

# Using Graphics in Data Collection to Aid Respondent Comprehension

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## Abstract

The National Center for Science and Engineering Statistics (NCSES) is a U.S. federal statistical agency within the National Science Foundation, charged with measuring the research and development (R&D) enterprise within the American economy.

Two surveys – the Survey of State Government Research and Development (SGRD) and the Survey of Nonprofit Research Activities (NPRA) – collect information about R&D funding sources and how those funds were spent. SGRD collects information from state government agencies and is conducted biennially via self-administered web instrument. NPRA collects data from nonprofit organizations. It is currently in development (it is not in production); it will also be conducted via self-administered web instrument. Two different contractors conduct these surveys on behalf of NCSES, a factor that affects how graphics can be displayed in their respective web survey environments.

Early cognitive interviews for SGRD revealed two main issues: a) respondents often skipped necessary but lengthy instructions about the appropriate inclusion and exclusion of certain types of funds, b) respondents sometimes were not able to accurately answer questions separating intramural research performance from extramural research performance. A diagram was developed to aid respondent comprehension and reduce measurement error. Noting that NPRA respondents may display similar tendencies as SGRD respondents, a diagram was developed and tested for that survey as well.

This paper will show examples of the diagrams tested qualitatively for both surveys, provide feedback from respondents on their utility and design, and describe how the diagrams will be displayed during survey deployment. It will also describe some of the challenges encountered in designing graphics, and determining their appropriate placement within web survey instruments.

**Key Words:** questionnaire design, graphics, diagrams

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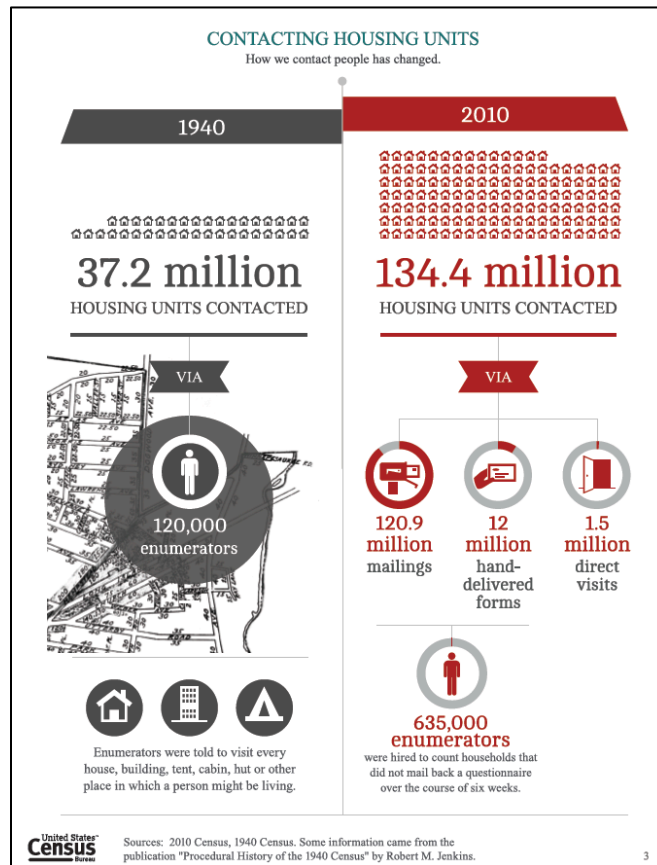
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# 1. Background

There is an old saying that “a picture is worth a thousand words,” and as statisticians and survey methodologists, the authors are aware that line and bar charts can more clearly show changes over time compared to simply looking at a table of data. However, the use of diagrams, pictures, and other images are generally limited to data dissemination, and helping people understand what the data shows. This paper discusses the authors’ attempts to move pictures into the realm of data collection, to help respondents understand the phenomenon being measured, in an attempt to reduce measurement error arising from problems related to comprehension.

## 1.1 Infographics for Data Dissemination

Some organizations have begun including infographics in their data dissemination efforts. Generally, infographics use simple color schemes, icons, and other design conventions to provide information about a certain topic. For example, part of an infographic that compares how the United States Census was conducted in 1940 and 2010 can be found in Figure 1 (U.S. Census Bureau, 2012).



**Figure 1: Portion of the infographic that compares the 1940 and 2010 United States Censuses.**

This infographic uses a very limited and consistent color scheme: gray is used for material related to 1940, and red is used for 2010. In addition, though only a small portion of the infographic is shown here, in its entirety, it appears on one scrolling

webpage (or as a 5-page PDF), where 1940 is always on the left and 2010 is on the right, thus providing a simple navigational path for the reader. Finally, the icons used in the infographic are very simple and easy to understand with minimal accompanying text.

## **1.2 Use of Graphics in Data Collection**

Graphics have been used in data collection before, with mixed results.

### ***1.2.1 Methodological Studies***

In a study published in 2004, Couper *et al.* provided photographic images in addition to the question text. The questions asked respondents to report, for example, how many times they went shopping, dined out, or made an overnight trip. Respondents were assigned to one of four treatment conditions:

- The question text alone
- The question with a picture that was salient, but intended to elicit a lower number of reports (low frequency)
- The question with a picture that was salient, but intended to elicit a higher number of reports (high frequency)
- The question with both low and high frequency pictures

For example, a question concerning the number of shopping trips made within the reference period could be paired with an image of a grocery store (high frequency) and/or a department store (low frequency). A question concerning the number of times a respondent dined out could be paired with an image of eating fast food (high frequency) and/or a couple eating in a restaurant (low frequency).

The researchers found that including images with questions had a systematic effect on the response data. The number of shopping trips a respondent reported were higher when the question was paired with a picture of a grocery store, for example. Specifically, “for some respondents, the pictures clarified the meaning of the questions, broadening their definition of the response category. For others, the pictures may have reinforced a narrow interpretation of the question’s meaning” (p. 264). The authors go on to suggest using “great care” when deciding which pictures to include with questions.

Another study that came out around the same time paired pictures of animals on endangered or threatened species lists with questions regarding support for their protection (Witte, *et al.*, 2004). This study found that support for the protection of the species increased when a photograph was displayed with the question. In addition, the researchers found that the quality of the photograph played a role: when it came to measuring support for two different species of fish, the photo where the fish stood out more clearly against the background yielded higher levels of support. Once again, the authors suggested exercising caution in pursuing these sorts of techniques in data collection, suggesting that respondents may not be aware of their influence on response.

Couper (2008) suggests that images can affect response, and says that studies suggest including images can be risky, since there could be an effect on the behaviors or attitudes reported. Further, he claims that there is no research that demonstrates the value of including images, and raises concerns about accessibility for visually impaired users.

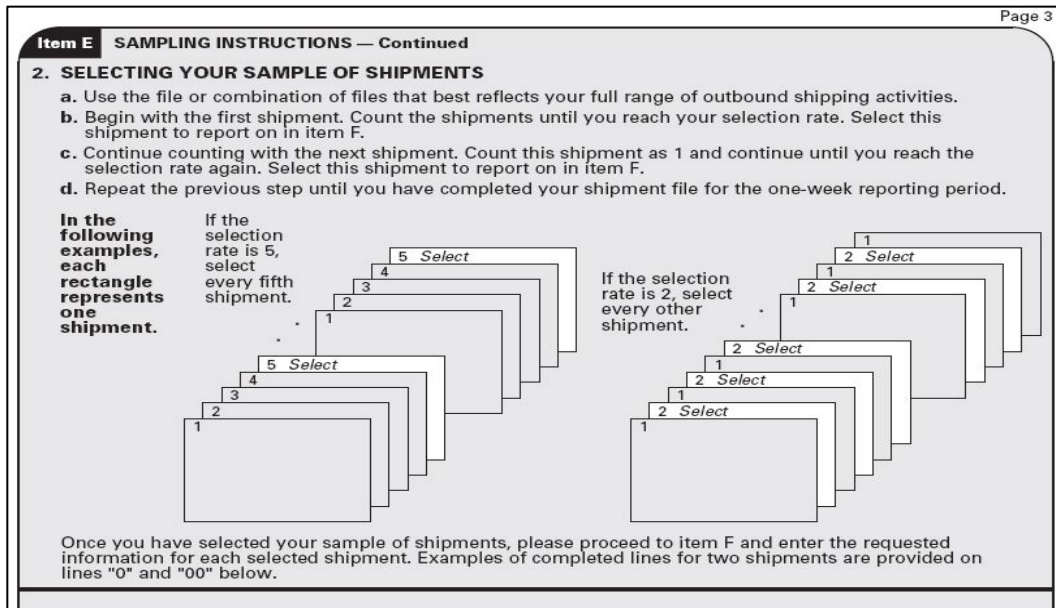
Both the Couper, *et al.* and Witte, *et al.* studies used photographic images, rather than diagrams or icons. In addition, both of those studies were capturing attitudinal and

behavioural data. However, there do not seem to be any methodological studies concerning the use of graphics in the collection of financial data.

### 1.2.2 Use in Federal Surveys

Though methodological studies featuring images and financial questions are exceedingly rare, two U.S. Federal surveys have introduced them into their data collection efforts with mixed results: the 2002 Commodity Flow Survey (CFS), and the Quarterly Foreign Direct Investment survey. The former was conducted by the U.S. Census Bureau on behalf of the (U.S.) Bureau of Transportation Statistics, the latter was conducted by the U.S. Bureau of Economic Analysis.

The 2002 CFS asked respondents to provide details about shipments that a business sent out during a particular week of interest. If the number of shipments was large enough, rather than ask for details about all of the shipments, respondents were asked to take a systematic sample of their shipments, and report details only for those selected. In an effort to explain the concept of systematic sampling to respondents who were not trained statisticians, a diagram was included (Figure 2). This diagram was not useful for respondents (Thomas, *et al.*, 2007). First, respondents paid too much attention to the diagram, and not to the text that explained it. Second, respondents failed to make the connection that each rectangle in the diagram corresponded to one of their shipping records, a finding complicated by the fact that shipping records could be kept in paper and/or electronic form. Finally, the placement of these instructions relative to the questions caused problems for respondents.



**Figure 2:** An example of a diagram, from the 2002 Commodity Flow Survey.

The Quarterly Foreign Direct Investment questionnaire included diagrams with a bit more success (Tuttle and Morrison, 2006). In an earlier version of the survey, a significant portion of the instructions provided guidance on which parts of the corporate family to include or exclude from the company's response. Unfortunately, those instructions were located in a separate instruction booklet that accompanied the questionnaire, and respondents frequently neglected to read those instructions, causing

measurement error. As a means of increasing respondents' attention to these critical instructions, they were converted into questions, and small, simplified organizational charts were developed and included on the survey instrument as supplements to the questions (Figure 3). Respondents generally liked these diagrams and attended to them. During cognitive testing, some participants commented that they worked because the organizational chart was a familiar concept.

**Part I – Rules for Consolidating the U.S. Affiliate**

**6** Has the ownership structure of this U.S. affiliate changed since the previous quarter?  
303  Yes – Please provide a chart showing the new ownership structure if available.  
 No

**7** Does this U.S. affiliate (as an individual entity) hold a MAJORITY voting interest (over 50 percent) in any U.S. business enterprises?  
304  Yes –

- **Consolidate** in this report ALL U.S. business enterprises proceeding down each ownership chain whose voting securities are more than 50 percent owned by the U.S. enterprise above (with the exception noted below). Hereinafter the U.S. business enterprises consolidated on this report are considered one U.S. affiliate.
- **DO NOT consolidate** any U.S. business enterprises in which a direct ownership interest and an indirect ownership interest are held by DIFFERENT foreign entities. Report this U.S. affiliate's interest in such enterprises on an equity basis, even if it is more than 50 percent. These enterprises must file their own Form BE-605 unless they qualify for exemption.

 No

**8** Does this U.S. affiliate hold a voting interest from 10 to 50 percent in any U.S. business enterprises?  
305  Yes – Do not consolidate such enterprises in this report. Report this U.S. affiliate's interest in such enterprises on an equity basis, OR in accordance with FASB ASC 320 (formerly FAS 115) if owned less than 20 percent. These enterprises must file their own Form BE-605 unless they qualify for exemption.  
 No

**9** Does this U.S. affiliate own, either directly or indirectly, any foreign business enterprises?  
306  Yes – Do not consolidate foreign business enterprises in this report. Report U.S. affiliate's interest in foreign operations on an equity basis, OR in accordance with FASB ASC 320 (formerly FAS 115) if owned less than 20 percent.  
 No

This U.S. affiliate

↓ >50%

U.S. business – Consolidate in this report.

↓ >50%

U.S. business – Consolidate in this report.

This U.S. affiliate

↓ 10 to 50%

U.S. business – Do not consolidate in this report.

This U.S. affiliate

↓

Foreign businesses – Do not consolidate in this report.

**Part II – Identifying the Foreign Parent**

**10** Does more than one foreign parent have a direct investment voting interest in this U.S. affiliate?  
307  Yes – File a separate BE-605 report for each foreign parent having a direct investment voting interest in this U.S. affiliate.  
 No

**11** What is the name of the FIRST foreign parent in a chain of ownership extending outside the United States that holds either a direct or indirect voting interest in this U.S. affiliate?  

- The entity named below is hereinafter referred to as the foreign parent.
- Report transactions with the foreign parent in [Parts III, IV, V, and VI](#).

308  
Name of the foreign parent of this U.S. affiliate

Page 2
Please continue on the next page
FORM BE-605 (Rev. 5/2012)

**Figure 3:** Organizational charts on the Quarterly Foreign Direct Investment questionnaire, effective May 2012

## 2. Methods

### 2.1 Two Surveys at the National Center for Science and Engineering Statistics

Among other things, the National Center for Science and Engineering Statistics is responsible for measuring research and development (R&D) expenditures in various sectors of the U.S. economy. These sectors include higher education, government (federal and state), business, and non-profit. Two surveys are of particular interest for this paper: the Survey of State Government R&D (SGRD), and the Nonprofit Research Activities Survey (NPRAS).

Both surveys measure internal and external R&D expenditures. Internal R&D, also known as intramural R&D performance, is what the organization spends on its own

research efforts by its own employees. External R&D, also known as extramural R&D performance, refers to money sent outside the organization, for other entities to do research. These could be grants or contracts, for example, and the other entity could be another government, a business, a college or university, or a nonprofit organization. In addition to collecting data about the nature of a state agency's or nonprofit's R&D expenditures, both surveys collect data about the sources of the funds used for R&D. These sources could include various levels of government (foreign, federal, state, or local), businesses, colleges or universities, nonprofits, or individuals.

SGRD collects information from state agencies via web instrument, and is transitioning from a biennial data collection cycle to an annual one. In the survey cycle that collected data concerning R&D expenditures during fiscal years 2014 and 2015, approximately 675 state agencies were in-scope, covering the 50 states, plus the District of Columbia (DC) and Puerto Rico. These agencies were not uniformly distributed. Most states have a relatively small number of agencies, and there are a few with a large number of agencies. This is because states can organize their administrative duties however they see fit. For example, one state might have environmental R&D contained entirely within the Department of Natural Resources. Another state might spread the same type of R&D project expenditures across its Departments of Natural Resources, Agriculture, and Environmental Quality. The states with the largest number of agencies are California, Kentucky, and Virginia.

The NPRA Survey is a new effort for NCSSES, which last collected R&D data from nonprofit organizations in the 1990s. It is currently being piloted following a multi-year development process that included exploratory interviews, cognitive interviews, and usability testing. The pilot launched in September 2016, with a mailing to approximately 3600 nonprofit organizations. It covers the 50 states and DC, but not Puerto Rico. Data is collected via web instrument, though a paper questionnaire is available. If the pilot is successful, NCSSES anticipates conducting the survey on a regular basis.

Neither survey collects information from public or private higher education institutions, which are covered under a separate survey (the Higher Education Research and Development, or HERD, Survey).

### *2.1.1 SGRD Testing*

During early stages of cognitive testing for the SGRD, in January 2015, respondents demonstrated some difficulties with the instrument. (A selected question from the instrument is shown in Figure 4.)

**Question 11 Expenditures for Extramural R&D Performance**

The next few questions ask about expenditures for extramural R&D performance, which we define as expenditures on R&D performed outside of your agency, but under your administrative oversight or control.

Examples of entities that perform extramural R&D are:

- > Public and private universities and colleges
- > Companies or individuals under contract for research projects or that received grants for research projects
- > Nonprofit organizations
- > Other agencies within your state
- > Other state governments
- > County, municipal, regional, or other local governments
- > The federal government

Expenditures for extramural R&D performance **include**, but are not limited to:

- Grants
- Payments for contracted R&D projects
- Reimbursable costs for R&D projects

Expenditures for extramural R&D performance **exclude**:

- Pass-through grants over which you have no administrative oversight or control
- Direct appropriations to state universities that are used for R&D activities over which you have no oversight or control (this information is reported by universities on NSF's Survey of Higher Education R&D)
- Expenditures for construction and acquisition of facilities used primarily for R&D ([Question 16](#))

**11. Of the total R&D expenditures reported in Question 3, [amounts], how much was for extramural R&D? If no R&D, please report \$0.<sup>1,0</sup>.....**

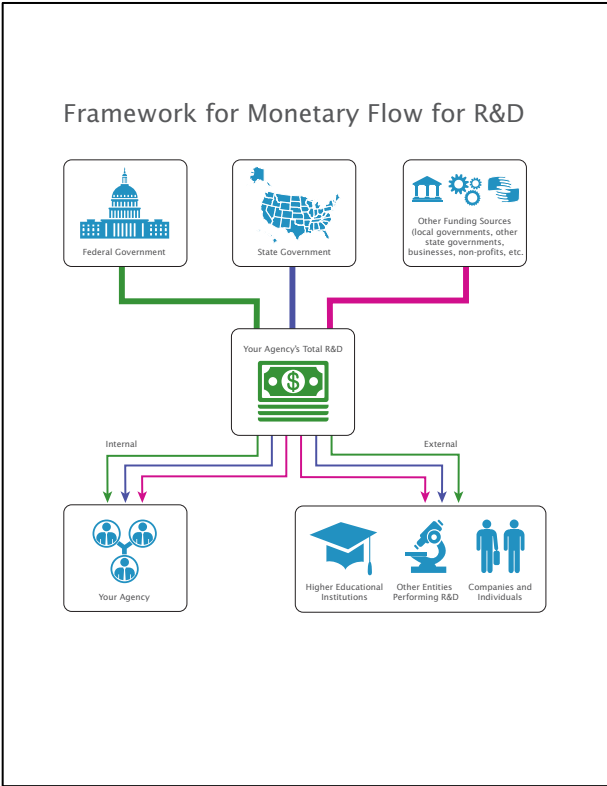
	<b>FY 2014</b>	<b>FY 2015</b>
\$	\$	\$
[input box]	[input box]	[input box]

**Figure 4:** Selected question cognitively tested on the SGRD, January 2015

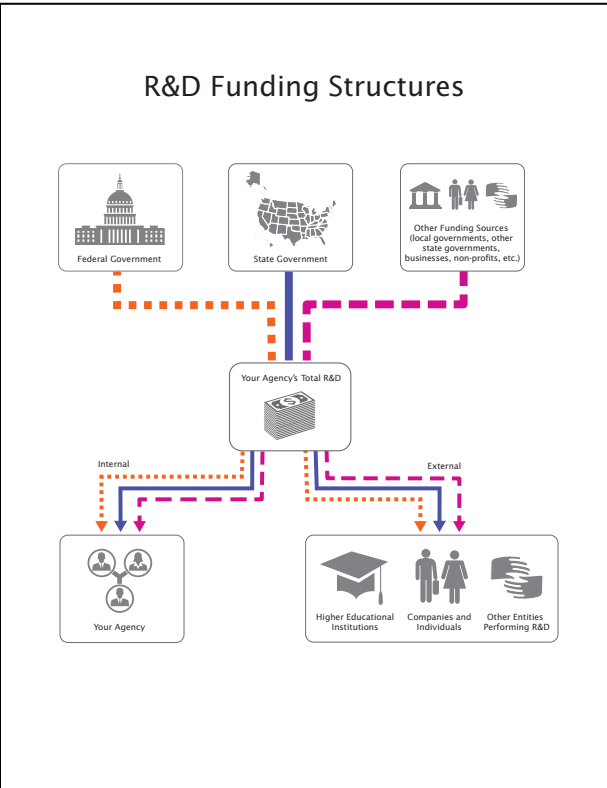
The text as it was presented on the page was dense, and many respondents failed to read it. Indeed, they would often read the question header and the question, but completely skip over the instructions. This was problematic for several reasons, but primarily because the instructions provided guidance on the interpretation of survey-specific terms, such as “intramural R&D” and “extramural R&D.” Some respondents, upon encountering the word “intramural” said the term made them think of sports. To counteract the problems of dense text and confusing terms, the authors proposed using a diagram to supplement the questions.

Early drafts were scribbled on available paper – the back of a page from a coloring book, then yellow legal pads – before returning home and soliciting the help of the professional graphic design team at the U.S. Census Bureau.

A few drafts of the graphic were produced before one was suitable enough to test with respondents, partly due to the fact that it required identifying the personnel with suitable graphics design expertise at the U.S. Census Bureau, then gaining their participation. This group is not typically involved with data collection, so this was a new experience for all involved. Version 3 (Figure 5) was tested with 17 respondents in April 2015, and Version 4 (Figure 6) was tested with 8 respondents in August 2015, as part of the usability testing for the web instrument. During the cognitive interview or usability test, the graphic appeared on a single page (separate from the questionnaire). In cognitive interviews, the questionnaire was a low-fidelity paper prototype of the web instrument.



**Figure 5.** SGRD graphic, Version 3, included in cognitive interviews, April 2015



**Figure 6.** SGRD graphic, Version 4, included in cognitive interviews, August 2015



### 2.1.2 NPRA Testing

Meanwhile, the NPRA Survey was in its early design stages. Following exploratory interviews to establish the type and level of information that might be available within nonprofits' organizational records, a questionnaire had been developed, and cognitive testing was underway. The content of NPRA was similar to SGRD, and it was the first time NCSES would be conducting a survey of nonprofit organizations in nearly 20 years. In addition, it was thought that respondents at nonprofits may not be familiar with the work of the National Science Foundation and its interest in R&D funding and spending patterns. In an effort to design a survey questionnaire that would be user-friendly, the use of a graphic was proposed. In all, 27 nonprofit organizations saw a graphic during the testing process. As in the SGRD testing, the graphic was provided to respondents on a sheet of paper, separate from the paper prototype of the questionnaire that was being tested.

A subcontractor to the project developed the NPRA graphic. It underwent some changes during the cognitive testing process, based on respondent feedback. For example, one version split the graphic into three pieces, so that each piece was presented with the relevant questions in the instrument. Figure 7 shows a version of the graphic that was tested with approximately 16 of the 27 organizations in the summer and fall of 2015.

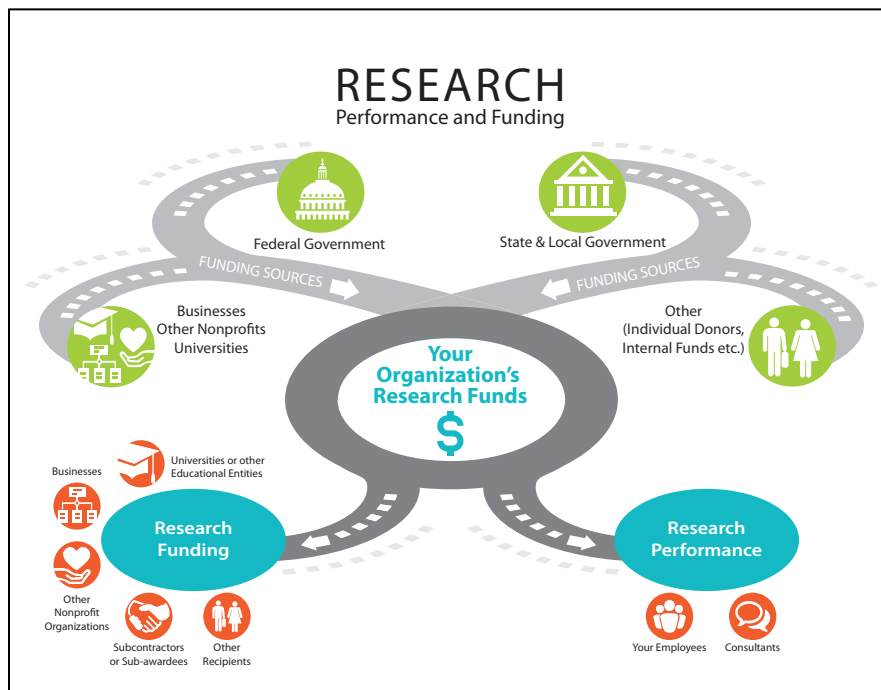


Figure 7. NPRA graphic, included in cognitive interviews in 2015

## 3. Results

### 3.1 Findings from SGRD Qualitative Research

During cognitive testing in April 2015, the graphic performed well. Generally, there was a good match between the intended meaning of the graphic and respondents' interpretations of it. Respondents were able to describe the content of the graphic accurately. In addition, some respondents' comments indicated that the graphic gave

them a better understanding of the terms “internal” and “external” (terms that had replaced “intramural” and “extramural”) which were used on the questionnaire.

There were a few instances where the graphic was not entirely clear. One respondent was not clear on whether the graphic referred to their agency’s budget or expenses, and another took some time to realize that the graphic was actually “money flow and not who benefits.”

Some respondents looked at both the text and the icons within the graphic to gain an understanding of it, but several respondents focused more on the text, saying things like “I was focused on the words, I guess.” Several respondents indicated that the images would have no meaning without the accompanying text.

Despite the fact that researchers had concerns about Version 3 of the graphic, it was tested because of scheduling constraints. Those concerns were addressed in the cognitive interviews. For example, different icons were used to represent companies (gears in the upper right corner, a pair of men in the lower right corner) and non-profits (a pair of hands in the upper right corner, a microscope in the lower right corner). In addition, there was no gender balance among the figures used to represent people – all of them were male. Finally, the title sounded rather formal. All three of these concerns were addressed in the cognitive interviews.

Respondents’ attention was drawn to the images within the graphic when researchers asked about their suitability for use as they were intended. Some respondents thought some icons could be modified, though several respondents indicated they would not know of other images that would be more suitable. Interestingly, the icon for “your agency” (the trio of individuals in the lower left corner) was particularly well-received; comments included “I can’t think of a better image” and “I do appreciate the agency is made of people.” Of the two conflicting images in use for companies and individuals (gears vs. pair of people), respondents preferred the pair of people. Finally, respondents spontaneously addressed the researchers’ concerns about gender balance. A few respondents made comments that there were no women, saying, “They’re all wearing neckties, it doesn’t seem inclusive,” and “I want one of them to be a girl.” Finally, respondents commented that the title of the graphic was “too academic.”

Respondents had differing opinions on where the graphic would best be placed. A few said it would be most useful if it was located at the beginning of the questionnaire, on the login or introduction page, or in the survey’s cover letter. Other respondents mentioned the graphic while discussing the questions it pertained to within the instrument, but none of the respondents indicated they would actually refer back to this graphic while completing the survey. Indeed, one respondent said, “if it wasn’t shown from the get-go, I wouldn’t look for it.”

Following the seventeen cognitive interviews in April 2015, the graphic was revised. More female figures were added, and discrepancies in the icons used were resolved. The color scheme was simplified further: all of the icons were made gray, so that the colored lines representing each source of funding stood out further. To address concerns about respondents who might print the graphic using black and white printers, or who might be color-blind, the line styles were varied. Earlier versions featured solid lines, but the latest graphic used solid, dashed, and dotted lines.

Feedback was obtained from eight respondents during usability testing that summer. Findings generally echoed those found during the cognitive interviews: respondents had varying opinions on the best location of the graphic, as well as varying levels of perceived usefulness.

The graphic was implemented in the SGRD data collection cycle that collected data on fiscal years 2014 and 2015. The survey was launched in the fall of 2015, and closed in July 2016. Based on respondent feedback during testing, the graphic was placed in multiple locations: in the initial mailing materials, and in the web instrument, and as a link within the relevant questions. The initial mailing materials consisted of an e-mailed survey invitation, and two attachments (a PDF of the graphic, and a PDF of the survey instrument). Because of concerns that the graphic might not be a viable means of helping respondents understand the question (and that a large graphic might prove too distracting on the page), it was not placed in its entirety within the web instrument. Rather, a link to it was placed following the questions it pertained to, as shown in Figure 8.

Form Number: SGRD OMB No.: 0607-0933 Approval Expires: 05-31-2016

USCENSUSBUREAU  
Helping You Make Informed Decisions

**Survey of State Government Research & Development**

Main Menu View/Print Report PDF About the Survey Contact Us FAQ Logout

**R&D Expenditures**

Expenditures for R&D Performed Internally (Internal R&D)

4. During FY 2014 and FY 2015, what were the total expenditures for internal R&D performance from federal funds, state funds, or other funds? For more information on internal R&D [open this supplemental PDF](#).

**Include**

**Types of activities**

- R&D performed by your agency's employees
- Services performed by others in support of an agency's R&D project (e.g., lab testing)
- Administration and management of R&D performed external to your agency (e.g., administration of R&D-related contracts)

**Types of costs**

- Salaries
- Benefits
- Supplies and movable equipment for R&D
- Travel
- Indirect costs
- Purchased services

**Exclude**

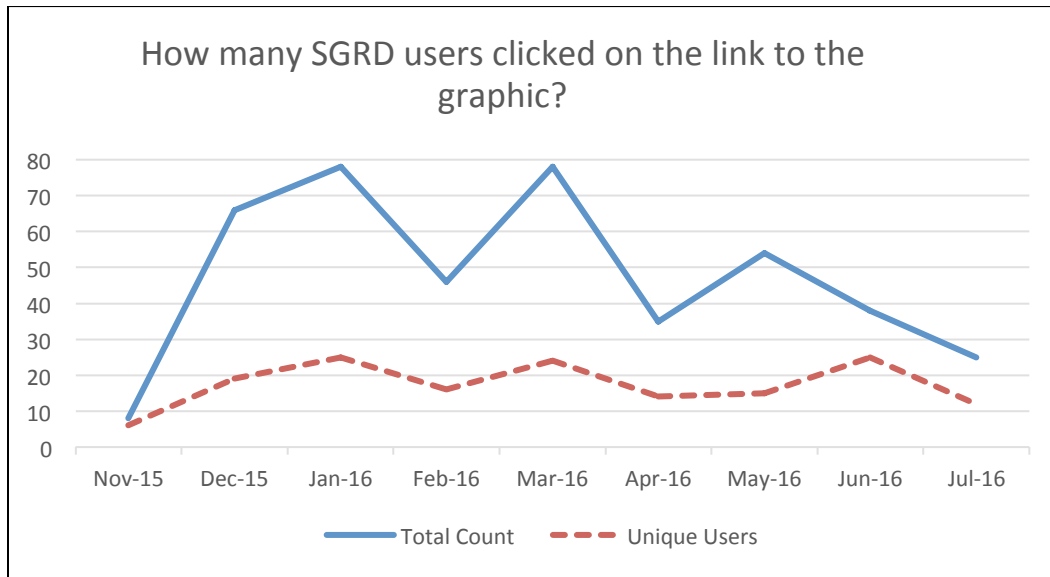
- R&D performed by higher education institutions
- R&D performed by businesses and individuals
- R&D performed by non-profit organizations
- R&D performed by other governments
- Construction and acquisition of land or facilities used primarily for R&D (report in Question 11)
- Fixed equipment used primarily for R&D (report in Question 11)

	FY 2014	FY 2015
a. Federal funds used for internal R&D	\$ 1.00	\$ 2.00
For example:		
• Grants		
• Contracts		
• Awards		
• Appropriations from the United States Government		
b. State funds used for internal R&D	\$ 9.00	\$ 10.00
For example:		

**Figure 8:** Excerpt from the FY 2014 and FY 2015 Survey of State Government Research and Development web instrument, with the link to the graphic in purple text.

### 3.2 Findings from SGRD Production Cycle

Because the data for SGRD was collected on the web, some paradata is available, specifically the total number of times the link was clicked on (which resulted in downloading the PDF of the graphic), and the number of unique users who downloaded the graphic, as shown in Figure 9.



**Figure 9:** The number of SGRD users who clicked on the link to the graphic, FY 2014 and FY 2015 survey cycle

Figure 8 shows that there are peaks of total and unique users in January and March 2016, and third peak of unique users in June. These peaks correspond with the more intensive non-response follow-up efforts. Though the absolute frequency of these figures is small, it bears repeating that the SGRD universe is also small (approximately 675 agencies in this particular survey cycle), and that the link was itself not the most visible. The authors find it promising that approximately 25 unique users still managed to find it in January, March, and June.

There are two strong limitations in interpretation of this data. First, these counters reset at the beginning of every month. Second, there are no cumulative counts of total unique users. As a result, one user visiting multiple times over the course of several months would be counted in each month s/he visited. Third, this data only captures the number of clicks on the link found within the web instrument. Since the graphic was included as an attachment in the initial SGRD mailing, it is difficult to assess how many people opened it and/or printed it for use during their response process, without needing to click on the link.

### 3.3 Results from NPRA Cognitive Interviews

Despite similar survey content between SGRD and NPRA, the findings from cognitive testing their respective graphics differed. Respondents who saw the graphic during NPRA cognitive interviews were asked what it showed, and how specify how helpful it was. Most of the nonprofits interviewed (16) did not like it and said it was not helpful, saying that the question text alone was sufficient for understanding the questions that were being asked. Additional comments suggested that the graphic could be tricky to interpret, and

was yet another thing to review in order to complete the questionnaire. Seven of the nonprofits liked it, saying it was good for breaking up the text, and for helping them understand a term used on the questionnaire (that term was later removed). Four were indifferent; some of them said they thought the graphic would not be useful to them, but would be good for “visual learners.” As a result of this feedback, the graphic was not incorporated into the instrument that was used in the pilot test for NPRA.

#### **4. Conclusions and Discussion**

First, a note of hope from the State Government R&D Survey: even when a link is somewhat buried, some respondents will still see it and click on it. The SGRD Survey is relatively small – there are only about 675 state level agencies in the universe. There was no thumbnail of the graphic within the web instrument, and there is no way of knowing how many respondents opened the attachment to the initial request that invited respondents to participate in the survey. Even so, there were about 25 unique visitors to the graphic in each of three months of the data collection cycle.

As for graphics themselves, they can be useful in conveying complex concepts, but these qualitative studies highlight the need for extensive testing. In the case of the State Government R&D Survey, cognitive interviewing and usability testing indicated that such a thing would be useful and appreciated by respondents. The same could not be said of the graphic proposed for use in the Nonprofit Research Activities Survey.

Results could be mixed for many reasons. First, the questions asked on the SGRD and NPRA, though similar in terms of content, are formatted and laid out differently in their respective environments. In addition, they do not share the same question order, skip patterns, or wording. The paper prototypes tested could have influenced respondents’ attitudes toward the graphics.

Second, the graphics themselves were different from each other. The SGRD graphic is a portrait-orientation, featuring gray icons and lines of three colors and styles (solid, dotted, and dashed). It uses squares and rectangles to differentiate among the various entities of interest. In contrast, the NPRA graphic is landscape-oriented, featuring gray lines with icons in green, blue, and red. It has a more rounded appearance, with ovals and circles.

More testing in the use of graphics to help respondents understand questions is certainly necessary. Such testing should continue to focus on their helpfulness and utility, as well as their best placement. Style is another area ripe for additional testing: perhaps one concept could be presented in multiple graphics, to assess whether (and how much) style plays a role in perceived usefulness.

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