Abstract
Survey research often wonder about the impact of missing data and whether the sample is representative of a larger population. This study focuses on investigating 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 factors such as gender, rank, academic level, and number of undergraduate or graduate courses taught. These analyses examined a set of FSSE items that comprise ten FSSE scales.

Background & Purpose
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 given on each survey question. In survey research, missing data occurs for many reasons and may come from a variety of sources. Item nonresponse, item nonresponse 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 & Preisser, 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 respondents are nonresponse if the item responses are not provided. 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.

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.

Data
The data used for this study came 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 personal growth in their courses, their faculty-student 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 data 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 8% are full-time faculty. On average, the faculty in this sample taught four undergraduate courses and one graduate-level course.

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 1.

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 < .01 due to the large sample size. Additionally, descriptors 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 ($\phi = \frac{b - c}{\sqrt{ad}}$) for 2x2 table or Cramer’s V coefficient ($V = \sqrt{\frac{\chi^2}{N}}$, where $V$ refers to the smaller number, row or column, in the contingency table) for a contingency table larger than 2x2, 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 of Cramer’s V, a Cramer’s V value needs to be converted to $V = \sqrt{\frac{V^2}{V^2 + 1}}$, and is done by multiplying its value by $\sqrt{\left(\frac{N-1}{N} \right)}$. For example, a Cramer’s V value of .10 obtained from a 2x4 table is equivalent to a phi or $V$ value of .10 and so the effect is small.

Discussion & Significance
Although the item nonresponse for items within the Discursive 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, that other survey items or it may be that these items are toward 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 race. 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 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.

If item nonresponse differences exist, what is the magnitude of the difference?
As shown in Table 2, 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 0.1). No item nonresponse bias differences in patterns across faculty gender and the number of undergraduate courses being taught among items in the Discourses with Diverse Others scale, but the magnitude of the differences are less than or equal to 0.5.

Research Questions & Results

<table>
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<tr>
<th>Does item nonresponse vary by faculty characteristics?</th>
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<td>As shown in Table 2, the items within each scale do not have high proportions of item nonresponse. The highest proportion of item nonresponse (i.e., 23%) 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.</td>
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See more about FSSE and this study at fsse.iub.edu/html/publications_presentations.cfm