Act: Participate in student clubs/groups	0.11	0.06			0.11	0.06		
	HS Act: Asked a teacher for advice after class	0.07	0.04			0.07	0.04		
	HS Act: Tutored another student	0.06	0.04			0.06	0.04		
	HS Act: Socialized w/ someone of another racial/ethnic group	0.21	0.08	2.54*	1.24	0.21	0.08	2.52*	1.23
	Hours per week (HPW) in HS: Socializing with friends	-0.04	0.02	-2.25*	0.96	-0.04	0.02	-2.23*	0.96
	HPW in HS: Studying/ homework	0.05	0.03			0.05	0.03		
Correlates of satisfaction									
	Future Act: Transfer to another college before graduating	-0.10	0.05	-2.10*	0.91	-0.09	0.05	-2.03*	0.91
	Future Act: Be satisfied with college	0.11	0.09			0.12	0.09		
	Is this institution your 1st choice?	-0.18	0.06	-3.06*	0.83	-0.19	0.06	-3.10*	0.83

(continued)

Category	Variable	Model 1 Student-Level Variables Only β	SE	t	OR	Model 2 Student & Institution-Level Variables β	SE	t	OR
Propensity to be engaged with, participate in organizations									
	HS Act: Performed volunteer work	-0.03	0.04			-0.03	0.04		
	HS Act: Voted in a student election	-0.06	0.05			-0.06	0.05		
	Future Act: Participate in student government	0.07	0.04			0.07	0.04		
Potential Proxies of attitudes towards surveys, research									
	Realistically, an individual can do little to bring about changes in society	0.11	0.05	2.22*	1.12	0.11	0.05	2.21*	1.12
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?								
	No	-0.18	0.09	-1.98*	0.84	-0.17	0.09		
	Missing	-0.17	0.18			-0.15	0.18		
Probable Major									
	Arts and Humanities	0.00	0.12			-0.01	0.12		
	Business	-0.06	0.11			-0.04	0.12		
	Engineering	0.22	0.10	2.23*	1.25	0.24	0.10	2.41*	1.27
	Education	0.26	0.23			0.27	0.24		
	Natural Sciences	-0.09	0.12			-0.08	0.12		
	Social Sciences	0.19	0.13			0.19	0.13		
	Professional	-0.06	0.12			-0.05	0.13		
	Other or Technical	0.08	0.21			0.09	0.21		
Institution-Level									
Intercept (γ_{00})		-0.85	0.16	-5.39*	0.43	-0.78	0.14	-5.56*	0.46
Administration Methods									
Mode	Web only					-0.85	0.34	-2.47*	0.43
	Mail only					-1.91	0.52	-3.70*	0.15
	Paper & Web					-1.11	0.59		
Incentive	Incentive for all					0.50	0.29		
	Lottery					0.41	0.36		
Structural characteristics									
	Selectivity, in 100-point increments					-0.19	0.25		
	Natural log of Size (undergraduate enrollment)					-0.29	0.15		
Climate									
	% of undergraduate students non-White, 10-point increments					-0.15	0.09		
	Graduation rate, 10-point increments					0.16	0.19		
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments					-0.05	0.08		
Level-2 Variance component (u_0)							1.10		
Proportion of variance accounted for at Level 2							23.1%		

Source: Final Asian American YFCY HGLM analysis sample

Note. Non-significant variables are shaded in gray, odds ratios and t-statistics shown for significant variables only.
SE = Standard Error; OR = Odds Ratio

* $p < .05$

Table 4.21

Final Hierarchical Models Predicting Likelihood of YFCY Response, African American/Black Students Only (N = 3,405)

		Model 1 Student-Level Variables Only				Model 2 Student & Institution-Level Variables			
Category	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Student Level									
Background Characteristics									
Gender	Female	-0.03	0.12			-0.02	0.12		
SES	Parental income	0.02	0.02			0.02	0.02		
	Not first generation	0.12	0.12			0.12	0.12		
	Future Act: Get a job to pay expenses	-0.02	0.09			-0.03	0.09		
Personality and other individual differences									
	Scholar (Factor)	-0.13	0.07			-0.12	0.07		
	Leader (Factor)	-0.06	0.06			-0.07	0.06		
	Hedonist (Factor)	-0.12	0.08			-0.11	0.08		
	Status Striver (Factor)	-0.02	0.05			-0.02	0.05		
	Artist (Factor)	-0.17	0.05	-3.13*	0.84	-0.17	0.05	-3.27*	0.84
	Social Activist (Factor)	0.02	0.06			0.02	0.06		
	Self Rating: Cooperativeness	0.03	0.06			0.03	0.06		
Correlates of academic achievement									
	High school GPA	0.17	0.03	5.02*	1.18	0.18	0.03	5.16*	1.19
	SAT score	0.01	0.03			0.02	0.04		
	Reason for going to college: Learning (Factor)	0.19	0.06	3.31*	1.21	0.19	0.06	3.25*	1.21
Missingness Indicators									
	Parental income	0.23	0.15			0.24	0.14		
	SAT/ACT Score	-0.29	0.13	-2.19*	0.75	-0.31	0.13	-2.37*	0.73
	Number of Missing items	-0.01	0.01			-0.01	0.01		
Correlates of academic and social involvement									
	Future Act: Participate in student clubs/groups	0.07	0.06			0.07	0.06		
	HS Act: Asked a teacher for advice after class	-0.09	0.06			-0.09	0.06		
	HS Act: Tutored another student	-0.01	0.07			-0.01	0.07		
	HS Act: Socialized w/ someone of another racial/ethnic group	-0.14	0.11			-0.15	0.11		
	Hours per week (HPW) in HS: Socializing with friends	-0.01	0.04			-0.01	0.04		
	HPW in HS: Studying/ homework	0.04	0.04			0.04	0.04		
Correlates of satisfaction									
	Future Act: Transfer to another college before graduating	-0.11	0.05	-1.96†	0.90	-0.11	0.06	-2.06*	0.89
	Future Act: Be satisfied with college	0.08	0.07			0.08	0.07		
	Is this institution your 1st choice?	0.08	0.10			0.09	0.10		

(continued)

Category	Variable	Model 1 Student-Level Variables Only β	SE	t	OR	Model 2 Student & Institution-Level Variables β	SE	t	OR
Propensity to be engaged with, participate in organizations									
	HS Act: Performed volunteer work	-0.03	0.08			-0.04	0.08		
	HS Act: Voted in a student election	-0.10	0.07			-0.10	0.07		
	Future Act: Participate in student government	0.00	0.06			0.01	0.06		
Potential Proxies of attitudes towards surveys, research									
	Realistically, an individual can do little to bring about changes in society	-0.02	0.06			-0.01	0.06		
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?								
	No	-0.03	0.11			-0.02	0.11		
	Missing	0.02	0.14			0.06	0.14		
Probable Major									
	Arts and Humanities	-0.05	0.22			-0.04	0.22		
	Business	0.00	0.18			0.01	0.19		
	Engineering	-0.15	0.24			-0.10	0.25		
	Education	-0.18	0.20			-0.17	0.20		
	Natural Sciences	-0.07	0.20			-0.05	0.20		
	Social Sciences	0.16	0.18			0.17	0.18		
	Professional	0.03	0.18			0.06	0.18		
	Other or Technical	0.19	0.23			0.19	0.23		
Institution-Level									
Intercept (γ_{00})		-1.11	0.16	-6.96*	0.33	-1.08	0.13	-8.05*	0.34
Administration Methods									
Mode	Web only					-1.28	0.38	-3.37*	0.28
	Mail only					-1.27	0.40	-3.14*	0.28
	Paper & Web					-1.38	0.53	-2.61*	0.25
Incentive	Incentive for all					0.71	0.32	2.22*	2.04
	Lottery					0.31	0.38		
Structural characteristics									
	Selectivity, in 100-point increments					-0.18	0.22		
	Natural log of Size (undergraduate enrollment)					-0.42	0.14	-2.89*	0.66
Climate									
	% of undergraduate students non-White, 10-point increments					-0.07	0.07		
	Graduation rate, 10-point increments					0.09	0.18		
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments					-0.06	0.08		
Level-2 Variance component (u_0)							1.28		
Proportion of variance accounted for at Level 2							25.7%		

Source: Final African American/Black YFCY HGLM analysis sample

Note. Non-significant variables are shaded in gray, odds ratios and t-statistics shown for significant variables only.
SE = Standard Error; OR = Odds Ratio

* $p < .05$, † $p = .05$

Table 4.22

Final Hierarchical Models Predicting Likelihood of YFCY Response, Latino/a Students Only (N = 2,344)

		Model 1 Student-Level Variables Only				Model 2 Student & Institution-Level Variables			
Category	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Student Level									
Background Characteristics									
Gender	Female	0.25	0.11	2.21*	1.28	0.27	0.12	2.34*	1.31
SES	Parental income	-0.02	0.02			-0.02	0.02		
	Not first generation	0.16	0.12			0.17	0.12		
	Future Act: Get a job to pay expenses	0.10	0.06			0.11	0.06		
Personality and other individual differences									
	Scholar (Factor)	-0.08	0.07			-0.08	0.07		
	Leader (Factor)	-0.06	0.09			-0.06	0.09		
	Hedonist (Factor)	-0.17	0.07	-2.51*	0.84	-0.17	0.07	-2.52*	0.84
	Status Striver (Factor)	-0.14	0.06	-2.43*	0.87	-0.14	0.06	-2.39*	0.87
	Artist (Factor)	0.00	0.07			-0.01	0.07		
	Social Activist (Factor)	0.03	0.06			0.03	0.06		
	Self Rating: Cooperativeness	-0.04	0.07			-0.04	0.07		
Correlates of academic achievement									
	High school GPA	0.11	0.05	2.04*	1.11	0.11	0.05	2.12*	1.12
	SAT score	0.00	0.06			0.00	0.06		
	Reason for going to college: Learning (Factor)	-0.05	0.07			-0.05	0.07		
Missingness Indicators									
	Parental income	0.20	0.16			0.20	0.16		
	SAT/ACT Score	-0.08	0.10			-0.10	0.10		
	Number of Missing items	-0.01	0.01			0.00	0.01		
Correlates of academic and social involvement									
	Future Act: Participate in student clubs/groups	-0.04	0.07			-0.04	0.07		
	HS Act: Asked a teacher for advice after class	0.13	0.09			0.13	0.09		
	HS Act: Tutored another student	-0.02	0.07			-0.02	0.08		
	HS Act: Socialized w/ someone of another racial/ethnic group	-0.09	0.12			-0.09	0.12		
	Hours per week (HPW) in HS: Socializing with friends	0.02	0.03			0.02	0.04		
	HPW in HS: Studying/ homework	0.08	0.03	2.45*	1.08	0.08	0.03	2.21*	1.08
Correlates of satisfaction									
	Future Act: Transfer to another college before graduating	-0.06	0.06			-0.05	0.06		
	Future Act: Be satisfied with college	0.10	0.10			0.08	0.10		
	Is this institution your 1st choice?	-0.07	0.13			-0.07	0.13		

(continued)

Category	Variable	Model 1 Student-Level Variables Only β	SE	t	OR	Model 2 Student & Institution-Level Variables β	SE	t	OR
Propensity to be engaged with, participate in organizations									
	HS Act: Performed volunteer work	0.03	0.11			0.03	0.11		
	HS Act: Voted in a student election	0.09	0.08			0.09	0.08		
	Future Act: Participate in student government	-0.07	0.05			-0.07	0.05		
Potential Proxies of attitudes towards surveys, research									
	Realistically, an individual can do little to bring about changes in society	-0.08	0.06			-0.08	0.06		
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?								
	No	-0.19	0.10			-0.19	0.10		
	Missing	-0.35	0.20			-0.34	0.21		
Probable Major									
	Arts and Humanities	0.17	0.21			0.16	0.21		
	Business	0.23	0.26			0.22	0.26		
	Engineering	0.35	0.27			0.41	0.27		
	Education	0.23	0.32			0.21	0.32		
	Natural Sciences	0.25	0.25			0.25	0.25		
	Social Sciences	0.26	0.23			0.25	0.23		
	Professional	0.27	0.19			0.28	0.19		
	Other or Technical	0.56	0.32			0.55	0.32		
Institution-Level									
Intercept (γ_{00})		-0.98	0.13	-7.34*	0.38	-0.95	0.12	-7.77*	0.39
Administration Methods									
Mode	Web only					-0.64	0.35		
	Mail only					-1.73	0.65	-2.66*	0.18
	Paper & Web					-0.77	0.47		
Incentive	Incentive for all					0.40	0.30		
	Lottery					-0.01	0.40		
Structural characteristics									
	Selectivity, in 100-point increments					-0.22	0.19		
	Natural log of Size (undergraduate enrollment)					-0.30	0.14	-2.16*	0.74
Climate									
	% of undergraduate students non-White, 10-point increments					0.01	0.10		
	Graduation rate, 10-point increments					0.22	0.15		
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments					0.03	0.08		
Level-2 Variance component (u_0)							0.84		
Proportion of variance accounted for at Level 2							22.6%		

Source: Final Latino/a YFCY HGLM analysis sample

Note. Non-significant variables are shaded in gray, odds ratios and t-statistics shown for significant variables only.
SE = Standard Error; OR = Odds Ratio

* $p < .05$

Table 4.23

Final Hierarchical Models Predicting Likelihood of YFCY Response, White Students Only (N = 5,000)

		Model 1 Student-Level Variables Only				Model 2 Student & Institution-Level Variables			
Category	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Student Level									
Background Characteristics									
Gender	Female	0.38	0.08	4.58*	1.46	0.38	0.08	4.62*	1.46
SES	Parental income	0.02	0.02			0.02	0.02		
	Not first generation	-0.08	0.11			-0.08	0.11		
	Future Act: Get a job to pay expenses	0.00	0.04			0.01	0.04		
Personality and other individual differences									
	Scholar (Factor)	0.07	0.06			0.07	0.06		
	Leader (Factor)	-0.08	0.04			-0.08	0.04		
	Hedonist (Factor)	-0.14	0.04	-3.81*	0.87	-0.15	0.04	-3.81*	0.86
	Status Striver (Factor)	0.04	0.04			0.05	0.04		
	Artist (Factor)	0.01	0.05			0.00	0.05		
	Social Activist (Factor)	-0.08	0.05			-0.08	0.05		
	Self Rating: Cooperativeness	0.07	0.05			0.07	0.05		
Correlates of academic achievement									
	High school GPA	0.10	0.03	3.01*	1.11	0.11	0.03	3.11*	1.11
	SAT score	0.03	0.03			0.02	0.03		
	Reason for going to college: Learning (Factor)	0.07	0.04			0.07	0.04		
Missingness Indicators									
	Parental income	0.03	0.12			0.03	0.12		
	SAT/ACT Score	-0.13	0.13			-0.14	0.13		
	Number of Missing items	-0.02	0.01	-2.18*	0.98	-0.02	0.01	-2.16*	0.98
Correlates of academic and social involvement									
	Future Act: Participate in student clubs/groups	0.05	0.05			0.05	0.05		
	HS Act: Asked a teacher for advice after class	-0.10	0.06			-0.11	0.06		
	HS Act: Tutored another student	-0.03	0.04			-0.03	0.04		
	HS Act: Socialized w/ someone of another racial/ethnic group	-0.08	0.05			-0.08	0.06		
	Hours per week (HPW) in HS: Socializing with friends	-0.01	0.02			-0.01	0.02		
	HPW in HS: Studying/ homework	0.05	0.02			0.04	0.02		
Correlates of satisfaction									
	Future Act: Transfer to another college before graduating	-0.09	0.04	-2.24*	0.91	-0.09	0.04	-2.19*	0.91
	Future Act: Be satisfied with college	0.01	0.08			0.01	0.08		
	Is this institution your 1st choice?	0.08	0.08			0.08	0.08		

(continued)

Category	Variable	Model 1 Student-Level Variables Only β	SE	t	OR	Model 2 Student & Institution-Level Variables β	SE	t	OR
Propensity to be engaged with, participate in organizations									
	HS Act: Performed volunteer work	0.09	0.07			0.09	0.07		
	HS Act: Voted in a student election	0.04	0.06			0.04	0.06		
	Future Act: Participate in student government	0.02	0.05			0.02	0.05		
Potential Proxies of attitudes towards surveys, research									
	Realistically, an individual can do little to bring about changes in society	-0.04	0.05			-0.04	0.05		
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?								
	No	-0.18	0.08	-2.23*	0.83	-0.17	0.08	-2.11*	0.84
	Missing	0.01	0.16			0.02	0.16		
Probable Major									
	Arts and Humanities	0.21	0.15			0.21	0.15		
	Business	0.18	0.14			0.18	0.14		
	Engineering	0.22	0.16			0.24	0.16		
	Education	0.27	0.16			0.28	0.16		
	Natural Sciences	0.25	0.15			0.25	0.15		
	Social Sciences	0.03	0.13			0.03	0.13		
	Professional	0.04	0.13			0.04	0.13		
	Other or Technical	0.22	0.21			0.23	0.22		
Institution-Level									
Intercept (γ_{00})		-0.85	0.13	-6.45*	0.43	-0.82	0.11	-7.35*	0.44
Administration Methods									
Mode	Web only					-0.99	0.30	-3.24*	0.37
	Mail only					-1.88	0.45	-4.18*	0.15
	Paper & Web					-1.04	0.45	-2.32*	0.35
Incentive	Incentive for all					0.60	0.23	2.56*	1.81
	Lottery					0.42	0.35		
Structural characteristics									
	Selectivity, in 100-point increments					0.06	0.17		
	Natural log of Size (undergraduate enrollment)					-0.33	0.13	-2.57*	0.72
Climate									
	% of undergraduate students non-White, 10-point increments					-0.06	0.10		
	Graduation rate, 10-point increments					0.01	0.14		
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments					-0.06	0.07		
Level-2 Variance component (u_0)							1.10		
Proportion of variance accounted for at Level 2							21.6%		

Source: Final White YFCY HGLM analysis sample

Note. Non-significant variables are shaded in gray, odds ratios and t-statistics shown for significant variables only.
SE = Standard Error; OR = Odds Ratio

* $p < .05$

Table 4.24

Final Hierarchical Models Predicting Likelihood of CSS Response, Asian American Students Only (N = 3, 980)

		Model 1 Student-Level Variables Only				Model 2 Student & Institution-Level Variables			
Category	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Student Level									
Background Characteristics									
Gender	Female	0.07	0.16			0.08	0.15		
SES	Parental income	0.02	0.02			0.02	0.02		
	Not first generation	-0.06	0.15			-0.06	0.15		
	Future Act: Get a job to pay expenses	0.04	0.05			0.04	0.05		
Personality and other individual differences									
	Scholar (Factor)	-0.04	0.08			-0.04	0.08		
	Leader (Factor)	-0.04	0.09			-0.05	0.09		
	Hedonist (Factor)	-0.07	0.07			-0.07	0.07		
	Status Striver (Factor)	-0.10	0.05	-2.08*	0.90	-0.09	0.05		
	Artist (Factor)	-0.02	0.06			-0.01	0.06		
	Social Activist (Factor)	0.00	0.08			-0.01	0.08		
	Self Rating: Cooperativeness	0.02	0.08			0.03	0.08		
Correlates of academic achievement									
	High school GPA	0.20	0.09	2.22*	1.22	0.19	0.09	2.16*	1.20
	SAT score	0.06	0.07			0.04	0.07		
	Reason for going to college: Learning (Factor)	-0.01	0.07			-0.02	0.07		
Missingness Indicators									
	Parental income	0.17	0.15			0.18	0.15		
	SAT/ACT Score	-0.02	0.23			0.01	0.23		
	Number of Missing items	-0.01	0.01			-0.01	0.01		
Correlates of academic and social involvement									
	Future Act: Participate in student clubs/groups	0.15	0.07	2.00*	1.16	0.14	0.08		
	HS Act: Asked a teacher for advice after class	-0.01	0.14			-0.01	0.14		
	HS Act: Tutored another student	-0.06	0.08			-0.06	0.08		
	HS Act: Socialized w/ someone of another racial/ethnic group	0.08	0.09			0.08	0.10		
	Hours per week (HPW) in HS: Socializing with friends	0.00	0.03			0.01	0.03		
	HPW in HS: Studying/ homework	0.02	0.04			0.01	0.04		
Correlates of satisfaction									
	Future Act: Transfer to another college before graduating	-0.21	0.07	-2.91*	0.81	-0.20	0.07	-2.84*	0.82
	Future Act: Be satisfied with college	-0.06	0.09			-0.07	0.09		
	Is this institution your 1st choice?	0.04	0.10			0.03	0.10		

(continued)

Category	Variable	Model 1 Student-Level Variables Only β	SE	t	OR	Model 2 Student & Institution-Level Variables β	SE	t	OR
Propensity to be engaged with, participate in organizations									
	HS Act: Performed volunteer work	-0.04	0.08			-0.04	0.08		
	HS Act: Voted in a student election	0.05	0.09			0.05	0.09		
	Future Act: Participate in student government	-0.11	0.08			-0.10	0.08		
Potential Proxies of attitudes towards surveys, research									
	Realistically, an individual can do little to bring about changes in society	-0.16	0.07	-2.31*	0.85	-0.16	0.07	-2.28*	0.85
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?								
	No	0.02	0.10			0.00	0.10		
	Missing	0.06	0.17			0.05	0.17		
Probable Major									
	Arts and Humanities	0.03	0.25			0.04	0.25		
	Business	0.40	0.25			0.40	0.25		
	Engineering	-0.13	0.19			-0.10	0.18		
	Education	0.90	0.23	3.89*	2.46	0.92	0.24	3.80*	2.50
	Natural Sciences	-0.31	0.19			-0.30	0.19		
	Social Sciences	0.21	0.19			0.22	0.20		
	Professional	-0.39	0.26			-0.35	0.26		
	Other or Technical	0.63	0.40			0.69	0.40		
Institution-Level									
Intercept (γ_{00})		-1.43	0.17	-8.38*	0.24	-1.42	0.14	-10.12*	0.24
Administration Methods									
Mode	Web only					-0.89	0.29	-3.05*	0.41
	Mail only					-1.31	0.49	-2.67*	0.27
	Paper & Web					-0.66	0.61		
Incentive	Incentive for all					0.58	0.43		
	Lottery					-0.17	0.29		
Structural characteristics									
	Selectivity, in 100-point increments					0.14	0.15		
	Natural log of Size (undergraduate enrollment)					-0.36	0.13	-2.76*	0.69
Climate									
	% of undergraduate students non-White, 10-point increments					0.07	0.08		
	Graduation rate, 10-point increments					0.29	0.16		
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments					0.13	0.08		
Level-2 Variance component (u_0)						0.78			
Proportion of variance accounted for at Level 2						57.2%			

Source: Final Asian American CSS HGLM analysis sample

Note. Non-significant variables are shaded in gray, odds ratios and t-statistics shown for significant variables only.
SE = Standard Error; OR = Odds Ratio

* $p < .05$, † $p = .05$

Table 4.25

Final Hierarchical Models Predicting Likelihood of CSS Response, African American/Black Students Only (N = 2,543)

		Model 1 Student-Level Variables Only				Model 2 Student & Institution-Level Variables			
Category	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Student Level									
Background Characteristics									
Gender	Female	0.46	0.18	2.58*	1.58	0.49	0.18	2.79*	1.63
SES	Parental income	0.04	0.02			0.04	0.02		
	Not first generation	-0.06	0.17			-0.08	0.17		
	Future Act: Get a job to pay expenses	0.06	0.10			0.08	0.10		
Personality and other individual differences									
	Scholar (Factor)	0.11	0.11			0.12	0.11		
	Leader (Factor)	-0.12	0.09			-0.12	0.09		
	Hedonist (Factor)	0.03	0.10			0.03	0.10		
	Status Striver (Factor)	-0.14	0.10			-0.13	0.10		
	Artist (Factor)	-0.04	0.07			-0.04	0.07		
	Social Activist (Factor)	-0.10	0.08			-0.10	0.08		
	Self Rating: Cooperativeness	0.03	0.09			0.03	0.09		
Correlates of academic achievement									
	High school GPA	0.12	0.06	2.19*	1.13	0.11	0.06	2.04*	1.12
	SAT score	0.10	0.06			0.09	0.06		
	Reason for going to college: Learning (Factor)	0.17	0.10			0.17	0.10		
Missingness Indicators									
	Parental income	-0.06	0.18			-0.04	0.18		
	SAT/ACT Score	-0.27	0.18			-0.27	0.18		
	Number of Missing items	0.00	0.02			0.00	0.02		
Correlates of academic and social involvement									
	Future Act: Participate in student clubs/groups	0.13	0.09			0.14	0.09		
	HS Act: Asked a teacher for advice after class	-0.01	0.11			-0.02	0.12		
	HS Act: Tutored another student	0.16	0.12			0.17	0.12		
	HS Act: Socialized w/ someone of another racial/ethnic group	0.26	0.18			0.24	0.18		
	Hours per week (HPW) in HS: Socializing with friends	-0.02	0.04			-0.02	0.04		
	HPW in HS: Studying/ homework	0.05	0.04			0.04	0.04		
Correlates of satisfaction									
	Future Act: Transfer to another college before graduating	-0.08	0.09			-0.08	0.09		
	Future Act: Be satisfied with college	0.07	0.14			0.08	0.14		
	Is this institution your 1st choice?	0.05	0.13			0.06	0.13		

(continued)

Category	Variable	Model 1 Student-Level Variables Only β	SE	t	OR	Model 2 Student & Institution-Level Variables β	SE	t	OR
Propensity to be engaged with, participate in organizations									
	HS Act: Performed volunteer work	0.03	0.11			0.02	0.11		
	HS Act: Voted in a student election	-0.02	0.12			-0.02	0.12		
	Future Act: Participate in student government	0.03	0.09			0.04	0.09		
Potential Proxies of attitudes towards surveys, research									
	Realistically, an individual can do little to bring about changes in society	-0.03	0.07			-0.02	0.07		
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?								
	No	-0.10	0.14			-0.09	0.14		
	Missing	-0.09	0.17			-0.08	0.18		
Probable Major									
	Arts and Humanities	0.04	0.28			0.04	0.28		
	Business	-0.12	0.33			-0.14	0.34		
	Engineering	-0.46	0.46			-0.44	0.47		
	Education	-0.37	0.34			-0.45	0.35		
	Natural Sciences	-0.04	0.32			-0.05	0.32		
	Social Sciences	-0.12	0.24			-0.12	0.25		
	Professional	0.15	0.25			0.16	0.25		
	Other or Technical	-0.49	0.38			-0.51	0.39		
Institution-Level									
Intercept (γ_{00})		-1.75	0.16	-10.63*	0.17	-1.68	0.14	-10.12*	0.19
Administration Methods									
Mode	Web only					-1.03	0.32	-3.05*	0.36
	Mail only					-1.58	0.71	-2.67*	0.21
	Paper & Web					-0.59	0.45		
Incentive	Incentive for all					0.58	0.37		
	Lottery					0.06	0.29		
Structural characteristics									
	Selectivity, in 100-point increments					-0.02	0.18		
	Natural log of Size (undergraduate enrollment)					-0.13	0.16		
Climate									
	% of undergraduate students non-White, 10-point increments					-0.16	0.12		
	Graduation rate, 10-point increments					0.18	0.17		
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments					0.10	0.07		
Level-2 Variance component (u_0)						1.01			
Proportion of variance accounted for at Level 2						36.1%			

Source: Final African American/Black CSS HGLM analysis sample

Note. Non-significant variables are shaded in gray, odds ratios and t-statistics shown for significant variables only.
SE = Standard Error; OR = Odds Ratio

* $p < .05$

Table 4.26

Final Hierarchical Models Predicting Likelihood of CSS Response, Latino/a Students Only (N =3,647)

		Model 1 Student-Level Variables Only				Model 2 Student & Institution-Level Variables			
Category	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Student Level									
Background Characteristics									
Gender	Female	0.30	0.13	2.33*	1.35	0.33	0.13	2.48*	1.38
SES	Parental income	0.02	0.01			0.02	0.01		
	Not first generation	0.11	0.13			0.11	0.13		
	Future Act: Get a job to pay expenses	-0.04	0.07			-0.03	0.07		
Personality and other individual differences									
	Scholar (Factor)	-0.14	0.10			-0.13	0.10		
	Leader (Factor)	0.00	0.07			-0.01	0.07		
	Hedonist (Factor)	-0.12	0.08			-0.12	0.08		
	Status Striver (Factor)	-0.05	0.07			-0.05	0.07		
	Artist (Factor)	0.03	0.08			0.03	0.08		
	Social Activist (Factor)	-0.05	0.08			-0.06	0.07		
	Self Rating: Cooperativeness	-0.02	0.08			-0.03	0.08		
Correlates of academic achievement									
	High school GPA	0.26	0.06	4.55*	1.29	0.25	0.06	4.28*	1.28
	SAT score	0.07	0.06			0.05	0.06		
	Reason for going to college: Learning (Factor)	-0.10	0.08			-0.10	0.08		
Missingness Indicators									
	Parental income	0.15	0.21			0.15	0.21		
	SAT/ACT Score	0.00	0.17			-0.01	0.17		
	Number of Missing items	-0.01	0.01			-0.01	0.02		
Correlates of academic and social involvement									
	Future Act: Participate in student clubs/groups	0.00	0.10			0.00	0.10		
	HS Act: Asked a teacher for advice after class	-0.11	0.10			-0.12	0.10		
	HS Act: Tutored another student	-0.01	0.07			-0.01	0.07		
	HS Act: Socialized w/ someone of another racial/ethnic group	0.12	0.14			0.10	0.14		
	Hours per week (HPW) in HS: Socializing with friends	-0.04	0.03			-0.04	0.03		
	HPW in HS: Studying/ homework	0.05	0.04			0.05	0.04		
Correlates of satisfaction									
	Future Act: Transfer to another college before graduating	-0.20	0.06	-3.38*	0.82	-0.19	0.06	-3.22*	0.82
	Future Act: Be satisfied with college	0.05	0.12			0.05	0.12		
	Is this institution your 1st choice?	-0.02	0.15			-0.01	0.15		

(continued)

Category	Variable	Model 1 Student-Level Variables Only β	SE	t	OR	Model 2 Student & Institution-Level Variables β	SE	t	OR
Propensity to be engaged with, participate in organizations									
	HS Act: Performed volunteer work	-0.08	0.08			-0.08	0.08		
	HS Act: Voted in a student election	0.22	0.08	2.63*	1.25	0.22	0.08	2.64*	1.25
	Future Act: Participate in student government	0.11	0.06			0.12	0.06		
Potential Proxies of attitudes towards surveys, research									
	Realistically, an individual can do little to bring about changes in society	-0.01	0.08			0.01	0.08		
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?								
	No	-0.03	0.14			-0.03	0.14		
	Missing	-0.15	0.19			-0.14	0.19		
Probable Major									
	Arts and Humanities	-0.40	0.29			-0.41	0.29		
	Business	-0.08	0.20			-0.12	0.20		
	Engineering	-0.74	0.35	-2.10*	0.48	-0.78	0.36	-2.18*	0.46
	Education	0.13	0.23			0.05	0.22		
	Natural Sciences	-0.25	0.23			-0.34	0.22		
	Social Sciences	-0.10	0.23			-0.12	0.23		
	Professional	-0.58	0.26	-2.22*	0.56	-0.61	0.26	-2.35*	0.54
	Other or Technical	-0.01	0.28			-0.03	0.28		
Institution-Level									
Intercept (γ_{00})		-1.56	0.17	-8.92*	0.21	-1.44	0.14	-10.41*	0.24
Administration Methods									
Mode	Web only					-1.01	0.32	-3.10*	0.37
	Mail only					-1.46	0.47	-3.11*	0.23
	Paper & Web					0.27	0.57		
Incentive	Incentive for all					0.67	0.34	1.98†	1.95
	Lottery					-0.40	0.33		
Structural characteristics									
	Selectivity, in 100-point increments					-0.22	0.16		
	Natural log of Size (undergraduate enrollment)					-0.21	0.15		
Climate									
	% of undergraduate students non-White, 10-point increments					-0.03	0.10		
	Graduation rate, 10-point increments					0.38	0.15	2.61*	1.47
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments					0.18	0.08	2.18*	1.19
Level-2 Variance component (u_0)						1.04			
Proportion of variance accounted for at Level 2						38.9%			

Source: Final Latino/a CSS HGLM analysis sample

Note. Non-significant variables are shaded in gray, odds ratios and t-statistics shown for significant variables only.
SE = Standard Error; OR = Odds Ratio

* $p < .05$

Table 4.27

Final Hierarchical Models Predicting Likelihood of CSS Response, White Students Only (N = 4,186)

		Model 1 Student-Level Variables Only				Model 2 Student & Institution-Level Variables			
Category	**Variable**	**β**	**SE**	**t**	**OR**	**β**	**SE**	**t**	**OR**
Student Level									
Background Characteristics									
Gender	Female	0.26	0.10	2.76*	1.30	0.26	0.10	2.75*	1.30
SES	Parental income	0.00	0.02			0.00	0.02		
	Not first generation	-0.15	0.13			-0.16	0.13		
	Future Act: Get a job to pay expenses	-0.03	0.05			-0.02	0.05		
Personality and other individual differences									
	Scholar (Factor)	-0.11	0.05	-2.11*	0.89	-0.11	0.05	-2.00*	0.90
	Leader (Factor)	-0.10	0.05	-2.19*	0.90	-0.10	0.05	-2.25*	0.90
	Hedonist (Factor)	-0.09	0.05			-0.08	0.05		
	Status Striver (Factor)	0.04	0.05			0.06	0.05		
	Artist (Factor)	-0.12	0.05	-2.30*	0.89	-0.11	0.05	-2.27*	0.89
	Social Activist (Factor)	-0.02	0.06			-0.03	0.06		
	Self Rating: Cooperativeness	0.01	0.06			0.01	0.06		
Correlates of academic achievement									
	High school GPA	0.31	0.04	7.02*	1.36	0.31	0.04	6.93*	1.36
	SAT score	0.08	0.04	2.17*	1.09	0.07	0.04		
	Reason for going to college: Learning (Factor)	0.05	0.06			0.05	0.06		
Missingness Indicators									
	Parental income	-0.10	0.17			-0.10	0.17		
	SAT/ACT Score	-0.26	0.14			-0.26	0.15		
	Number of Missing items	-0.02	0.01			-0.02	0.01		
Correlates of academic and social involvement									
	Future Act: Participate in student clubs/groups	0.05	0.06			0.05	0.06		
	HS Act: Asked a teacher for advice after class	0.09	0.08			0.08	0.08		
	HS Act: Tutored another student	-0.06	0.07			-0.06	0.07		
	HS Act: Socialized w/ someone of another racial/ethnic group	-0.06	0.07			-0.04	0.07		
	Hours per week (HPW) in HS: Socializing with friends	0.04	0.03			0.04	0.03		
	HPW in HS: Studying/ homework	0.07	0.03	2.03*	1.07	0.06	0.03		
Correlates of satisfaction									
	Future Act: Transfer to another college before graduating	-0.24	0.06	-4.04*	0.79	-0.26	0.06	-4.28*	0.77
	Future Act: Be satisfied with college	-0.08	0.10			-0.09	0.10		
	Is this institution your 1st choice?	0.00	0.11			-0.01	0.11		

(continued)

Category	Variable	Model 1 Student-Level Variables Only β	SE	t	OR	Model 2 Student & Institution-Level Variables β	SE	t	OR
Propensity to be engaged with, participate in organizations									
	HS Act: Performed volunteer work	0.15	0.08	1.98*	1.17	0.16	0.08	1.99*	1.17
	HS Act: Voted in a student election	0.08	0.07			0.08	0.07		
	Future Act: Participate in student government	-0.03	0.05			-0.03	0.05		
Potential Proxies of attitudes towards surveys, research									
	Realistically, an individual can do little to bring about changes in society	-0.01	0.07			-0.01	0.07		
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?								
	No	-0.08	0.08			-0.08	0.08		
	Missing	-0.02	0.14			-0.03	0.14		
Probable Major									
	Arts and Humanities	-0.14	0.17			-0.14	0.17		
	Business	-0.16	0.16			-0.18	0.16		
	Engineering	-0.26	0.20			-0.26	0.20		
	Education	-0.38	0.18	-2.05*	0.69	-0.39	0.18	-2.14*	0.68
	Natural Sciences	-0.17	0.16			-0.19	0.16		
	Social Sciences	-0.10	0.18			-0.10	0.18		
	Professional	-0.32	0.19			-0.31	0.19		
	Other or Technical	-0.24	0.22			-0.22	0.23		
Institution-Level									
Intercept (γ_{00})		-1.03	0.13	-8.23*	0.36	-1.01	0.09	-10.72*	0.36
Administration Methods									
Mode	Web only					-1.10	0.23	-4.81*	0.33
	Mail only					-1.21	0.44	-2.72*	0.30
	Paper & Web					-0.73	0.39		
Incentive	Incentive for all					0.41	0.30		
	Lottery					0.01	0.21		
Structural characteristics									
	Selectivity, in 100-point increments					0.02	0.13		
	Natural log of Size (undergraduate enrollment)					-0.36	0.11	-3.31*	0.70
Climate									
	% of undergraduate students non-White, 10-point increments					0.01	0.07		
	Graduation rate, 10-point increments					0.18	0.12		
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments					0.07	0.04		
Level-2 Variance component (u_0)						0.66			
Proportion of variance accounted for at Level 2						45.4%			

Source: Final White CSS HGLM analysis sample

Note. Non-significant variables are shaded in gray, odds ratios and t-statistics shown for significant variables only.

SE = Standard Error; OR = Odds Ratio

* p < .05, † p = .05

Correlates of satisfaction. With two exceptions, students' self-rated likelihood of transferring to another college before graduating negatively predicted both YFCY and CSS response for students of all race/ethnicities (the exceptions to this were Latino/a students for YFCY response, and Black students for CSS response). Interestingly, the self-rated likelihood of transfer had a more negative impact on CSS response than on YFCY when examined within groups (YFCY odds ratios 0.89-0.91, CSS odds ratios 0.77-0.82), but across racial/ethnic groups the impact of the variable (when significant) was similar within each set of analyses. Self-rated likelihood of being satisfied with college had no significant impact on any group for either survey. Having indicated that an institution was a students' first choice or not significantly predicted YFCY response for Asian Americans only, but the effect of first choice status for this group was curiously negative, with students attending their first choice approximately 0.83 times as likely to respond to the YFCY as those not attending their first choice. Although counter-intuitive, these results agree with descriptive results, which show that Asian Americans attending their first choice responded to the YFCY at lower rates than those at their second or lower choice (23% vs. 26%; the opposite was the case for all other racial/ethnic groups). It is not clear why such a pattern is observed—potentially it may have something to do with the fact that Asian Americans in the YFCY sample were far less likely than students of any other racial/ethnic group to indicate that they were attending their first choice (49%, compared to 53% of African Americans, 66% of Latino/as, and 73% of White students).

Propensity to be engaged with, participate in organizations. None of the variables representing students' propensities to be engaged with or participate in organizations significantly predicted YFCY response for students of any race/ethnicity. Two of these variables predicted CSS response, one in the Latino/a model, and one in the White model. Among

Latino/as, students who voted in a student election in high school were 1.25 times as likely to respond to the CSS as those who did not cast such a vote. Among White students, on the other hand, the frequency with which students reported performing volunteer work in high school significantly and positively predicted CSS response propensity (odds ratio 1.17).

Proxies of attitudes towards surveys/research. Only among Asian American and White students were any of the proxies of attitudes towards surveys/research significant response predictors. Among White students, not answering the question asking for permission to include their ID number negatively predicted YFCY response, with those skipping this question 0.84 times as likely to respond to the YFCY as those who answered "yes." No effect was shown for this variable among Whites for CSS response, nor among any other group in the other analyses. Among Asian Americans, the question pertaining to whether an individual can bring about changes in society significantly predicted both YFCY and CSS response, though in opposite directions on each survey. On the YFCY, feeling more strongly that an individual can do little to bring about changes in society was associated (counter-intuitively) with higher response propensities (odds ratio 1.12), while on the CSS the opposite was the case (odds ratio 0.85).

The impact of the "individual changing society" variable in the Asian American YFCY analysis is odd, because descriptively, higher agreement on this variable was associated with slightly lower YFCY response rates for Asian Americans. Specifically, 25.3% of Asian Americans who "strongly disagreed" that an individual can do little to bring about changes in society responded to the YFCY, compared to 23.8% of those who "strongly agreed" (the same pattern was shown for all other students, though the differences between the strong agreers and strong disagreers were much larger for other groups). Entering variables into the Asian American YFCY model one by one revealed that part of the counterintuitive positive effect of

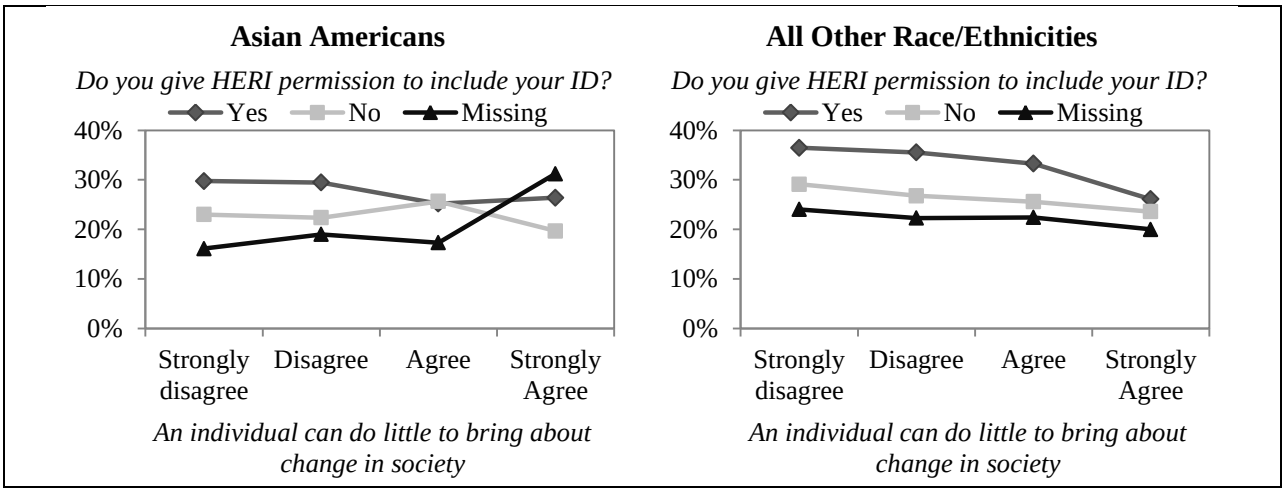

Figure 4.8. YFCY response rates among Asian Americans and all other race/ethnicities, by opinions on whether an individual can bring about changes in society, and whether or not permission to include ID was granted

Source: Final HGLM analysis samples, by race (see Appendix G for more details)

believing individuals can do little to change society was likely due to the particulars of the sample employed. Specifically, for Asian Americans on the YFCY, but not for other groups of students on this survey nor any groups on the CSS, there appeared to be an interaction between believing that an individual can make changes in society and the variable representing giving permission to HERI to include students' ID when data was sent back to the institution. As can be seen in Figure 4.8, among students who did not identify as Asian American, agreeing more strongly that an individual can do little to bring about changes in society was associated with lower response rates, regardless of whether permission was granted to include ID numbers. However, among students who identified as Asian American, higher agreement on the individual changing society question was loosely associated with lower response rates for students who answered "yes" or "no" to the ID permission question, but the opposite was the case for students who skipped the ID question entirely. Although there were only 32 Asian American students who both "strongly agreed" that an individual can do little to change society and who skipped the

ID question, it is possible that the unusually high response rate for this small group (31.3%) is behind the surprising positive effect of the "view" variable in the YFCY regression.

Probable major. Few of the indicators representing probable majors significantly predicted YFCY or CSS response, and those that did were primarily predictive of CSS response. Only for Asian American students did any of the major variables significantly predict YFCY response; the students in this group who expected to major in Engineering were 1.27 times as likely to respond to the YFCY as were students who entered college undecided about their major. In terms of CSS response, expecting to major in education was positively associated with response propensity for Asian Americans as well (odds ratio 2.50), but was negatively associated with response propensity for White students (odds ratio 0.68). For Latino/as, expectations of majoring in an engineering or a professional field were both associated with lower response propensities (odds ratios 0.46 and 0.54 respectively). The direction of all of these effects are in line with descriptive results; however, the impact of expecting to major in Education on Asian American CSS response propensity must be interpreted with caution as there were only 86 Asian American students included in the CSS sample who anticipated majoring in this field.

Institution-Level: Survey administration mode. For all race/ethnicities, administration mode significantly predicted YFCY and CSS response propensities. Compared to paper-only survey administrations, mail survey modes significantly and negatively predicted YFCY and CSS response propensities for all racial/ethnic groups (odds ratios 0.10-0.34), and web-only modes significantly and negatively predicted response propensities for all groups but Latino/as on the YFCY (odds ratios 0.28-0.48). As with the aggregated models as well as those separated by gender, odds ratios associated with survey mode variables were among the largest in magnitude for each racial/ethnic group.

To put the very small odds ratios associated with in perspective, Table 4.28 shows each ratio inverted to represent the odds of responding to paper-only surveys compared to each of the other modes. As can be seen, among White, Black and Asian American students, students were more than twice as likely to respond to the YFCY if it was given on paper only than if it was given via the web, and were more than three times (and up to 6.67 times) as likely to respond to paper-only YFCY administrations when compared to mail-only administrations. Among Black and White students, the odds of responding to paper-only surveys were also much higher—approximately 3 to 4 times higher—than the odds of responding to paper and web mixed-mode surveys. Similarly, students of all race/ethnicities were significantly more likely to respond to the CSS if it was given on paper only than on the web (2.44 to 3.03 times as likely), and were significantly more likely to respond to paper-only surveys than surveys given via the mail (3.33 to 4.76 times as likely).

Table 4.28
Odds of Responding to Paper Surveys Versus Surveys Given in Other Modes, YFCY and CSS Analyses by Race/Ethnicity

		YFCY							
		Asian		**Black**		**Latino/a**		**White**	
		OR	**Sig.**	**OR**	**Sig.**	**OR**	**Sig.**	**OR**	**Sig.**
Odds of responding to* non-mail, paper-only surveys, *compared to…									
Administration Mode	Web only	2.33	*	3.57	*	1.89		2.70	*
	Mail only	6.67	*	3.57	*	5.56	*	6.67	*
	Paper & Web	3.03		4.00	*	2.16		2.86	*

		CSS							
		Asian		**Black**		**Latino/a**		**White**	
		OR	**Sig.**	**OR**	**Sig.**	**OR**	**Sig.**	**OR**	**Sig.**
Odds of responding to* non-mail, paper-only surveys, *compared to…									
Administration Mode	Web only	2.44	*	2.78	*	2.70	*	3.03	*
	Mail only	3.70	*	4.76	*	4.35	*	3.33	*
	Paper & Web	1.93		1.80		0.76		2.08	

Source: Final YFCY and CSS HGLM analyses, by race/ethnicity
Note. OR = Odds Ratio
*p < .05

Institution-Level: Incentives. Incentives significantly predicted response propensities for students of different race/ethnicities—at least for the YFCY. In terms of YFCY response, offering a guaranteed incentive for all students was associated with higher odds of response (compared to offering no incentive) for Black students (odds ratio 2.04), and White students (odds ratio 1.81), but had no impact for Asian American or Latino students. In terms of the CSS, incentives did not significantly predict response propensities, but the incentive-for-all condition approached significance for Latino students (odds ratio 1.95, $p = 0.05$). The offering of a lottery incentive did not significantly predict YFCY or CSS response for any group.

Institution-Level: Structural characteristics. None of the structural characteristics other than size significantly impacted the odds of students of different race/ethnicities responding to the YFCY or CSS. Size—the natural log of the number of undergraduates at the institution—negatively predicted YFCY response for all racial/ethnic groups except Asian Americans, and it also negatively predicted CSS response for Asian American and White students. For every one-unit increase in the natural log of undergraduate enrollment, students were approximately 0.6-0.7 times as likely to respond to the relevant survey.

Institution-Level: Climate characteristics. Lastly, none of the climate-related institutional characteristics significantly predicted YFCY response for any racial/ethnic group, but two characteristics did significantly predict CSS response—though one was significant for Latino/a students only, and the other was significant for Asian Americans and Latino/as only. For Asian Americans and Latinos, the proportion of times that an institution has been included in the TFS norms significantly and positively predicted response (Asian American odds ratio 1.34; Latino odds ratio 1.19). Among Latino/as, institutional (six year) graduation rate also positively predicted response (odds ratio 1.47).

The fact that graduation rate impacted response propensities for Latino/as on the CSS only could be attributed to several factors. First, Latino/a students have among the lowest graduation rates from four-year institutions of any racial/ethnic group (DeAngelo, Franke, Hurtado, Pryor, & Tran, 2011). As a result, these students might be uniquely affected by a climate/context in which graduation rates tend to be high for all students. Perhaps Latino/as who attend institutions that graduate a higher proportion of students, knowing that many of their peers at other institutions will not persist to graduation, feel more positively about their institution and are more likely to respond to surveys as a result. A second explanation might be that the graduation rate measure is acting as a proxy in this group for persistence to the fourth year—to the point at which the CSS is taken. However, if this latter explanation s the case, it is not clear why the graduation rate measure would function as a proxy of persistence only for Latino/as.

Institution-Level: Proportion of variance explained. As with all previous analyses, the proportion of variance explained at the institution level was higher in the CSS separate-race analyses than in the YFCY separate-race analyses. Within the YFCY and CSS analyses, however, there was no consistent pattern in terms of which group had the most variance explained at level two. In the YFCY analyses, the largest amount of institution-level variance explained was in the African American analysis (26%), while White students had the least amount of variance explained (22%). In the CSS analyses, the group for which the most variance was accounted for was Asian Americans (with over half of the variance in institutional response rates (57%) accounted for by the model's level-2 predictors), while the group for which the least variance was accounted for was African American students (36%). It is unclear why the CSS models predicted such wildly different amounts of variance across groups; it could be due in part to the composition of the institutional samples that were included in each analysis.

Whether the difference in variance accounted for across groups is due to differences in environmental and survey mode across groups, or whether it is an expression of the particulars of the samples employed, will have to be examined in future studies.

Largest predictors. Table 4.29 displays the five predictor variables with the largest t-statistics (in terms of absolute value) from the YFCY and CSS models disaggregated by race/ethnicity. There were many similarities across groups and surveys in the top predictors, as well as some interesting differences. In terms of similarities, survey administration modality (specifically, variables representing web administration and/or mail administration) showed up in all eight lists at or near the top. High school GPA emerged as one of the largest predictors for many of the groups as well, although this variable was not among the top five variables for Asian Americans in either the YFCY or CSS analyses, nor was it in the list of top five predictors of YFCY response for Latino/a students (these students did, however, have hours per week spent studying in high school appear on their YFCY list). Gender (female) was one of the top predictors for African American and White students in both the YFCY and CSS analyses; it was also a top predictor of CSS response for Latino/a students and YFCY response for Asian American students.

Personality factors emerged in the top five predictors for students of different race/ethnicities in the YFCY models only, with the Hedonist factor appearing in the top five YFCY lists for Asian Americans, Latino/as, and White students, the Artist factor appearing for African American/Black students and Latino/a students, and the Leader factor appearing for Asian Americans. By contrast, expecting to transfer institutions before graduation was a top predictor of CSS response only for all groups except African American/Blacks, for whom transfer likelihood did not appear on any list. Further, variables representing institutional climate

also appeared the top five predictors for CSS regressions only, with institutional size (undergraduate FTE) among the top five predictors of Asian American and White student CSS response, and 6-year graduation rate among the top five predictors of Latino/a students CSS response. Only African American/Black students did not have any institution-level variables (aside from administration mode) appear in their top five YFCY or CSS predictor list. In fact, no institution-level variables besides survey modality were significant in either Black regression.

Table 4.29
Significant Predictor Variables With the Largest t-statistics, YFCY and CSS Analyses by Race

	YFCY			
Rank	**Asian American**		**Black/African American**	
(abs.)	**Predictor**	**t**	**Predictor**	**t**
1	Mode: Mail	-3.70	High school GPA	5.16
2	Female	3.40	Mode: Web	-3.37
3	Leader (factor)	-3.12	Artist (factor)	-3.27
4	First choice institution?	-3.10	Go to College to Learn (factor)	3.25
5	Hedonist (factor)	-2.90	Mode: Mail	-3.14
5	SAT/ACT Score missing	-2.90		
	Latino/a		**White**	
	Predictor	**t**	**Predictor**	**t**
1	Mode: Mail	-2.66	Female	4.62
2	Hedonist (factor)	-2.52	Mode: Mail	-4.18
3	Artist (factor)	-2.39	Hedonist (factor)	-3.81
4	Female	2.34	Mode: Web	-3.24
5	HPW in HS: Studying	2.21	High school GPA	3.11
	CSS			
Rank	**Asian American**		**Black/African American**[a]	
(abs.)	**Predictor**	**t**	**Predictor**	**t**
1	Planned major: Education	3.80	Mode: Web	-3.05
2	Mode: Web	-3.05	Mode: Mail	-2.67
3	Future act: Transfer	-2.84	Female	2.79
4	Institutional size	-2.76	High school GPA	2.04
5	Mode: Mail	-2.67		
	Latino/a		**White**	
	Predictor	**t**	**Predictor**	**t**
1	High school GPA	4.28	High school GPA	6.93
2	Future act: Transfer	-3.22	Mode: Web	-4.81
3	Mode: Mail	-3.11	Future act: Transfer	-4.28
4	Mode: Web	-3.10	Institutional size	-3.31
5	Graduation rate	2.61	Female	2.75

Source: Final YFCY and CSS HGLM analyses by race/ethnicity
Note. abs. = absolute value; t-statistics are ranked in descending order of absolute value, t = t-statistic associated with each predictor. [a]Black/African American students have only four variables listed for the CSS because these were the only significant variables in the model

Summary of Results

Table 4.30 and Table 5.1 summarize the results of all fourteen models run. Table 4.30 shows the odds ratios associated with all significant predictors, while Table 5.1 provides a more general summary, showing hypotheses about the direction of effects for each variable, actual direction of effects in the models, and whether or not these effects supported the working hypotheses undergirding the analysis. Below, the results of all fourteen analyses are synthesized and discussed in terms of predictor magnitude and direction. In the next chapter, these results will be considered in terms of the extent to which they supported the working hypotheses.

Summary of Significant Student-Level Predictors

As can be seen in Table 4.30, there were no student-level predictors that were significant in every model. However, there was a core group of variables that were significant in half or more of the models run: high school GPA (significant positive predictor in 13/14 relevant models); self-rated likelihood of transferring (significant negative predictor in 12/14 models); gender-female (significant positive predictor in 8/10 relevant models); the Hedonist factor (significant negative predictor in 9/14 models); the Artist factor (significant negative predictor in 8/14 models); overall item missingness on baseline survey (significant negative predictor in 8/14 models); SAT score missingness (significant negative predictor in 7/14 models), and saying "no" to the ID question (significant negative predictor in 7/14 models). Within the broad categories of predictors, correlates of academic achievement, academic involvement, satisfaction, and participation in organizations generally positively predicted response, while personality types, correlates of social involvement, negative attitudes towards survey/research, and baseline survey missingness generally negatively predicted response.

On the whole, the variables that achieved significance in various models had relatively consistent effects across groups in terms of both magnitude and direction. That is, the odds ratios associated with each predictor were relatively similar across models when they achieved significance. There were a few exceptions to this general pattern, however. First, the effect of being female on YFCY response likelihood was larger in the Asian American analysis than in any other (odds ratio 1.61 compared to 1.31-1.46 in other analyses), and the effect of being female on CSS response likelihood was larger in the African Americans analysis than in any other (odds ratio 1.63 compared to 1.30-1.45 in other analyses). Curiously, though, gender was not a significant predictor of YFCY response among African Americans, and nor was it a significant predictor of CSS response among Asian Americans. Why gender would have the strongest effect among Asians in the YFCY analysis yet have no effect in the CSS, and likewise, why gender would have the strongest effect among African Americans in the CSS analysis yet no effect in the YFCY—is unclear. It may have something to do with retention to the degree, at least for African Americans. Among this group, females tend to be much more likely than males to complete a college degree (DeAngelo, et al., 2011), and thus more likely be around to take the CSS.

A series of unexpected effects of the race/ethnicity variables were shown in the aggregate and gender-specific YFCY and CSS models. Most strikingly, Black/African American students were no more or less likely to respond to the YFCY than were White students, but they were significantly less likely to respond to the CSS in all relevant analyses. Similarly, Asian American students were equally as likely as White students to respond to the YFCY, but significantly less likely to respond to the CSS (though this was only true in the aggregate and female analyses). On the other hand, students who identified as an "other" race/ethnicity or as

non-U.S. citizens were significantly less likely to respond to the YFCY (in all relevant models except the male-only model), but equally likely to respond to the CSS. Whether the seemingly inverted response propensities over time associated with African American and Asian American students on the one hand, and "other" and foreign students on the other, is an artifact of the samples employed or a "true" effect of changing impact of race/ethnicity over time is something that will need to be examined in future research.

Another interesting difference in the magnitudes of odds ratios across the models predicting YFCY and CSS response can be seen when examining the high school GPA variable. With only one exception (Asian Americans on the YFCY), high school GPA positively predicted student response propensities in all analyses. Further, the impact of this variable seemed to increase over time—for the YFCY, a one-unit increase in the high school GPA variable was associated with an increase in the odds of responding of between 1.08 and 1.19, while on the CSS a one-unit increase in this variable was associated with an increase in the odds of responding of between 1.12 and 1.36. Comparing the GPA predictor within analysis groups, it can be seen that, with one exception, the magnitudes of the odds ratios associated with GPA were approximately 10 to 20 percent larger for the CSS than YFCY. The only group of students that did not show an increased impact of high school GPA over the four years was African Americans; this group actually saw a decrease of about six percent in the magnitude of the GPA variable's odds ratio across the two surveys.

A general pattern of increasing impact of high school academic achievement on student survey response propensity over the course of college could be attributable to several factors. To the extent that high grades in high school are predictive of high grades in college, and to the extent that academic success at a college or university engenders positive feelings towards that

school, high school grades may more strongly predict CSS response than YFCY response because over four years, high-achieving students have had longer to experience success at the institution, and therefore feel more positively toward it. Similarly, high grades in high school could also be associated with general engagement in college, which may also predict increasing positive regard for the institution over time. Finally, high school GPA has been shown to be one of the strongest predictors of retention and graduation (DeAngelo, et al., 2011; Murtaugh, Burns, & Schuster, 1999; Reason, 2009), so it would naturally be expected to also predict response to surveys.

The decreasing impact of high school GPA on response propensity that was shown for African American students, on the other hand, is initially puzzling. The result may make sense in the broader context of the African American student experience at predominantly White institutions—the type that comprised most of the institutional samples in this study. Scholars have suggested that academically successful African American students may be more likely than their equally successful peers of other races/ethnicities to experience feelings of isolation over the course of their college career (Fries-Britt, 1998; Fries-Britt & Griffin, 2007). To the extent that this is true, it could result in negative feelings among African American high-achievers towards the institution they are attending, which could in turn lead these students to be less likely to want to help their institution by filling out a survey about their university experiences.

Turning to students' majors, a perplexing pattern of effects was seen across surveys and analysis groups in terms of both direction and magnitude. While on the YFCY the (very) few significant major predictors were positive, on the CSS only one—engineering, for Asian Americans—was positive. The rest of the significant major predictors in the CSS models were all negatively related to response, indicating that students entering college with an idea of what

they will major in were less likely than their undecided peers to respond to the survey. There is no obvious reason why such effects would be observed in the CSS analysis. Most likely, the observed pattern of results is due to 'noise' in the measure of major, as four years had passed between when students selected a probable major on the TFS and when they took the CSS. There could very well be a large group of students who ended up majoring in different fields than they initially expected, and unobserved patterns in terms of the general categories students switched into and out of could be behind the major-related results in this study, rather than the impact of the major selections themselves. Further work on this issue should attempt to employ more accurate measures of majors—perhaps drawn from institutional information systems.

Finally, a few other differences across groups and surveys in terms of the significant student-level predictors are notable. First, first-generation student status significantly predicted CSS response only, with non-first generation students more likely to respond than first-generation students—though this was only true in the models with the largest sample sizes (all students, females, and males). Such effects could be due to a general pattern of decreased engagement of first-generation students over the course of college, which has been observed by scholars (Pike & Kuh, 2005). Second, the Scholar personality factor showed mixed effects on the YFCY compared to the CSS. Specifically, students who scored higher on the Scholar factor were more likely to respond to the YFCY (in the case of the aggregate and male-only analyses), but less likely to respond to the CSS (this time in the male-only and White-only analyses). This result may be due to a mismatch of expectations versus reality, as discussed earlier in this chapter. If the effect is replicated in future research, the theory behind this study's predictions regarding personality factors and response rates may need to be adjusted.

Summary of Significant Institution-Level Predictors

Odds ratios associated with institution-level predictors were quite consistent across groups in terms of magnitude and direction, particularly in terms of administration methods. Virtually every model demonstrated that administering either the YFCY or CSS via a method other than on paper, in-person, was predictive of much lower student response propensities. Mail surveys were associated with the lowest response odds for all groups, but web surveys were also associated with much lower response odds for all groups except Latino/as on the YFCY.

Incentives positively predicted response in the YFCY models only, though type of incentive mattered. Only incentives that were guaranteed for all survey takers significantly and positively predicted response (compared to the offering of no incentive), while lottery incentives had no effect on response. Why incentives would significantly predict only YFCY but not CSS response is not clear. Such an effect could be due to differences between institutions in terms of incentive implementation (e.g. in terms of the type of incentives offered, how the presence of incentives was communicated, and so on), or it could be due to differences between seniors and first-years in terms of how incentives are viewed (seniors could, for example, have "incentive fatigue"). Future work should investigate whether incentives impact response differences differently for seniors versus first-years, as well as whether the effect of incentives is mode-specific.

One possible explanation for the differences in impact of incentives for the YFCY and CSS could be an unexamined interaction effect between mode and incentive type. The current study was unfortunately not able to include interaction variables in the final models due to small cell sizes in several interaction conditions, but the results of the institution-only OLS regressions that began this chapter do suggest that an interaction effect might be at play. Specifically, the

OLS analyses showed that the effectiveness of incentive type is likely linked to modality, with incentives for all students particularly effective for boosting response rates to web surveys, and lottery incentives not particularly effective for boosting response rates for any kind of survey. In fact, in the CSS OLS regression, lottery incentives actually appeared to suppress response rates. It could be possible that seniors, having experienced four years of surveys with lottery incentives, most likely without winning (probabilistically speaking, the vast majority of students will not win prize drawings), are fatigued or jaded with this type of incentive.

In terms of structural- and climate-related institutional characteristics, only one, size of the undergraduate student body, significantly predicted student response propensity consistently across the YFCY and CSS analyses. This predictor was negative—larger student populations were associated with lower response odds for all groups of students—with four exceptions (Asian Americans on the YFCY, aggregate group on the CSS, African Americans on the CSS, and Latino/as on the CSS). The negative impact of institutional size on response likelihood is most likely due to the confluence of a few factors. First, there is the logistical difficulty associated with surveying a very large group of students, especially if one cannot gather them all in a room together. Second, there is the likelihood that students at larger campuses may feel less of a connection to their campus than those at smaller schools, and will therefore be less likely to want to take a survey designed for the benefit of the institution. Finally, the institution-only OLS regressions suggested that there may be an additional interactive effect of web modality and size, with students at larger institutions relatively less likely to respond to web surveys than paper surveys.

Table 4.30

Summary of Odds Ratios for Significant Predictors, All Models

		YFCY							CSS						
Cat.	**Variable**	**All**	**Fem.**	**Male**	**Asian**	**Black**	**Latino**	**White**	**All**	**Fem.**	**Male**	**Asian**	**Black**	**Latino**	**White**
Student Level															
Background Characteristics															
Race	Black/African American								0.74	0.77	0.70				
	Latino/a			0.86											
	Asian American								0.78	0.71					
	Other	0.90	0.91						0.90						
	Citizenship status: Foreign	0.79	0.73												
	Female	1.41			1.61		1.31	1.46	1.45				1.63	1.38	1.30
SES	Parental income														
	Not first generation								1.17	1.14	1.18				
	Future Act: Get a job to pay for expenses														
Personality and other individual differences															
	Scholar (Factor)	1.04		1.06							0.93				0.90
	Leader (Factor)	0.95	0.96	0.94	0.84				0.96	0.95					0.90
	Hedonist (Factor)	0.88	0.87	0.89	0.86		0.84	0.86	0.91	0.95	0.87				
	Status Striver (Factor)	0.97			0.91		0.87		0.95	0.95	0.94				
	Artist (Factor)	0.94	0.93	0.94		0.84			0.91	0.92	0.88				0.89
	Social Activist (Factor)	0.97	*0.97*												
	Self Rating: Cooperativeness	1.04	1.04						1.03	*1.04*					
Correlates of academic achievement															
	High school GPA	1.09	1.08	1.10		1.19	1.12	1.11	1.22	1.18	1.29	1.20	1.12	1.28	1.36
	SAT score	1.03	1.04						1.07	1.08	1.05				
	Reason for going to college:														
	Learning (Factor)					1.21			1.04						
Missingness Indicators															
	Parental income									*1.09*					
	SAT/ACT Score	0.85	0.84	0.85	0.72	0.73			0.86	0.85					
	Number of Missing items	0.98	0.98	0.98	0.98			0.98	0.98	0.98	0.98				

(continued)

Cat.	Variable	YFCY All	YFCY Fem.	YFCY Male	YFCY Asian	YFCY Black	YFCY Latino	YFCY White	CSS All	CSS Fem.	CSS Male	CSS Asian	CSS Black	CSS Latino	CSS White
Correlates of academic and social involvement															
	Future Act: Participate in student clubs/groups	1.08	1.09	1.07					1.11	1.10	1.12				
	HS Act: Asked a teacher for advice after class									*1.04*					
	HS Act: Tutored another student														
	HS Act: Socialized w/ someone of another racial/ethnic group	0.95	0.95		1.23				0.95						
	Hours per week (HPW) in HS: Socializing with friends	0.98		0.96	0.96										
	HPW in HS: Studying/ homework	1.03		1.04			1.08		1.03		1.06				
Correlates of satisfaction															
	Future Act: Transfer to another college before graduating	0.89	0.88	0.90	0.91	0.89		0.91	0.85	0.85	0.87	0.82		0.82	0.77
	Future Act: Be satisfied with your college	1.05		1.06											
	Is this institution your 1st choice?				0.83										
Propensity to be engaged with, participate in organizations															
	HS Act: Performed volunteer work	1.05	1.05						1.07	1.07					1.17
	Voted in a student election													1.25	
	Future Act: Participate in student government														
Potential Proxies of attitudes towards surveys, research															
	Realistically, an individual can do little to bring about changes in our society				1.12							0.85			
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?														
	No	0.87	0.90	0.82				0.84	0.91	0.90	0.92				
	Missing	0.87		0.82					0.86	0.88	0.83				
Probable Major															
	Arts and Humanities														
	Business	1.13		1.18											
	Engineering				1.27				0.85		0.80			0.46	
	Education											2.50			0.68
	Natural Sciences								0.87	0.88	0.84				
	Social Sciences								0.91						
	Professional								0.70	0.75	0.60			0.54	
	Other or Technical										*0.84*				

(continued)

Category	Variable	YFCY All	YFCY Fem.	YFCY Male	YFCY Asian	YFCY Black	YFCY Latino	YFCY White	CSS All	CSS Fem.	CSS Male	CSS Asian	CSS Black	CSS Latino	CSS White
Institution-Level															
Administration Methods															
Mode	Web only	0.37	0.44	0.25	0.43	0.28		0.37	0.42	0.48	0.30	0.41	0.36	0.37	0.33
	Mail only	0.20	0.25	0.10	0.15	0.28	0.18	0.15	0.31	0.34	0.24	0.27	0.21	0.23	0.30
	Paper & Web	0.28	0.32	0.25		0.25		0.35			0.33				
Incentive	Incentive for all	1.82	1.83	1.79		2.04		1.81						*1.95*	
	Lottery														
Structural characteristics															
	Selectivity, in 100-point increments														
	Natural log of Size (undergraduate enrollment)	0.67	0.69	0.64		0.66	0.74	0.72	*0.80*	0.79	0.78	0.69			0.70
	% of undergraduate students non-White, 10-point increments										0.87				
Climate															
	Graduation rate, 10-point increments													1.47	
	% of administrations in TFS norms, 10-point increments								1.12	1.13	1.11			1.19	
Proportion of variance accounted for at level 2		**25.2**	**22.4**	**30.5**	**23.1**	**25.7**	**22.6**	**21.6**	**41.1**	**41.8**	**53.3**	**57.2**	**36.1**	**38.9**	**45.4**

Source: Final HGLM models

Note. Significant = $p < .05$; *Italics* indicate $p = .05$

Two additional institutional characteristics impacted CSS response odds but not YFCY. First, six-year graduation rate was a positive predictor of CSS response for Latino/as only. Such an effect may be related to the overall graduation rates of Latinos, which tend to be lower than those of other racial/ethnic groups (DeAngelo, et al., 2011; Fry, 2002). If Latino/a students observe that their peers drop out of college at higher rates, they may be more likely to be satisfied with their college in general if they know that they themselves are likely to graduate. Second, proportion of times an institution has achieved TFS norms status—intended to be a measure of the survey climate or survey-savviness of an institution—was a positive predictor in all but two CSS models. This finding is particularly interesting in light of the findings that suggested that survey mode might exert a stronger influence on response propensity for seniors than first-year students. It is possible that mode and survey climate are both more important for surveys given to students in their fourth year than in their first year, perhaps because students have been exposed to many more surveys by the time they reach the end of their senior year. Such exposure may make students more sensitive to survey administration techniques (increased impact of mode); it could also get students in the habit of taking surveys (at institutions with positive survey climates)—or in the habit of not taking surveys, as the case may be.

Predictors with the Most Impact

Table 4.31 displays the five predictor variables with the largest t-statistics (in terms of absolute value), from each model. These variables represent the factors that most strongly impacted response propensity for each group. Interestingly, many of the student-level variables that were most consistently significant across groups—high school GPA, likelihood of transfer, gender, and the Hedonism and Artist factors—were also consistently among the strongest

predictors across groups. It seems, then, that these variables are not only (relatively) universal predictors of longitudinal survey response, but that they are also universally important predictors.

In terms of institution-level variables, only two modality predictors—mail and web modalities—were consistently found among the five largest predictors within each model. Thus it appears that, although immutable institutional-level characteristics like size might be significant predictors of response for most students, it is the institution-level characteristics that are under the control of institutional representatives—the modality of the survey—that have the most impact on students.

Table 4.31
Top Five Significant Predictor Variables With the Largest t-statistics, All Models

	# of models	**5 largest t-statistics in order of absolute magnitude**[a]												
		YFCY							**CSS**					
Variable	in top 5	All	F	M	A	B	L	W	All	F	M	A	B	L	W
High school GPA	11	4	3	2		1		5	1	1	1		4	1	1
Mode: Mail	9		4	1	1	5	1	2				5	2	3	
Future act: Transfer	8	3	2						2	2	2	3		2	3
Female	7	2			2		4	1	3				3		5
Hedonist (factor)	7	1	1	3	5		2	3			3				
Mode: Web	7					2		4			4	2	1	4	2
Number of missing items	5	5	5	4					4	4					
Artist (factor)	4					3	3		5	3					
Institutional size	2											4			4
ID permission: No	1			5											
SAT/ACT Score missing	1				5										
First choice institution?	1				4										
Leader (factor)	1				3										
Go to college to learn (factor)	1					4									
HPW in HS: Studying	1						5								
Future act: Student clubs/groups	1									5					
Planned major: Professional	1										5				
Planned major: Education	1											1			
Graduation rate	1													5	

Source: Final HGLM analyses, all groups. (See Table 4.13, Table 4.19, Table 4.31 for more details)
Note. All = aggregate models, F = Female, M = Male, A = Asian, B = Black/African American, L = Latino/a, W = White
[a] Variables are ordered in terms of absolute magnitude within each model. 1 = predictor with the largest t-statistic within the relevant model, 5 = predictor with the smallest t-statistic

Conclusion

This chapter has discussed in detail the results of the preliminary OLS regressions predicting average institutional response rates; the conditional models examining the impact of personality/student typology on gender effects; the overall (aggregate) HGLM models predicting YFCY and CSS student response propensity; and HGLM models predicting student response propensity to these surveys separately by gender and race/ethnicity. Results have been also been summarized across models. To conclude the study, the next chapter will compare how the results from this chapter align with working hypotheses (discussed in detail in Chapter 3), as well as how the results contribute to the overall literature on student response propensity. The study will end with implications for research, practice, and policy, as well as with avenues for future research.

CHAPTER 5: CONCLUSION

Surveys of college students are commonly used to collect data about the student experience. Researchers and practitioners alike rely on student survey data to recommend policy changes, make critical decisions, and ensure educational excellence. The quality of such recommendations, decisions, and assurances, however, is heavily dependent on the pool of students who respond to the survey in question. If the respondents to any given survey are not representative of the population at large, then the data collected from the survey cannot be said to describe the intended group—and any conclusions that are reached based on the survey data will not be generalizable. While imperfect, one indicator of a survey sample's representativeness is the survey's response rate. It is usually the case that survey respondents are not a random subset of the population, so as response rates drop respondent pools likely become less and less representative of the entire population (Pike, 2008; Porter, 2004b).

Over the past few decades, student survey response rates have been declining in higher education, and it is now not unusual for student surveys to achieve response rates of less than 30% (Dey, 1997; Jans & Roman, 2007). Yet although the higher education community has noticed this trend, very little research has investigated the factors that make students more (or less) likely to respond to surveys. What little research that exists is scattered across multiple disciplines, covers different populations, was conducted for different purposes, and has largely been focused on single institutions. As a result, findings are difficult to synthesize, and few significant results have been replicated across studies. Only three student-level correlates of student survey response have been consistently identified in the literature: gender (women are more likely to respond than men, see for example Hunt-White, 2007; Porter & Whitcomb, 2005b; Porter, et al., 2004; Sax, Gilmartin, et al., 2003; Szelényi, et al., 2005), race/ethnicity

(White students are more likely to respond than students of other race/ethnicities, see for example Burkam & Lee, 1998; Clarkberg, et al., 2008; Dey, 1997; Porter & Whitcomb, 2005b; Sax, Gilmartin, et al., 2003; Szelényi, et al., 2005), and academic background (higher-achieving students are more likely to respond, see for example Burkam & Lee, 1998; Clarkberg, et al., 2008; Porter & Umbach, 2006; Porter, et al., 2004; Thistlethwaite & Wheeler, 1966; Woosley, 2005; Yu, et al., 2007). At the institution level—which is only rarely examined—no consistent correlates have been found (see Chapter 2 for a review of these studies).

Taken as a whole, the literature on student survey response is disjointed and leaves many open questions. For example, although race and gender have been identified as response predictors across many studies, no research has yet examined why females and White students have higher response propensities. Furthermore, many of the existing studies on student survey response suffer from methodological weaknesses that prevent their generalization beyond the study. Specifically, most existing studies have employed small samples from single institutions, and even among those few that used data from many institutions, only one utilized a hierarchical modeling technique that statistically took into account the fact that students are nested within schools (Porter & Umbach, 2006).

The goal of the current study was to bring some consistency to the evidence concerning student- and institution-level predictors of survey response, and to address several of the open questions in the literature using a large multi-institutional database and an appropriate methodology. To accomplish this, longitudinal student survey response was examined for students one and four years into their college education. Predictors were drawn from national surveys administered by the Higher Education Research Institute (HERI) to students entering four-year colleges and universities in the falls of 2003, 2004 and 2005 (the TFS), as well as

institution-level data sources on administration methodology (ARFs) and general institutional characteristics (IPEDS). Longitudinal non-response to two follow-up surveys—one given one year after matriculation (the YFCY, administered in the springs of 2004, 2005 or 2006) and one given four years after (the CSS, administered in the springs of 2007, 2008 or 2009)—was examined using a hierarchical generalized linear modeling (HGLM) technique. Modeling was done for aggregated groups of students as well as separately for males and females, and Asian American, African American, Latino/a, and White students. Both student-level characteristics (such as demographics, personality, and behaviors), and institution-level characteristics (such as administration methods and institutional climate) were incorporated into the models.

This study represents the first attempt to examine, in a single model that appropriately accounts for the hierarchical nature of the data, the impact on response rates of administration method, institutional characteristics, student academic background, personality characteristics, and social/academic engagement. This study also represents the first attempt to systematically examine predictors of response separately by race and gender. The study was designed to investigate the following research questions:

1. What demographic, attitudinal, behavioral, and institution-level factors (including administration methods) predict response to student surveys?
2. How do predictors of response differ at the end of the first year in college and the end of the fourth year in college?
3. Do predictors of response differ for males and females and for students of different race/ethnicities, in comparison to the general population, to each other, and to surveys administered one and four years after matriculation?

Drawing on sociological, organizational, and psychological theories of survey response, a conceptual model of student- and institution-level influences on student survey response was developed to guide the study (Figure 3.1). At the student level, three primary areas were hypothesized to impact student survey response propensity: pre-college characteristics, (such as

SES, personality, high school academics), experiences during college (in particular those that impact a students' view of the organizational climate), and situational/normative factors (such as peers, survey topic interest, and physical/time constraints). At the institution level, it was hypothesized that the general environment (location, size, control), organizational climate (including survey-taking climate), and survey administrative techniques (mode and incentive) would affect the probability of student survey response. Based on this model, as well as the body of literature described in Chapter 2, a series of working hypotheses were developed to guide the study's analyses. Some of these hypotheses were supported by the analyses' results, while others were not. Below, each of the working hypotheses is re-stated and then evaluated based on the results of the models; a high-level summary of all working hypotheses, along with how the study's results align with predictions, can be found in Table 5.1.

A note on how to read Table 5.1: the table summarizes the results of this study by displaying, for each model run, (a) whether a given predictor was significant in the final analysis ($p < .05$), and (b) whether the direction of the significant effect was positive or negative. On the left-hand side of the table are indicators of the expected significance and direction of each predictor; these are taken from the working hypotheses outlined in Chapter 3. The right-hand side of the table contains indicators of whether the pattern of results observed for each variable supports the relevant working hypothesis. A working hypotheses is deemed supported if, each time a predictor achieves significance, it is in the direction hypothesized. Please note, Table 5.1 does not contain any information on the size or importance of each significant effect, nor does it correct for differences in sample sizes across analyses (recall that sample sizes were much larger for the aggregate and gender-specific models than for the separate-race analyses).

Table 5.1

General Working Hypotheses and Summary of Significant Results

Category	Variable	Working Hypothesis[a]	YFCY Results[b] All	F	M	A	B	L	W	CSS Results[b] All	F	M	A	B	L	W	Hypothsis Supported?[c]
Student Level																	
Background Characteristics																	
Race	Black/African American	–								–	–	–					Yes
	Latino/a	–			–												Yes
	Asian American	–								–	–						Yes
	Other	–	–	–						–							Yes
	Citizenship status: Foreign	x	–	–													No
	Female	+	+			+		+	+	+				+	+	+	Yes
SES	Parental income	x															Yes
	Not first generation	+								+	+	+					Yes
	Future Act: Get a job to pay for expenses	–															No
Personality and other individual differences																	
	Scholar (Factor)	+	+		+							–				–	No
	Leader (Factor)	–	–	–	–	–				–	–					–	Yes
	Hedonist (Factor)	–	–	–	–	–		–	–	–	–	–					Yes
	Status Striver (Factor)	–	–			–		–		–	–	–					Yes
	Artist (Factor)	–	–	–	–		–			–	–	–				–	Yes
	Social Activist (Factor)	+	–														No
	Self Rating: Cooperativeness	+	+	+						+							Yes
Correlates of academic achievement																	
	High school GPA	+	+	+	+		+	+	+	+	+	+	+	+	+	+	Yes
	SAT score	+	+	+						+	+	+					Yes
	Reason to go to college: Learning (Factor)	+					+			+							Yes
Missingness Indicators																	
	Parental income	–															No
	SAT/ACT Score	–	–	–	–	–	–			–	–						Yes
	Number of Missing items	–	–	–	–	–			–	–	–	–					Yes

(continued)

Category Variable	Working Hypothesis[a]	YFCY Results[b] All	F	M	A	B	L	W	CSS Results[b] All	F	M	A	B	L	W	Hypothsis Supported?[c]
Correlates of academic and social involvement																
Future Act: Participate in student clubs/groups	+	+	+	+					+	+	+					Yes
HS Act: Asked a teacher for advice after class	+															No
HS Act: Tutored another student	+															No
HS Act: Socialized w/ another racial/ethnic grp	+	–	–		+				–							No
HPW in HS: Socializing w/ friends	–	–		–	–											Yes
HPW in HS: Studying/ homework	+	+		+			+		+		+					Yes
Correlates of satisfaction																
Future Act: Transfer to another college	–	–	–	–	–	–		–	–	–	–	–		–	–	Yes
Future Act: Be satisfied with your college	+	+		+												Yes
Is this institution your 1st choice?	+				–											No
Propensity to be engaged with, participate in organizations																
HS Act: Performed volunteer work	+	+	+						+	+					+	Yes
Voted in a student election	+													+		Yes
Future Act: Participate in student government	+															No
Potential Proxies of attitudes towards surveys, research																
Individual can do little to bring about change	–				+							–				No
Give HERI permission to include ID?																
No	–	–	–	–				–	–	–	–					Yes
Missing	–	–		–					–	–	–					Yes
Probable Major																
Arts and Humanities	x															Yes
Business	x	+		+												No
Engineering	x				+				–		–			–		No
Education	x											+			–	No
Natural Sciences	x								–	–	–					No
Social Sciences	x								–							No
Professional	x								–	–	–			–		No
Other or Technical	x															Yes

(continued)

Category	Variable	Working Hypothesis[a]	YFCY Results[b] All	F	M	A	B	L	W	CSS Results[b] All	F	M	A	B	L	W	Hypothsis Supported?[c]
Institution-Level																	
Administration Methods																	
Mode	Web only	−	−	−	−	−	−		−	−	−	−	−	−	−	−	Yes
	Mail only	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	Yes
	Paper & Web	−	−	−	−	−			−			−					Yes
Incentive	Incentive for all	+	+	+	+		+		+								Yes
	Lottery	+															No
Structural characteristics																	
	Selectivity	+															No
	Size (undergraduate enrollment)	−	−	−	−		−	−	−		−	−	−			−	Yes
	% of undergraduate students non-White	+ (for URM[d])										−					No
Climate																	
	Graduation rate	+													+		Yes
	% TFS norms	+								+	+	+			+		Yes

Source: Final HGLM models

Note. All = aggregate model; F = Female, M = Male, A = Asian American, B = Black/African American, L = Latino; W = White

[a] + indicates a positive predicted effect, − a negative predicted effect, x a predicted null effect

[b] + indicates a significant positive effect ($p < .05$), − a significant negative effect ($p < .05$).

[c] The working hypothesis is supported if all significant effects across models are in the direction hypothesized

[d] URM = underrepresented minority students; here URM is defined as non-White

Support for Working Hypotheses

Research Question 1: Student- and institution-level factors predicting student survey response

Working Hypothesis 1-1: Student-level predictors of longitudinal survey response propensity will include: sociodemographic characteristics and personality type; predictors of academic success, engagement, and satisfaction with the institution attended; propensity to be civically engaged; attitudes towards surveys; and the extent to which items are left blank on the TFS.

At a basic level, the results of this study supported working hypothesis 1-1: significant predictors of student response propensity were observed in one or more of the above categories in all models run, and most of the significant predictors were in the direction specified (see Table 5.1). However, not every variable intended to measure each of these categories was significant in one or more models, and no single student-level predictor proved significant in all fourteen models.

Some variables more consistently predicted response than did others; there was a set of variables that were significant in at least half of the fourteen models run. The two predictors that most often significantly predicted YFCY and CSS response propensity were high school GPA (significant positive predictor in 13 of the 14 models run) and expecting to transfer institutions (significant negative predictor in 12 of the 14 models). These two variables were also among the strongest predictors in each model (as measured by the absolute value of their associated t-statistics). The fact that high school GPA had such a considerable impact on student response propensity in this study aligns well with the existing literature concerning academic achievement and student survey response, and reinforces the common wisdom that it is the highest-achieving

students who are most likely to respond to student surveys. Transfer likelihood has been found to be a (negative) predictor of response in only one previous study, done at a single institution (Clarkberg, et al., 2008); its consistently large negative impact on student response propensity across the many institutions in this study suggests that there is not only a link between student retention and student survey response, but also that this link may be associated with commitment to an institution. Indeed, self-rated likelihood of transfer has been found to be among the strongest negative predictors of actual student retention (DeAngelo, et al., 2011), suggesting that survey response decisions are related to perceptions of an institution—if a student intends to leave an institution, he or she is likely not apt to complete a survey about their experiences.

Being female significantly (positively) predicted response propensities in 8 of the 10 non-gender-specific models. Again, this is in agreement with the existing body of literature on student survey response. Adding weight to the impact of gender, the gender predictors in this study were consistently among the strongest predictors in each model. This study's findings thus serve to confirm the fact that males are less likely to respond to surveys than are females, and they also emphasize the fact that student survey respondent samples are likely to be biased towards females.

Other hypothesized predictors of response that were significant in at least half of the fourteen models run included personality (with leaders, hedonists, and artists all predicted to have lower response rates), missingness indicators (with both the number of missing items as a whole and missingness of SAT/ACT score specifically negatively predicting response); and attitudes towards surveys/research (with responding "no" to the ID permission question negatively related to response). Three of these same variables were also among the strongest predictors in many of the models run, specifically personality (the hedonist and leader factors)

and baseline survey missingness (overall number of missing items on the TFS). Personality, item missingness, and attitudes towards surveys/research have not been simultaneously examined in any previous studies of college student response propensity, and the findings from this study thus expand upon what is known about the biases of survey respondent pools. It seems that certain types of students are consistently less likely to respond to surveys, namely those who drink and enjoy partying, those who are more creative and artistic, and those who have less trust in the survey research process. As a result, longitudinal student survey data is likely to be biased toward non-partying, non-artistic, trusting students, whose opinions and experiences may not be representative of the student population as a whole.

Some of the variables that were hypothesized to predict response in this study did so in none of the fourteen models run, or in only one model. For example, marking Latino/a on the TFS significantly predicted response propensities in the YFCY male model only, and voting in a student election in high school significantly predicted response in the Latino/a CSS model only. Expecting to get a job to pay for college expenses, tutoring another student in high school, asking a teacher for advice after class in high school, and expecting to participate in student government in college all failed to be significant predictors in any of the models run. Lastly, indicating attendance at a first choice institution predicted response in the Asian American YFCY model only, but this predictor was in the opposite direction than hypothesized (negative instead of positive).

Why few or none of the above variables were significant may be attributable to many factors. First, this study included in its models multiple measures of similar constructs. To the extent that these variables overlapped in their ability to predict response propensity, it is not surprising that some would be significant (those more strongly related to the outcome) while

others would not be. Similarly, the variables included in this study were not specifically designed to be measures of the constructs of interest. As a result, the extent to which the variables actually tap into the intended constructs may be limited. If the constructs themselves (e.g., college student involvement) are related to response propensity, but the intended proxy measures of these constructs (e.g., tutoring another student in high school) do not actually access the underlying dimension of interest, it would not be unexpected that such measures would fail to predict response. Finally, it could always be the case that the constructs of interest themselves are not related to survey response. Unfortunately, because of the way this study was designed, it cannot determine which of the above scenarios is most likely. Future research on the topic will need to be designed to more rigorously test the conceptual model and working hypotheses underlying this study.

Only a few significant predictors in various models contradicted specific predictions made in working hypothesis 1-1 (aside from those discussed above that were expected to be significant but were not). Citizenship status, for example, was hypothesized to have no effect on response propensity, yet a significant negative impact of this variable was observed in two models. The social activist personality factor, on the other hand, was predicted to positively impact response propensity, but in the one (YFCY) model in which it was a significant predictor, the observed effect was negative. Similarly, the scholar personality factor was hypothesized to be positively related to survey response, but a positive effect was observed only in two models predicting YFCY response, while in two models predicting CSS response, this factor had a significant negative impact. Investigations into this latter effect, discussed in the previous chapter, revealed that the Scholar factor became a negative predictor in the CSS analyses only after high school GPA entered the model. It is likely that the Scholar factor's negative impact in

the senior year is due to a mismatch between expectations of academic success before college and actual academic performance over the four years of college.

In total, the picture that emerges from the pattern of consistent effects across groups is one that suggests that students' pre-college characteristics have a substantial and enduring impact on response rates. In particular, gender, personality, academics, and baseline survey missingness seem to matter the most for student response likelihood. Such results verify many of the suggestions made by working hypothesis 1-1, and lend support to many aspects of the conceptual model of survey response discussed in Chapter 3 (particularly the portion of the model that concerns pre-college characteristics). However, not every suggestion made in hypothesis 1-1 was verified by this study's results. Outside the core set of significant predictors, there was quite a bit of variability in terms of the factors that were significant across groups and surveys, too much to draw firm conclusions about many of the working hypothesis. To investigate the matter further, future work should endeavor to test the predictions made in working hypothesis 1-1 again using a different sample and/or different measures of the same constructs.

Working Hypothesis 1-2: Institution-level correlates of longitudinal survey nonresponse will include selectivity, structural characteristics that impact the climate for students, the institutional survey-taking climate, administration mode, and use of incentives.

Working hypothesis 1-2 concerned institution-level predictors of nonresponse. Results from this study strongly supported portions of the hypothesis, in particular those that concerned survey administration methods (mode and use of incentives). As can be seen in Table 5.1, administration mode significantly predicted student response, in the direction hypothesized, in all of the models run. Compared to paper-only in-person administration modes, web, mail, and mixed paper/web survey modalities all yielded significantly lower student survey response rates.

In addition, in many of the models run the modality predictors had the largest coefficients and odds ratios (in terms of absolute magnitude), indicating that how an institution elects to survey its students has a large bearing on student response decisions. Corroborating this interpretation, two modality variables—representing web and mail modalities—were also among the largest predictors (as measured by absolute t-statistics) for many groups of students. Clearly, the choice of how a survey is administered has a significant impact on student response propensity; the best method for getting students to respond is one that involves paper survey instruments that are handed to students in person.

Incentives played a less certain role in the prediction of student response likelihood. Type and use of incentives did significantly predict student response in the HGLM analyses, but this occurred in the YFCY models only. In 5 of the 7 YFCY models, students who were offered a small guaranteed incentive to take the survey responded at significantly higher rates than those not offered an incentive. In no models (YFCY nor CSS) did lottery incentives have any effect on response propensities. As discussed in Chapter 4, it is unclear whether the lack of significant impact of incentives on the CSS results indicates a differential impact of incentives across year in school, or whether it is attributable to the intricacies of the institutional samples employed (and will therefore not be replicated in future studies). It makes intuitive sense that student attitudes towards incentives might change as they are exposed to more and more survey incentives during college, but evidence from this study can neither verify nor disconfirm such a suggestion. Future research will need to be designed to explore this possibility.

Interestingly, the HGLM results concerning incentives diverged somewhat from the results of the OLS-only analyses that began the results chapter. In the OLS analyses, the same significant and positive impact of guaranteed incentives was shown for YFCY response, but a

significant impact of lottery incentives was also shown for CSS response. Contrary to expectations however, the impact of lottery incentives on CSS response rates was *negative* in the OLS analyses, and investigations into the matter revealed that there was likely an unaccounted-for interaction effect between incentive use/type and survey modality. Descriptive examinations of the OLS institutional samples (which, recall, were much larger than the samples used for the HGLM analyses) suggested that survey administrations that are done on paper, in person, do not benefit from any type of incentive, whereas survey administrations done on the web *do* benefit, in particular from the offering of a small incentive guaranteed for all. Lottery incentives, on the other hand, appeared to be completely ineffective for web surveys and potentially detrimental for paper surveys. Unfortunately, such interactive effects could not be examined in either the OLS or HGLM analyses in this study due to limitations of the data, but future research should keep these issues in mind. A productive line of research likely exists in studies that tease out the relationship between survey modality and incentives.

In terms of structural and climate-related institutional characteristics, hypothesis 1-2 was only partially supported. Only one structural characteristic, institutional size (undergraduate FTE), had a consistent impact on student survey response propensity; this variable negatively predicted response in 10 of the 14 models run. That larger institutions are expected to have lower response rates is not surprising, as the logistics of reaching out to a large number of students are obviously more difficult than those involving far fewer students. However, investigations into the impact of institutional size, done in connection with the OLS analyses that began Chapter 4, revealed that there may be more at play for large institutions. Perhaps because of the increased logistical difficulties associated with giving paper surveys to large numbers of undergraduates, larger institutions in this study's samples were much more likely than smaller

ones to employ web surveys. Web surveys are, as was seen in both the OLS and HGLM analyses, uniformly associated with lower response rates. But larger institutions in this study seemed to have even more negative outcomes with online surveys, for in descriptive investigations (discussed at the beginning of Chapter 4) it was found that web surveys were associated with *even lower* response rates at larger institutions than paper surveys. Most likely, the additional negative impact seen for web surveys at large institutions can be attributed to their climate, which may be more impersonal; a survey method that itself is quite impersonal might thus be expected to be less effective at larger institutions. Of course, this study did not formally model interaction effects between size and survey mode, so speculations regarding such matters remain tentative, and should be confirmed by future research.

Only one climate-related institutional characteristic, survey-taking climate (proportion of times an institution has been included in the TFS norms), significantly predicted student survey response propensities, but this was true of CSS response only. In 5 of the 7 CSS models, the proportion of times that institutions achieved TFS "norms status" positively impacted student response likelihoods, supporting the hypothesis that an institutions' survey climate can impact student response decisions. The fact that this aspect of the climate impacted the response propensities of graduating seniors only suggests that the impact of survey-taking climate is most strongly felt over several years at an institution rather than only one.

When examined across models, the institution-level results in this study do support the notion that institutional characteristics can and do affect student response propensities. However, the specific institutional variables that consistently and significantly impacted response likelihoods were relatively few, and they did not include all those hypothesized. For example, the selectivity of an institution had no impact on student survey response propensity in

any model, and an institution's structural diversity (proportion of the student body that is non-white) significantly predicted student response propensity in only one model.

The overall pattern of significant non-modality-related institution-level results can be interpreted in a few ways. First, it is possible that two very specific institutional characteristics—size and survey climate—are simply the most important considerations in terms of impacting students' response propensities. Alternately (and more likely), it is possible that this study did not identify/include the most appropriate or salient climate measures. Many institution-level variables were omitted from the analyses done here by necessity; perhaps in these omissions lie structural and climate measures more central to student response. Recall, however, that the institution-level variables in this study were chosen from a much larger pool of variables, many of which proved unrelated to response in the institution-only OLS analyses. Nevertheless, more work needs be conducted in this area.

Research Question 2: Predictors of response at the end of the first year and fourth year in college

Working Hypothesis 2: In general, predictors of response will not be different for surveys given at the end of the first year and at the end of the fourth year in college. However, to the extent that predictors are different at these different time points, students will differ in their propensity to respond to student surveys based on their perceptions of their relationship with their institution, and whether these develop positively or negatively.

Working hypothesis 2 concerned the expected differences in predictors of first-year longitudinal nonresponse (YFCY models) and senior-year longitudinal nonresponse (CSS models), in particular as these related to students' relationships with their institution. Overall, it was expected that there would be few differences in predictors across first-year and senior-year

models, but that those that were observed would relate to students' perceptions of their institution. Specifically, it was expected that student- and institution-level predictors that are associated with engagement or positive relationships with an institution would maintain their importance or become more important in the CSS models compared to the YFCY models, while negative student- and institution-level predictors of satisfaction and engagement would be of increasing importance over the course of a students' career in college.

For the most part, there were no noticeable patterns of differences in significant predictors across the YFCY and CSS models, supporting the null hypothesis that no differences would be observed. Where differences were observed, however, they did not always fit neatly into the categories of variables thought to be related to students' relationships with their institution. For instance, only one institution-level characteristic thought to be related to student-centeredness (graduation rate) predicted CSS response but not YFCY, but this was true in one model only. At the student level, differences across the YFCY and CSS models were largely concentrated in demographic and/or background categories rather than in categories thought to be predictive of students' regard for their institutions. Specifically, first-generation status and many of the race/ethnicity variables significantly predicted CSS response only, and high school GPA was a stronger predictor of CSS response than YFCY response. To the extent that first-generation students and students of non-White races/ethnicities are expected to be less engaged in college (or feel more alienated from campus life), and to the extent that high school GPA is predictive of a positive regard for the institution attended, such patterns could be seen as supporting the basic underlying premise of working hypothesis 2. However, because it is uncertain whether such assumptions are true, the hypothesis cannot be said to have been supported.

Two unanticipated differences across YFCY and CSS models were also observed. First, as mentioned previously, survey climate was a significant predictor of CSS response only; students at institutions with histories of successful TFS administrations were more likely to respond to the CSS but not YFCY. Second, more of the variance across institutions could be accounted for by institution-level variables in the CSS models than the YFCY models—the proportion of variance accounted for at level two in the CSS analyses was approximately 40%, while for the YFCY this figure hovered around 25%. In combination, these two results suggest that survey administration techniques and the institutional survey climate become more and more important to student response rates over the course of a students' college career. Thus, the results of this study seem to indicate that it is not student climate factors but rather survey and survey climate factors that exert an increasing impact as students spend more time in college. This means that institutional choices of how to survey students may need to be different depending on how long the students have been in college. Future research should be designed to explore this possibility in more detail.

Research Question 3: Predictors of response for males and females and for students of different race/ethnicities

Working Hypothesis 3-1: Males and females will have largely similar predictors of response, but will differ in terms of administrative techniques and personality.

Working hypothesis 3-1 concerned differences in predictors for males and females. As with the first- to senior-year comparisons, it was hypothesized that males and females would have largely similar predictors to one another. It was further hypothesized that if differences were observed, males and females would differ from one another in terms of the impact of personality characteristics (thought to mitigate the effect of gender on response) and

administration techniques (with males relatively more likely to respond to web surveys than females). Regarding male and female response rates to surveys administered one and four years after matriculation, it was hypothesized that the impact of the gender variable would be stronger for surveys administered four years after matriculation than those administered one year afterwards.

In terms of differences in predictors of male and female response propensities, almost nothing of note was observed—particularly in terms of student-level predictors. Contrary to expectations, personality did *not* mitigate the impact of gender on response likelihood; this was true both for the aggregated groups of students as well as for students broken down by race/ethnicity. Further, only two personality predictors differentially predicted male and female response propensities. These were self-ratings of cooperativeness (positive predictor of YFCY and CSS response for females only), and the scholar personality factor (significant predictor of male response only, though in opposite directions for the YFCY (positive) and CSS (negative)). The fact that two personality-related differences in predictors showed up consistently in the male and female models provides some support that personality may in part explain males' and females' different response propensities. However, neither of these personality variables had a particularly large impact (as measured both by odds ratios and t-statistics), so the support provided is weak at best.

In terms of the impact of gender on YFCY versus CSS response, the results showed no differences of any note. It does not appear that gender differentially predicts response propensity one and four years into college. Rather, it seems that females are simply more likely than males to respond to surveys over their entire college career.

Turning to institution-level predictors, incentives showed no differential impact across gender, but administrative methods did differentially predict male and female response—though not in the direction hypothesized. Based on prior research it was thought that males would be relatively more likely than females to respond to web surveys, but the opposite proved to be the case in this study for both the YFCY and CSS. That is, relative to in-person paper surveys, males were predicted to be much *less* likely than females to respond to surveys given via the web. In both the CSS and YFCY analyses, odds ratios associated with the web administration variable for males were about 60% as large as those for females, indicating a larger difference between paper response rates and web response rates for males relative to females (because odds ratios closer to zero indicate larger negative effects). T-statistics associated with web and mail modality variables were also larger for males than for females, relative to other variables in the model. Descriptive results corroborate the fact that males responded more to paper surveys than to those given via other modalities, as shown in Figure 5.1. Relative to other modalities and to females, males have a much higher likelihood of responding to both the CSS and YFCY if these surveys are given on paper (in person) than via any other method.

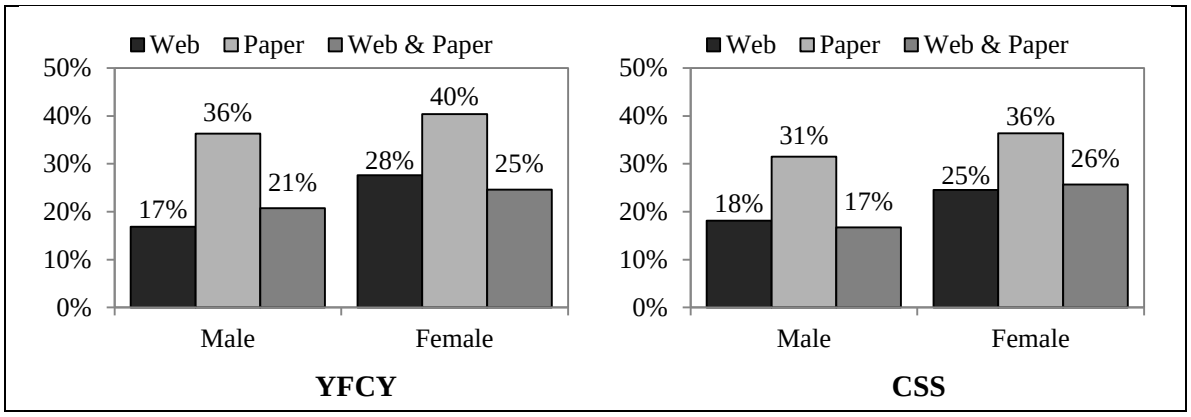

Figure 5.1. YFCY and CSS response rates, by gender and administration mode
Source: Final Female and Male YFCY and CSS HGLM analysis samples

Given the differences—or lack thereof—of significant predictors across male and female models, it seems clear that hypothesis 3-1 was largely rejected. The factors accounting for the differences in male and female response rates remain basically unexplained by this study, though some of the observed differences are certainly due to administration modalities. Not only did the survey mode variables show stronger effects in the male-only models, but administration method-related variables (along with other significant institution-level predictors, though these were few) also accounted for much more of the variance in male response rates across institutions than the variance in female response rates. For whatever reason, it appears that males are more sensitive to survey mode than are females.

Working Hypothesis 3-2: White students and students of non-White race/ethnicities will also have largely similar predictors of response. To the extent that students of non-White race/ethnicities share experiences in college not experienced by White students, their response predictors will be similar to one another but dissimilar to those of Whites, and will change in the same ways one and four years into college.

Working hypothesis 3-2 concerned differences in predictors of response for students of different race/ethnicities. It was thought that, in general, factors that uniquely impact the

satisfaction and engagement of students of different races/ethnicities (specifically, institutional selectivity and structural diversity) would impact these same students' response propensities while failing to impact those of White students. Over four years, it was hypothesized that factors that predict the satisfaction and engagement of non-White students would be stronger predictors of CSS response than YFCY response for these students, while the same would not be observed for these variables in the models examining White students only.

Like working hypothesis 3-1, hypothesis 3-2 was largely unsupported in this study. No predictors consistently predicted response propensities of students of different race/ethnicities while failing to impact those of Whites; indeed, relatively few factors at all significantly predicted response for students of non-White race/ethnicities. At the institution level, neither predictor specifically hypothesized to uniquely impact non-White students, selectivity and structural diversity, was significant in any racial/ethnic-specific model. Consequently, no differences in these variables were observed when comparing the YFCY and CSS models. On the whole, the models in this study provided very few explanations for differences in response rates across racial/ethnic groups—indeed, the most striking result with respect to race/ethnicity was the *lack* of differences across groups, as well as the lack of significant predictors in general in the models separated by race/ethnicity. Considerably more work needs to be done to uncover the reasons behind differences in response rates across racial/ethnic groups.

Revised Conceptual Model

Figure 5.2 shows a revised version of the conceptual model underlying this study, amended to incorporate the results described above. Strikethrough text illustrates factors that were hypothesized to be related to survey response but which failed to achieve significance, grey text represents factors that could not be tested, bold text shows the factors that were most

important for predicting student response, normal un-bolded text shows factors that were predicted to impact response and which did, but not most strongly, and question marks show findings that were not tested directly but that were suggested based on explorations of the data. Differences between this model and the one originally hypothesized in Figure 3.1 are described below.

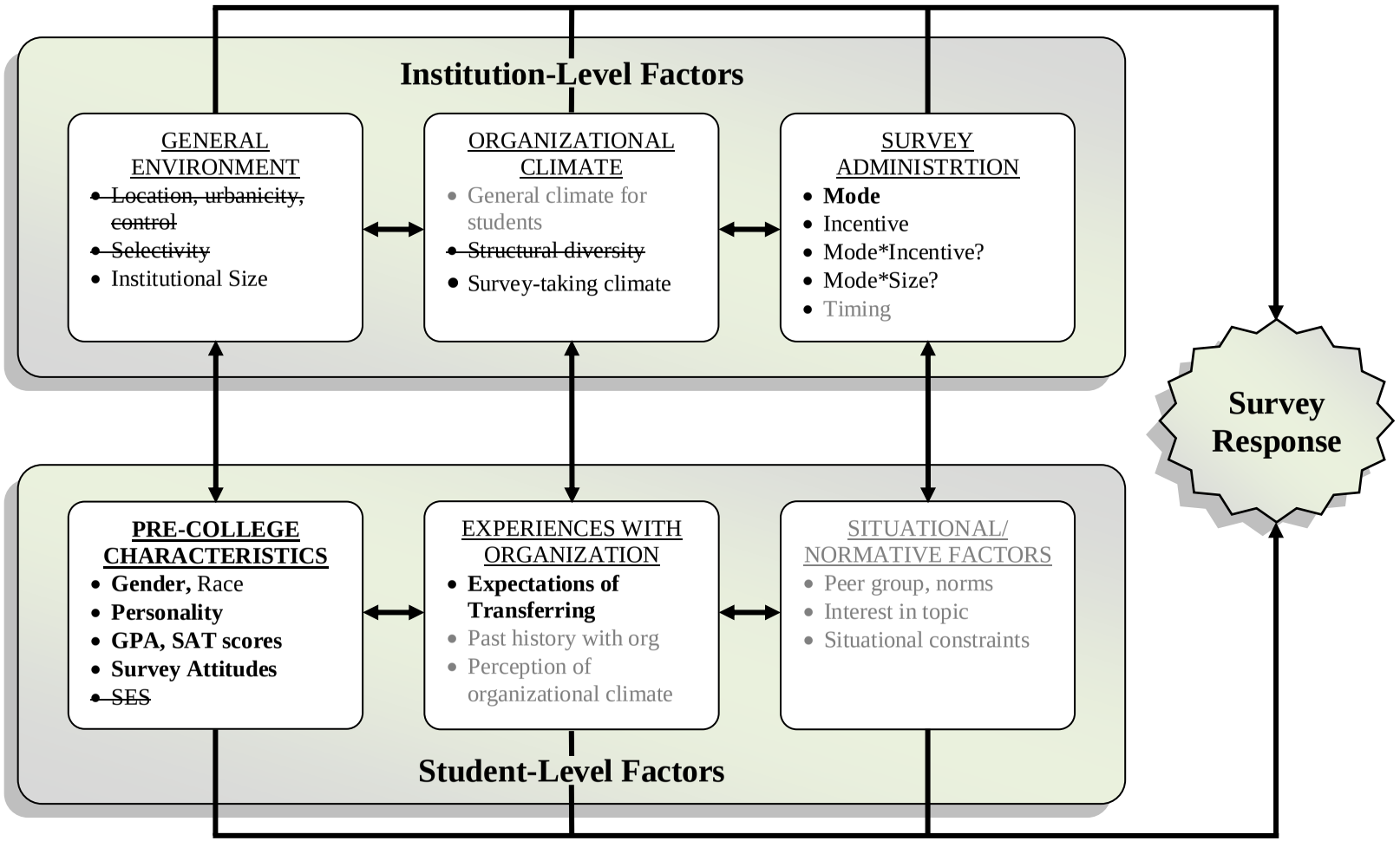

Figure 5.2. Revised conceptual model of student- and institution-level influences on student survey response

Note. Strikethrough text illustrates factors that were hypothesized to be related to survey response but which failed to achieve significance, grey text represents factors that could not be tested, bold text shows the factors that were most important for predicting student response, normal un-bolded text shows factors that were predicted to impact response and which did, but not most strongly, and question marks show findings that were not tested directly but that were suggested based on explorations of the data.

As can be seen in the revised conceptual model, the area most elucidated by this study's results concerns the pre-college characteristics impacting student response propensity. Although a preponderance of results related to pre-college characteristics is not unexpected (due to the nature of the data employed), it is certainly interesting that characteristics measured at the beginning of students' college careers can be so reliably used to predict response to surveys administered as late as four years later. Across virtually all groups of students examined in this study, students' high school achievement, gender, personality, and attitudes towards surveys (measured both by permission to include student ID with the data and by the number of questions which were skipped on the baseline survey) consistently predicted future response propensities. This indicates that the character, experiences, and attitudes that students bring with them to college have an enduring impact on their likelihood of responding to surveys over the course of college. It also indicates that there are certain groups of students on whom more effort may need to be expended in order to secure survey response—and that it is not difficult to identify these students with the relevant metrics.

Aside from pre-college characteristics, the only other important student-level factor that is shown in the revised conceptual model is students' likelihood of transfer, a variable thought to represent students' experiences with their institution—or at least their expectation of such experiences. Students who enter college with expectations of leaving before they complete a four year degree are not only less likely to actually complete those four years (DeAngelo, et al., 2011), but are also less likely to complete surveys when they do stay until graduation. How exactly transfer expectations influence response propensities was not investigated in this study; it could be the case that such expectations are linked to poor experiences at an institution, which make students less inclined to respond to surveys, though it could also be the case that incoming

transfer expectations serve as a proxy for attitudes antithetical to survey response in general (disagreeable students may be more likely to both mark expectations of transfer and avoid filling out future surveys). Regardless of the mechanism by which transfer expectation influence response propensities, this predictor was one of the most robust in the current study. To the extent that this variable (or an analogous one) can be employed in future work on student survey nonresponse, it should.

In terms of institution-level factors that influence students' likelihood of responding to surveys, Figure 5.2 shows that the most important in this study was clearly survey modality. Students were far less likely to respond to web surveys and mail surveys than to paper surveys handed out in person, and this was even more true for males than for females. Though paper surveys might be more expensive to administer, their cost will be at least partially offset by the increased representativeness of the data collected. As far as the impact of incentives goes, this study demonstrated that, at least for first-year students, a small incentive guaranteed to all survey takers can have a positive impact on student response likelihood. Lottery incentives, on the other hand, appear to have no impact on students at all. However, as the question marks in the revised conceptual model's Survey Administration box indicate, this study ends with more questions about incentives than answers. It is not clear, for instance, whether the impact of use and type of incentives varies by survey modality or by institutional characteristics like size. Additional research must be designed to answer such questions.

Finally, supporting the conceptual model's basic predictions about institution-level effects, two institution-level predictors, representing the general institutional environment (size) and the institutional climate (proportion of times in the TFS norms) significantly predicted response in this study. A number of other environmental and climate-related variables were

tested or considered for inclusion in this study but did not prove significant, such as selectivity, institutional diversity, urbanicity, and control (see Appendix G for the whole list). It remains largely unclear what specific institutional environment and institutional climate measures are most important in terms of impacting student response. Based on the results of the current study we can conclude only that the number of undergraduates on campus is an important factor to consider, as is survey-taking climate—at least for graduating students. It is quite likely that there are many as-of-yet unidentified institution-level factors that influence student survey response propensity; this is a ripe area for future investigations.

Overall, the findings in this study verify the basic premises laid out in the conceptual model of survey response that was developed in Chapter 3 (Figure 3.1) and revised in this chapter (Figure 5.2). It is likely that this model prove useful to future research on student survey response.

Implications

The current study is first of its kind to predict student survey nonresponse using institutional characteristics, administration methods, and student demographic, behavioral and attitudinal characteristics, all in one hierarchical model. It is also the first to use these same variables to model response separately across gender and race. As such, it has brought a modicum of consistency to the literature concerning the prediction of college student survey response. At the same time, the results of the many models run here leave many open questions that must be addressed in future work. The implications of the current study for researchers and practitioners, along with the unaddressed issues that these groups might profitably address in the future, are briefly discussed below.

Implications for Research

The quality of all research utilizing student survey data is heavily dependent on the samples of students who respond to the surveys. Most of the statistical methods employed by higher education researchers assume that survey samples are randomly drawn from a population, and that all students have equal probabilities of responding surveys (Berk & Freedman, 2003; Heeringa, et al., 2009). Unfortunately, this study has demonstrated that such assumptions are likely not satisfied in the case of longitudinal student survey data. Indeed, in this study response to surveys one and four years into college was reliably predicted using a relatively small set of student characteristics, including gender, personality, achievement measures, survey attitudes, and intentions to transfer. Longitudinal datasets created by linking baseline to follow-up student survey data, then, are liable to be biased in predictable ways—towards females, high achievers, non-partiers, non-artists, who do not intend to transfer and who trust the survey research process. Consequently, many student voices are likely left out of scholarly research, including students least likely to be academically successful, students engaged in risk behavior such as heavy episodic drinking, and students who are at risk of leaving an institution. Put another way, the longitudinal datasets currently used for research in higher education likely omit information from the very students who are arguably most important to study.

Knowing this, there are a few ways in which higher education researchers might attempt to address systematic biases in longitudinal student survey data. First, researchers should engage more in studies of the factors that make students more likely to respond to surveys, with the goal of raising the level of scholarship in this area and thereby raising response rates. Second, researchers should avoid using longitudinal data without weighting it to correct for nonresponse. If longitudinal datasets are not weighted, conclusions drawn from analyses with these data,

future research based on these conclusions, and, indeed, the entire longitudinal research enterprise in general, is likely to be generalizable to only a select segment of the college student population. Such a state of affairs is not ideal if the goal of higher education research is to increase student success across the board. It is particularly undesirable for policy measures that are based on unweighted longitudinal research, for such measures are not likely to be effective for students whose voices were not heard in the data to begin with.

Beyond longitudinal data, this study may also serve to inform research on cross-sectional college student survey nonresponse. Far less data is available to describe and model nonresponse in cross-sectional student survey samples, but scholars have suggested that such data likely suffer from the same (or similar) nonresponse biases as longitudinal data (Pike, 2008). The results from this study may therefore be useful in selecting the types of variables that should be used to weight cross-sectional data to correct for nonresponse bias.

In addition to implications surrounding the representativeness of student survey samples, this study also has implications for researchers in terms of the many avenues it opens up for future scholarly work. For example, a fruitful avenue for research likely lies in connecting actual student experiences to survey response propensities, perhaps by linking TFS to YFCY data and using this to predict CSS response. Another lies in developing measures more appropriate for testing the conceptual model, such as institutional climate measures that are relevant to survey response decisions. A third area ready for future research lies in the use of alternative quantitative methodologies to investigate student survey response. For example, a hierarchical structural equation model could quite elegantly model important unobserved constructs, change within students over time, and direct as well as indirect effects. Alternately, similar models to the ones used in this study could be developed that incorporate instrumental variables, which can

account for unobservable but important constructs like the probability of being retained to the senior year.

A variety of future studies could also be developed around the questions raised in the process of conducting this study. For example, does survey modality interact with institutional characteristics, such as size? Does the impact of incentive use and type depend on the modality chosen? Does institutional climate exert a different impact on response propensity for first-year students than for graduating seniors? Do different types of incentives work in different ways for these same two groups? And of course, why do females respond at higher rates than males, and why do White students tend to respond at higher rates than students of other race/ethnicities? This study was unable to satisfactorily answer these latter two questions, so it remains unknown whether there are unique factors that differentially impact males and females, or students of color compared to White students.

Implications for Practice

The most important implications of this study for practitioners concern the impact of survey modality on response rates. Results of this study have demonstrated that survey modalities matter a great deal to whether students respond to surveys, and that administering a paper survey in person is the method which will secure responses from the largest number of students. Of course, in-person paper surveys are far more expensive in terms of time, money and people than are web surveys, and because of this paper surveys will likely continue to fall out of favor among those whose job it is to administer student surveys. However, such practitioners should always keep in mind the fact that in-person paper surveys have been shown to be one of the most effective ways to elicit student response; it is possible the associated extra expense of such surveys might be worth it for important instruments. In particular, practitioners might want

to think very carefully about how they administer critical surveys such as entering surveys, exit surveys, and surveys used to demonstrate worth to accrediting bodies.

If survey administrators feel they must use web surveys for some reason, the findings of this study suggest that a well-chosen incentive can help boost student response rate. Namely, a small incentive that is guaranteed to all survey takers will likely be more effective than a lottery incentive given to one lucky winner. While giving a small incentive to every student who completes a survey is, again, more expensive in terms of work and perhaps also expense, these types of incentives do seem to be most effective for students, and practitioners should keep this option in mind.

Beyond implications relating to administration methods and incentives, this study has additional implications for practitioners as well. In particular, this study suggests that practitioners who administer surveys to their campus' student body may want to focus their time and resources on the recruitment of specific segments of the respondent population that are least likely to respond (such as males, Hedonists, Artists, students expecting to transfer, and students who tend to skip a large number of survey items). Those practitioners who take part in the CIRP's yearly TFS administration, in particular, have in this study a wealth of information that can be used to identify the students least likely to respond to follow-up surveys. It might make sense for such individuals to focus their YFCY and CSS survey invitation and reminder efforts, for example, on the least-likely-to-respond students in order to increase these students' response likelihoods—perhaps survey administrators could personally call students, or specifically tailor survey incentives. Meanwhile, standard procedures could be used for the students most likely to respond (females, high achievers, etc.). This study further suggests that if practitioners can find

a way to cultivate a norm of taking surveys on their campus—a positive survey-taking climate, in other words—they may be able to boost baseline response rates across all student groups.

Finally, the questions regarding administration methods that were raised by this study provide an opportunity for practitioners, particularly institutional research (IR) professionals, to contribute to the literature on student survey response. IR professionals and other survey researchers on college campuses are in unique positions to practice their craft in systematic ways, with the aim of yielding deep understandings of how various factors interact to impact student response propensity. Indeed, those who administer surveys on a regular basis not only have unrivaled access to their research population but also the opportunity and ability to try new techniques to find out what works. By methodically adjusting administrative techniques over different survey administrations, IR practitioners can identify the methods that work best for eliciting responses from the students on their campus. If the results of these investigations are presented at conferences or published in trade journals, they will doubtlessly help practitioners at other similar institutions, as well as stimulate larger-scale scholarly interest.

Conclusion

College student surveys are used extensively for both scholarly and practical purposes, and data collected with these instruments are frequently used to assess student outcomes for accountability purposes, to make institutional improvements, and to conduct scholarly research. Indeed, student surveys are an integral part of the higher education enterprise, and as we move into a future of ever-increasing accountability they are likely to only increase in importance. Consequently, concerns about the quality of data collected with student surveys must be addressed. One obvious concern is the rising rate of student nonresponse that has been observed over the past few decades.

The current study was undertaken because the literature on student survey response reveals relatively little about the factors that make students more or less likely to respond to surveys. The study was the first of its kind to investigate the predictors of student survey response with a large sample of students and institutions, an appropriate hierarchical methodology, and a wide variety of student- and institution-level variables. Results revealed that response propensities to student surveys can be reliably predicted, across different groups of students and different years in school. But perhaps the most exciting outcome of this study is the promise that it shows for future research on student survey response. It is time for both researchers and practitioners to take up student survey response as a research topic. In order for research to make valid inferences and for practitioners to design effective programs to improve student success, it is essential to have information that is representative of the entire population of students. To achieve representativeness in student survey samples, the decline of survey response rates must be halted. And to raise response rates, we need to know why students do not respond to surveys and what will make them more likely to do so. Only further research can bear this out.

APPENDIX A

2004 Freshman Survey Instrument

PLEASE PRINT NAME AND PERMANENT/HOME ADDRESS (one letter or number per box) 000001

NAME: FIRST MI LAST

When were you born? Month (01-12) Day (01-31) Year

ADDRESS:

CITY: STATE: ZIP: PHONE: – –

2004 STUDENT INFORMATION FORM

MARKING DIRECTIONS

Your responses will be read by an optical mark reader. Please,

- Use a pencil or black or blue pen.
- Fill in the oval completely.
- Erase cleanly any marks you wish to change or "X" out mark if in pen.

CORRECT MARK ● INCORRECT MARKS ✓ X

PLEASE PROVIDE YOUR ID NUMBER (as instructed) | Mark here if directed | GROUP CODE A | GROUP CODE B

1. Your sex: ○ Male ○ Female

2. How old will you be on December 31 of this year? (Mark one)

16 or younger ○ | 17 ○ | 18 ○ | 19 ○ | 20 ○ | 21-24 ○ | 25-29 ○ | 30-39 ○ | 40-54 ○ | 55 or older ○

3. Is English your native language?

○ Yes ○ No

4. In what year did you graduate from high school? (Mark one)

2004 ○ | 2003 ○ | 2002 ○ | 2001 or earlier ○ | Did not graduate but passed G.E.D. test ○ | Never completed high school ○

5. Are you enrolled (or enrolling) as a: (Mark one)

Full-time student? ○ Part-time student? ○

6. How many miles is this college from your permanent home? (Mark one)

5 or less ○ | 6-10 ○ | 11-50 ○ | 51-100 ○ | 101-500 ○ | Over 500 ○

7. What was your average grade in high school? (Mark one)

A or A+ ○ | A– ○ | B+ ○ | B ○ | B– ○ | C+ ○ | C ○ | D ○

8. From what kind of secondary school did you graduate? (Mark one)

- ○ Public school (not charter or magnet)
- ○ Public charter school
- ○ Public magnet school
- ○ Private religious/parochial school
- ○ Private independent college-prep school
- ○ Home school

9. What were your scores on the SAT I and/or ACT?

SAT VERBAL

SAT MATH

ACT Composite

10. Citizenship status:

- ○ U.S. citizen
- ○ Permanent resident (green card)
- ○ Neither

11. Prior to this term, have you ever taken courses for credit at this institution?

○ Yes ○ No

12. Since leaving high school, have you ever taken courses at any other institution? (Mark all that apply in each column)

	For Credit	Not for Credit
Yes, at a community/junior college	○	○
Yes, at a 4-yr. college or university	○	○
Yes, at some other postsecondary school (For example, technical, vocational, business)	○	○

13. During your last year of high school what proportion of the time did you live with: (Mark one in each row)

	All	Most	Some	None
Mother	A	M	S	N
Father	A	M	S	N
Stepmother	A	M	S	N
Stepfather	A	M	S	N
Grandparent	A	M	S	N
Legal guardian	A	M	S	N
Other adult(s)	A	M	S	N

14. Where do you plan to live during the fall term? (Mark one)

- ○ With my family or other relatives
- ○ Other private home, apartment or room
- ○ College residence hall
- ○ Fraternity or sorority house
- ○ Other campus student housing
- ○ Other

15. Is this college your: (Mark one)

First choice? ○ | Second choice? ○ | Third choice? ○ | Less than third choice? ○

16. To how many colleges other than this one did you apply for admission this year?

None ○ | 1 ○ | 2 ○ | 3 ○ | 4 ○ | 5 ○ | 6 ○ | 7-10 ○ | 11 or more ○

17. During high school (grades 9-12) how many years did you study each of the following subjects? (Mark one for each item)

	None	1/2	1	2	3	4	5 or more
English	○	○	○	○	○	○	○
Mathematics	○	○	○	○	○	○	○
Foreign Language	○	○	○	○	○	○	○
Physical Science	○	○	○	○	○	○	○
Biological Science	○	○	○	○	○	○	○
History/Am. Govt.	○	○	○	○	○	○	○
Computer Science	○	○	○	○	○	○	○
Arts and/or Music	○	○	○	○	○	○	○

18. Do you have a disabilty? (Mark all that apply)

- ○ None
- ○ Hearing
- ○ Speech
- ○ Orthopedic
- ○ Learning disability
- ○ Health-related
- ○ Partially sighted or blind
- ○ Other

19. What is the highest academic degree that you intend to obtain? (Mark one in each column)

	Highest Planned	Highest Planned At This College
None	○	○
Vocational certificate	○	○
Associate (A.A. or equivalent)	○	○
Bachelor's degree (B.A., B.S., etc.)	○	○
Master's degree (M.A., M.S., etc.)	○	○
Ph.D. or Ed.D.	○	○
M.D., D.O., D.D.S., or D.V.M.	○	○
J.D. (Law)	○	○
B.D. or M.DIV. (Divinity)	○	○
Other	○	○

20. Are your parents: (Mark one)

- ○ Both alive and living with each other?
- ○ Both alive, divorced or living apart?
- ○ One or both deceased?

21. How much of your first year's educational expenses (room, board, tuition, and fees) do you expect to cover from each of the sources listed below? (Mark one answer for each possible source)

	None	Less than $1,000	$1,000-2,999	$3,000-5,999	$6,000-9,999	$10,000+
Family resources (parents, relatives, spouse, etc.)	○	○	○	○	○	○
My own resources (savings from work, work-study, other income)	○	○	○	○	○	○
Aid which need not be repaid (grants, scholarships, military funding, etc.)	○	○	○	○	○	○
Aid which must be repaid (loans, etc.)	○	○	○	○	○	○
Other than above	○	○	○	○	○	○

22. What is your best estimate of your parents' total income last year? Consider income from all sources before taxes. (Mark one)

- ○ Less than $10,000
- ○ $10,000-14,999
- ○ $15,000-19,999
- ○ $20,000-24,999
- ○ $25,000-29,999
- ○ $30,000-39,999
- ○ $40,000-49,999
- ○ $50,000-59,999
- ○ $60,000-74,999
- ○ $75,000-99,999
- ○ $100,000-149,999
- ○ $150,000-199,999
- ○ $200,000-249,999
- ○ $250,000 or more

23. Current religious preference: (Mark one in each column)

	Yours	Father's	Mother's
Baptist	Ⓨ	Ⓕ	Ⓜ
Buddhist	Ⓨ	Ⓕ	Ⓜ
Church of Christ	Ⓨ	Ⓕ	Ⓜ
Eastern Orthodox	Ⓨ	Ⓕ	Ⓜ
Episcopalian	Ⓨ	Ⓕ	Ⓜ
Hindu	Ⓨ	Ⓕ	Ⓜ
Islamic	Ⓨ	Ⓕ	Ⓜ
Jewish	Ⓨ	Ⓕ	Ⓜ
LDS (Mormon)	Ⓨ	Ⓕ	Ⓜ
Lutheran	Ⓨ	Ⓕ	Ⓜ
Methodist	Ⓨ	Ⓕ	Ⓜ
Presbyterian	Ⓨ	Ⓕ	Ⓜ
Quaker	Ⓨ	Ⓕ	Ⓜ
Roman Catholic	Ⓨ	Ⓕ	Ⓜ
Seventh Day Adventist	Ⓨ	Ⓕ	Ⓜ
Unitarian/Universalist	Ⓨ	Ⓕ	Ⓜ
United Church of Christ/Congregational	Ⓨ	Ⓕ	Ⓜ
Other Christian	Ⓨ	Ⓕ	Ⓜ
Other Religion	Ⓨ	Ⓕ	Ⓜ
None	Ⓨ	Ⓕ	Ⓜ

24. Do you consider yourself a Born-Again Christian?

○ Yes ○ No

25. Please indicate your ethnic background. (Mark all that apply)

- ○ White/Caucasian
- ○ African American/Black
- ○ American Indian/Alaska Native
- ○ Asian American/Asian
- ○ Native Hawaiian/Pacific Islander
- ○ Mexican American/Chicano
- ○ Puerto Rican
- ○ Other Latino
- ○ Other

26. For the activities below, indicate which ones you did during the past year. If you engaged in an activity frequently, mark Ⓕ. If you engaged in an activity one or more times, but not frequently, mark Ⓞ (Occasionally). Mark Ⓝ (Not at all) if you have not performed the activity during the past year. (Mark one for each item)

	Frequently	Occasionally	Not at all
Attended a religious service	Ⓕ	Ⓞ	Ⓝ
Was bored in class	Ⓕ	Ⓞ	Ⓝ
Participated in organized demonstrations	Ⓕ	Ⓞ	Ⓝ
Tutored another student	Ⓕ	Ⓞ	Ⓝ
Studied with other students	Ⓕ	Ⓞ	Ⓝ
Was a guest in a teacher's home	Ⓕ	Ⓞ	Ⓝ
Smoked cigarettes	Ⓕ	Ⓞ	Ⓝ
Drank beer	Ⓕ	Ⓞ	Ⓝ
Drank wine or liquor	Ⓕ	Ⓞ	Ⓝ
Felt overwhelmed by all I had to do	Ⓕ	Ⓞ	Ⓝ
Felt depressed	Ⓕ	Ⓞ	Ⓝ
Performed volunteer work	Ⓕ	Ⓞ	Ⓝ
Played a musical instrument	Ⓕ	Ⓞ	Ⓝ
Asked a teacher for advice after class	Ⓕ	Ⓞ	Ⓝ
Discussed politics	Ⓕ	Ⓞ	Ⓝ
Voted in a student election	Ⓕ	Ⓞ	Ⓝ
Socialized with someone of another racial/ethnic group	Ⓕ	Ⓞ	Ⓝ
Came late to class	Ⓕ	Ⓞ	Ⓝ
Used the Internet for research or homework	Ⓕ	Ⓞ	Ⓝ
Performed community service as part of a class	Ⓕ	Ⓞ	Ⓝ
Used a personal computer	Ⓕ	Ⓞ	Ⓝ
Discussed religion/spirituality: In class	Ⓕ	Ⓞ	Ⓝ
With friends	Ⓕ	Ⓞ	Ⓝ
With family	Ⓕ	Ⓞ	Ⓝ
Worked on a local, state, or national political campaign	Ⓕ	Ⓞ	Ⓝ
Maintained a healthy diet	Ⓕ	Ⓞ	Ⓝ
Stayed up all night	Ⓕ	Ⓞ	Ⓝ
Missed school because of illness	Ⓕ	Ⓞ	Ⓝ

27. For each item, please mark Yes or No:

	Yes	No
Did your high school require community service for graduation?	Ⓨ	Ⓝ
Have you participated in: A summer research program?	Ⓨ	Ⓝ
A health science research program sponsored by a university?	Ⓨ	Ⓝ

28. What is the highest level of formal education obtained by your parents? (Mark one in each column)

	Father	Mother
Grammar school or less	○	○
Some high school	○	○
High school graduate	○	○
Postsecondary school other than college	○	○
Some college	○	○
College degree	○	○
Some graduate school	○	○
Graduate degree	○	○

29. In deciding to go to college, how important to you was each of the following reasons? (Mark one answer for each possible reason)

	Very Important	Somewhat Important	Not Important
My parents wanted me to go	Ⓥ	Ⓢ	Ⓝ
I could not find a job	Ⓥ	Ⓢ	Ⓝ
Wanted to get away from home	Ⓥ	Ⓢ	Ⓝ
To be able to get a better job	Ⓥ	Ⓢ	Ⓝ
To gain a general education and appreciation of ideas	Ⓥ	Ⓢ	Ⓝ
There was nothing better to do	Ⓥ	Ⓢ	Ⓝ
To make me a more cultured person	Ⓥ	Ⓢ	Ⓝ
To be able to make more money	Ⓥ	Ⓢ	Ⓝ
To learn more about things that interest me	Ⓥ	Ⓢ	Ⓝ
To prepare myself for graduate or professional school	Ⓥ	Ⓢ	Ⓝ
To get training for a specific career	Ⓥ	Ⓢ	Ⓝ
To find my purpose in life	Ⓥ	Ⓢ	Ⓝ

30. How would you characterize your political views? (Mark one)

- ○ Far left
- ○ Liberal
- ○ Middle-of-the-road
- ○ Conservative
- ○ Far right

31. Rate yourself on each of the following traits as compared with the average person your age. We want the most accurate estimate of how you see yourself. (Mark one in each row)

	Highest 10%	Above Average	Average	Below Average	Lowest 10%
Academic ability	○	○	○	○	○
Artistic ability	○	○	○	○	○
Compassion	○	○	○	○	○
Computer skills	○	○	○	○	○
Cooperativeness	○	○	○	○	○
Courage	○	○	○	○	○
Creativity	○	○	○	○	○
Drive to achieve	○	○	○	○	○
Emotional health	○	○	○	○	○
Forgiveness	○	○	○	○	○
Generosity	○	○	○	○	○
Kindness	○	○	○	○	○
Leadership ability	○	○	○	○	○
Mathematical ability	○	○	○	○	○
Physical health	○	○	○	○	○
Public speaking ability	○	○	○	○	○
Religiousness	○	○	○	○	○
Self-confidence (intellectual)	○	○	○	○	○
Self-confidence (social)	○	○	○	○	○
Self-understanding	○	○	○	○	○
Spirituality	○	○	○	○	○
Time management	○	○	○	○	○
Understanding of others	○	○	○	○	○
Writing ability	○	○	○	○	○

32. Mark only three responses, one in each column.

(M) Your mother's occupation
(F) Your father's occupation
(Y) Your probable career occupation

NOTE: If your father or mother is deceased, please indicate his or her last occupation.

	Y	F	M
Accountant or actuary	Y	F	M
Actor or entertainer	Y	F	M
Architect or urban planner	Y	F	M
Artist	Y	F	M
Business (clerical)	Y	F	M
Business executive (management, administrator)	Y	F	M
Business owner or proprietor	Y	F	M
Business salesperson or buyer	Y	F	M
Clergy (minister, priest)	Y	F	M
Clergy (other religious)	Y	F	M
Clinical psychologist	Y	F	M
College administrator/staff	Y	F	M
College teacher	Y	F	M
Computer programmer or analyst	Y	F	M
Conservationist or forester	Y	F	M
Dentist (including orthodontist)	Y	F	M
Dietitian or nutritionist	Y	F	M
Engineer	Y	F	M
Farmer or rancher	Y	F	M
Foreign service worker (including diplomat)	Y	F	M
Homemaker (full-time)	Y	F	M
Interior decorator (including designer)	Y	F	M
Lab technician or hygienist	Y	F	M
Law enforcement officer	Y	F	M
Lawyer (attorney) or judge	Y	F	M
Military service (career)	Y	F	M
Musician (performer, composer)	Y	F	M
Nurse	Y	F	M
Optometrist	Y	F	M
Pharmacist	Y	F	M
Physician	Y	F	M
Policymaker/Government	Y	F	M
School counselor	Y	F	M
School principal or superintendent	Y	F	M
Scientific researcher	Y	F	M
Social, welfare or recreation worker	Y	F	M
Therapist (physical, occupational, speech)	Y	F	M
Teacher or administrator (elementary)	Y	F	M
Teacher or administrator (secondary)	Y	F	M
Veterinarian	Y	F	M
Writer or journalist	Y	F	M
Skilled trades	Y	F	M
Laborer (unskilled)	Y	F	M
Semi-skilled worker	Y	F	M
Unemployed	Y	F	M
Other	Y	F	M
Undecided	Y		

33. Mark one in each row:

(1) Disagree Strongly
(2) Disagree Somewhat
(3) Agree Somewhat
(4) Agree Strongly

	4	3	2	1
There is too much concern in the courts for the rights of criminals	4	3	2	1
Abortion should be legal	4	3	2	1
The death penalty should be abolished	4	3	2	1
Marijuana should be legalized	4	3	2	1
It is important to have laws prohibiting homosexual relationships	4	3	2	1
Racial discrimination is no longer a major problem in America	4	3	2	1
Realistically, an individual can do little to bring about changes in our society	4	3	2	1
Wealthy people should pay a larger share of taxes than they do now	4	3	2	1
Colleges should prohibit racist/sexist speech on campus	4	3	2	1
Same-sex couples should have the right to legal marital status	4	3	2	1
Affirmative action in college admissions should be abolished	4	3	2	1
The activities of married women are best confined to the home and family	4	3	2	1
Federal military spending should be increased	4	3	2	1
Colleges have the right to ban extreme speakers	4	3	2	1
If two people really like each other, it's all right for them to have sex even if they've known each other for only a very short time	4	3	2	1
The federal government should do more to control the sale of handguns	4	3	2	1

34. Below is a list of community service/volunteer activities. Indicate which of these you participated in during high school. (Mark all that apply)

- None
- Tutoring/teaching
- Counseling/mentoring
- Environmental activities
- Child care
- Elder care
- Hospital work
- Substance abuse education
- Other health education
- Services to the homeless
- Community improvement/ construction
- Conflict mediation
- Service to my religious community
- Other community service

35. During your last year in high school, how much time did you spend during a typical week doing the following activities?

Hours per week:	None	Less than 1 hour	1-2	3-5	6-10	11-15	16-20	Over 20
Studying/homework								
Socializing with friends								
Talking with teachers outside of class								
Exercise or sports								
Partying								
Working (for pay)								
Volunteer work								
Student clubs/groups								
Watching TV								
Household/childcare duties								
Reading for pleasure								
Playing video/ computer games								
Prayer/meditation								

36. Do you have any concern about your ability to finance your college education? (Mark one)

- None (I am confident that I will have sufficient funds)
- Some (but I probably will have enough funds)
- Major (not sure I will have enough funds to complete college)

37. Below are some reasons that might have influenced your decision to attend this particular college. How important was each reason in your decision to come here? (Mark one answer for each possible reason)

	Very Important	Somewhat Important	Not Important
My relatives wanted me to come here	V	S	N
My teacher advised me	V	S	N
This college has a very good academic reputation	V	S	N
This college has a good reputation for its social activities	V	S	N
I was offered financial assistance	V	S	N
The cost of attending this college	V	S	N
High school counselor advised me	V	S	N
Private college counselor advised me	V	S	N
I wanted to live near home	V	S	N
Not offered aid by first choice	V	S	N
This college's graduates gain admission to top graduate/ professional schools	V	S	N
This college's graduates get good jobs	V	S	N
I was attracted by the religious affiliation/orientation of the college	V	S	N
I wanted to go to a school about the size of this college	V	S	N
Rankings in national magazines	V	S	N
Information from a website	V	S	N
I was admitted through an Early Action or Early Decision program	V	S	N
A visit to the campus	V	S	N

38. Below is a list of different undergraduate major fields grouped into general categories. Mark only one oval to indicate your probable field of study.

ARTS AND HUMANITIES
- Art, fine and applied (1)
- English (language and literature) (2)
- History (3)
- Journalism (4)
- Language and Literature (except English) (5)
- Music (6)
- Philosophy (7)
- Speech (8)
- Theater or Drama (9)
- Theology or Religion (10)
- Other Arts and Humanities (11)

BIOLOGICAL SCIENCE
- Biology (general) (12)
- Biochemistry or Biophysics (13)
- Botany (14)
- Environmental Science (15)
- Marine (Life) Science (16)
- Microbiology or Bacteriology (17)
- Zoology (18)
- Other Biological Science (19)

BUSINESS
- Accounting (20)
- Business Admin. (general) (21)
- Finance (22)
- International Business (23)
- Marketing (24)
- Management (25)
- Secretarial Studies (26)
- Other Business (27)

EDUCATION
- Business Education (28)
- Elementary Education (29)
- Music or Art Education (30)
- Physical Education or Recreation (31)
- Secondary Education (32)
- Special Education (33)
- Other Education (34)

ENGINEERING
- Aeronautical or Astronautical Eng. (35)
- Civil Engineering (36)
- Chemical Engineering (37)
- Computer Engineering (38)
- Electrical or Electronic Engineering (39)
- Industrial Engineering (40)
- Mechanical Engineering (41)
- Other Engineering (42)

PHYSICAL SCIENCE
- Astronomy (43)
- Atmospheric Science (incl. Meteorology) (44)
- Chemistry (45)
- Earth Science (46)
- Marine Science (incl. Oceanography) (47)
- Mathematics (48)
- Physics (49)
- Statistics (50)
- Other Physical Science (51)

PROFESSIONAL
- Architecture or Urban Planning (52)
- Home Economics (53)
- Health Technology (medical, dental, laboratory) (54)
- Library or Archival Science (55)
- Medicine, Dentistry, Veterinary Medicine (56)
- Nursing (57)
- Pharmacy (58)
- Therapy (occupational, physical, speech) (59)
- Other Professional (60)

SOCIAL SCIENCE
- Anthropology (61)
- Economics (62)
- Ethnic Studies (63)
- Geography (64)
- Political Science (gov't., international relations) (65)
- Psychology (66)
- Social Work (67)
- Sociology (68)
- Women's Studies (69)
- Other Social Science (70)

TECHNICAL
- Building Trades (71)
- Data Processing or Computer Programming (72)
- Drafting or Design (73)
- Electronics (74)
- Mechanics (75)
- Other Technical (76)

OTHER FIELDS
- Agriculture (77)
- Communications (78)
- Computer Science (79)
- Forestry (80)
- Kinesiology (81)
- Law Enforcement (82)
- Military Science (83)
- Other Field (84)
- Undecided (85)

DO NOT WRITE IN THIS AREA

39. Please indicate the importance to you personally of each of the following: (Mark one for each item)

(N) Not Important (S) Somewhat Important (V) Very Important (E) Essential

- Becoming accomplished in one of the performing arts (acting, dancing, etc.) (E) (V) (S) (N)
- Becoming an authority in my field (E) (V) (S) (N)
- Obtaining recognition from my colleagues for contributions to my special field (E) (V) (S) (N)
- Influencing the political structure (E) (V) (S) (N)
- Influencing social values (E) (V) (S) (N)
- Raising a family (E) (V) (S) (N)
- Having administrative responsibility for the work of others (E) (V) (S) (N)
- Being very well off financially (E) (V) (S) (N)
- Helping others who are in difficulty (E) (V) (S) (N)
- Making a theoretical contribution to science (E) (V) (S) (N)
- Writing original works (poems, novels, short stories, etc.) (E) (V) (S) (N)
- Creating artistic work (painting, sculpture, decorating, etc.) (E) (V) (S) (N)
- Becoming successful in a business of my own (E) (V) (S) (N)
- Becoming involved in programs to clean up the environment (E) (V) (S) (N)
- Developing a meaningful philosophy of life (E) (V) (S) (N)
- Participating in a community action program (E) (V) (S) (N)
- Helping to promote racial understanding (E) (V) (S) (N)
- Keeping up to date with political affairs (E) (V) (S) (N)
- Becoming a community leader (E) (V) (S) (N)
- Integrating spirituality into my life (E) (V) (S) (N)
- Improving my understanding of other countries and cultures (E) (V) (S) (N)
- Working to find a cure to a health problem (E) (V) (S) (N)

40. What is your best guess as to the chances that you will: (Mark one for each item)

(N) No Chance (L) Very Little Chance (S) Some Chance (V) Very Good Chance

- Change major field? (V) (S) (L) (N)
- Change career choice? (V) (S) (L) (N)
- Participate in student government? (V) (S) (L) (N)
- Get a job to help pay for college expenses? (V) (S) (L) (N)
- Work full-time while attending college? (V) (S) (L) (N)
- Join a social fraternity or sorority? (V) (S) (L) (N)
- Play varsity/intercollegiate athletics? (V) (S) (L) (N)
- Make at least a "B" average? (V) (S) (L) (N)
- Participate in student protests or demonstrations? (V) (S) (L) (N)
- Transfer to another college before graduating? (V) (S) (L) (N)
- Be satisfied with your college? (V) (S) (L) (N)
- Participate in volunteer or community service work? (V) (S) (L) (N)
- Seek personal counseling? (V) (S) (L) (N)
- Communicate regularly with your professors? (V) (S) (L) (N)
- Socialize with someone of another racial/ethnic group? (V) (S) (L) (N)
- Participate in student clubs/groups? (V) (S) (L) (N)
- Strengthen your religious beliefs/convictions? (V) (S) (L) (N)
- Participate in a study abroad program? (V) (S) (L) (N)

41. Do you give the Higher Education Research Institute (HERI) permission to include your ID number should your college request the data for additional research analyses? ○ Yes ○ No

The remaining ovals are provided for questions specifically designed by your college rather than the Higher Education Research Institute. If your college has chosen to use the ovals, please observe carefully the supplemental directions given to you.

42. (A) (B) (C) (D) (E)	49. (A) (B) (C) (D) (E)	56. (A) (B) (C) (D) (E)
43. (A) (B) (C) (D) (E)	50. (A) (B) (C) (D) (E)	57. (A) (B) (C) (D) (E)
44. (A) (B) (C) (D) (E)	51. (A) (B) (C) (D) (E)	58. (A) (B) (C) (D) (E)
45. (A) (B) (C) (D) (E)	52. (A) (B) (C) (D) (E)	59. (A) (B) (C) (D) (E)
46. (A) (B) (C) (D) (E)	53. (A) (B) (C) (D) (E)	60. (A) (B) (C) (D) (E)
47. (A) (B) (C) (D) (E)	54. (A) (B) (C) (D) (E)	61. (A) (B) (C) (D) (E)
48. (A) (B) (C) (D) (E)	55. (A) (B) (C) (D) (E)	62. (A) (B) (C) (D) (E)

THANK YOU!

R20230-Questar/40014C-03-54321

APPENDIX B
2006 YFCY ARF
Copy of online instrument

2006 Your First College Year (YFCY) Administration Report Form (ARF)

Thank you for accessing the 2006 YFCY Administration Report Form (ARF). The ARF is a short web-based form that inquires about specific institutional information needed to process your completed YFCY surveys and to prepare your institutional reports. In addition, it provides the Higher Education Research Institute (HERI) with valuable information about the nature of incentive programs, marketing strategies, and any specific challenges of survey administration on your campus. We utilize this feedback to enhance YFCY and to streamline future administrations of the instrument.

The ARF is due by **June 5, 2006**. Please note: We will be unable to process your institution's data until we receive the completed ARF. If we do not receive it by June 5, your data may not be included in the comparison groups for the national data and we cannot guarantee that you will receive your YFCY deliverables in a timely fashion.

Questions marked with an asterisk (*) are mandatory.

1. Contact information:

Name of institution
Ace Code
City
State

2. Please provide contact information for the CSS representative at your campus:

First name
Last Name
Title/Position
Phone
Email

Administration Information

3. What is the total number of first-time, full-time, first-year (FTFTFY) students at your institution (not including transfer or part-time students)? Please note that these counts reflect ALL of your FTFTFY students, not only those who were surveyed.

Men
Women
Total

***4. How many students did you survey (i.e., number of students who received a survey, NOT the number who responded)?**

5. How many surveys were returned due to undeliverable addresses (postal or e-mail)?

***6. How did you select the students to be surveyed? (Mark all that apply)**

- ☐ All of our first-time, full-time, first-year (FTFTFY) students
- ☐ Follow-up to CIRP Freshman Survey
- ☐ Random Sample
- ☐ Targeted sample: students enrolled in a course or set of courses
- ☐ Targeted sample: students in residence halls
- ☐ Targeted sample: students enrolled in a special program(s)

***7. What methods did you use to administer the survey? (Mark all that apply)**

- ☐ Via e-mail/on-line
- ☐ Via U.S. or campus mail
- ☐ In classes
- ☐ In another proctored setting
- ☐ In residence halls
- ☐ As part of "Assessment Day" activities
- ☐ In conjunction with student advising
- ☐ In conjunction with course registration

8. When did you initially administer the YFCY survey (i.e., first wave)?

- ○ February
- ○ March
- ○ April
- ○ May
- ○ June or later

9. When did you administer the second wave of YFCY?

- ○ Didn't administer a second wave (n/a)
- ○ February
- ○ March
- ○ April
- ○ May
- ○ June or later

10. What incentives to complete YFCY did you use? (Mark all that apply)

- ☐ We did not use incentives
- ☐ Entry into a raffle/drawing
- ☐ Food
- ☐ Gift certificate
- ☐ Coupon/discount for campus or local vendors
- ☐ Cash

10. Do you feel that this incentive plan was successful?

12. What types of marketing strategies did you use for YFCY? (Mark all that apply)

- ☐ We did not use any marketing strategies (n/a)
- ☐ Advanced notification by mail/e-mail
- ☐ Personal contact by faculty/residence hall staff/student representatives
- ☐ Postcard reminders
- ☐ E-mail reminders
- ☐ Student newspaper announcements
- ☐ Postings on campus or student website(s)

13. Do you feel that this marketing plan was successful?

14. Did you utilize any of the 30 answer choices for supplemental questions? (If so, please e-mail your questions and response options to the YFCY Project Team at yfcy@ucla.edu)

15. Which ID number did your students use on YFCY?

- ○ Social Security Number
- ○ Student Identification Number
- ○ Other, please specify

16. Please provide any general comments or describe any special challenges that were encountered during the administration of YFCY (if any).

17. May we contact you to follow-up on your answers?

- ○ Yes
- ○ No

Thank you for your support of this research program.

APPENDIX C
2008 CSS ARF
Copy of online instrument

2007-08 College Senior Survey (CSS)
Administration Report Form (ARF)

Thank you for accessing the 2008 CSS Administration Report Form (ARF). The ARF is a short web-based form that inquires about specific institutional information needed to process your completed CSS surveys and to prepare your institutional reports. In addition, it provides the Higher Education Research Institute (HERI) with valuable information about the nature of incentive programs, marketing strategies, and any specific challenges of survey administration on your campus. We utilize this feedback to enhance CSS and to streamline future administrations of the instrument.

The ARF is due by **June 30, 2008**. Please note: We will be unable to process your institution's data until we receive the completed ARF. If we do not receive it by June 30, your data may not be included in the comparison groups for the national data, and we cannot guarantee that you will receive your CSS deliverables in a timely fashion.

1. Contact information:

Name of institution
Ace Code
City
State

2. Please provide contact information for the CSS representative at your campus:

First name
Last Name
Title/Position
Phone
Email

Administration Information

3. What method of administration did your institution use for the 2008 CSS?

- ○ Paper Only
- ○ Web Only
- ○ Paper & Web

4. What population of students did you target with the CSS?
(Select all that apply)

- ☐ Graduating Seniors
- ☐ Seniors who were not graduating

If you targeted populations of students other than ones above, please specify:

5. Did you intend to use the CSS as a follow-up to the CIRP Freshman Survey?

- ○ Yes
- ○ No

6. How many students did you attempt to survey?

7. Did you target <u>all</u> of the students identified in #4?

- ○ Yes
- ○ No

If "No":

7a. Please indicate the sampling strategy you employed in the administration of the survey: *(Select one)*

- ○ Random sample of students
- ○ Targeted sample: only students who completed the CIRP TFS
- ○ Targeted sample: students enrolled in a course or set of courses
- ○ Targeted sample: students in a specific academic program or major

If you used sampling method other than the ones described above, please specify:

If "random sample of students":

7b. What percentage of students did you survey?

7c. What kind of random selection process did you use?
(Ex. simple random sample, stratified random sample, etc.)

8. How did you administer the CSS?

- ◯ In a proctored group
- ◯ Through the mail
- ◯ Through e-mail
- ◯ Individually (but not mailed)
- ◯ Some combination of the above methods
- ◯ Other

If "In a proctored group":

8a. Did you administer the CSS to students in:

- ◯ A single proctored group
- ◯ Two or more proctored groups

8b. Did these proctored sessions take place:
(Select all that apply)

- ☐ As part of commencement rehearsal
- ☐ As part of commencement exercises
- ☐ In class session(s)
- ☐ As part of an Assessment or Testing Day
- ☐ During a stand-alone, scheduled survey time

If you used a proctored session method other than the ones described above, please specify:

If "Through the mail":

8a. Did you mail each student their survey:

- ◯ By itself (with no other materials)
- ◯ With commencement materials
- ◯ With non-commencement-related materials
- ◯ With other materials

What were the other materials you mailed with the survey invitation (if any)?

8b. Did you include a letter or other materials introducing or explaining the purpose of the survey?

- ◯ Yes
- ◯ No

If "Yes," please describe:

8c. How many surveys were returned due to *undeliverable* postal addresses?

8d. When did you send the first survey mailing to students? (Day-Month e.g. *12-Jun*)

8e. Did you send any reminders about the survey?

- ◯ Yes
- ◯ No

If "Yes":

8f. How many reminders did you mail to students?

8g. When did you send the reminders?

8h. Did you mail another survey instrument with any of your reminders?

- ◯ Yes
- ◯ No

If* "Through e-mail*":

8a. Did you utilize HERI's web-based e-mail distribution system?

- ◯ Yes
- ◯ No, we handled the e-mail distribution ourselves

8b. In your e-mail, how did you introduce or explain the purpose of the survey?

8c. How many surveys were returned due to *undeliverable* e-mail addresses?

8d. When did you send the first email inviting students to take the survey? (Day-Month e.g. *18-Jun*)

8e. How many reminders did you send to the students?

8g. When did you send the reminders?

If "Individually (but not mailed)," "Some combination of the above methods" or "Other":

8a. Please describe briefly how you administered the CSS:

8b. How many surveys were you unable to deliver due to *undeliverable* email and/or mail addresses?

9. Please describe any challenges you faced during administration of the CSS:

10. Did you use any incentives to encourage students to take the CSS?

- ○ Yes
- ○ No

If "Yes":

10a. How were the survey incentives distributed?

- ☐ Each participant received an incentive
- ☐ Each participant received an entry into a raffle/drawing

10b. Which of the following were used as incentives?
(Select all that apply)

- ☐ Graduation ticket
- ☐ Food
- ☐ Gift Certificate
- ☐ Coupon/Discount for campus or local vendors
- ☐ Cash

If you used any incentives other than the ones described above, please specify:

10c. Do you feel that this incentive plan was successful?

- ○ Yes
- ○ No

10d. Additional comments on incentive plan:

11. Did you use any marketing strategies when administering the CSS?

- ○ Yes
- ○ No

If "Yes":

11a. What types of marketing strategies did you use? *(Select all that apply)*

- ☐ Advanced notification by mail
- ☐ Advanced notification by email
- ☐ Personal contact by faculty/residence hall staff/student reps
- ☐ Postcard reminders
- ☐ Email reminders
- ☐ Student newspaper announcements
- ☐ Postings on campus or student website(s)

If you employed any marketing strategies other than the ones described above, please specify:

11b. Do you feel that this marketing plan was successful?

- ○ Yes
- ○ No

11c. Additional comments on marketing plan:

12. Did your institution utilize any of the optional web services provided for the 2007-08 CSS?

- ○ Yes
- ○ No

If "Yes":

12a. Which web options did your campus utilize? *(Select all that were used)*

- ☐ Customized welcome/thank you screens
- ☐ Customized group codes
- ☐ HERI-distributed emails to students
- ☐ Web-integrated additional questions
- ☐ Real-time data analysis

If you used any web options other than the ones listed above, please specify:

12b. What were your experiences in employing these optional web services for the 2007-08 CSS?

13. What type of ID number did you ask students to provide?

- ◯ Campus ID
- ◯ Social Security Number

If you asked students to provide an ID number other than the two types described above, please specify:

14. Was your institution's response rate on the CSS different from other student surveys at your institution?

- ◯ Yes
- ◯ No

If so, why do you think that was the case?

15. Please provide any general comments or describe any special challenges that were encountered during the administration of the CSS (if any).

Thank you for your support of this research program.

APPENDIX D
List of institutions in YFCY sample

Institution Name	Location	Institution type[a]	# Students
Abilene Christian University	Abilene, TX	Prot 4yr-high	887
Adelphi University	Garden City, NY	Priv U-low	533
Agnes Scott College	Decatur, GA	Prot 4yr-high	232
Albertus Magnus College	New Haven, CT	Cath 4yr-low	129
Albright College	Reading, PA	Prot 4yr-med	394
Atlanta College of Art	Atlanta, GA	Nons 4yr-med	70
Augustana College	Rock Island, IL	Prot 4yr-high	456
Austin Peay State University	Clarksville, TN	Pub 4yr-med	930
Babson College	Babson Park, MA	Nons 4yr-v high	374
Bard College	Annandale-on-Hudson, NY	Nons 4yr-v high	368
Bates College	Lewiston, ME	Nons 4yr-v high	452
Berea College	Berea, KY	Nons 4yr-med	363
Bernard M Baruch College	New York, NY	Pub 4yr-high	1385
Bowdoin College	Brunswick, ME	Nons 4yr-v high	457
Bowie State University	Bowie, MD	Pub Black 4yr	401
Brevard College	Brevard, NC	Prot 4yr-v low	120
Bucknell University	Lewisburg, PA	Nons 4yr-v high	900
Buena Vista University	Storm Lake, IA	Prot 4yr-med	294
Cal Poly State U-San Luis Obispo	San Luis Obispo, CA	Pub 4yr-high	2274
Carlow University	Pittsburgh, PA	Cath 4yr-low	205
Case Western Reserve University	Cleveland, OH	Priv U-high	598
Centenary College	Hackettstown, NJ	Prot 4yr-v low	236
Centenary College of Louisiana	Shreveport, LA	Prot 4yr-high	150
Charleston Southern University	Charleston, SC	Prot 4yr-med	411
Clark University	Worcester, MA	Nons 4yr-high	505
Colby College	Waterville, ME	Nons 4yr-v high	488
Colgate University	Hamilton, NY	Nons 4yr-v high	635
College of Santa Fe	Santa Fe, NM	Cath 4yr-high	110
College of Wooster	Wooster, OH	Nons 4yr-high	497
Daemen College	Amherst, NY	Nons 4yr-low	324
Dominican University of California	San Rafael, CA	Cath 4yr-med	197
Earlham College	Richmond, IN	Prot 4yr-high	275
East Texas Baptist University	Marshall, TX	Prot 4yr-low	325
Emmanuel College	Boston, MA	Cath 4yr-med	426
Emory University	Atlanta, GA	Priv U-high	1206

(continued)

Institution Name	Location	Institution type[a]	# Students
Fairfield University	Fairfield, CT	Cath 4yr-high	794
Gannon University	Erie, PA	Cath 4yr-med	435
Gardner-Webb University	Boiling Springs, NC	Prot 4yr-low	337
Georgia Institute of Technology	Atlanta, GA	Pub U-high	1693
Georgia Southwestern State U	Americus, GA	Pub 4yr-high	276
Grace College	Winona Lake, IN	Prot 4yr-low	195
Grand Valley State University	Allendale, MI	Pub 4yr-high	3020
Haverford College	Haverford, PA	Nons 4yr-v high	284
Hollins University	Roanoke, VA	Nons 4yr-high	155
Immaculata University	Immaculata, PA	Cath 4yr-low	255
Judson College	Elgin, IL	Nons 4yr-med	112
Lawrence Technological University	Southfield, MI	Nons 4yr-med	259
Lawrence University	Appleton, WI	Nons 4yr-v high	348
Loyola College in Maryland	Baltimore, MD	Cath 4yr-high	879
Lynn University	Boca Raton, FL	Nons 4yr-low	523
Mercer University	Macon, GA	Prot 4yr-high	527
Miami University	Oxford, OH	Pub U-high	2342
Michigan Technological University	Houghton, MI	Pub 4yr-high	1082
Monmouth University	West Long Branch, NJ	Nons 4yr-med	870
Moravian College	Bethlehem, PA	Prot 4yr-high	295
Mount Vernon Nazarene University	Mount Vernon, OH	Prot 4yr-med	372
Northwest Missouri State U	Maryville, MO	Pub 4yr-med	1167
Northwestern University	Evanston, IL	Priv U-high	1321
Notre Dame College	Cleveland, OH	Cath 4yr-med	138
Oberlin College	Oberlin, OH	Nons 4yr-v high	622
Oklahoma Wesleyan University	Bartlesville, OK	Prot 4yr-med	72
Philadelphia University	Philadelphia, PA	Nons 4yr-med	607
Point Park University	Pittsburgh, PA	Nons 4yr-low	412
Randolph-Macon Woman's College	Lynchburg, VA	Prot 4yr-high	192
Rider University	Lawrenceville, NJ	Nons 4yr-med	797
Rowan University	Glassboro, NJ	Pub 4yr-high	1003
Sacred Heart University	Fairfield, CT	Cath 4yr-med	716
Saint Anselm College	Manchester, NH	Cath 4yr-high	478
Sarah Lawrence College	Bronxville, NY	Nons 4yr-high	342
Scripps College	Claremont, CA	Nons 4yr-v high	184
Seton Hall University	South Orange, NJ	Priv U-low	1154
Smith College	Northampton, MA	Nons 4yr-v high	512

(continued)

Institution Name	Location	Institution type[a]	# Students
Sonoma State University	Rohnert Park, CA	Pub 4yr-med	1079
Southern Methodist University	Dallas, TX	Priv U-low	953
SUNY Institute of Technology	Utica, NY	Pub 4yr-unk	63
SUNY-Stony Brook	Stony Brook, NY	Pub U-high	1365
Teikyo Post University	Waterbury, CT	Nons 4yr-low	183
Tennessee Temple University	Chattanooga, TN	Prot 4yr-unk	101
Texas Woman's University	Denton, TX	Pub U-low	478
Towson University	Towson, MD	Pub 4yr-high	1538
U of California-San Diego	La Jolla, CA	Pub U-high	3539
U of Michigan-Flint	Flint, MI	Pub 4yr-high	445
U of Nebraska-Omaha	Omaha, NE	Pub 4yr-med	1419
U of Notre Dame	South Bend, IN	Priv U-high	1604
U of Portland	Portland, OR	Cath 4yr-high	628
U of Redlands	Redlands, CA	Nons 4yr-high	514
U of Wisconsin-Milwaukee	Milwaukee, WI	Pub U-low	3469
Washington and Lee University	Lexington, VA	Nons 4yr-v high	458
Wellesley College	Wellesley, MA	Nons 4yr-v high	460
Wesleyan College	Macon, GA	Prot 4yr-high	84
Whitman College	Walla Walla, WA	Nons 4yr-v high	298
Wilkes University	Wilkes-Barre, PA	Nons 4yr-med	470
Willamette University	Salem, OR	Nons 4yr-high	452
Wittenberg University	Springfield, OH	Prot 4yr-high	488

Note. Pub = Public; Nons = non-sectarian private; Cath = Catholic; Prot = Protestant; 4yr = Four-year college; U = University; high = high selectivity, med = medium selectivity; low = low selectivity, unk = unknown selectivity

[a] "Institution type" is equivalent to CIRP's "Stratification cell" typology. See Cooperative Institutional Research Program (n.d.) for specific stratification cell definitions.

APPENDIX E
List of institutions in CSS sample

Institution	Location	Institution type[a]	# Students
Albertus Magnus College	New Haven, CT	Cath 4yr-low	129
Allegheny College	Meadville, PA	Nons 4yr-high	408
Alma College	Alma, MI	Prot 4yr-high	300
Asbury College	Wilmore, KY	Nons 4yr-high	229
Augustana College	Rock Island, IL	Prot 4yr-high	456
Austin College	Sherman, TX	Prot 4yr-high	343
Baylor University	Waco, TX	Priv U-med	2261
Bentley College	Waltham, MA	Nons 4yr-high	830
Bethany Lutheran College	Mankato, MN	Prot 4yr-med	138
Bethel College	North Newton, KS	Prot 4yr-med	103
Biola University	La Mirada, CA	Priv U-low	518
Bluffton College	Bluffton, OH	Prot 4yr-med	233
Boston College	Chestnut Hill, MA	Priv U-med	2267
Bucknell University	Lewisburg, PA	Nons 4yr-v high	900
Cal Poly State U-Pomona	Pomona, CA	Pub 4yr-med	2486
California Baptist University	Riverside, CA	Prot 4yr-v low	294
California State U-Channel Islands	Camarillo, CA	Pub 4yr-unk	218
California State U-San Marcos	San Marcos, CA	Pub 4yr-low	769
Carlow University	Pittsburgh, PA	Cath 4yr-low	205
Carthage College	Kenosha, WI	Prot 4yr-high	446
Case Western Reserve University	Cleveland, OH	Priv U-high	598
Chapman University	Orange, CA	Nons 4yr-high	635
Claremont McKenna College	Claremont, CA	Nons 4yr-v high	264
Coe College	Cedar Rapids, IA	Nons 4yr-high	306
Colgate University	Hamilton, NY	Nons 4yr-v high	635
College of Charleston	Charleston, SC	Pub 4yr-high	1520
College of New Rochelle	New Rochelle, NY	Cath 4yr-low	177
Columbus College of Art and Design	Columbus, OH	Nons 4yr-low	264
Dartmouth College	Hanover, NH	Nons 4yr-v high	910
Davidson College	Davidson, NC	Nons 4yr-v high	379
Dickinson College	Carlisle, PA	Nons 4yr-high	526
Dominican University	River Forest, IL	Cath 4yr-med	254
Dordt College	Sioux Center, IA	Prot 4yr-high	309
East Texas Baptist University	Marshall, TX	Prot 4yr-low	325
Erskine College	Due West, SC	Prot 4yr-high	165

(continued)

Institution	Location	Institution type[a]	# Students
Ferrum College	Ferrum, VA	Prot 4yr-v low	272
Fordham University	New York, NY	Priv U-low	1568
Freed-Hardeman University	Henderson, TN	Prot 4yr-med	353
Gannon University	Erie, PA	Cath 4yr-med	435
George Fox University	Newberg, OR	Prot 4yr-high	399
Gonzaga University	Spokane, WA	Cath 4yr-high	826
Goshen College	Goshen, IN	Prot 4yr-med	131
Gustavus Adolphus College	Saint Peter, MN	Prot 4yr-high	507
Hamilton College	Clinton, NY	Nons 4yr-v high	485
Harvey Mudd College	Claremont, CA	Nons 4yr-v high	180
Haverford College	Haverford, PA	Nons 4yr-v high	284
Huntingdon College	Montgomery, AL	Prot 4yr-high	167
Illinois Wesleyan University	Bloomington, IL	Nons 4yr-v high	515
Juniata College	Huntingdon, PA	Nons 4yr-high	376
Lafayette College	Easton, PA	Nons 4yr-v high	597
Lebanon Valley College	Annville, PA	Prot 4yr-high	354
Luther College	Decorah, IA	Prot 4yr-high	641
Marywood University	Scranton, PA	Cath 4yr-med	331
McPherson College	McPherson, KS	Prot 4yr-v low	102
Middlebury College	Middlebury, VT	Nons 4yr-v high	548
Molloy College	Rockville Centre, NY	Cath 4yr-low	239
Monmouth University	West Long Branch, NJ	Nons 4yr-med	848
Montclair State University	Upper Montclair, NJ	Pub 4yr-med	1759
Moore College of Art and Design	Philadelphia, PA	Nons 4yr-low	77
Mount Saint Mary's College	Los Angeles, CA	Cath 4yr-med	322
Mount Saint Mary's College	Emmitsburg, MD	Cath 4yr-high	427
Northwestern College	Orange City, IA	Prot 4yr-high	343
Ohio Northern University	Ada, OH	Prot 4yr-high	576
Regis College	Weston, MA	Nons 4yr-low	154
Regis University	Denver, CO	Cath 4yr-high	320
Ripon College	Ripon, WI	Nons 4yr-high	195
Rollins College	Winter Park, FL	Nons 4yr-high	432
Saint John's University-Queens	Jamaica, NY	Priv U-low	2901
Saint Mary's College	Notre Dame, IN	Cath 4yr-high	334
Saint Norbert College	De Pere, WI	Cath 4yr-high	497
Saint Peter's College	Jersey City, NJ	Cath 4yr-low	509
Saint Vincent College	Latrobe, PA	Cath 4yr-med	258

(continued)

Institution	Location	Institution type[a]	# Students
Santa Clara University	Santa Clara, CA	Priv U-med	873
Southern Wesleyan University	Central, SC	Prot 4yr-low	96
Susquehanna University	Selinsgrove, PA	Prot 4yr-high	485
Tabor College	Hillsboro, KS	Prot 4yr-med	136
Taylor University	Upland, IN	Nons 4yr-high	366
Texas State University-San Marcos	San Marcos, TX	Pub 4yr-high	2402
U of Illinois-Springfield	Springfield, IL	Pub 4yr-unk	115
U of Michigan	Ann Arbor, MI	Pub U-high	4468
U of New Hampshire	Durham, NH	Pub U-med	1993
U of Notre Dame	South Bend, IN	Priv U-high	1604
U of Portland	Portland, OR	Cath 4yr-high	628
U of Richmond	Richmond, VA	Nons 4yr-v high	623
U of the Pacific	Stockton, CA	Priv U-low	744
Wake Forest University	Winston-Salem, NC	Priv U-med	1025
Washington and Lee University	Lexington, VA	Nons 4yr-v high	446
Waynesburg College	Waynesburg, PA	Prot 4yr-low	345
Wells College	Aurora, NY	Nons 4yr-high	72
Wesleyan College	Macon, GA	Prot 4yr-high	84
Wheaton College	Norton, MA	Nons 4yr-high	418
Whitman College	Walla Walla, WA	Nons 4yr-v high	306
Wilkes University	Wilkes-Barre, PA	Nons 4yr-med	470
Wofford College	Spartanburg, SC	Prot 4yr-high	272

Note. Pub = Public; Nons = non-sectarian private; Cath = Catholic; Prot = Protestant; 4yr = Four-year college; U = University; high = high selectivity, med = medium selectivity; low = low selectivity, unk = unknown selectivity

[a] "Institution type" is equivalent to CIRP's "Stratification cell" typology. See Cooperative Institutional Research Program (n.d.) for specific stratification cell definitions.

APPENDIX F
Preliminary institution-only OLS regression samples

Table F.1
Institutional Sample for preliminary YFCY institution-only OLS regressions

		N	%	Mean	SD
Type & Control	University, Public	21	10.1%		
	University, Private	18	8.7%		
	4-year, public	37	17.9%		
	4-year, private	131	63.3%		
Survey mode	Web only	47	22.7%		
	Paper only	130	62.8%		
	Web & Paper	30	14.5%		
Selectivity				1102	132
Total		**207**			

Source: 2004-2005 IPEDS; 2004, 2005, 2006 YFCY ARF

Table F.2
Institutional Sample for preliminary CSS institution-only OLS regressions

		N	%	Mean	SD
Type & Control	University, Public	6	3.3%		
	University, Private	14	7.7%		
	4-year, public	17	9.4%		
	4-year, private	144	79.6%		
Survey mode	Web only	75	41.4%		
	Paper only	90	49.7%		
	Web & Paper	16	8.8%		
Selectivity				1101	147
Total		**181**			

Source: 2004-2005 IPEDS; 2007, 2008, 2009 CSS ARF

APPENDIX G
Descriptive Statistics for OLS Institution-Only Regressions

Table G.1

Descriptive Statistics for OLS Institution-Only Regression, YFCY Sample

Category	Variable	N	%	Mean	SD	Min	Max
DV	***Average YFCY response rate***			46.15	29.00	2.2	100
Administration Methods							
Mode	Paper, single proctored session	15	7.2%				
	Paper, multiple proctored sessions	76	36.7%				
	Paper, other in-person method	27	13.0%				
	Web only	47	22.7%				
	Paper & Web	30	14.5%				
	Mail only	12	5.8%				
Incentives	No incentive	120	58.0%				
	Small incentive for all	39	18.8%				
	Larger lottery incentive	48	23.2%				
Survey-taking climate							
	# years participating in TFS, 1985-2009			15.55	8.63	0.00	26.00
	% of years in norms sample, 10-point increments			6.03	3.19	0.00	10.00
Other Climate characteristics							
	% of undergraduate students non-White, in 10-point increments			2.13	1.87	0.24	10.00
	Graduation rate (6 year, 2003 cohort), in 10-point increments			6.11	1.81	0.90	9.60
	Full-time undergraduate retention rate, in 10-point increments			7.85	1.14	2.60	9.80
	Ratio of grad to undergrad enrollment			0.25	0.29	0.00	1.59
	Natural log of Student services expenses per FTE			7.68	0.65	6.00	9.46
Structural characteristics							
	Natural log of Size (undergraduate enrollment)			8.07	0.99	5.87	10.53
	Selectivity, in 100-point increments			11.03	1.32	7.75	13.95
Urbanicity	Rural	9	4.3%				
	Small town	28	13.5%				
	Large town	7	3.4%				
	Urban fringe of mid-size city	19	9.2%				
	Mid-size city	65	31.4%				
	Urban fringe of large city	43	20.8%				
	Large city	36	17.4%				
Total		**207**	**100%**				

Source: Preliminary YFCY institution-only OLS regression sample

Table G.2

Descriptive Statistics for OLS Institution-Only Regression, CSS Sample

Category	Variable	N	%	Mean	SD	Min	Max
DV	***Average CSS response rate***			48.48	27.34	2.93	100.00
Administration Methods							
Mode	Paper, single proctored session	32	17.7%				
	Paper, multiple proctored sessions	12	6.6%				
	Paper, other in-person method	39	21.5%				
	Web only	75	41.4%				
	Paper & Web	7	3.9%				
	Mail only	16	8.8%				
Incentives	No incentive	107	59.1%				
	Small incentive for all	27	14.9%				
	Larger lottery incentive	47	26.0%				
Survey-taking climate							
	# years participating in TFS, 1985-2009			17.80	7.40	0.00	26.00
	% of years in norms sample, 10-point increments			6.80	2.70	0.00	10.00
Other Climate characteristics							
	% of undergraduate students non-White, in 10-point increments			1.82	1.68	0.13	9.96
	Graduation rate (6 year, 2003 cohort), in 10-point increments			6.48	1.61	0.80	9.60
	Full-time undergraduate retention rate, in 10-point increments			8.01	1.16	2.60	10.00
	Ratio of grad to undergrad enrollment			0.23	0.27	0.00	1.59
	Natural log of Student services expenses per FTE			7.78	0.61	5.74	9.38
Structural characteristics							
	Natural log of Size (undergraduate enrollment)			7.95	1.00	5.15	10.58
	Selectivity, in 100-point increments			11.08	1.47	0.00	14.70
Urbanicity	Rural	12	6.6%				
	Small town	24	13.3%				
	Large town	7	3.9%				
	Urban fringe of mid-size city	15	8.3%				
	Mid-size city	55	30.4%				
	Urban fringe of large city	39	21.5%				
	Large city	29	16.0%				
Total		**181**	**100%**				

Source: Preliminary CSS institution-only OLS regression sample

APPENDIX H
Descriptive Statistics

Table H.1

Descriptive Statistics, Aggregate YFCY Group

		Mean	SD	Min	Max
DV	*Responded to the YFCY*	0.30	0.46	0.00	1.00
Student Level (N = 62,465)					
Background Characteristics					
Race	Black/African American	0.05	0.23	0.00	1.00
	Latino/a	0.04	0.19	0.00	1.00
	Asian American	0.08	0.27	0.00	1.00
	Other	0.07	0.25	0.00	1.00
	Female	0.57	0.49	0.00	1.00
	Citizenship status: Foreign	0.02	0.13	0.00	1.00
SES	Parental income	9.13	3.01	1.00	14.00
	Not first generation	0.82	0.39	0.00	1.00
	Future Act: Get a job to pay for expenses	3.19	0.90	1.00	4.00
Personality and other individual differences					
	Scholar (Factor)	0.00	0.86	-4.09	1.67
	Leader (Factor)	0.00	0.86	-2.85	1.73
	Hedonist (Factor)	0.00	0.93	-1.82	2.57
	Status Striver (Factor)	0.00	0.87	-2.48	1.93
	Artist (Factor)	0.00	0.88	-1.79	2.86
	Social Activist (Factor)	0.00	0.90	-2.12	2.64
	Self Rating: Cooperativeness	3.90	0.75	1.00	5.00
Correlates of academic achievement					
	High school GPA	6.47	1.38	1.00	8.00
	SAT score	11.81	1.58	4.80	16.00
	Reason for going to college: Learning (Factor)	0.00	0.82	-2.92	1.28
Missingness Indicators					
	Parental income	0.13	0.33	0.00	1.00
	SAT/ACT Score	0.15	0.36	0.00	1.00
	Number of Missing items	6.08	5.61	0.00	20.00
Correlates of academic and social involvement					
	Future Act: Participate in student clubs/groups	3.23	0.81	1.00	4.00
	HS Act: Asked a teacher for advice after class	2.11	0.62	1.00	3.00
	HS Act: Tutored another student	1.71	0.67	1.00	3.00
	HS Act: Socialized w/ someone of another racial/ethnic grp	2.67	0.52	1.00	3.00
	Hours per week (HPW) in HS: Socializing with friends	5.64	1.53	1.00	8.00
	HPW in HS: Studying/ homework	4.25	1.58	1.00	8.00
Correlates of satisfaction					
	Future Act: Transfer to another college before graduating	2.00	0.83	1.00	4.00
	Future Act: Be satisfied with your college	3.48	0.61	1.00	4.00
	Is this institution your 1st choice?	0.69	0.46	0.00	1.00

(continued)

		Mean	SD	Min	Max
Propensity to be engaged with, participate in organizations					
	HS Act: Performed volunteer work	2.15	0.65	1.00	3.00
	Voted in a student election	1.98	0.68	1.00	3.00
	Future Act: Participate in student government	2.20	0.87	1.00	4.00
Potential Proxies of attitudes towards surveys, research					
	Realistically, an individual can do little to bring about changes in our society	1.99	0.81	1.00	4.00
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?				
	No	0.36	0.48	0.00	1.00
	Missing	0.14	0.34	0.00	1.00
Probable Major					
	Arts and Humanities	0.13	0.34	0.00	1.00
	Business	0.16	0.37	0.00	1.00
	Engineering	0.10	0.30	0.00	1.00
	Education	0.07	0.26	0.00	1.00
	Natural Sciences	0.11	0.31	0.00	1.00
	Social Sciences	0.11	0.31	0.00	1.00
	Professional	0.12	0.33	0.00	1.00
	Other or Technical	0.06	0.23	0.00	1.00
Institution-Level (N = 94)					
Administration Methods					
Mode	Web only	0.29	0.45	0.00	1.00
	Mail only	0.05	0.23	0.00	1.00
	Paper & Web	0.14	0.35	0.00	1.00
Incentive	Incentive for all	0.20	0.40	0.00	1.00
	Lottery	0.22	0.42	0.00	1.00
Structural characteristics					
	Selectivity, in 100-point increments	11.34	1.40	8.20	13.95
	Natural log of Size (undergraduate enrollment)	7.91	0.89	5.80	10.01
Climate					
	% of undergraduate students non-White, 10-point increments	1.96	1.33	0.24	9.22
	Graduation rate, 10-point increments	6.47	1.77	2.80	9.60
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments	7.56	1.84	2.50	10.00

Source: 2003, 2004 and 2005 TFS data, final YFCY aggregate HGLM analysis sample

Table H.2
Descriptive Statistics, YFCY Males

		Mean	SD	Min	Max
DV	*Responded to the YFCY*	0.26	0.44	0.00	1.00
Student Level (N = 26,757)					
Background Characteristics					
Race	Black/African American	0.05	0.21	0.00	1.00
	Latino/a	0.03	0.18	0.00	1.00
	Asian American	0.08	0.27	0.00	1.00
	Other	0.06	0.24	0.00	1.00
	Citizenship status: Foreign	0.02	0.14	0.00	1.00
SES	Parental income	9.42	2.96	1.00	14.00
	Not first generation	0.82	0.38	0.00	1.00
	Future Act: Get a job to pay for expenses	3.07	0.92	1.00	4.00
Personality and other individual differences					
	Scholar (Factor)	0.14	0.87	-4.09	1.66
	Leader (Factor)	0.08	0.86	-2.85	1.73
	Hedonist (Factor)	0.10	0.97	-1.35	2.57
	Status Striver (Factor)	0.03	0.88	-2.48	1.93
	Artist (Factor)	-0.07	0.88	-1.79	2.86
	Social Activist (Factor)	-0.09	0.92	-2.12	2.64
	Self Rating: Cooperativeness	3.87	0.77	1.00	5.00
Correlates of academic achievement					
	High school GPA	6.28	1.46	1.00	8.00
	SAT score	12.03	1.61	5.00	16.00
	Reason for going to college: Learning (Factor)	-0.18	0.88	-2.92	1.28
Missingness Indicators					
	Parental income	0.10	0.30	0.00	1.00
	SAT/ACT Score	0.12	0.32	0.00	1.00
	Number of Missing items	6.14	5.80	0.00	20.00
Correlates of academic and social involvement					
	Future Act: Participate in student clubs/groups	3.06	0.85	1.00	4.00
	HS Act: Asked a teacher for advice after class	2.05	0.61	1.00	3.00
	HS Act: Tutored another student	1.65	0.66	1.00	3.00
	HS Act: Socialized w/ someone of another racial/ethnic group	2.65	0.54	1.00	3.00
	Hours per week (HPW) in HS: Socializing with friends	5.71	1.56	1.00	8.00
	HPW in HS: Studying/ homework	3.92	1.57	1.00	8.00
Correlates of satisfaction					
	Future Act: Transfer to another college before graduating	2.01	0.82	1.00	4.00
	Future Act: Be satisfied with your college	3.42	0.64	1.00	4.00
	Is this institution your 1st choice?	0.70	0.46	0.00	1.00
Propensity to be engaged with, participate in organizations					
	HS Act: Performed volunteer work	2.02	0.64	1.00	3.00
	Voted in a student election	1.95	0.68	1.00	3.00
	Future Act: Participate in student government	2.13	0.84	1.00	4.00

(continued)

		Mean	SD	Min	Max
Potential Proxies of attitudes towards surveys, research					
	Realistically, an individual can do little to bring about changes in our society	2.09	0.83	1.00	4.00
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?				
	No	0.37	0.48	0.00	1.00
	Missing	0.15	0.36	0.00	1.00
Probable Major					
	Arts and Humanities	0.11	0.31	0.00	1.00
	Business	0.20	0.40	0.00	1.00
	Engineering	0.19	0.39	0.00	1.00
	Education	0.04	0.19	0.00	1.00
	Natural Sciences	0.11	0.31	0.00	1.00
	Social Sciences	0.08	0.27	0.00	1.00
	Professional	0.08	0.27	0.00	1.00
	Other or Technical	0.06	0.24	0.00	1.00
Institution-Level (N = 87)					
Administration Methods					
Mode	Web only	0.28	0.45	0.00	1.00
	Mail only	0.05	0.21	0.00	1.00
	Paper & Web	0.14	0.35	0.00	1.00
Incentive	Incentive for all	0.18	0.39	0.00	1.00
	Lottery	0.22	0.42	0.00	1.00
Structural characteristics					
	Selectivity, in 100-point increments	11.27	1.40	8.20	13.95
	Natural log of Size (undergraduate enrollment)	7.98	0.87	5.80	10.01
Climate					
	% of undergraduate students non-White, 10-point increments	1.91	1.35	0.24	9.22
	Graduation rate, 10-point increments	6.42	1.77	2.80	9.60
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments	7.52	1.88	2.50	10.00

Source: 2003, 2004 and 2005 TFS data, final YFCY male HGLM analysis sample

Table H.3
Descriptive Statistics, YFCY Females

		Mean	SD	Min	Max
DV	*Responded to the YFCY*	0.33	0.47	0.00	1.00
Student Level (N = 35,708)					
Background Characteristics					
Race	Black/African American	0.06	0.24	0.00	1.00
	Latino/a	0.04	0.19	0.00	1.00
	Asian American	0.08	0.27	0.00	1.00
	Other	0.07	0.26	0.00	1.00
	Citizenship status: Foreign	0.02	0.13	0.00	1.00
SES	Parental income	8.89	3.04	1.00	14.00
	Not first generation	0.81	0.39	0.00	1.00
	Future Act: Get a job to pay for expenses	3.29	0.87	1.00	4.00
Personality and other individual differences					
	Scholar (Factor)	-0.11	0.83	-3.84	1.67
	Leader (Factor)	-0.06	0.85	-2.85	1.65
	Hedonist (Factor)	-0.07	0.89	-1.82	2.57
	Status Striver (Factor)	-0.02	0.85	-2.13	1.86
	Artist (Factor)	0.05	0.88	-1.58	2.86
	Social Activist (Factor)	0.06	0.88	-1.90	2.64
	Self Rating: Cooperativeness	3.92	0.74	1.00	5.00
Correlates of academic achievement					
	High school GPA	6.61	1.29	1.00	8.00
	SAT score	11.63	1.54	4.80	16.00
	Reason for going to college: Learning (Factor)	0.13	0.75	-2.92	1.02
Missingness Indicators					
	Parental income	0.15	0.35	0.00	1.00
	SAT/ACT Score	0.17	0.38	0.00	1.00
	Number of Missing items	6.04	5.47	0.00	20.00
Correlates of academic and social involvement					
	Future Act: Participate in student clubs/groups	3.36	0.76	1.00	4.00
	HS Act: Asked a teacher for advice after class	2.16	0.62	1.00	3.00
	HS Act: Tutored another student	1.75	0.69	1.00	3.00
	HS Act: Socialized w/ someone of another racial/ethnic group	2.69	0.50	1.00	3.00
	Hours per week (HPW) in HS: Socializing with friends	5.58	1.49	1.00	8.00
	HPW in HS: Studying/ homework	4.51	1.54	1.00	8.00
Correlates of satisfaction					
	Future Act: Transfer to another college before graduating	1.98	0.83	1.00	4.00
	Future Act: Be satisfied with your college	3.53	0.58	1.00	4.00
	Is this institution your 1st choice?	0.68	0.47	0.00	1.00
Propensity to be engaged with, participate in organizations					
	HS Act: Performed volunteer work	2.25	0.64	1.00	3.00
	Voted in a student election	2.00	0.69	1.00	3.00
	Future Act: Participate in student government	2.25	0.89	1.00	4.00

(continued)

		Mean	SD	Min	Max
Potential Proxies of attitudes towards surveys, research					
	Realistically, an individual can do little to bring about changes in our society	1.92	0.79	1.00	4.00
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?				
	No	0.36	0.48	0.00	1.00
	Missing	0.13	0.34	0.00	1.00
Probable Major					
	Arts and Humanities	0.15	0.36	0.00	1.00
	Business	0.13	0.33	0.00	1.00
	Engineering	0.03	0.18	0.00	1.00
	Education	0.10	0.30	0.00	1.00
	Natural Sciences	0.11	0.31	0.00	1.00
	Social Sciences	0.13	0.34	0.00	1.00
	Professional	0.16	0.36	0.00	1.00
	Other or Technical	0.05	0.22	0.00	1.00
Institution-Level (N = 94)					
Administration Methods					
Mode	Web only	0.29	0.45	0.00	1.00
	Mail only	0.05	0.23	0.00	1.00
	Paper & Web	0.14	0.35	0.00	1.00
Incentive	Incentive for all	0.20	0.40	0.00	1.00
	Lottery	0.22	0.42	0.00	1.00
Structural characteristics					
	Selectivity, in 100-point increments	11.34	1.40	8.20	13.95
	Natural log of Size (undergraduate enrollment)	7.91	0.89	5.80	10.01
Climate					
	% of undergraduate students non-White, 10-point increments	1.96	1.33	0.24	9.22
	Graduation rate, 10-point increments	6.47	1.77	2.80	9.60
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments	7.56	1.84	2.50	10.00

Source: 2003, 2004 and 2005 TFS data, final YFCY female HGLM analysis sample

Table H.4
Descriptive Statistics, YFCY Asian Americans

		Mean	SD	Min	Max
DV	*Responded to the YFCY*	0.25	0.43	0.00	1.00
Student Level (N = 4,945)					
Background Characteristics					
	Female	0.56	0.50	0.00	1.00
SES	Parental income	7.74	3.51	1.00	14.00
	Not first generation	0.73	0.44	0.00	1.00
	Future Act: Get a job to pay for expenses	3.22	0.84	1.00	4.00
Personality and other individual differences					
	Scholar (Factor)	0.05	0.85	-3.23	1.63
	Leader (Factor)	-0.24	0.90	-2.85	1.65
	Hedonist (Factor)	-0.34	0.77	-1.43	2.57
	Status Striver (Factor)	0.14	0.86	-2.13	1.87
	Artist (Factor)	0.06	0.83	-1.43	2.86
	Social Activist (Factor)	0.10	0.89	-1.74	2.64
	Self Rating: Cooperativeness	3.91	0.78	1.00	5.00
Correlates of academic achievement					
	High school GPA	6.75	1.22	1.00	8.00
	SAT score	12.41	1.53	6.20	16.00
	Reason for going to college: Learning (Factor)	0.04	0.83	-2.92	1.12
Missingness Indicators					
	Parental income	0.09	0.29	0.00	1.00
	SAT/ACT Score	0.15	0.36	0.00	1.00
	Number of Missing items	5.59	5.80	0.00	20.00
Correlates of academic and social involvement					
	Future Act: Participate in student clubs/groups	3.36	0.74	1.00	4.00
	HS Act: Asked a teacher for advice after class	2.13	0.62	1.00	3.00
	HS Act: Tutored another student	1.92	0.69	1.00	3.00
	HS Act: Socialized w/ someone of another racial/ethnic group	2.79	0.45	1.00	3.00
	Hours per week (HPW) in HS: Socializing with friends	5.31	1.55	1.00	8.00
	HPW in HS: Studying/ homework	4.80	1.68	1.00	8.00
Correlates of satisfaction					
	Future Act: Transfer to another college before graduating	2.05	0.84	1.00	4.00
	Future Act: Be satisfied with your college	3.36	0.61	1.00	4.00
	Is this institution your 1st choice?	0.49	0.50	0.00	1.00
Propensity to be engaged with, participate in organizations					
	HS Act: Performed volunteer work	2.29	0.65	1.00	3.00
	Voted in a student election	1.96	0.71	1.00	3.00
	Future Act: Participate in student government	2.26	0.87	1.00	4.00

(continued)

		Mean	SD	Min	Max
Potential Proxies of attitudes towards surveys, research					
	Realistically, an individual can do little to bring about changes in our society	2.09	0.85	1.00	4.00
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?				
	No	0.43	0.50	0.00	1.00
	Missing	0.15	0.36	0.00	1.00
Probable Major					
	Arts and Humanities	0.07	0.25	0.00	1.00
	Business	0.16	0.37	0.00	1.00
	Engineering	0.15	0.36	0.00	1.00
	Education	0.02	0.13	0.00	1.00
	Natural Sciences	0.19	0.39	0.00	1.00
	Social Sciences	0.10	0.30	0.00	1.00
	Professional	0.14	0.35	0.00	1.00
	Other or Technical	0.03	0.17	0.00	1.00
Institution-Level (N = 89)					
Administration Methods					
Mode	Web only	0.30	0.46	0.00	1.00
	Mail only	0.06	0.23	0.00	1.00
	Paper & Web	0.11	0.32	0.00	1.00
Incentive	Incentive for all	0.20	0.40	0.00	1.00
	Lottery	0.22	0.42	0.00	1.00
Structural characteristics					
	Selectivity, in 100-point increments	11.38	1.42	8.20	13.95
	Natural log of Size (undergraduate enrollment)	7.95	0.89	5.80	10.01
Climate					
	% of undergraduate students non-White, 10-point increments	1.99	1.35	0.44	9.22
	Graduation rate, 10-point increments	6.54	1.76	2.80	9.60
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments	7.62	1.81	2.50	10.00

Source: 2003, 2004 and 2005 TFS data, final YFCY Asian HGLM analysis sample

Table H.5
Descriptive Statistics, YFCY African Americans/Blacks

		Mean	SD	Min	Max
DV	*Responded to the YFCY*	0.25	0.44	0.00	1.00
Student Level (N = 3,405)					
Background Characteristics					
	Female	0.63	0.48	0.00	1.00
SES	Parental income	6.59	3.11	1.00	14.00
	Not first generation	0.70	0.46	0.00	1.00
	Future Act: Get a job to pay for expenses	3.24	0.89	1.00	4.00
Personality and other individual differences					
	Scholar (Factor)	-0.10	0.81	-3.74	1.63
	Leader (Factor)	0.19	0.90	-2.85	1.65
	Hedonist (Factor)	-0.45	0.65	-1.82	2.57
	Status Striver (Factor)	0.28	0.89	-2.13	1.88
	Artist (Factor)	0.11	0.89	-1.41	2.86
	Social Activist (Factor)	0.35	0.95	-1.74	2.64
	Self Rating: Cooperativeness	4.01	0.78	1.00	5.00
Correlates of academic achievement					
	High school GPA	5.65	1.60	1.00	8.00
	SAT score	10.05	1.36	5.00	15.20
	Reason for going to college: Learning (Factor)	0.02	0.83	-2.92	0.77
Missingness Indicators					
	Parental income	0.13	0.33	0.00	1.00
	SAT/ACT Score	0.24	0.43	0.00	1.00
	Number of Missing items	7.57	6.16	0.00	20.00
Correlates of academic and social involvement					
	Future Act: Participate in student clubs/groups	3.23	0.84	1.00	4.00
	HS Act: Asked a teacher for advice after class	2.19	0.65	1.00	3.00
	HS Act: Tutored another student	1.74	0.67	1.00	3.00
	HS Act: Socialized w/ someone of another racial/ethnic group	2.82	0.42	1.00	3.00
	Hours per week (HPW) in HS: Socializing with friends	5.38	1.70	1.00	8.00
	HPW in HS: Studying/ homework	4.04	1.55	1.00	8.00
Correlates of satisfaction					
	Future Act: Transfer to another college before graduating	2.11	0.90	1.00	4.00
	Future Act: Be satisfied with your college	3.38	0.67	1.00	4.00
	Is this institution your 1st choice?	0.53	0.50	0.00	1.00
Propensity to be engaged with, participate in organizations					
	HS Act: Performed volunteer work	2.13	0.67	1.00	3.00
	Voted in a student election	2.04	0.70	1.00	3.00
	Future Act: Participate in student government	2.33	0.93	1.00	4.00

(continued)

		Mean	SD	Min	Max
Potential Proxies of attitudes towards surveys, research					
	Realistically, an individual can do little to bring about changes in our society	1.95	0.88	1.00	4.00
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?				
	No	0.35	0.48	0.00	1.00
	Missing	0.18	0.38	0.00	1.00
Probable Major					
	Arts and Humanities	0.10	0.30	0.00	1.00
	Business	0.18	0.39	0.00	1.00
	Engineering	0.08	0.27	0.00	1.00
	Education	0.06	0.24	0.00	1.00
	Natural Sciences	0.08	0.28	0.00	1.00
	Social Sciences	0.12	0.33	0.00	1.00
	Professional	0.17	0.38	0.00	1.00
	Other or Technical	0.07	0.26	0.00	1.00
Institution-Level (N = 94)					
Administration Methods					
Mode	Web only	0.29	0.45	0.00	1.00
	Mail only	0.05	0.23	0.00	1.00
	Paper & Web	0.14	0.35	0.00	1.00
Incentive	Incentive for all	0.20	0.40	0.00	1.00
	Lottery	0.22	0.42	0.00	1.00
Structural characteristics					
	Selectivity, in 100-point increments	11.34	1.40	8.20	13.95
	Natural log of Size (undergraduate enrollment)	7.91	0.89	5.80	10.01
Climate					
	% of undergraduate students non-White, 10-point increments	1.96	1.33	0.24	9.22
	Graduation rate, 10-point increments	6.47	1.77	2.80	9.60
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments	7.56	1.84	2.50	10.00

Source: 2003, 2004 and 2005 TFS data, final YFCY Black HGLM analysis sample

Table H.6
Descriptive Statistics, YFCY Latino/as

		Mean	SD	Min	Max
DV	*Responded to the YFCY*	0.27	0.44	0.00	1.00
Student Level (N = 2,344)					
Background Characteristics					
	Female	0.60	0.49	0.00	1.00
SES	Parental income	6.97	3.27	1.00	14.00
	Not first generation	0.57	0.50	0.00	1.00
	Future Act: Get a job to pay for expenses	3.37	0.82	1.00	4.00
Personality and other individual differences					
	Scholar (Factor)	-0.13	0.84	-4.09	1.63
	Leader (Factor)	0.01	0.86	-2.85	1.65
	Hedonist (Factor)	-0.12	0.86	-1.05	2.57
	Status Striver (Factor)	0.19	0.87	-2.13	1.86
	Artist (Factor)	0.04	0.88	-1.58	2.86
	Social Activist (Factor)	0.25	0.94	-1.74	2.64
	Self Rating: Cooperativeness	3.91	0.76	1.00	5.00
Correlates of academic achievement					
	High school GPA	6.28	1.39	1.00	8.00
	SAT score	10.90	1.31	5.60	16.00
	Reason for going to college: Learning (Factor)	0.11	0.79	-2.92	0.79
Missingness Indicators					
	Parental income	0.09	0.28	0.00	1.00
	SAT/ACT Score	0.25	0.43	0.00	1.00
	Number of Missing items	6.50	5.83	0.00	20.00
Correlates of academic and social involvement					
	Future Act: Participate in student clubs/groups	3.29	0.79	1.00	4.00
	HS Act: Asked a teacher for advice after class	2.16	0.62	1.00	3.00
	HS Act: Tutored another student	1.80	0.70	1.00	3.00
	HS Act: Socialized w/ someone of another racial/ethnic group	2.83	0.41	1.00	3.00
	Hours per week (HPW) in HS: Socializing with friends	5.40	1.60	1.00	8.00
	HPW in HS: Studying/ homework	4.23	1.52	1.00	8.00
Correlates of satisfaction					
	Future Act: Transfer to another college before graduating	1.95	0.85	1.00	4.00
	Future Act: Be satisfied with your college	3.51	0.59	1.00	4.00
	Is this institution your 1st choice?	0.66	0.48	0.00	1.00
Propensity to be engaged with, participate in organizations					
	HS Act: Performed volunteer work	2.19	0.67	1.00	3.00
	Voted in a student election	1.99	0.72	1.00	3.00
	Future Act: Participate in student government	2.30	0.91	1.00	4.00

(continued)

		Mean	SD	Min	Max
Potential Proxies of attitudes towards surveys, research					
	Realistically, an individual can do little to bring about changes in our society	1.94	0.85	1.00	4.00
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?				
	No	0.38	0.48	0.00	1.00
	Missing	0.15	0.36	0.00	1.00
Probable Major					
	Arts and Humanities	0.10	0.30	0.00	1.00
	Business	0.19	0.39	0.00	1.00
	Engineering	0.10	0.30	0.00	1.00
	Education	0.04	0.20	0.00	1.00
	Natural Sciences	0.10	0.30	0.00	1.00
	Social Sciences	0.14	0.34	0.00	1.00
	Professional	0.13	0.34	0.00	1.00
	Other or Technical	0.05	0.23	0.00	1.00
Institution-Level (N = 92)					
Administration Methods					
Mode	Web only	0.29	0.46	0.00	1.00
	Mail only	0.05	0.23	0.00	1.00
	Paper & Web	0.14	0.35	0.00	1.00
Incentive	Incentive for all	0.20	0.40	0.00	1.00
	Lottery	0.23	0.42	0.00	1.00
Structural characteristics					
	Selectivity, in 100-point increments	11.33	1.38	8.20	13.95
	Natural log of Size (undergraduate enrollment)	7.92	0.89	5.80	10.01
Climate					
	% of undergraduate students non-White, 10-point increments	1.97	1.34	0.24	9.22
	Graduation rate, 10-point increments	6.47	1.75	2.80	9.60
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments	7.54	1.85	2.50	10.00

Source: 2003, 2004 and 2005 TFS data, final YFCY Latino/a HGLM analysis sample

Table H.7
Descriptive Statistics, YFCY White Students

		Mean	SD	Min	Max
DV	*Responded to the YFCY*	0.32	0.47	0.00	1.00
Student Level (N = 5,000)					
Background Characteristics					
	Female	0.57	0.50	0.00	1.00
SES	Parental income	9.61	2.73	1.00	14.00
	Not first generation	0.85	0.36	0.00	1.00
	Future Act: Get a job to pay for expenses	3.18	0.92	1.00	4.00
Personality and other individual differences					
	Scholar (Factor)	0.00	0.86	-3.84	1.66
	Leader (Factor)	0.00	0.85	-2.85	1.65
	Hedonist (Factor)	0.09	0.96	-1.20	2.57
	Status Striver (Factor)	-0.07	0.85	-2.13	1.86
	Artist (Factor)	-0.03	0.88	-1.74	2.86
	Social Activist (Factor)	-0.08	0.85	-1.74	2.64
	Self Rating: Cooperativeness	3.90	0.74	1.00	5.00
Correlates of academic achievement					
	High school GPA	6.51	1.35	1.00	8.00
	SAT score	11.93	1.52	4.80	16.00
	Reason for going to college: Learning (Factor)	0.01	0.81	-2.92	0.89
Missingness Indicators					
	Parental income	0.12	0.32	0.00	1.00
	SAT/ACT Score	0.13	0.34	0.00	1.00
	Number of Missing items	5.73	5.25	0.00	20.00
Correlates of academic and social involvement					
	Future Act: Participate in student clubs/groups	3.21	0.83	1.00	4.00
	HS Act: Asked a teacher for advice after class	2.11	0.62	1.00	3.00
	HS Act: Tutored another student	1.67	0.67	1.00	3.00
	HS Act: Socialized w/ someone of another racial/ethnic group	2.62	0.54	1.00	3.00
	Hours per week (HPW) in HS: Socializing with friends	5.73	1.50	1.00	8.00
	HPW in HS: Studying/ homework	4.19	1.55	1.00	8.00
Correlates of satisfaction					
	Future Act: Transfer to another college before graduating	1.97	0.81	1.00	4.00
	Future Act: Be satisfied with your college	3.51	0.59	1.00	4.00
	Is this institution your 1st choice?	0.73	0.44	0.00	1.00
Propensity to be engaged with, participate in organizations					
	HS Act: Performed volunteer work	2.14	0.65	1.00	3.00
	Voted in a student election	1.99	0.66	1.00	3.00
	Future Act: Participate in student government	2.17	0.85	1.00	4.00

(continued)

		Mean	SD	Min	Max
Potential Proxies of attitudes towards surveys, research					
	Realistically, an individual can do little to bring about changes in our society	1.97	0.79	1.00	4.00
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?				
	No	0.34	0.47	0.00	1.00
	Missing	0.13	0.34	0.00	1.00
Probable Major					
	Arts and Humanities	0.15	0.36	0.00	1.00
	Business	0.16	0.37	0.00	1.00
	Engineering	0.09	0.28	0.00	1.00
	Education	0.09	0.28	0.00	1.00
	Natural Sciences	0.10	0.31	0.00	1.00
	Social Sciences	0.10	0.30	0.00	1.00
	Professional	0.12	0.33	0.00	1.00
	Other or Technical	0.06	0.24	0.00	1.00
Institution-Level (N = 94)					
Administration Methods					
Mode	Web only	0.29	0.45	0.00	1.00
	Mail only	0.05	0.23	0.00	1.00
	Paper & Web	0.14	0.35	0.00	1.00
Incentive	Incentive for all	0.20	0.40	0.00	1.00
	Lottery	0.22	0.42	0.00	1.00
Structural characteristics					
	Selectivity, in 100-point increments	11.34	1.40	8.20	13.95
	Natural log of Size (undergraduate enrollment)	7.91	0.89	5.80	10.01
Climate					
	% of undergraduate students non-White, 10-point increments	1.96	1.33	0.24	9.22
	Graduation rate, 10-point increments	6.47	1.77	2.80	9.60
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments	7.56	1.84	2.50	10.00

Source: 2003, 2004 and 2005 TFS data, final YFCY White HGLM analysis sample

Table H.8
Descriptive Statistics, Aggregate CSS Group

		Mean	SD	Min	Max
DV	*Responded to the CSS*	0.25	0.44	0.00	1.00
Student Level (N = 57,509)					
Background Characteristics					
Race	Black/African American	0.04	0.21	0.00	1.00
	Latino/a	0.06	0.24	0.00	1.00
	Asian American	0.07	0.25	0.00	1.00
	Other	0.08	0.27	0.00	1.00
	Female	0.56	0.50	0.00	1.00
	Citizenship status: Foreign	0.02	0.13	0.00	1.00
SES	Parental income	9.35	3.00	1.00	14.00
	Not first generation	0.84	0.37	0.00	1.00
	Future Act: Get a job to pay for expenses	3.17	0.91	1.00	4.00
Personality and other individual differences					
	Scholar (Factor)	0.00	0.85	-4.18	1.65
	Leader (Factor)	0.00	0.86	-2.93	1.71
	Hedonist (Factor)	0.00	0.93	-1.53	2.62
	Status Striver (Factor)	0.00	0.87	-2.21	1.96
	Artist (Factor)	0.00	0.88	-1.70	2.96
	Social Activist (Factor)	0.00	0.90	-2.06	2.60
	Self Rating: Cooperativeness	3.93	0.74	1.00	5.00
Correlates of academic achievement					
	High school GPA	6.55	1.33	1.00	8.00
	SAT score	11.94	1.57	4.30	16.00
	Reason for going to college: Learning (Factor)	0.00	0.82	-3.07	0.96
Missingness Indicators					
	Parental income	0.11	0.32	0.00	1.00
	SAT/ACT Score	0.15	0.35	0.00	1.00
	Number of Missing items	5.49	5.26	0.00	20.00
Correlates of academic and social involvement					
	Future Act: Participate in student clubs/groups	3.31	0.78	1.00	4.00
	HS Act: Asked a teacher for advice after class	2.14	0.61	1.00	3.00
	HS Act: Tutored another student	1.73	0.68	1.00	3.00
	HS Act: Socialized w/ someone of another racial/ethnic group	2.68	0.51	1.00	3.00
	Hours per week (HPW) in HS: Socializing with friends	5.64	1.51	1.00	8.00
	HPW in HS: Studying/ homework	4.35	1.56	1.00	8.00
Correlates of satisfaction					
	Future Act: Transfer to another college before graduating	1.94	0.81	1.00	4.00
	Future Act: Be satisfied with your college	3.54	0.59	1.00	4.00
	Is this institution your 1st choice?	0.71	0.46	0.00	1.00
Propensity to be engaged with, participate in organizations					
	HS Act: Performed volunteer work	2.19	0.64	1.00	3.00
	Voted in a student election	2.03	0.67	1.00	3.00
	Future Act: Participate in student government	2.24	0.87	1.00	4.00

(continued)

		Mean	SD	Min	Max
Potential Proxies of attitudes towards surveys, research					
	Realistically, an individual can do little to bring about changes in our society	1.96	0.81	0.99	4.00
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?				
	No	0.32	0.47	0.00	1.00
	Missing	0.12	0.33	0.00	1.00
Probable Major					
	Arts and Humanities	0.13	0.34	0.00	1.00
	Business	0.18	0.38	0.00	1.00
	Engineering	0.07	0.26	0.00	1.00
	Education	0.07	0.26	0.00	1.00
	Natural Sciences	0.11	0.32	0.00	1.00
	Social Sciences	0.12	0.33	0.00	1.00
	Professional	0.12	0.33	0.00	1.00
	Other or Technical	0.05	0.22	0.00	1.00
Institution-Level (N = 94)					
Administration Methods					
Mode	Web only	0.45	0.50	0.00	1.00
	Mail only	0.05	0.23	0.00	1.00
	Paper & Web	0.12	0.32	0.00	1.00
Incentive	Incentive for all	0.15	0.36	0.00	1.00
	Lottery	0.31	0.46	0.00	1.00
Structural characteristics					
	Selectivity, in 100-point increments	11.46	1.31	8.95	14.70
	Natural log of Size (undergraduate enrollment)	7.90	0.98	5.97	10.58
Climate					
	% of undergraduate students non-White, 10-point increments	1.74	1.41	0.13	7.47
	Graduation rate, 10-point increments	6.99	1.51	3.40	9.60
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments	7.77	2.10	0.08	10.00

Source: 2003, 2004 and 2005 TFS data, final CSS Aggregate HGLM analysis sample

Table H.9
Descriptive Statistics, CSS Females

		Mean	SD	Min	Max
DV	*Responded to the CSS*	0.28	0.45	0.00	1.00
Student Level (N = 32,479)					
Background Characteristics					
Race	Black/African American	0.05	0.21	0.00	1.00
	Latino/a	0.07	0.25	0.00	1.00
	Asian American	0.06	0.25	0.00	1.00
	Other	0.08	0.27	0.00	1.00
	Female	1.00	0.00	1.00	1.00
	Citizenship status: Foreign	0.01	0.12	0.00	1.00
SES	Parental income	9.14	3.02	1.00	14.00
	Not first generation	0.83	0.37	0.00	1.00
	Future Act: Get a job to pay for expenses	3.27	0.88	1.00	4.00
Personality and other individual differences					
	Scholar (Factor)	-0.11	0.83	-4.18	1.65
	Leader (Factor)	-0.07	0.85	-2.93	1.71
	Hedonist (Factor)	-0.08	0.90	-1.53	2.62
	Status Striver (Factor)	-0.04	0.86	-2.13	1.89
	Artist (Factor)	0.05	0.87	-1.49	2.96
	Social Activist (Factor)	0.05	0.87	-2.06	2.60
	Self Rating: Cooperativeness	3.95	0.72	1.00	5.00
Correlates of academic achievement					
	High school GPA	6.71	1.24	1.00	8.00
	SAT score	11.78	1.51	4.50	16.00
	Reason for going to college: Learning (Factor)	0.13	0.75	-3.07	0.95
Missingness Indicators					
	Parental income	0.14	0.35	0.00	1.00
	SAT/ACT Score	0.18	0.38	0.00	1.00
	Number of Missing items	5.54	5.20	0.00	20.00
Correlates of academic and social involvement					
	Future Act: Participate in student clubs/groups	3.44	0.72	1.00	4.00
	HS Act: Asked a teacher for advice after class	2.18	0.62	1.00	3.00
	HS Act: Tutored another student	1.77	0.69	1.00	3.00
	HS Act: Socialized w/ someone of another racial/ethnic group	2.70	0.50	1.00	3.00
	Hours per week (HPW) in HS: Socializing with friends	5.57	1.48	1.00	8.00
	HPW in HS: Studying/ homework	4.58	1.53	1.00	8.00
Correlates of satisfaction					
	Future Act: Transfer to another college before graduating	1.93	0.82	1.00	4.00
	Future Act: Be satisfied with your college	3.58	0.57	1.00	4.00
	Is this institution your 1st choice?	0.71	0.46	0.00	1.00
Propensity to be engaged with, participate in organizations					
	HS Act: Performed volunteer work	2.29	0.63	1.00	3.00
	Voted in a student election	2.05	0.68	1.00	3.00
	Future Act: Participate in student government	2.28	0.89	1.00	4.00

(continued)

		Mean	SD	Min	Max
Potential Proxies of attitudes towards surveys, research					
	Realistically, an individual can do little to bring about changes in our society	1.89	0.79	0.99	4.00
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?				
	No	0.31	0.46	0.00	1.00
	Missing	0.12	0.32	0.00	1.00
Probable Major					
	Arts and Humanities	0.15	0.35	0.00	1.00
	Business	0.13	0.34	0.00	1.00
	Engineering	0.02	0.15	0.00	1.00
	Education	0.09	0.29	0.00	1.00
	Natural Sciences	0.11	0.32	0.00	1.00
	Social Sciences	0.14	0.35	0.00	1.00
	Professional	0.16	0.36	0.00	1.00
	Other or Technical	0.05	0.22	0.00	1.00
Institution-Level (N = 94)					
Administration Methods					
Mode	Web only	0.45	0.50	0.00	1.00
	Mail only	0.05	0.23	0.00	1.00
	Paper & Web	0.12	0.32	0.00	1.00
Incentive	Incentive for all	0.15	0.36	0.00	1.00
	Lottery	0.31	0.46	0.00	1.00
Structural characteristics					
	Selectivity, in 100-point increments	11.46	1.31	8.95	14.70
	Natural log of Size (undergraduate enrollment)	7.90	0.98	5.97	10.58
Climate					
	% of undergraduate students non-White, 10-point increments	1.74	1.41	0.13	7.47
	Graduation rate, 10-point increments	6.99	1.51	3.40	9.60
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments	7.77	2.10	0.08	10.00

Source: 2003, 2004 and 2005 TFS data, final CSS female HGLM analysis sample

Table H.10
Descriptive Statistics, CSS Males

		Mean	SD	Min	Max
DV	*Responded to the CSS*	0.22	0.41	0.00	1.00
Student Level (N = 25,030)					
Background Characteristics					
Race	Black/African American	0.04	0.20	0.00	1.00
	Latino/a	0.06	0.23	0.00	1.00
	Asian American	0.07	0.26	0.00	1.00
	Other	0.07	0.26	0.00	1.00
	Female	0.00	0.00	0.00	0.00
	Citizenship status: Foreign	0.02	0.14	0.00	1.00
SES	Parental income	9.61	2.96	1.00	14.00
	Not first generation	0.85	0.36	0.00	1.00
	Future Act: Get a job to pay for expenses	3.05	0.93	1.00	4.00
Personality and other individual differences					
	Scholar (Factor)	0.14	0.86	-4.18	1.64
	Leader (Factor)	0.09	0.86	-2.93	1.63
	Hedonist (Factor)	0.11	0.97	-1.25	2.62
	Status Striver (Factor)	0.05	0.88	-2.21	1.96
	Artist (Factor)	-0.07	0.87	-1.70	2.96
	Social Activist (Factor)	-0.07	0.92	-2.03	2.60
	Self Rating: Cooperativeness	3.90	0.76	1.00	5.00
Correlates of academic achievement					
	High school GPA	6.35	1.42	1.00	8.00
	SAT score	12.12	1.63	4.30	16.00
	Reason for going to college: Learning (Factor)	-0.16	0.88	-3.07	0.96
Missingness Indicators					
	Parental income	0.08	0.27	0.00	1.00
	SAT/ACT Score	0.11	0.32	0.00	1.00
	Number of Missing items	5.42	5.34	0.00	20.00
Correlates of academic and social involvement					
	Future Act: Participate in student clubs/groups	3.14	0.83	1.00	4.00
	HS Act: Asked a teacher for advice after class	2.09	0.61	1.00	3.00
	HS Act: Tutored another student	1.67	0.66	1.00	3.00
	HS Act: Socialized w/ someone of another racial/ethnic group	2.66	0.53	1.00	3.00
	Hours per week (HPW) in HS: Socializing with friends	5.74	1.54	1.00	8.00
	HPW in HS: Studying/ homework	4.05	1.55	1.00	8.00
Correlates of satisfaction					
	Future Act: Transfer to another college before graduating	1.96	0.80	1.00	4.00
	Future Act: Be satisfied with your college	3.48	0.62	1.00	4.00
	Is this institution your 1st choice?	0.71	0.46	0.00	1.00
Propensity to be engaged with, participate in organizations					
	HS Act: Performed volunteer work	2.07	0.63	1.00	3.00
	Voted in a student election	1.99	0.67	1.00	3.00
	Future Act: Participate in student government	2.18	0.85	1.00	4.00

(continued)

		Mean	SD	Min	Max
Potential Proxies of attitudes towards surveys, research					
	Realistically, an individual can do little to bring about changes in our society	2.06	0.83	1.00	4.00
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?				
	No	0.33	0.47	0.00	1.00
	Missing	0.13	0.34	0.00	1.00
Probable Major					
	Arts and Humanities	0.11	0.32	0.00	1.00
	Business	0.23	0.42	0.00	1.00
	Engineering	0.14	0.34	0.00	1.00
	Education	0.04	0.20	0.00	1.00
	Natural Sciences	0.11	0.32	0.00	1.00
	Social Sciences	0.09	0.29	0.00	1.00
	Professional	0.08	0.28	0.00	1.00
	Other or Technical	0.05	0.22	0.00	1.00
Institution-Level (N = 88)					
Administration Methods					
Mode	Web only	0.45	0.50	0.00	1.00
	Mail only	0.06	0.23	0.00	1.00
	Paper & Web	0.11	0.32	0.00	1.00
Incentive	Incentive for all	0.15	0.36	0.00	1.00
	Lottery	0.31	0.46	0.00	1.00
Structural characteristics					
	Selectivity, in 100-point increments	11.54	1.31	8.95	14.70
	Natural log of Size (undergraduate enrollment)	7.96	0.95	6.17	10.58
Climate					
	% of undergraduate students non-White, 10-point increments	1.67	1.35	0.13	7.47
	Graduation rate, 10-point increments	7.09	1.46	3.60	9.60
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments	7.77	2.12	0.08	10.00

Source: 2003, 2004 and 2005 TFS data, final CSS male HGLM analysis sample

Table H.11
Descriptive Statistics, CSS Asian Americans

		Mean	SD	Min	Max
DV	*Responded to the CSS*	0.19	0.39	0.00	1.00
Student Level (N = 3,980)					
	Background Characteristics				
Sex	Female	0.53	0.50	0.00	1.00
SES	Parental income	8.28	3.33	1.00	14.00
	Not first generation	0.79	0.41	0.00	1.00
	Future Act: Get a job to pay for expenses	3.22	0.85	1.00	4.00
	Personality and other individual differences				
	Scholar (Factor)	-0.05	0.88	-4.18	1.61
	Leader (Factor)	-0.24	0.90	-2.93	1.63
	Hedonist (Factor)	-0.30	0.81	-1.04	2.62
	Status Striver (Factor)	0.19	0.87	-2.13	1.87
	Artist (Factor)	0.07	0.85	-1.18	2.96
	Social Activist (Factor)	0.12	0.90	-1.81	2.60
	Self Rating: Cooperativeness	3.96	0.76	1.00	5.00
	Correlates of academic achievement				
	High school GPA	6.44	1.39	1.00	8.00
	SAT score	12.12	1.67	5.00	16.00
	Reason for going to college: Learning (Factor)	-0.01	0.83	-3.07	0.81
	Missingness Indicators				
	Parental income	0.10	0.30	0.00	1.00
	SAT/ACT Score	0.14	0.35	0.00	1.00
	Number of Missing items	5.07	5.23	0.00	20.00
	Correlates of academic and social involvement				
	Future Act: Participate in student clubs/groups	3.36	0.73	1.00	4.00
	HS Act: Asked a teacher for advice after class	2.13	0.61	1.00	3.00
	HS Act: Tutored another student	1.88	0.69	1.00	3.00
	HS Act: Socialized w/ someone of another racial/ethnic group	2.82	0.43	1.00	3.00
	Hours per week (HPW) in HS: Socializing with friends	5.28	1.56	1.00	8.00
	HPW in HS: Studying/ homework	4.70	1.65	1.00	8.00
	Correlates of satisfaction				
	Future Act: Transfer to another college before graduating	2.05	0.87	1.00	4.00
	Future Act: Be satisfied with your college	3.39	0.62	1.00	4.00
	Is this institution your 1st choice?	0.51	0.50	0.00	1.00
	Propensity to be engaged with, participate in organizations				
	HS Act: Performed volunteer work	2.29	0.64	1.00	3.00
	Voted in a student election	2.00	0.68	1.00	3.00
	Future Act: Participate in student government	2.24	0.86	1.00	4.00

(continued)

		Mean	SD	Min	Max
Potential Proxies of attitudes towards surveys, research					
	Realistically, an individual can do little to bring about changes in our society	2.07	0.85	1.00	4.00
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?				
	No	0.39	0.49	0.00	1.00
	Missing	0.13	0.33	0.00	1.00
Probable Major					
	Arts and Humanities	0.06	0.25	0.00	1.00
	Business	0.19	0.39	0.00	1.00
	Engineering	0.12	0.32	0.00	1.00
	Education	0.02	0.15	0.00	1.00
	Natural Sciences	0.15	0.36	0.00	1.00
	Social Sciences	0.09	0.28	0.00	1.00
	Professional	0.23	0.42	0.00	1.00
	Other or Technical	0.03	0.16	0.00	1.00
Institution-Level (N = 89)					
Administration Methods					
Mode	Web only	0.47	0.50	0.00	1.00
	Mail only	0.06	0.23	0.00	1.00
	Paper & Web	0.10	0.30	0.00	1.00
Incentive	Incentive for all	0.13	0.34	0.00	1.00
	Lottery	0.33	0.47	0.00	1.00
Structural characteristics					
	Selectivity, in 100-point increments	11.54	1.31	8.95	14.70
	Natural log of Size (undergraduate enrollment)	7.94	0.98	5.97	10.58
Climate					
	% of undergraduate students non-White, 10-point increments	1.75	1.42	0.13	7.47
	Graduation rate, 10-point increments	7.10	1.48	3.40	9.60
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments	7.80	2.07	0.08	10.00

Source: 2003, 2004 and 2005 TFS data, final CSS Asian HGLM analysis sample

Table H.12
Descriptive Statistics, CSS African Americans/Blacks

		Mean	SD	Min	Max
DV	*Responded to the CSS*	0.14	0.35	0.00	1.00
Student Level (N = 2,543)					
	Background Characteristics				
Sex	Female	0.60	0.49	0.00	1.00
SES	Parental income	7.03	3.14	1.00	14.00
	Not first generation	0.74	0.44	0.00	1.00
	Future Act: Get a job to pay for expenses	3.24	0.89	1.00	4.00
	Personality and other individual differences				
	Scholar (Factor)	-0.10	0.83	-4.18	1.61
	Leader (Factor)	0.18	0.88	-2.93	1.63
	Hedonist (Factor)	-0.39	0.67	-1.33	2.46
	Status Striver (Factor)	0.29	0.87	-2.13	1.89
	Artist (Factor)	0.10	0.88	-1.09	2.96
	Social Activist (Factor)	0.38	0.97	-1.81	2.60
	Self Rating: Cooperativeness	4.02	0.79	1.00	5.00
	Correlates of academic achievement				
	High school GPA	5.86	1.50	1.00	8.00
	SAT score	10.49	1.32	5.30	15.40
	Reason for going to college: Learning (Factor)	0.02	0.85	-3.07	0.75
	Missingness Indicators				
	Parental income	0.13	0.34	0.00	1.00
	SAT/ACT Score	0.27	0.45	0.00	1.00
	Number of Missing items	6.90	5.81	0.00	20.00
	Correlates of academic and social involvement				
	Future Act: Participate in student clubs/groups	3.33	0.81	1.00	4.00
	HS Act: Asked a teacher for advice after class	2.20	0.65	1.00	3.00
	HS Act: Tutored another student	1.76	0.68	1.00	3.00
	HS Act: Socialized w/ someone of another racial/ethnic group	2.87	0.37	1.00	3.00
	Hours per week (HPW) in HS: Socializing with friends	5.39	1.68	1.00	8.00
	HPW in HS: Studying/ homework	4.12	1.55	1.00	8.00
	Correlates of satisfaction				
	Future Act: Transfer to another college before graduating	2.04	0.88	1.00	4.00
	Future Act: Be satisfied with your college	3.43	0.65	1.00	4.00
	Is this institution your 1st choice?	0.56	0.50	0.00	1.00
	Propensity to be engaged with, participate in organizations				
	HS Act: Performed volunteer work	2.20	0.66	1.00	3.00
	Voted in a student election	2.07	0.70	1.00	3.00
	Future Act: Participate in student government	2.40	0.94	1.00	4.00

(continued)

		Mean	SD	Min	Max
Potential Proxies of attitudes towards surveys, research					
	Realistically, an individual can do little to bring about changes in our society	1.92	0.88	1.00	4.00
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?				
	No	0.31	0.46	0.00	1.00
	Missing	0.19	0.39	0.00	1.00
Probable Major					
	Arts and Humanities	0.09	0.29	0.00	1.00
	Business	0.18	0.39	0.00	1.00
	Engineering	0.06	0.24	0.00	1.00
	Education	0.05	0.21	0.00	1.00
	Natural Sciences	0.12	0.32	0.00	1.00
	Social Sciences	0.13	0.34	0.00	1.00
	Professional	0.16	0.37	0.00	1.00
	Other or Technical	0.07	0.26	0.00	1.00
Institution-Level (N = 93)					
Administration Methods					
Mode	Web only	0.45	0.50	0.00	1.00
	Mail only	0.05	0.23	0.00	1.00
	Paper & Web	0.12	0.32	0.00	1.00
Incentive	Incentive for all	0.15	0.36	0.00	1.00
	Lottery	0.31	0.47	0.00	1.00
Structural characteristics					
	Selectivity, in 100-point increments	11.47	1.32	8.95	14.70
	Natural log of Size (undergraduate enrollment)	7.90	0.98	5.97	10.58
Climate					
	% of undergraduate students non-White, 10-point increments	1.76	1.41	0.25	7.47
	Graduation rate, 10-point increments	7.00	1.52	3.40	9.60
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments	7.84	2.01	0.08	10.00

Source: 2003, 2004 and 2005 TFS data, final CSS Black HGLM analysis sample

Table H.13
Descriptive Statistics, CSS Latino/as

		Mean	SD	Min	Max
DV	*Responded to the CSS*	0.15	0.35	0.00	1.00
Student Level (N = 3,647)					
Background Characteristics					
Sex	Female	0.60	0.49	0.00	1.00
SES	Parental income	7.10	3.27	1.00	14.00
	Not first generation	0.56	0.50	0.00	1.00
	Future Act: Get a job to pay for expenses	3.38	0.80	1.00	4.00
Personality and other individual differences					
	Scholar (Factor)	-0.24	0.82	-3.56	1.61
	Leader (Factor)	-0.04	0.87	-2.93	1.63
	Hedonist (Factor)	-0.12	0.86	-1.53	2.62
	Status Striver (Factor)	0.21	0.85	-2.13	1.87
	Artist (Factor)	0.09	0.88	-1.25	2.96
	Social Activist (Factor)	0.23	0.92	-2.06	2.60
	Self Rating: Cooperativeness	3.91	0.76	1.00	5.00
Correlates of academic achievement					
	High school GPA	6.03	1.42	2.00	8.00
	SAT score	10.54	1.39	4.80	16.00
	Reason for going to college: Learning (Factor)	0.08	0.79	-3.07	0.85
Missingness Indicators					
	Parental income	0.09	0.29	0.00	1.00
	SAT/ACT Score	0.27	0.44	0.00	1.00
	Number of Missing items	6.35	5.69	0.00	20.00
Correlates of academic and social involvement					
	Future Act: Participate in student clubs/groups	3.30	0.78	1.00	4.00
	HS Act: Asked a teacher for advice after class	2.16	0.62	1.00	3.00
	HS Act: Tutored another student	1.78	0.69	1.00	3.00
	HS Act: Socialized w/ someone of another racial/ethnic group	2.81	0.44	1.00	3.00
	Hours per week (HPW) in HS: Socializing with friends	5.37	1.63	1.00	8.00
	HPW in HS: Studying/ homework	4.05	1.46	1.00	8.00
Correlates of satisfaction					
	Future Act: Transfer to another college before graduating	2.00	0.87	1.00	4.00
	Future Act: Be satisfied with your college	3.49	0.61	1.00	4.00
	Is this institution your 1st choice?	0.66	0.47	0.00	1.00
Propensity to be engaged with, participate in organizations					
	HS Act: Performed volunteer work	2.16	0.67	1.00	3.00
	Voted in a student election	2.03	0.71	1.00	3.00
	Future Act: Participate in student government	2.30	0.89	1.00	4.00

(continued)

		Mean	SD	Min	Max
Potential Proxies of attitudes towards surveys, research					
	Realistically, an individual can do little to bring about changes in our society	1.95	0.86	1.00	4.00
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?				
	No	0.32	0.47	0.00	1.00
	Missing	0.15	0.36	0.00	1.00
Probable Major					
	Arts and Humanities	0.08	0.27	0.00	1.00
	Business	0.20	0.40	0.00	1.00
	Engineering	0.09	0.29	0.00	1.00
	Education	0.06	0.23	0.00	1.00
	Natural Sciences	0.08	0.28	0.00	1.00
	Social Sciences	0.14	0.35	0.00	1.00
	Professional	0.13	0.34	0.00	1.00
	Other or Technical	0.06	0.24	0.00	1.00
Institution-Level (N = 92)					
Administration Methods					
Mode	Web only	0.46	0.50	0.00	1.00
	Mail only	0.05	0.23	0.00	1.00
	Paper & Web	0.11	0.31	0.00	1.00
Incentive	Incentive for all	0.15	0.36	0.00	1.00
	Lottery	0.32	0.47	0.00	1.00
Structural characteristics					
	Selectivity, in 100-point increments	11.49	1.31	8.95	14.70
	Natural log of Size (undergraduate enrollment)	7.91	0.99	5.97	10.58
Climate					
	% of undergraduate students non-White, 10-point increments	1.77	1.41	0.25	7.47
	Graduation rate, 10-point increments	7.01	1.52	3.40	9.60
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments	7.83	2.02	0.08	10.00

Source: 2003, 2004 and 2005 TFS data, final CSS Latino/a HGLM analysis sample

Table H.14
Descriptive Statistics, CSS White Students

		Mean	SD	Min	Max
DV	*Responded to the CSS*	0.27	0.45	0.00	1.00
Student Level (N = 4,186)					
Background Characteristics					
Sex	Female	0.55	0.50	0.00	1.00
SES	Parental income	9.85	2.70	1.00	14.00
	Not first generation	0.88	0.33	0.00	1.00
	Future Act: Get a job to pay for expenses	3.17	0.90	1.00	4.00
Personality and other individual differences					
	Scholar (Factor)	0.03	0.86	-3.17	1.61
	Leader (Factor)	-0.01	0.87	-2.93	1.63
	Hedonist (Factor)	0.06	0.96	-1.11	2.62
	Status Striver (Factor)	-0.06	0.85	-2.13	1.87
	Artist (Factor)	-0.03	0.87	-1.16	2.96
	Social Activist (Factor)	-0.09	0.87	-2.03	2.60
	Self Rating: Cooperativeness	3.91	0.73	1.00	5.00
Correlates of academic achievement					
	High school GPA	6.68	1.28	1.00	8.00
	SAT score	12.14	1.52	6.50	16.00
	Reason for going to college: Learning (Factor)	-0.01	0.82	-3.07	0.84
Missingness Indicators					
	Parental income	0.11	0.32	0.00	1.00
	SAT/ACT Score	0.12	0.33	0.00	1.00
	Number of Missing items	5.26	5.09	0.00	20.00
Correlates of academic and social involvement					
	Future Act: Participate in student clubs/groups	3.31	0.78	1.00	4.00
	HS Act: Asked a teacher for advice after class	2.15	0.60	1.00	3.00
	HS Act: Tutored another student	1.71	0.66	1.00	3.00
	HS Act: Socialized w/ someone of another racial/ethnic group	2.63	0.53	1.00	3.00
	Hours per week (HPW) in HS: Socializing with friends	5.74	1.48	1.00	8.00
	HPW in HS: Studying/ homework	4.30	1.53	1.00	8.00
Correlates of satisfaction					
	Future Act: Transfer to another college before graduating	1.91	0.79	1.00	4.00
	Future Act: Be satisfied with your college	3.56	0.58	1.00	4.00
	Is this institution your 1st choice?	0.74	0.44	0.00	1.00
Propensity to be engaged with, participate in organizations					
	HS Act: Performed volunteer work	2.19	0.63	1.00	3.00
	Voted in a student election	2.01	0.67	1.00	3.00
	Future Act: Participate in student government	2.21	0.87	1.00	4.00

(continued)

		Mean	SD	Min	Max
Potential Proxies of attitudes towards surveys, research					
	Realistically, an individual can do little to bring about changes in our society	1.95	0.77	1.00	4.00
	Do you give the HERI permission to include your ID number should your college request the data for additional research analyses?				
	No	0.31	0.46	0.00	1.00
	Missing	0.11	0.32	0.00	1.00
Probable Major					
	Arts and Humanities	0.14	0.35	0.00	1.00
	Business	0.17	0.38	0.00	1.00
	Engineering	0.07	0.26	0.00	1.00
	Education	0.08	0.27	0.00	1.00
	Natural Sciences	0.11	0.31	0.00	1.00
	Social Sciences	0.12	0.32	0.00	1.00
	Professional	0.12	0.32	0.00	1.00
	Other or Technical	0.06	0.23	0.00	1.00
Institution-Level (N = 94)					
Administration Methods					
Mode	Web only	0.45	0.50	0.00	1.00
	Mail only	0.05	0.23	0.00	1.00
	Paper & Web	0.12	0.32	0.00	1.00
Incentive	Incentive for all	0.15	0.36	0.00	1.00
	Lottery	0.31	0.46	0.00	1.00
Structural characteristics					
	Selectivity, in 100-point increments	11.46	1.31	8.95	14.70
	Natural log of Size (undergraduate enrollment)	7.90	0.98	5.97	10.58
Climate					
	% of undergraduate students non-White, 10-point increments	1.74	1.41	0.13	7.47
	Graduation rate, 10-point increments	6.99	1.51	3.40	9.60
	% of times included in TFS norms, of times participating, 1985-2008, 10-point increments	7.77	2.10	0.08	10.00

Source: 2003, 2004 and 2005 TFS data, final CSS White HGLM analysis sample

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