

# A User-Driven Method for Using Research Products to Empirically Assess Item Importance in National Surveys

Ai Rene Ong; Robert Schultz; Sofi Sinozich; Jennifer J. Sinibaldi; Brady T. West; James Wagner; John Finamore

ESRA 2021

# Acknowledgement

This research was supported by the National Center for Science and Engineering Statistics (NCSES) through a Broad Agency Announcement (BAA).

Disclaimer: content on these slides do not reflect official NCSES policies.

# Background

- Large-scale, nationally representative surveys provide essential statistics for the general population
  - E.g., unemployment statistics from the U.S. Bureau of Labor Statistics
- However, these surveys are often long and burdensome, and survey non-response has increased over the years<sup>1</sup>
- Decisions about how to redesign surveys to reduce burden have to take into account
  1. The importance of each question to the stakeholders (e.g., congress, academics)
  2. The burden of each question to the respondents

# Proposed method

- To measure the **importance** of the individual survey items for the stakeholders, we coded documents that use the survey data and other research products for their item use
- To measure **respondent burden**, we looked at time spent on each page in a web survey and breakoff rates to questions
- We then use these measures of importance and burden to propose some ideas for **survey redesign**

# Survey of Doctorate Recipients

- Design: NCSES-sponsored longitudinal survey with a fixed panel design
- Sample:
  - Individuals under the age of 76 who have obtained a Science, Engineering, or Health doctorate from the United States
  - Sampled from Survey of Earned Doctorates (SED)
- Modes: Web, mail, CATI
  - This case study will only be focused on web mode
    - 93% of SDR respondents completed in web
  - Sample size in web mode: 70,770<sup>1</sup>
- No. of items: 202
  - Each option in “select all that apply” questions was considered a separate item

# Other data sources

- To measure item importance:
  - Bibliography of NCSES publications, peer-reviewed journal articles, and other documents that have used SDR variables (information provided by NCSES)
  - Data table download statistics from NCSES's Online Data Tool that provides data users access to SDR variables (information provided by NCSES)
- To measure item burden:
  - Page-level timing and break-off paradata from web respondents to the 2019 SDR cycle

# Method

- Bibliography was coded for their use of SDR variables and number of citations to calculate overall item use and average influence
  - *Average influence* =  $\frac{\text{No.of times item is used}}{\text{Total citations}}$
- The data table download statistics for each variable were summed up
- Items that are displayed on the same page have page-timing averaged
- As it is unclear where the break-off happened, the same page break-off rate is used for all the items on the same page

# Analysis

- Descriptive analysis of item usage, influence, and burden
- We will present:
  - Unused items across the bibliography coded, data table download statistics
  - Most burdensome items according to the web timing and break-off paradata in SDR 2019



# A selection of unused items

Item	Question topic	Time (sec)	Break-off (%)
A33.2	No. of people supervised indirectly	18.2	0
E14	Earliest age of difficulty	16.8	0.2
A29.1	Most important reason for working in an area outside the field of your first U.S. doctoral degree	14.1	0.1
A40A	Year retired	13.2	0
C01	Attend any work-related training	11.7	1
A29.2	Second most important reason for working in an area outside the field of your first U.S. doctoral degree	9.7	0.2
C03	Most important reason for taking training	9.5	0.2
D12	School-related costs paid for by an employer	7.0	0
D08	Enrolled full-time/part-time/not enrolled but taking courses	6.8	0
D07	Enrolled in a college/taking courses on the week of Feb 1, 2019	5.6	0.3
E03.3	Partner's duties on job require technical expertise of a bachelor's degree and above	4.4	0.4

# Recommendations (1)

- For unused items, one can consider either dropping the items from the survey or asking these questions every other year
- The average time to answer these questions is not very long (less than median page time)
- Break-off rates on these pages are low but added together may have an effect on lessening respondent burden

# A selection of the most burdensome items

Item	Question topic	Freq. of use	Avg. influence	Data table download	Time (sec)	Break-off (%)
A06	Duties and responsibilities in the last job	2	26.5	0	96.35	0.6
A20	Duties and responsibilities in the job	14	61.07	0	63.37	4.7
A09	Principal employer in the week of February 1, 2019	20	53.1	24	55.8	4.8
A13	Description of principal employer	4	70	0	30.81	2.5
A44	Total earned income in 2018	12	109.83	6	30.7	3.5
A04	Date last worked for pay or profit	3	12	3	30.37	0.5
A10	No. of people who worked for principal employer	6	72.17	0	30.26	1.9
A05	Title of last job held	3	17.67	0	29.4	0.6
A21	Job category code for current job	27	72.96	33	25	0.2
A07	Job category for last job	3	16	0	25	0.03
D04	Month and year degree awarded	2	2	0	20.74	0.1

# Recommendations (II)

Item	Question topic	Freq. of use	Avg. influence	Data table download	Time (sec)	Break-off (%)
A06	Duties and responsibilities in the last job	2	26.5	0	96.35	0.6
A20	Duties and responsibilities in the job	14	61.07	0	63.37	4.7

- These are open-ended text questions, which explains why they take the longest
- They are also important questions for NCSES and survey data users and need to be kept in the survey
- Knowing that these are burdensome items:
  1. Consider including wording such as, “Your answer to this question is very important...” to motivate respondents
  2. Ask these questions only to respondents who have switched jobs/job titles

# Summary

- Through a combination of examining survey item usage and web question timing and break-off paradata, we identified a few items that can be dropped
- We also identified potentially burdensome items that are important that would benefit from a redesign

# Limitations and future directions

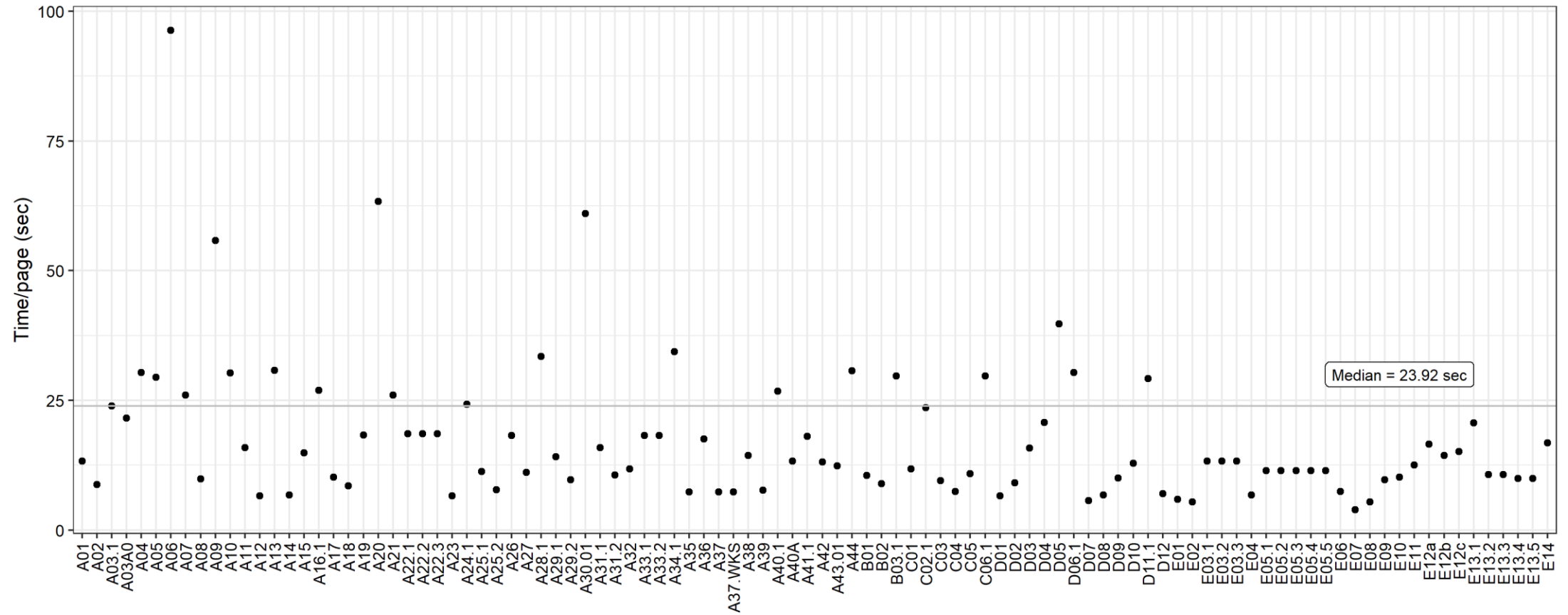
- This method is dependent on having good data on variable use
- Other measures of respondent burden need to be considered, and methods to combine different measures of burden should also be investigated

Thank you!

Ong, Ai Rene

[aireneo@umich.edu](mailto:aireneo@umich.edu)

# Average page timing





# Page break-off rate

