

## **Forced-Choice Versus Open-Ended Versions of the Field of Bachelor's Degree Question in the 2007 ACS Content Test<sup>1</sup>**

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### **Abstract**

The U.S. Census Bureau conducted the 2007 American Community Survey (ACS) Content Test from July through September 2007. As part of the test, the Census Bureau tested two versions, a forced-choice version and an open-ended version, of a new question proposed for inclusion in the ACS. The question collects information from respondents about the field(s) of study of their bachelor's degree.

In the open-ended version of the question, the respondent lists the specific field(s) of degree. The forced-choice version consists of eight categories for the respondent to indicate whether or not a person's field of degree could be classified into each of the categories listed. Half of the selected sample addresses were randomly assigned the open-ended version, while the other half received the forced-choice version. Standard ACS data collection procedures were used to collect data for the 2007 ACS Content Test. Additionally, to test the reliability and consistency of respondents' answers to the field of degree questions, a Content Follow-Up reinterview was conducted by telephone during which respondents were asked both versions of the question. Respondents were asked the same version they received in the original interview first, followed by the other version.

This paper will present a comparison of the two versions of the field of degree question including overall response distributions, item nonresponse rates, comparability with existing data sources, response consistency, and reliability measures.

**Key words:** Forced-Choice Questions, Open-Ended Questions, American Community Survey, 2007 ACS Content Test, Field of Degree

### **1. Introduction**

The ACS is a large national household survey that collects detailed demographic, socioeconomic, and housing information from 250,000 sample addresses monthly or approximately three million addresses each year. It is a continuous survey that collects person and housing unit information on an annual basis that was historically collected by the once-a-decade decennial census long form. These data are important to many government agencies and private organizations for allocating funds and services.

Before implementing any changes in ACS production, the Census Bureau tests any proposed new questions or question revisions. The 2007 ACS Content Test was designed to assess whether the ACS can reliably collect data on the field(s) of a person's bachelor's degree(s). The inclusion of a field of degree question on the ACS was proposed to provide field of degree data annually for small levels of geography and to assist in building a sampling frame for the National Science Foundation's (NSF) National Survey of College Graduates (NSCG). Two versions of a field of degree question were tested – a forced-choice version and an open-ended version. This test helped to determine which of the two versions of the field of degree question, if either, could provide reasonable and reliable estimates.

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<sup>1</sup> This report is released to inform interested parties of ongoing research and to encourage discussion of work in progress. Any views expressed on statistical, methodological, technical, or operational issues are those of the authors and not necessarily those of the U.S. Census Bureau.

## **2. Evaluation Criteria and Research Questions**

In an effort to determine which version of the field of degree question performed better, we identified a set of evaluation criteria and related research questions before the test was fielded.

The first criterion addressed the comparability of the estimates and distributions to existing data sources. Are the relative distributions of the ACS field of degree data roughly comparable to existing data sources?

The second criterion addressed item missing data rates and the reliability of the estimates. Do the two versions of the field of degree question have different item missing data rates? Which of the two question versions results in more reliable estimates at equal levels of detail?

The third criterion addressed response correspondence between the forced-choice and open-ended versions of the field of degree question. How well do the field of degree responses correspond between the forced-choice and open-ended versions of the question?

The fourth criterion addressed the potential impact on identifying science and engineering graduates for the NSCG. How many more people are identified as possible science and engineering graduates for the NSCG sampling frame using a combination of field of degree and occupation/educational attainment data compared to the current method of using just occupation/educational attainment data?

## **3. Background**

### **3.1 Reasons for Testing a Field of Degree Question on the ACS**

The NSF, working through the Office of Management and Budget (OMB) Interagency Committee for the ACS, requested that the Census Bureau consider adding a question on the field of bachelor's degree to the ACS. If collected, this information could assist in selecting sample cases for the NSCG. The target population for the NSCG consists of college-educated scientists and engineers, including both people with a degree in a science and engineering field and people working in a science and engineering occupation. In the past, the NSCG used respondents from the decennial census long form as a sampling frame. They used educational attainment and occupation data to try to pre-identify people in the science and engineering field and to stratify the sample. If the ACS collects field of degree data, people in the science and engineering field may be more accurately identified, thus saving on screening costs.

### **3.2 Versions of the Field of Degree Question**

In the Content Test, we tested two versions of the field of degree question – a forced-choice version and an open-ended version. A forced-choice question typically consists of a series of categories to which respondents are expected to provide a response – for example, check either a “yes” or “no” box for each. The forced-choice field of degree question asked the respondent to classify field(s) of bachelor's degree into a category or categories by responding “yes” or “no” to each of eight broad categories. A write-in option was provided in case the respondent felt that the field of degree was not represented in the other categories. The open-ended question provided a blank space to allow the respondent to list the specific field(s) of bachelor's degree. Examples were provided to help the respondent understand the level of detail needed. The wording of the two versions of the field of degree question was based on findings from cognitive interviewing (Rothgeb and Beck, 2007). The field of degree questions and the preceding identical skip instructions on the paper form are shown in Figure 1.

In the Content Test, the field of degree question followed the questions on school enrollment and educational attainment. Note that “BACHELOR'S DEGREE” was shown in all capital letters twice in each version to emphasize the degree of interest. The skip instruction was intended to elicit a response to the field of degree question only for people reported to have a bachelor's degree or higher.

Figure 1: Field of Degree Question Versions on Paper Form

Forced-Choice Version	Open-Ended Version																											
<p><b>F</b> Answer question 12 if this person has a bachelor's degree or higher. Otherwise, SKIP to question 13.</p> <p><b>12</b> This question focuses on this person's <b>BACHELOR'S DEGREE</b>. In which of the following major fields did this person receive his/her <b>BACHELOR'S DEGREE(S)</b>? Mark (X) "Yes" or "No" box for each category.</p> <table border="1"> <thead> <tr> <th></th> <th>Yes</th> <th>No</th> </tr> </thead> <tbody> <tr> <td>a. Biological, Agricultural, Physical, Earth, or Other Natural Sciences</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>b. Health, Nursing, or Medical Fields</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>c. Engineering, Computer Sciences, or Mathematical Sciences</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>d. History, Arts, or Humanities</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>e. Psychology, Economics, or Other Social Sciences</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>f. Business or Management</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>g. Education or Education Administration</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>h. Some other major field – Specify <input type="text"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table>		Yes	No	a. Biological, Agricultural, Physical, Earth, or Other Natural Sciences	<input type="checkbox"/>	<input type="checkbox"/>	b. Health, Nursing, or Medical Fields	<input type="checkbox"/>	<input type="checkbox"/>	c. Engineering, Computer Sciences, or Mathematical Sciences	<input type="checkbox"/>	<input type="checkbox"/>	d. History, Arts, or Humanities	<input type="checkbox"/>	<input type="checkbox"/>	e. Psychology, Economics, or Other Social Sciences	<input type="checkbox"/>	<input type="checkbox"/>	f. Business or Management	<input type="checkbox"/>	<input type="checkbox"/>	g. Education or Education Administration	<input type="checkbox"/>	<input type="checkbox"/>	h. Some other major field – Specify <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p><b>F</b> Answer question 12 if this person has a bachelor's degree or higher. Otherwise, SKIP to question 13.</p> <p><b>12</b> This question focuses on this person's <b>BACHELOR'S DEGREE</b>. Please print below the specific major(s) of any <b>BACHELOR'S DEGREES</b> this person has received. (For example: chemical engineering, elementary teacher education, organizational psychology)</p> <div style="border: 1px solid black; height: 60px; width: 100%;"></div>
	Yes	No																										
a. Biological, Agricultural, Physical, Earth, or Other Natural Sciences	<input type="checkbox"/>	<input type="checkbox"/>																										
b. Health, Nursing, or Medical Fields	<input type="checkbox"/>	<input type="checkbox"/>																										
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## 4. Methodology

### 4.1 Basic Test Design

The Content Test sample design mirrored, as closely as possible, the production ACS design to simulate the conditions under which the field of degree question may be administered. The Content Test consisted of a national sample of approximately 30,000 residential addresses in the continental United States. The test used a paired sample design. That is, when we selected an address, we also selected a nearby address, with one receiving the forced-choice version of the field of degree question (15,000 addresses total) and the other receiving the open-ended version (15,000 addresses total).

The ACS uses a sequential combination of data collection modes – mail, telephone (Computer-Assisted Telephone Interview - CATI) and personal visit (Computer-Assisted Personal Interview - CAPI) – to collect the data for independent monthly samples over a three-month period. The Content Test followed the same schedule and procedures for these operations as the July 2007 ACS production panel. Questionnaires were mailed to sampled households at the end of June 2007. The Content Test used an English-only mail form but the automated instruments (CATI, CAPI, and Content Follow-Up reinterview) included both English and Spanish versions. Households not responding by mail by the end of July and for which we found a phone number via a telephone number look-up operation were contacted for a CATI interview during the month of August 2007. In September 2007, Census Bureau field representatives visited a sample of households that did not respond by mail or CATI by the end of August in an attempt to collect the data.

The full ACS implementation strategy was used for the test with the exclusion of the Failed Edit Follow-Up (FEFU) operation. The FEFU operation, in which households are contacted via a CATI operation to complete key data items left blank on their mail questionnaires or to collect person information when more than five persons are in the household, was excluded for cost-saving purposes and to analyze responses in their purest form. In addition, the Content Test purposely did not include any edit or imputation steps so as not to mask any response problems with either question version.

Since both question versions had space for an open-ended response, we implemented a coding operation to classify all write-ins provided in the original interview and the Content Follow-Up (CFU). Specifically, we adapted the NSCG coding system for the Content Test with some modifications to account for the fact that the ACS collects much less detailed degree data than the NSCG. The coding operation started with an autocoding operation, followed by clerical and expert coding. We coded each write-in response and used that code to classify the degree into one of the eight categories from the forced-choice version for analytical comparison purposes.

#### **4.2 Content Follow-Up (CFU) Reinterview**

About two weeks after we received a completed mail return questionnaire or completed CATI or CAPI interview, the responding household entered the CFU operation. The CFU was designed to assess the reliability of the data. By re-asking the field of degree questions, we obtained a second response for these items, allowing us to compare the answers from the original interview to the answers from the CFU.

The telephone center staff completed the CFU interviews between July 17 and October 17, 2007. At the first contact with a household, CFU interviewers asked to speak with the respondent who completed the original interview (as listed on the mail questionnaire or in the CATI/CAPI interview). If that person was not available, interviewers scheduled a callback at a time when the original respondent was expected to be home. If we could not reach the original respondent at the second contact, interviewers completed the interview with an ACS eligible household respondent (a knowledgeable household member age 15 years or older).

In the CFU, we asked questions of all people identified as college graduates with a bachelor's degree or higher in the original data collection. The CFU reinterview did not replicate the full ACS interview. A few housing questions were asked first to provide some context for the interview. Then, the five preceding person-level questions were asked, followed by the field of degree question in two ways. First, respondents were asked the same version of the field of degree question they had been asked in the original interview. This gave us two measures of the same question, one from the original mail, CATI, or CAPI interview and one from the CFU. Immediately after that, we asked respondents the other version of the field of degree question. For example, if the household received the open-ended version in the original interview, they received the open-ended version in the CFU followed by the forced-choice version. Asking both versions of the field of degree question from the same person at the same time in the CFU allowed us to compare open-ended and forced-choice responses to determine if people place the degrees into the categories the way we intended.

### **5. Limitations**

Some aspects of the Content Test implementation should be considered when looking at the results of this analysis and evaluating the data.

- The CFU was done entirely by telephone. If the original data were collected by mail or CAPI, the difference in data collection mode could account for some of the response variance.
- Because the CFU was conducted by telephone, households that did not provide a phone number in the original mail or CAPI interview were excluded from the CFU if we could not obtain a phone number from a vendor look-up.
- For about 14 percent of the CFU cases, we did not have the same respondent in the CFU that we had in the original interview. This means that differences between the original interview and the CFU for these cases could be due in part to having different people answer the questions.
- As mentioned earlier, we did not edit the data that respondents reported, nor did we impute for missing responses. We also did not adjust the weights for unit nonresponse or to match known population totals, as is done with ACS production data. We purposely chose not to implement these adjustments in order to prevent masking any response problems either question version might have. This is a limitation in that the data cannot be easily compared to published data sources.

### **6. Results**

The weighted unit response rate was roughly 97 percent for the forced-choice and open-ended versions of the questionnaire in the original interview. The unit response rate for the CFU was roughly 90 percent for both versions of the questionnaire. Since we observed no difference in the unit response rates between the forced-choice and

open-ended questionnaires, for the original interview as well as the CFU, we are confident that the findings presented in this report are not confounded by differences between responding universes.

### 6.1 Comparability of Estimates and Distributions to Existing Data Sources

For any new question proposed for inclusion in the ACS, it is required that the collected data have relatively similar distributions to those from existing data sources. The 2003 National Survey of College Graduates (NSCG) collected detailed degree information from college graduates. The resulting data were available at the same level of detail as the data in this test. Therefore, the NSCG data were determined to be the best source for comparison. Note that these comparisons are informal since no formal statistical testing between the Content Test and NSCG data can be done due to differences in data processing between the test and production data (i.e., the Content Test data were not edited or imputed, nor were there any adjustments for nonresponse or raking to known population totals).

Table 1 shows the distributions of the percentage of people in each field of degree category. While the distributions are mostly similar between the test questions and the NSCG, there are some noticeable trends in the data. The percentages for the forced-choice version are nominally higher than the percentages for open-ended version and the 2003 NSCG for many of the categories. The same holds true for the “Total” line of the table, which contains the sum of the percentages across the eight categories. The totals are all over 100 percent, meaning that some people were reported to have degrees that fall in more than one category. The forced-choice figure of 114.4 percent is nominally higher than the 106.5 percent for the open-ended version and the 103.7 percent for the 2003 NSCG. This finding indicates that there was more reporting of degrees or majors in multiple categories in the forced-choice version than in the open-ended version or in the 2003 NSCG.

**Table 1. Percent Distributions of Field of Degree**  
(Universe: People reported to have a bachelor’s degree or higher)

Field of Degree Categories	Response Distribution		
	Forced-Choice (%)	Open-Ended (%)	2003 NSCG* (%)
Biological, agricultural, physical, earth, or other natural sciences	10.8	9.9	9.3
Health, nursing, or medical fields	10.0	7.6	7.2
Engineering, computer sciences, or mathematical sciences	14.4	12.5	13.2
History, arts, or humanities	18.6	14.8	15.5
Psychology, economics, or other social sciences	15.2	15.2	14.2
Business or management	23.8	22.4	20.9
Education or education administration	17.7	14.0	15.2
Some other major field	4.1	10.1	8.2
<b>Total**</b>	114.4	106.5	103.7

Missing data are not included. \* NSCG data are fully weighted and edited.

\*\*Totals are greater than 100 percent because people reported to have degrees that fall into more than one category are counted in each category.

While there are people with multiple bachelor’s degrees or double majors that legitimately should be reported in more than one category, the intention was that each degree or major would go into one and only one category. The percentage of people who were in more than one category in the forced-choice version was about twice the percentage of those in the open-ended version (13.0 percent versus 6.4 percent).<sup>2</sup> These percentages are statistically

<sup>2</sup> A note of clarification: Given the “Total” presented in Table 1 for the forced-choice version was 114.4 percent and the open-ended version was 106.5, one may think that 14.4 and 6.5 percent of people, respectively, were reported to have degrees in more than one category. Instead, we report these percentages as 13.0 percent for forced-choice and 6.4 for open-ended. The difference is that a very small percentage of people were reported to have degrees or majors in more than two categories.

different. Both estimates are nominally higher than the 3.7 percent in the NSCG. Given that the multiple-category reporting is lowest in the NSCG, we believe that the 13.0 percent figure for the forced-choice question is erroneously high.

We also looked at multiple reporting for the forced-choice question by the mode used to collect the data in the original interview. We found that the rate of multiple-category reporting for CATI was significantly higher than both mail and CAPI (CATI: 22.2 percent, mail: 11.0 percent, and CAPI: 14.4 percent, with no difference between the mail and CAPI modes),<sup>3</sup> suggesting a potential mode effect. The forced-choice question in the CATI mode is more susceptible to multiple-category reporting than the other modes. For the open-ended question, the multiple-category reporting rates were not statistically different by mode (CATI: 4.4 percent, mail: 6.3 percent, and CAPI: 7.7 percent). However, each of those figures is significantly lower than the corresponding rates for the forced-choice version.

Why was the multiple-category reporting rate much higher for the forced-choice version, especially for CATI? Recall that the forced-choice question in CATI/CAPI was asked as a series of “yes/no” questions. In cognitive interviewing of the CATI/CAPI instrument, we saw that people answered “yes” to a category but later found another category that was more appropriate (Rothgeb and Beck, 2007). We hypothesize that in a CATI interview, respondents may be reluctant to correct a previous response so multiple categories are left as “yes” responses. The forced-choice question was asked as eight separate questions, each requiring a “yes” or “no” response before proceeding to the next question. The face-to-face setting with personal interaction in a CAPI interview may make it easier for a respondent and interviewer to go back-and-forth to correct erroneous responses. For the mail version, there was nothing on the form to tell the respondent to place each degree or major into one and only one category, so the hypothesis is that people with interdisciplinary majors may have checked each box that could apply to the degree.

## 6.2 Item Missing Data Rates

The item missing data rate is computed for people who were reported to have a bachelor’s degree or higher in the educational attainment question. For the forced-choice version, an answer of “yes” to any of the seven specific categories or a codeable write-in response to the “some other major field” category is considered a response. For the open-ended version, only codeable answers are considered responses. The item missing data rate for the open-ended version (6.5 percent) is significantly higher than the forced-choice version (3.2 percent). These results are not surprising given that other research has shown that open-ended questions tend to have a higher nonresponse rates than forced-choice questions (Chesnut *et al.*, 2007; Griffith *et al.*, 1995.)

We theorized that the higher rate for the open-ended version could be in part because respondents provided information that could not be coded, so we calculated a missing data rate that considered any answer to be a response. The missing data rate under that definition was still significantly higher for open-ended, 3.5 percent versus 1.9 percent for forced-choice, indicating that the open-ended question was less likely to get any response than the forced-choice question. It is also important to remember that in the ACS production setting, these rates should be lower because some households are contacted in the FEFU operation to complete data items left blank on their mail questionnaires, which was not done for this test.

## 6.3 Reliability of Estimates

Recall that in the CFU we re-asked the same version of the field of degree question that the household received in the original mail, CATI, or CAPI interview. The CFU gave us a second measure of the person’s field of degree using the same question, and we used those data to help measure reliability.

To measure the reliability of the responses between the original mail, CATI, or CAPI interview and the CFU interview, we calculated the Gross Difference Rate (GDR) for each degree category. The GDR is the percentage of inconsistent responses between the original interview and the CFU for each degree category. For example, in the original interview, if the respondent said that the person had a biology degree, but in the CFU, the respondent did not mention biology, that would be an inconsistent response for biology.

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<sup>3</sup> The comparisons between mail, CATI, and CAPI used the Bonferroni method to adjust for the fact that multiple comparisons were being performed.

Table 2 gives the GDRs for each of the eight categories. The table shows that for six of the eight categories, the GDR was significantly lower for the open-ended version than for the forced-choice version, and for the other two categories, the difference between the two was not significant. These results indicate that the open-ended version produced significantly more reliable results than the forced-choice version.

**Table 2. Field of Degree Content Follow-Up Comparison Statistics – Gross Difference Rates**

(Universe: People reported to have a bachelor's degree or higher who responded to the field of degree question in the original interview and CFU)

	Gross Difference Rate				
	Forced-choice vs. CFU (%)	Open-Ended vs. CFU (%)	Difference (%)	Margin of Error (%)	Significant
Biological, agricultural, physical, earth, or other natural sciences	6.1	3.1	3.0	±1.0	Yes
Health, nursing, or medical fields	3.8	1.0	2.8	±0.7	Yes
Engineering, computer sciences, or mathematical sciences	3.5	1.9	1.6	±0.9	Yes
History, arts, or humanities	8.8	5.1	3.7	±1.3	Yes
Psychology, economics, or other social sciences	8.0	3.2	4.8	±1.2	Yes
Business or management	5.5	2.8	2.7	±0.9	Yes
Education or education administration	4.9	4.0	0.9	±1.0	No
Some other major field	3.2	4.2	-0.9	±1.0	No

Recall that when we studied the distributions between the two test questions and the NSCG data we had more people that reported degrees in more than one category in the forced-choice version than we did in the open-ended version and in the NSCG. To help determine whether multiple degree reporting contributed to the difference in reliability, we compared the GDRs using only people who were reported to have a degree in only one category in both the original interview and the CFU. The major finding is that the forced-choice version performed just as well as the open-ended version when restricted to this universe. This indicates that the difference in reliability between the forced-choice and the open-ended versions is largely due to people who are reporting multiple degree categories. In other words, not only does it seem that people given the forced-choice version are over-reporting the number of categories, they are not replicating the multiple categories they originally reported in the CFU.

#### 6.4 Response Correspondence Between the Forced-Choice and the Open-Ended Versions

Recall that in the CFU, after we re-asked the same version of the field of degree question that the household received originally, we then asked the other version of the field of degree question. This gave us the opportunity to compare open-ended and forced-choice answers for the same person at the same time from the same respondent. For this analysis, we only used the cases that were asked the open-ended version first followed by the forced-choice version because we did not want the category names themselves to influence the open-ended answer given by the respondent.

Using these data, we calculated an agreement rate – the percentage of time that all of the categories indicated in the open-ended response exactly matched all of the categories given in the forced-choice version. We found that this agreement rate was low (65.1 percent) indicating a problem for people in classifying the degrees. Among the mismatches, we noticed a large number of situations (20.2 percent of all cases) where the category indicated in the open-ended response was also given in the forced-choice version, but additional categories were provided in the forced-choice version as well. The open-ended and forced-choice answers were totally different 12.5 percent of the time. The remaining 2.2 percent of the cases were more complicated partial match situations. Anecdotal information and a closer examination of the responses suggest that respondents had difficulty placing degrees into categories the way we expected. The cognitive interviews showed similar results.

### 6.5 Potential Impact on Identifying Science and Engineering Graduates for the NSCG

One of the proposed uses of the data from the field of degree question is to assist in building a sampling frame for the NSCG. The main focus is to identify possible science and engineering graduates. The current frame for NSCG used Census 2000 long form data to identify this population based on occupation and educational attainment. In light of the replacement of the Census long form by the ACS, we looked at the impact on the identification of this population of using the field(s) of bachelor's degree in combination with occupation and educational attainment.

We started by using just educational attainment and occupation to identify science and engineering people, as has been done in the past. Using that method, we found 21 percent of the people reported to have a bachelor's degree or higher in our sample would be identified as possible science and engineering people, regardless of question version (open-ended: 21.1 percent and forced-choice: 21.0 percent). When we also took into account the field of degree, 49.1 percent of the graduates receiving the open-ended question and 47.4 percent of the graduates receiving the forced-choice question would be identified as possible science and engineering people.

Thus, we found no difference in the amount of people identified as possible science and engineering people between the two field of degree questions. Specifically, of people reported to have a bachelor's degree or higher in our sample, 27.9 percent in the forced-choice version and 26.4 percent in the open-ended version would not have been identified as possible science and engineering people by the current method used by NSCG but are considered possible science and engineering people based on their field of degree. These numbers are not significantly different, indicating an identical gain in the sampling frame for the NSCG regardless of question version.

## 7. Summary

Taken together, these results, with the exception of the item missing data rates, seem to favor the open-ended version of the field of degree question. The over-reporting of multiple categories appears to be a flaw in the design or administration of the forced-choice question, and provides support for the theory that people have difficulty classifying degrees uniquely into the categories. Additional results and details are presented in Raglin *et al.*, 2008.

In accordance with the *U.S. Census Bureau Policy on New Content for the American Community Survey*, the OMB reviewed these results and other considerations, such as the added benefits and cost implications, and made the decision to include the open-ended version of the field of degree question on the ACS. The field of degree question will make its debut in ACS production in January 2009.

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