

Item Nonresponse Bias on the Faculty Survey of Student Engagement

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Surveys are a widespread tool in the assessment of educational quality. However, the quality and usefulness of the survey data depends on the validity of the responses respondents give on each survey question. In survey research, missing data occurs for many reasons and may come from a variety of sources such as noncoverage, total or unit response, item non response and partial response (Brick & Kalton, 1996). Because the sources of missing data may result in a non-representative sample of a larger population, the results or the inferences made based on the sample might be inaccurate. Because most surveys are self-reported and have some level of item nonresponse, this might in turn bias the estimates that represent particular educational outcomes. While assessing the quality of survey data, the major concern is the extent to which respondents provide high-quality data by providing accurate and complete responses to all survey items (Schaeffer & Presser, 2003) and whether the item nonresponse patterns have an impact on the outcome measures or depend on certain characteristics of respondents.

Although there are no agreed-upon criteria to determine nonresponse, there is a general consensus that respondent behavior should not vary depending on group membership. For example, in a survey of faculty, the occurrence of nonresponse items should not relate to factors such as gender, rank, discipline, or other group membership. The Faculty Survey of Student Engagement (FSSE) is a survey which annually collects information about student engagement both in and out of the classroom at hundreds of baccalaureate degree-granting colleges and

universities. Although faculty members tend to respond to surveys at higher rates than students, nonresponse patterns may still exist across different groups. This might result in higher or lower scores on FSSE measures for certain groups, which may reflect either the actual performance of faculty or the biased estimates of performance due to nonresponse bias.

Purpose

The purpose of this study was to investigate the prevalence of item nonresponse bias among participants in the FSSE survey and its impact on the estimates of ten FSSE scale scores, by comparing item nonresponse patterns across faculty-level characteristics such as gender identity, racial or ethnic identification, citizenship, employment status, academic rank, and the number of undergraduate or graduate courses taught.

The following questions guided this study:

1. Does item nonresponse vary by faculty-level characteristics?
2. If item nonresponse differences exist, what is the magnitude of the difference?

Methods

Data Source

The data used for this study come from the 2014 administration of the Faculty Survey of Student Engagement (FSSE). FSSE annually collects data from faculty members at baccalaureate degree-granting colleges and universities. FSSE was designed to complement the National Survey of Student Engagement by measuring faculty perceptions and expectations of undergraduate engagement in educationally purposeful activities, the extent to which faculty promote learning and development in their courses, the extent of faculty interaction with students, and how faculty allocate their time. Results from FSSE provide institutions with an

assessment of faculty attitudes and behaviors related to educational practices known to produce positive educational outcomes for students. In addition, survey results provide insight into how faculty members perceive their institution, divide up their work time, and spend class time. The 2014 FSSE administration resulted in 18,860 faculty respondents from 143 institutions.

Sample

The sample for this study consists of responses from approximately 18,860 faculty members at 143 institutions that participated in the FSSE survey. To be included in this study, faculty had to have provided their demographic information at the end of the FSSE survey. Forty-seven percent of the faculty members in this study identify as women, 72% identify as White with most, 97%, identifying as citizens of the United States. Twenty-seven percent are full Professors and 81% are full-time faculty. On average, the faculty in this sample taught four undergraduate courses and one graduate-level course. For more details about the sample in this study, see Table 1.

Measures

The item nonresponse was examined among fifty survey items on the FSSE 2014 survey. These fifty items were selected because they are included in ten FSSE scales, the main measures of faculty involvement in student engagement on the FSSE survey. These scales are Higher-Order Learning, Reflective & Integrative Learning, Learning Strategies, Quantitative Reasoning, Collaborative Learning, Discussions with Diverse Others, Student-Faculty Interaction, Effective Teaching Practices, Quality of Interactions, and Supportive Environment. For more information about these scales see Table 2.

Analyses

To answer the first research question about whether or not item nonresponse depends on faculty-level characteristics, item responses to fifty survey items were dichotomously recoded to indicate whether or not the item was responded to or missing. Next, chi-square tests of independence were used to examine whether the item nonresponse for each item differed by the faculty characteristics gender identity, racial or ethnic identification, citizenship, employment status, academic rank, and the number of undergraduate or graduate courses taught. Significance was noted for $p < .001$ due to the large sample size. Additionally, descriptives of individual items were examined to ensure that responses were well distributed and that there was no evidence that items were difficult to answer (such as unusually high item nonresponse). To answer the second research question about the magnitude of the item nonresponse for different groups, the effect size for the chi-square test of independence was calculated using the phi coefficient ($\phi = \sqrt{\frac{\chi^2}{N}}$) for 2×2 table or Cramer's V coefficient ($V = \sqrt{\frac{\chi^2}{N(L-1)}}$, where L refers to the smaller number, row or column, in the contingency table) for a contingency table larger than 2×2, to describe the magnitude of association between the dichotomous or categorical variables. The range of phi or Cramer's V coefficient is between 0 and 1, which corresponds to the complete independence to complete dependence of the variables. To measure the effect size of a chi-square test of independence, Cohen (1988) has suggested that phi values .10, .30 and .50 correspond to small, medium and large effects, respectively. To interpret the magnitude for Cramer's V, a Cramer's V value needs to be converted to w , which is equivalent to a phi coefficient and is done by multiplying its value by $\sqrt{L-1}$. For example, a Cramer's V value of .10 obtained from a 2×4 table is equivalent to a phi or w value of .10 and so the effect is small.

Results

As shown in Table 3, the items within each scale do not have high proportions of item nonresponse. The highest proportion of item nonresponse (i.e., 14-15%) was found in the Discussions with Diverse Others scale and the lowest proportion of item nonresponse (i.e., 2-3%) was in the Supportive Environment scale. Overall, the item nonresponse rate for items within FSSE scales is between 2 to 15%. Using chi-square tests of independence to examine the item nonresponse by faculty characteristics, we find that most of the item nonresponse does not vary by faculty characteristics. As shown in Table 3, there were some significant differences found for item nonresponse by faculty characteristics, but the effect size (i.e., the magnitude of the relationship) was very small (less than .1). For example, there are significant differences in item nonresponse by gender and the number of undergraduate courses being taught among items in the Discussions with Diverse Others scale, but the magnitude of the differences are less than or equal to .05.

Discussion and Implications

Although the item nonresponse for items within the Discussions with Diverse Others scale is not extremely high, it is higher than the items in other scales. This may be an indication that these items are more difficult to answer than other survey items or it may be that these items are towards the end of the survey and respondents are dropping off. Cognitive interviews or additional testing could help with understanding why these items have more missing responses. One limitation of this study is that it did not account for when participants stop responding to the survey. It is possible that patterns of bias could emerge after respondents that did not finish the survey are removed from the analysis. Additionally, this study does not account for response bias. It is unknown whether or not there exists bias in who responds to the FSSE in general. Although some statistically significant differences in item nonresponse were found for some of

the tested items, the magnitude of these differences was trivial. Institutions and researchers using these items can feel confident that item nonresponse does not bias the results of these items. Future faculty characteristics, such as faculty's disciplinary appointment, age, and earned doctorate, could additionally be examined to further strengthen these results.

Conclusion

There are no notable item nonresponse bias indications among the items in the ten FSSE scales. The proportion of missing responses to these items does not vary by the faculty characteristics gender identity, racial or ethnic identification, citizenship, employment status, academic rank, and the number of undergraduate or graduate courses taught. Institutions and researchers using these items can feel confident that item nonresponse does not bias their results.

References

- Brick, J. M., & Kalton, G. (1996). Handling missing data in survey research. *Statistical methods in medical research*, 5(3), 215-238.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd edition). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Schaeffer, N. C., & Presser, S. (2003). The science of asking questions. *Annual Review of Sociology*, 65-88.

Table 1 Select Sample Characteristics

		N	%
Employment status	Part-time	3092	19
	Full-time	13391	81
Academic rank	Full Professor	4258	27
	Associate Professor	3840	24
	Assistant Professor	3735	24
	Full-time Lecturer/Instructor	2005	13
	Part-time Lecturer/Instructor	2023	13
Woman		7620	47
U.S. citizen		15671	97
Racial/Ethnic identification	Asian, Native Hawaiian, or Other Pacific Islander	773	5
	Black or African American	948	6
	Hispanic or Latino	454	3
	White	11632	72
	American Indian, Alaska Native, Other, Multiracial	782	5
	I prefer not to respond	1594	10
Number of undergraduate courses taught	0	1004	6
	1	1130	7
	2	2020	12
	3	1733	11
	4	2212	13
	5	1321	10
	6	2249	14
	7	1033	6
	8	1530	9
	9 or more courses	2017	12
Number of graduate courses taught	0	11202	68
	1	2061	13
	2	1368	8
	3	619	4
	4 or more courses	1194	7

Table 2 Select FSSE Items

Supportive Environment	How important is it to you that your institution increase its emphasis on each of the following: <i>Response Options: Very important, Important, Somewhat important, Not important</i>
	fSEacademic Providing support to help students succeed academically
	fSElearnsup Students using learning support services (tutoring services, writing center, etc.)
	fSEdiverse Encouraging contact among students from different backgrounds (social, racial/ethnic, religious, etc.)
	fSEsocial Providing opportunities for students to be involved socially
	fSEwellness Providing support for students' overall well-being (recreation, health care, counseling, etc.)
	fSEnonacad Helping students manage their non-academic responsibilities (work, family, etc.)
	fSEactivities Students attending campus activities and events (performing arts, athletic events, etc.)
	fSEevents Students attending events that address important social, economic, or political issues
Quality of Interactions	Indicate your perception of the quality of student interactions with the following people at your institution: <i>Response options: 1=Poor to 7=Excellent</i>
	fQIstudent Other students
	fQIadvisor Academic advisors
	fQIfaculty Faculty
	fQIstaff Student services staff (career services, student activities, housing, etc.)
	fQIadmin Other administrative staff and offices (registrar, financial aid, etc.)
Student-Faculty Interaction	During the current school year, about how often have you done each of the following with the undergraduate students you teach or advise: <i>Response options: Very much, Quite a bit, Some, Very little</i>
	fSFcareer Talked about their career plans
	fSFotherwork Worked on activities other than coursework (committees, student groups, etc.)
	fSFdiscuss Discussed course topics, ideas, or concepts outside of class
	FSFperform Discussed their academic performance
Effective Teaching Practices	In your undergraduate courses, to what extent do you do the following? <i>Response options: Very much, Quite a bit, Some, Very little</i>
	fETgoals Clearly explain course goals and requirements
	fETorganize Teach course sessions in an organized way
	fETexample Use examples or illustrations to explain difficult points
	fETvariety Use a variety of teaching techniques
	fETreview Review and summarize material for students
	fETstandards Provide standards for satisfactory completion of assignments
	fETdraftfb Provide feedback to students on drafts or works in progress
	fETfeedback Provide prompt and detailed feedback on tests or completed assignments
Quantitative Reasoning	In your selected course section, how important is it to you that the typical student do the following: <i>Response options: Very important, Important, Somewhat important, Not important</i>
	fQRconclude Reach conclusions based on his or her own analysis of numerical information (numbers, graphs, statistics, etc.)
	fQRproblem Use numerical information to examine a real-world problem or issue (unemployment, climate change, public health, etc.)
	fQRevaluate Evaluate what others have concluded from numerical information
Reflective & Integrative Learning	In your selected course section, how important is it to you that the typical student do the following: <i>Response options: Very important, Important, Somewhat important, Not important</i>
	fRIintegrate Combine ideas from different courses when completing assignments
	fRIsocietal Connect his or her learning to societal problems or issues
	fRIdiverse Include diverse perspectives (political, religious, racial/ethnic, gender, etc.) in course discussions or assignments
	fRIownview Examine the strengths and weaknesses of his or her own views on a topic or issue
	fRIperspect Try to better understand someone else's views by imagining how an issue looks from his or her perspective
	fRInewview Learn something that changes the way he or she understands an issue or concept
	fRIconnect Connect ideas from your course to his or her prior experiences and knowledge
Collaborative Learning	In your selected course section, how much do you encourage students to do the following: <i>Response options: Very much, Quite a bit, Some, Very little</i>
	fCLaskhelp Ask other students for help understanding course material
	fCLexplain Explain course material to other students
	fCLstudy Prepare for exams by discussing or working through course material with other students
	fCLproject Work with other students on course projects or assignments

Table 2 Select FSSE Items (continued)

Learning Strategies	In your selected course section, how much do you encourage students to do the following: <i>Response options: Very much, Quite a bit, Some, Very little</i>
	fLSreading Identify key information from reading assignments
	fLSnotes Review notes after class
	fLSsummary Summarize what has been learned from class or from course materials
Discussions with Diverse Others	In your selected course section, how much opportunity do students have to engage in discussions with people from the following groups: <i>Response options: Very much, Quite a bit, Some, Very little</i>
	fDDrace People of a race or ethnicity other than their own
	fDDeconomic People from an economic background other than their own
	fDDreligion People with religious beliefs other than their own
	fDDpolitical People with political views other than their own
Higher-Order Learning	In your selected course section, how much does the coursework emphasize the following: <i>Response options: Very much, Quite a bit, Some, Very little</i>
	fHOapply Applying facts, theories, or methods to practical problems or new situations
	fHOanalyze Analyzing an idea, experience, or line of reasoning in depth by examining its parts
	fHOevaluate Evaluating a point of view, decision, or information source
	fHOform Forming a new idea or understanding from various pieces of information

Table 3 Item Nonresponse and Statistical and Practical Differences by Groups Among Select FSSE Items

Item		Nonresponse		Statistical and Practical Differences						
		N	%	Gender	Employment Status	Academic Rank	Race/Ethnicity	Citizenship	Number of Undergrad. Courses	Number of Graduate Courses
Supportive Environment	fSEacademic	513	3							
	fSElearnsup	456	2							
	fSEdiverse	385	2							
	fSEsocial	389	2							
	fSEwellness	424	2							
	fSEnonacad	425	2							
	fSEactivities	560	3							
Quality of Interactions	fSEevents	561	3							
	fQIstudent	545	3							
	fQIadvisor	730	4		$\phi=.039^*$	$V=.038^*$				
	fQIfaculty	664	4							
	fQIstaff	1244	7						$V=.048^*$	
	fQIadmin	1104	6				$V=.039^*$		$V=.046^*$	
	fSFcareer	976	6		$\phi=.030^*$					
Student-Faculty Interaction	fSFotherwork	1113	6		$\phi=.035^*$					
	fSFdiscuss	1032	6		$\phi=.041^*$					
	FSFperform	1089	6							
Effective Teaching Practices	fETgoals	986	6							
	fETorganize	1091	6							
	fETexample	1115	6							
	fETvariety	1021	6							
	fETreview	1035	6							
	fETstandards	1045	6							
	fETdraftfb	1115	6							
	fETfeedback	1195	7							
Quantitative Reasoning	fQRconclude	1973	11		$\phi=.035^*$					
	fQRproblem	2044	12							
	fQRevaluate	2108	11		$\phi=.031^*$					
Reflective & Integrative Learning	fRIintegrate	1997	11							
	fRIsocietal	2124	12							
	fRIdiverse	2096	12				$V=.049^*$			
	fRIownview	2121	12				$V=.039^*$			
	fRIperspect	2160	12							
	fRInewview	2131	12				$V=.039^*$			
	fRIconnect	2155	12				$V=.053^*$			
Collaborative Learning	fCLaskhelp	2202	13						$V=.048^*$	
	fCLexplain	2336	13							
	fCLstudy	2342	13							
	fCLproject	2315	13						$V=.048^*$	
Learning Strategies	fLSreading	2322	13				$V=.043^*$			
	fLSnotes	2397	14		$\phi=.029^*$				$V=.063^*$	
	fLSsummary	2378	14						$V=.049^*$	
Discussions with Diverse Others	fDDrace	2448	14				$V=.045^*$		$V=.048^*$	
	fDDeconomic	2563	15				$V=.045^*$		$V=.045^*$	
Higher-Order Learning	fDDreligion	2665	15	$V=.039^*$			$V=.041^*$		$V=.050^*$	
	fDDpolitical	2710	15	$V=.037^*$			$V=.043^*$		$V=.051^*$	
	fHOapply	2369	14		$\phi=.031^*$					
Higher-Order Learning	fHOanalyze	2360	13							
	fHOevaluate	2392	14				$V=.041^*$			
Higher-Order Learning	fHOform	2462	14							

Note: $*p < .001$. For dichotomous variables, employment status and citizenship, values are computed using Continuity Correction (2*2 table) instead of a Chi-Square test.