So, you want to do a mixed-mode survey?

Considerations and Design Decisions when Mixing Web and Mail Modes

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AAPOR Webinar
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Mixed-mode surveys are ubiquitous

- Survey practitioners have increasingly turned to self-administered survey modes of data collection, often combining web and mail in a mixed mode study (e.g., Olson, et al. 2020).

- There are many ways to mix survey modes.

- There are many ways to design self-administered surveys.

- We will cover 3 main takeaways today with mixed-mode studies.

Main points for today

- Takeaway #1: Mail surveys still matter.
- Takeaway #2: Make participation in a mode easy. Communicate about that mode clearly.
- Takeaway #3: Selecting someone in the household is important.

Frames influence the decision to use postal mail as a contact mode vs. participation mode

- Address-based samples
  - Good for general population surveys. Use the USPS Delivery Sequence File as the frame. Addresses are main unit.
  - For (more) complete coverage, must start with a mailed recruitment letter. Telephone numbers can be added, but has incomplete coverage.
- List samples
  - Good for special population surveys. Use a list of known members of a group, including employees, students, professional association members, administrative records.
  - Contact information determines modes of recruitment. May have addresses and/or email addresses and/or telephone numbers.
- Pre-recruited panels or past studies
  - Frame includes persons who have already agreed to be part of a study (and thus inherits all of the coverage and nonresponse issues).

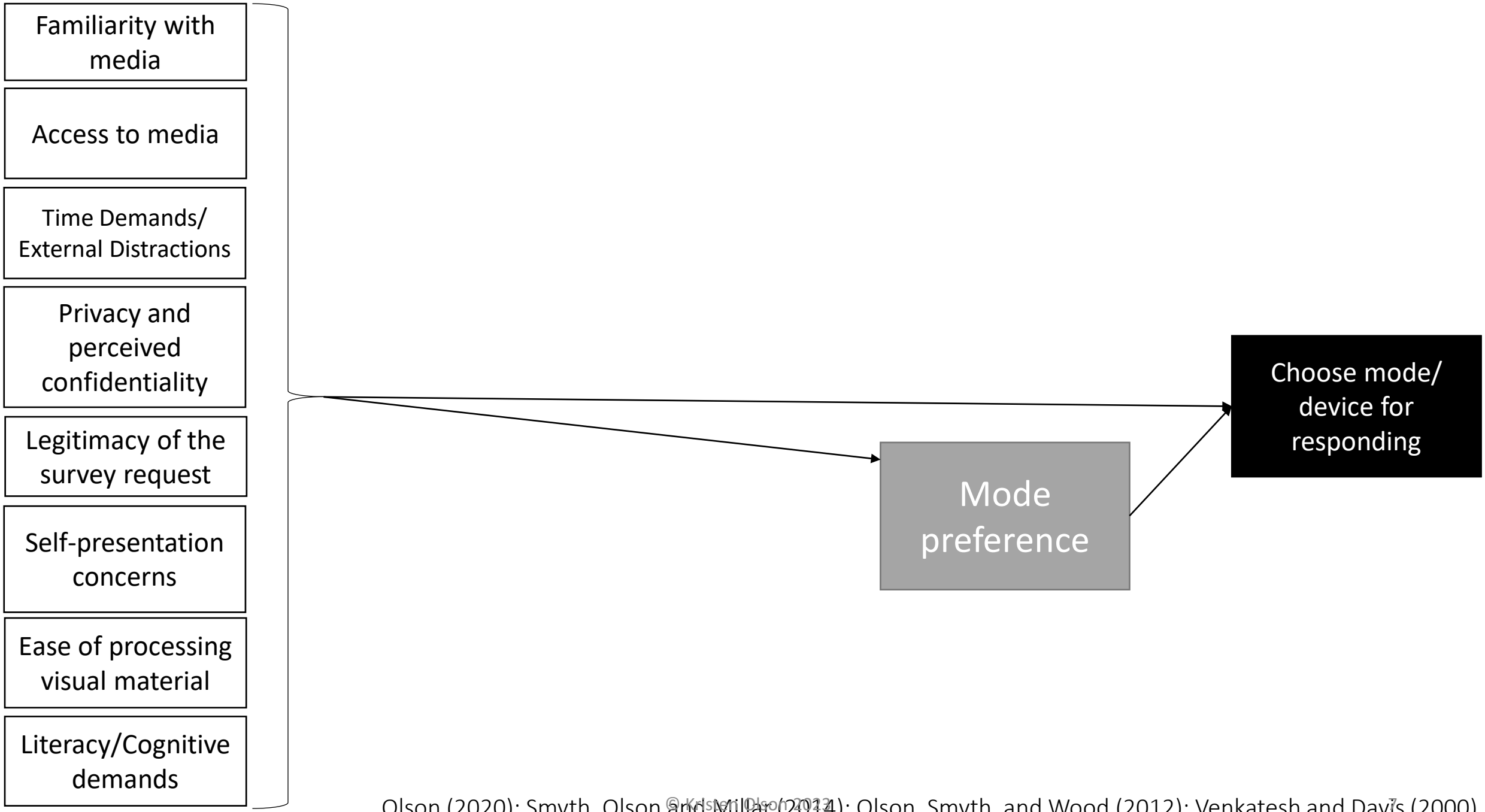
Mail recruitment doesn't necessarily mean mail participation.

- Single mode: Mail only or web only

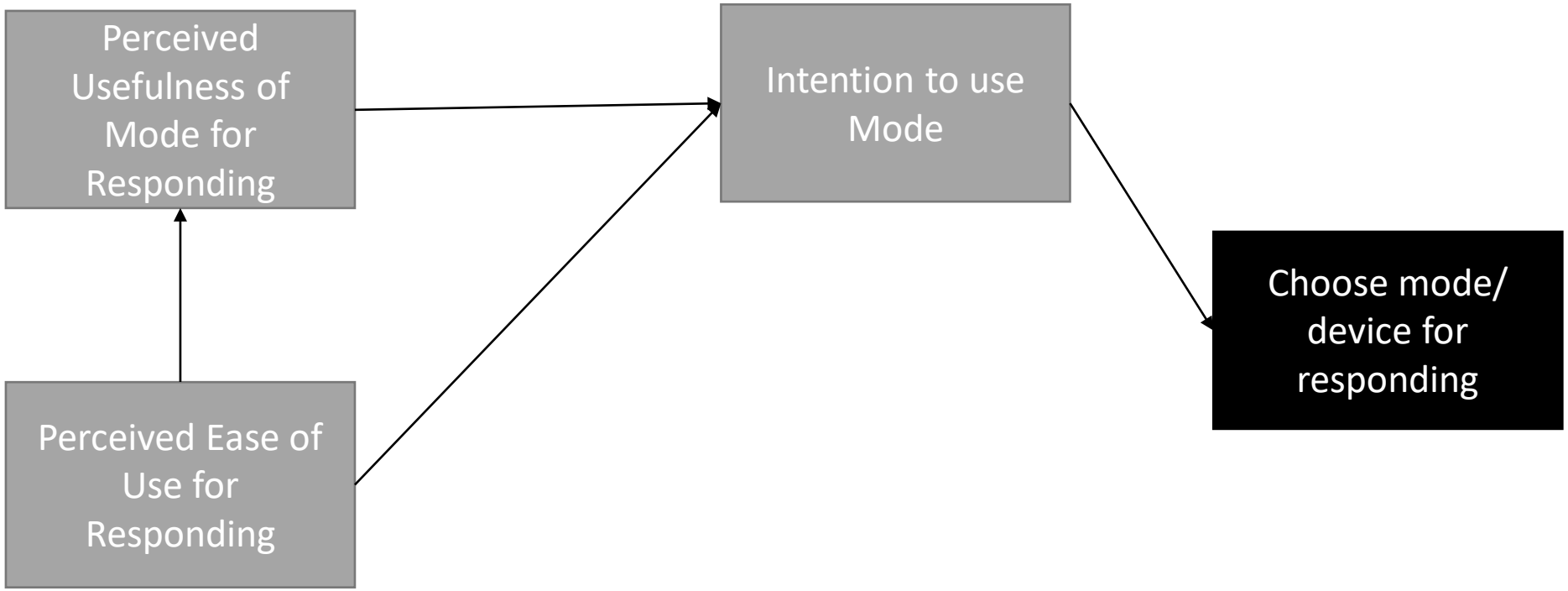
- Sequential mixed mode: Mail → web; Web → mail

- Concurrent mixed mode: Mail and web at the same time

But why might different people choose to participate with different modes?



Olson (2020); Smyth, Olson and Millar (2014); Olson, Smyth, and Wood (2012); Venkatesh and Davis (2000)



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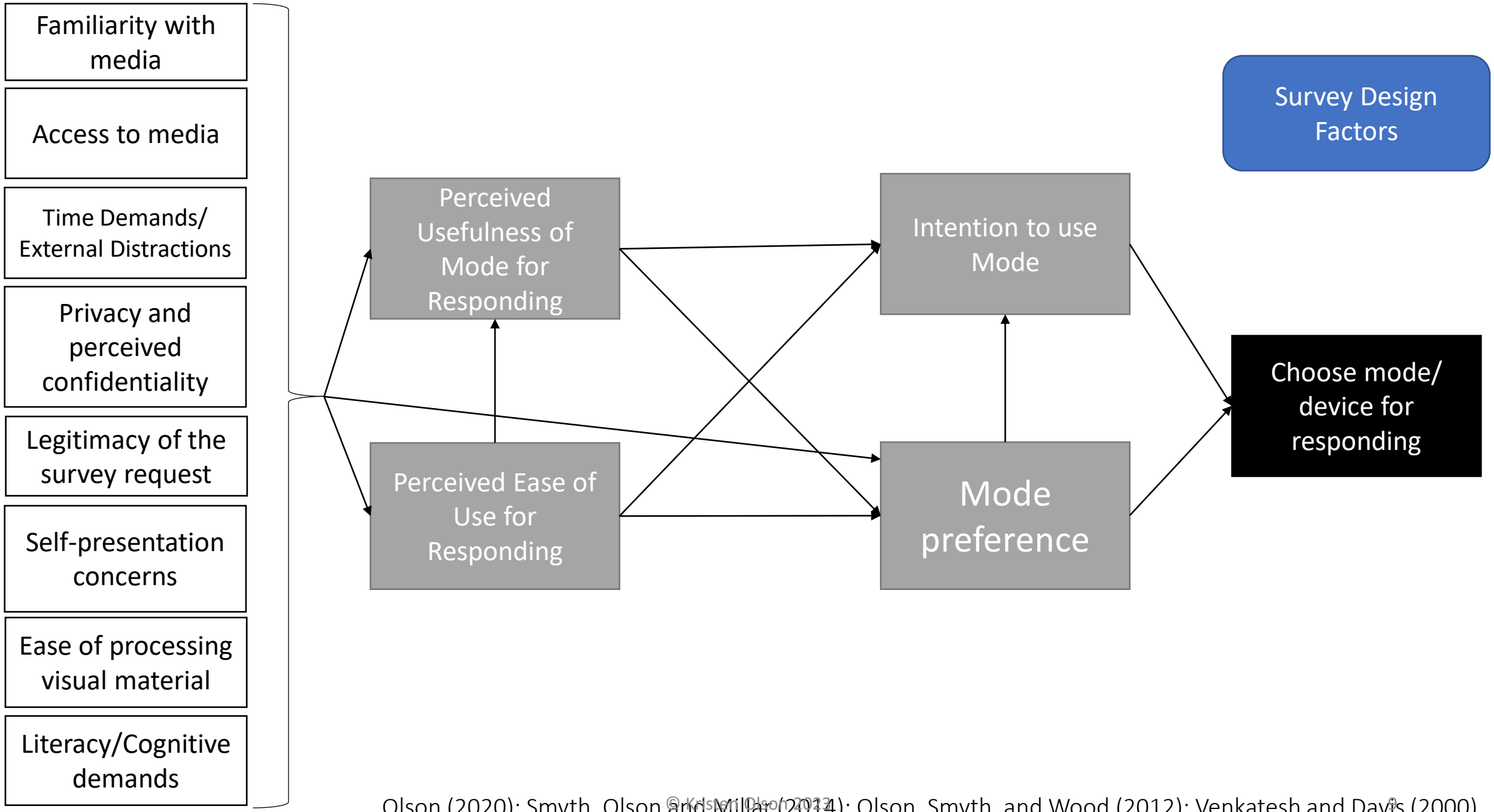

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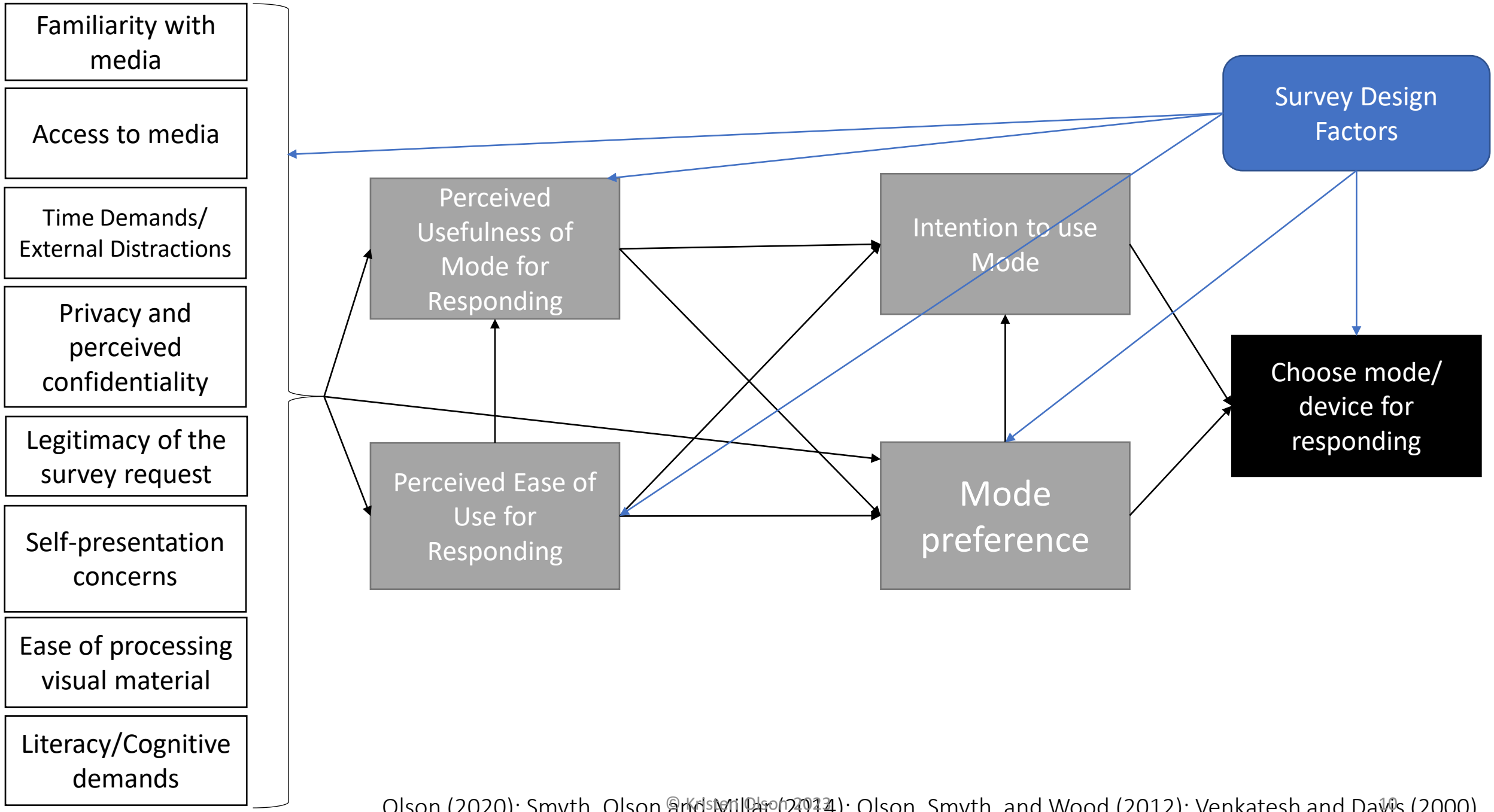

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Why does a theoretical framework for modes matter?

- Different design factors may act on perceived usefulness or perceived ease of using the mode
- Different design factors may modify the influence of preexisting respondent characteristics
- This decision may be reevaluated at each contact attempt
  - Especially if different modes are introduced across contact attempts

Which modes in what order?

- Early work indicated that concurrent mixed-mode web and mail designs yielded lower response rates than mail-only surveys (e.g., Medway and Fulton 2012).
  - Suggesting that mail should be used over concurrent mixed-mode designs.

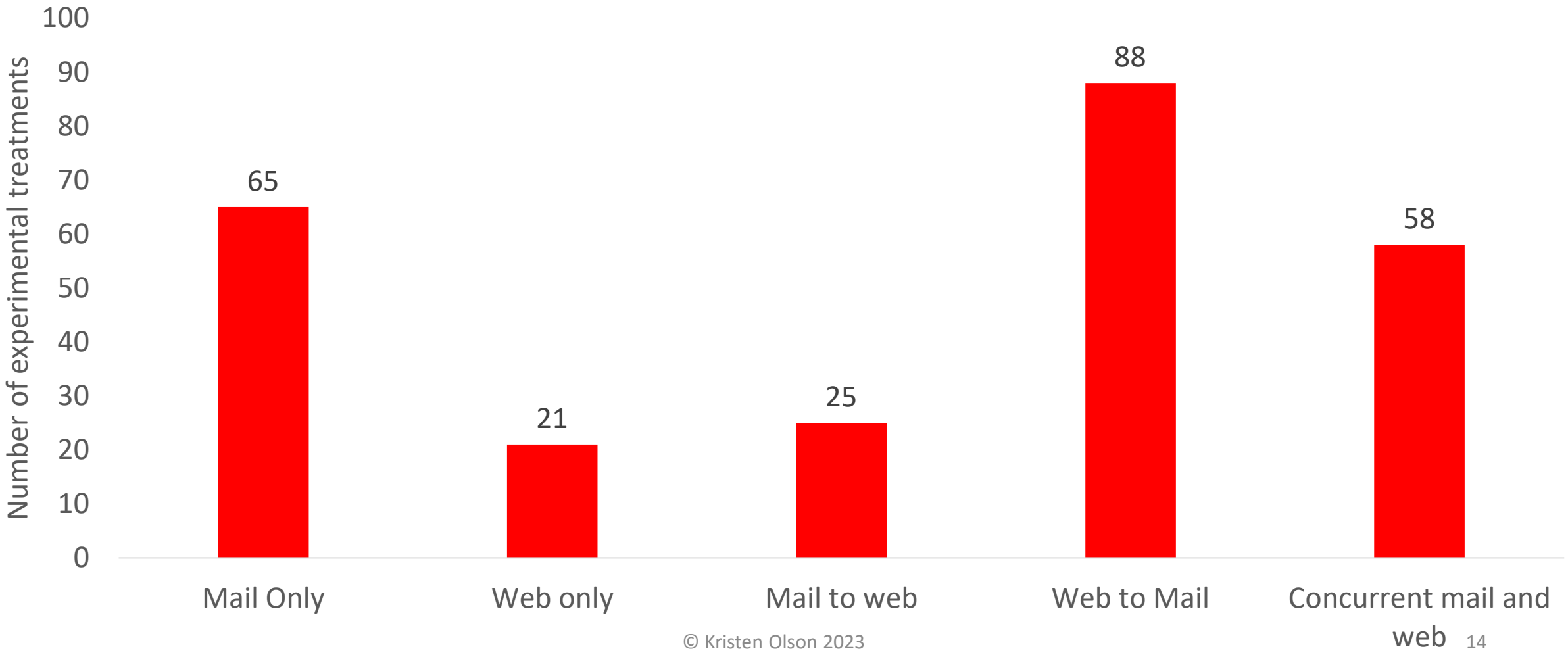
- But, there is pressure to incorporate web into our designs. As a result, sequential mixed-mode designs (sometimes called web-push or push-to-web) are often used (e.g., Dillman, Smyth, and Christian 2014).

- What evidence exists about mode combinations that are in use today?

Meta-Analysis (ongoing work!)

- Quantitative summary of existing studies that are experimental comparisons of mixed-mode self-administered surveys
- What do we mean by mixed mode?
  - Some sample members must have had the option of completing either mail surveys or web surveys at some point during the data collection, offered at the same time or not
  - Must include an experimental comparison that includes a **mail** and **web** mixed-mode condition to a single-mode mail or single-mode web or different mixed-mode (web and mail) condition
  - Exclude mixed-mode designs that use interviewers only in one of the modes (e.g., web/F2F vs. F2F)
  - Largely focus on surveys of people (not establishments)
- 58 papers
  - Each paper can have multiple studies
  - Each study can have multiple treatments, including for the same mode assignment
  - 257 treatments
- Coded outcomes and design features - Still in progress!

Systematic Review: What modes have been examined across 58 papers and 257 experimental treatments?



Takeaway #1: Mail surveys still matter.

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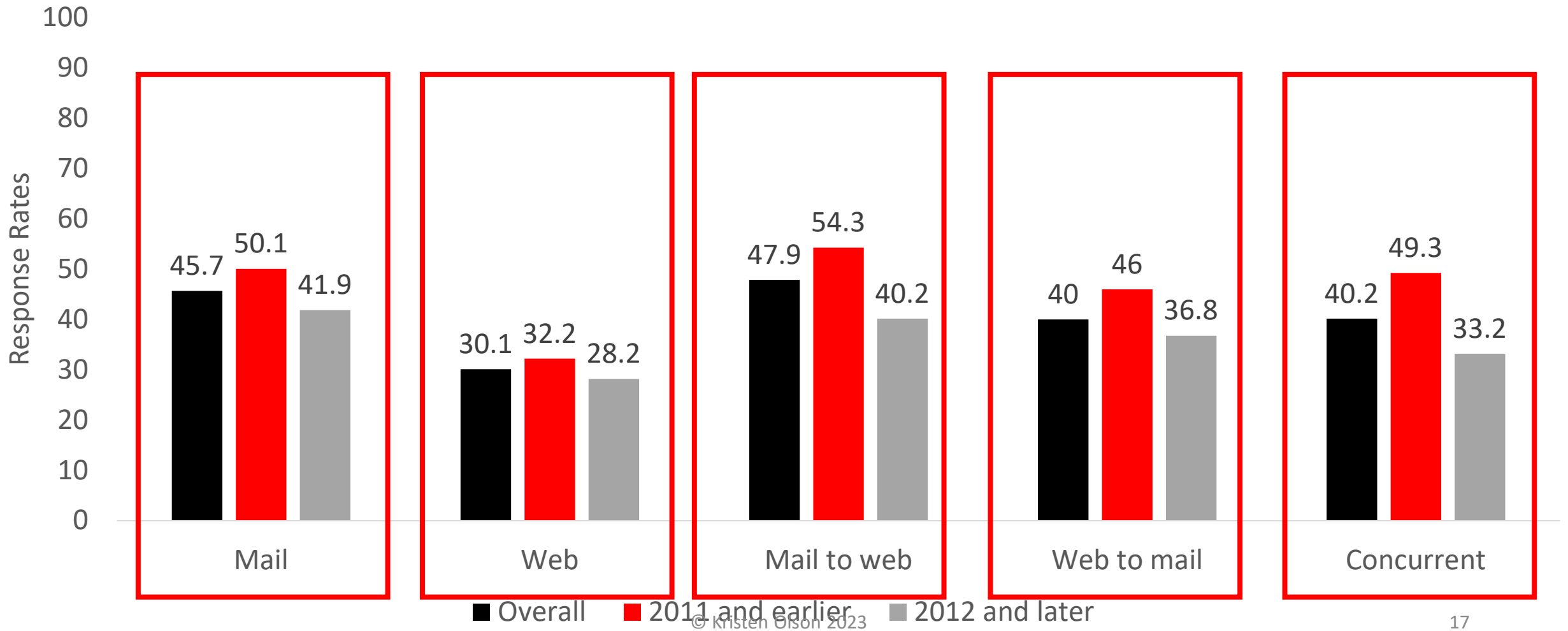
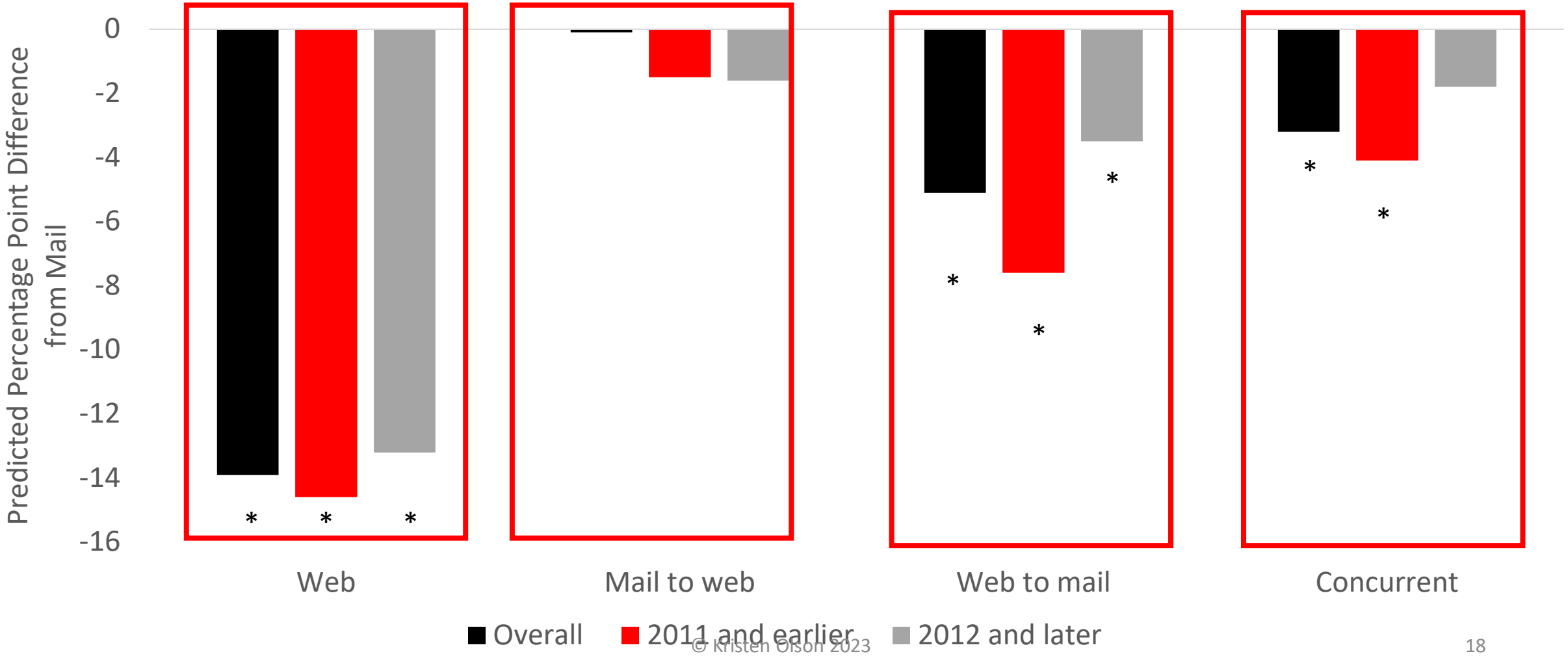
- Response rates for mode combinations that contain or start with mail are higher than web surveys alone or those that start with web.

- Representation is similar across mode combinations for demographic characteristics. Web surveys differ from mode combinations that contain mail on direct measures of familiarity and access to media.

Meta-Analysis: Mail only and mail-to-web have the highest response rates, followed web-to-mail and concurrent mixed mode designs, followed by web only. All have decreased.



Meta-Analysis: Accounting for the combinations of modes studied in the same experiment….



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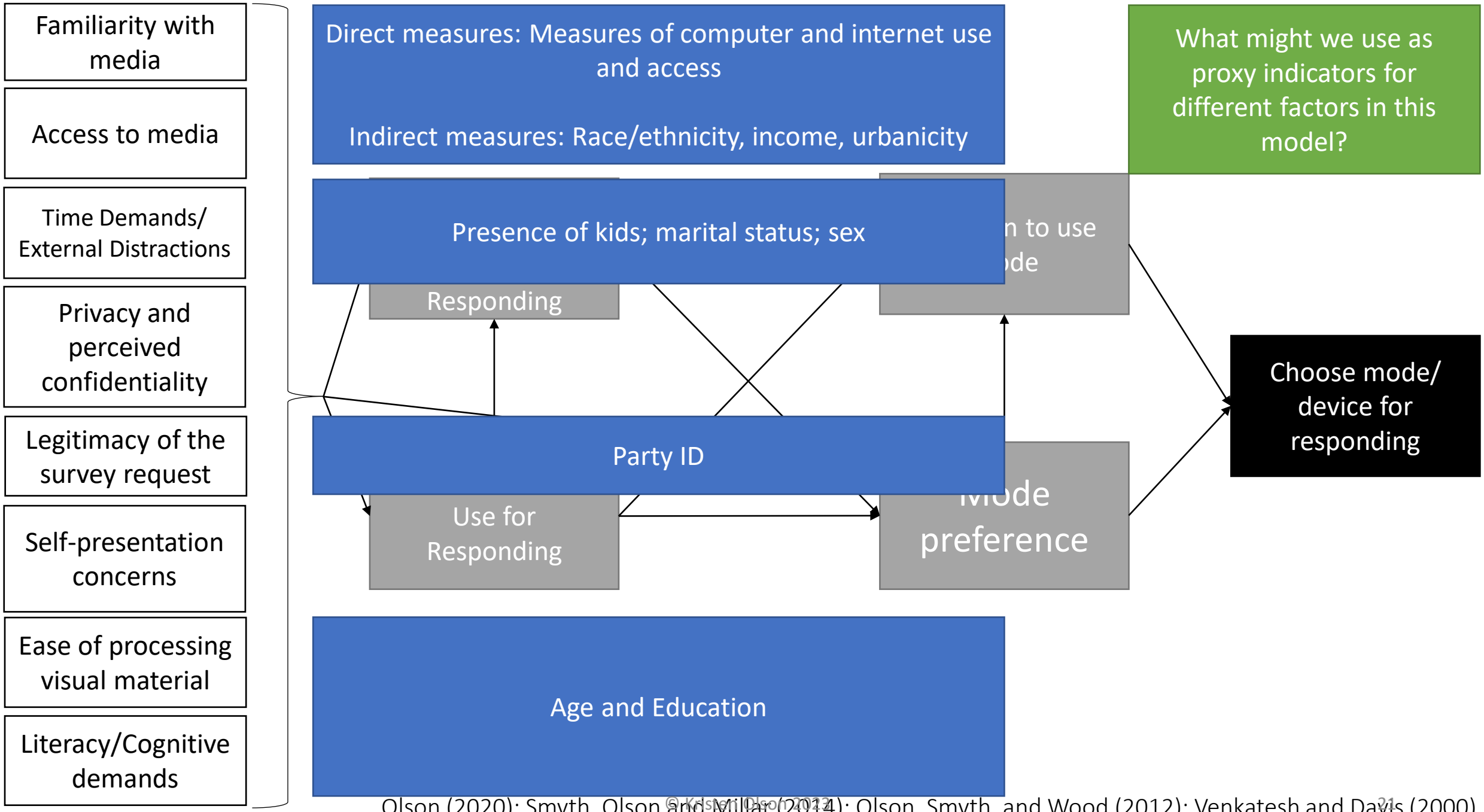

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Evaluating representivity: Comparing categorical variables to ACS population values

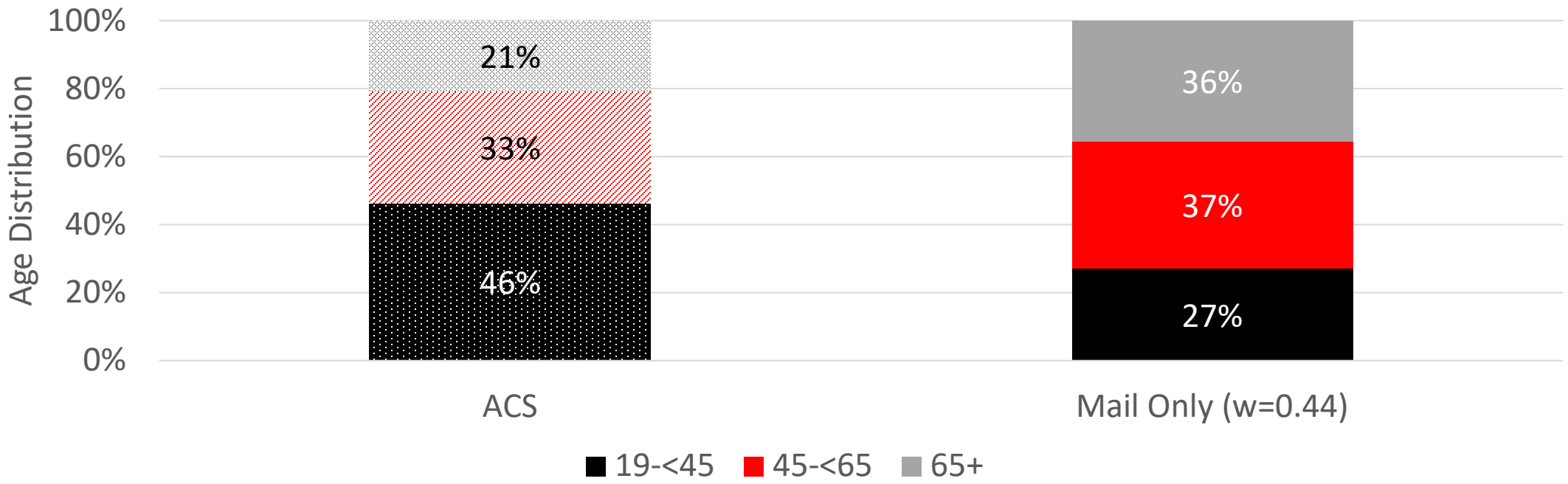
- Cohen's w (Cohen, 1988; p. 216+) as measure of consistency for the survey data (p_{1i}) with ACS data (p_{0i}) (smaller is better; small deviations from benchmark=0.1; medium=0.3; large=0.5)

Base weighted survey estimate

$$\omega = \sqrt{\sum_{i=1}^{m} \frac{(p_{1i} - p_{0i})^2}{p_{0i}}}$$

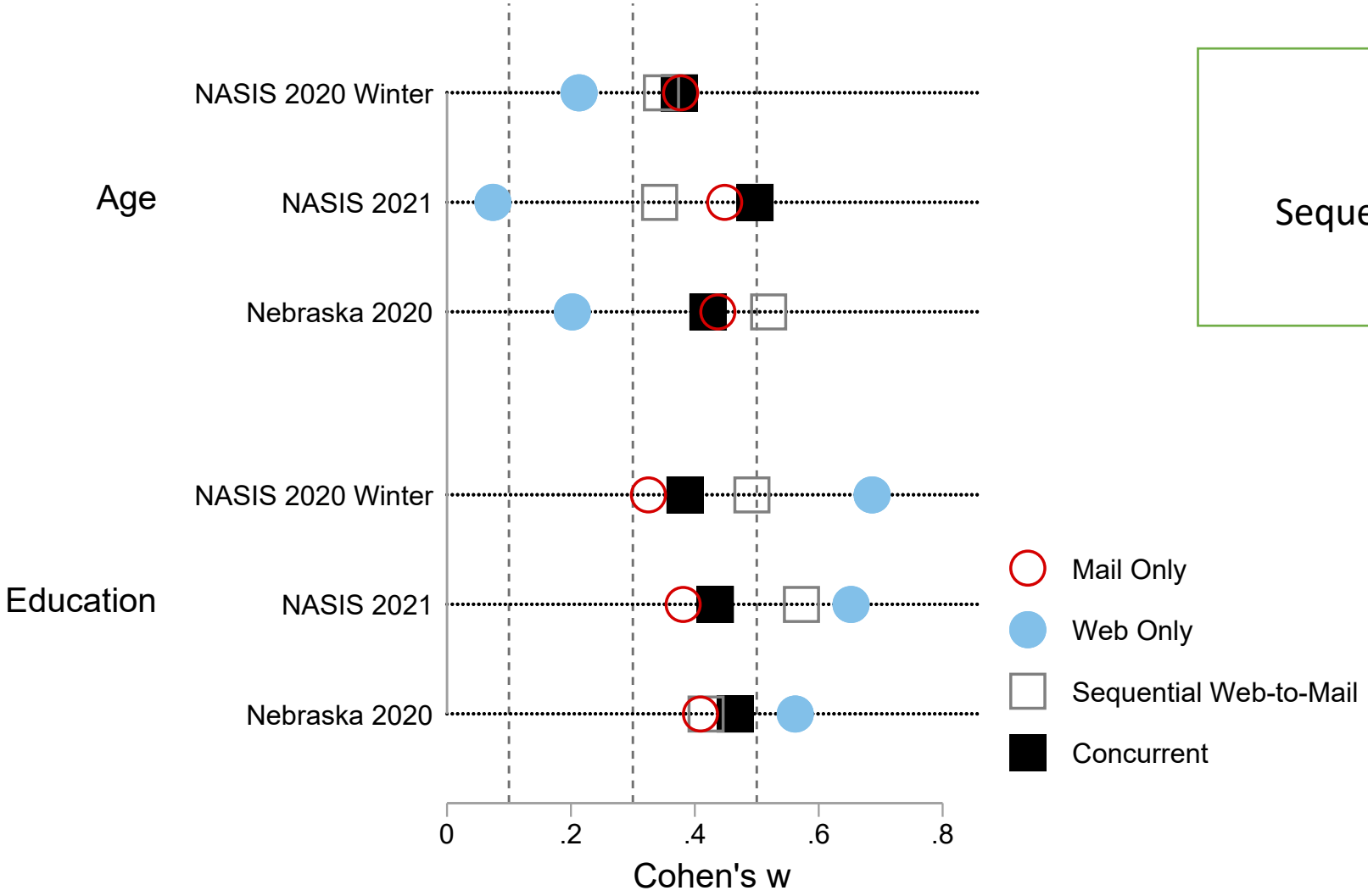
ACS estimate

Example: Calculating Cohen's ω



$$\omega = \sqrt{\frac{(0.36-0.21)^2}{0.21} + \frac{(0.37-0.33)^2}{0.33} + \frac{(0.27-0.46)^2}{0.46}} = \sqrt{0.191} = 0.44$$

Cognitive Abilities



Mail only: 0.396
Web only: 0.398
Sequential Web-to-Mail: 0.448
Concurrent: 0.429

	Mail Only	Web Only	Sequential Web-to-Mail	Concurrent
Access: Direct Measures	**0.112**	0.208	0.131	**0.115**
Access: Indirect Measures	0.189	0.182	0.174	**0.161**
Time Demands	0.191	0.197	**0.184**	0.193
Cognitive Abilities	**0.396**	**0.398**	0.448	0.429
Legitimacy	**0.078**	0.119	0.105	0.200
Overall	**0.191**	0.218	**0.199**	**0.197**

What do we know about representation?

- Representation is strikingly similar across single- and mixed-mode combinations for demographic characteristics.

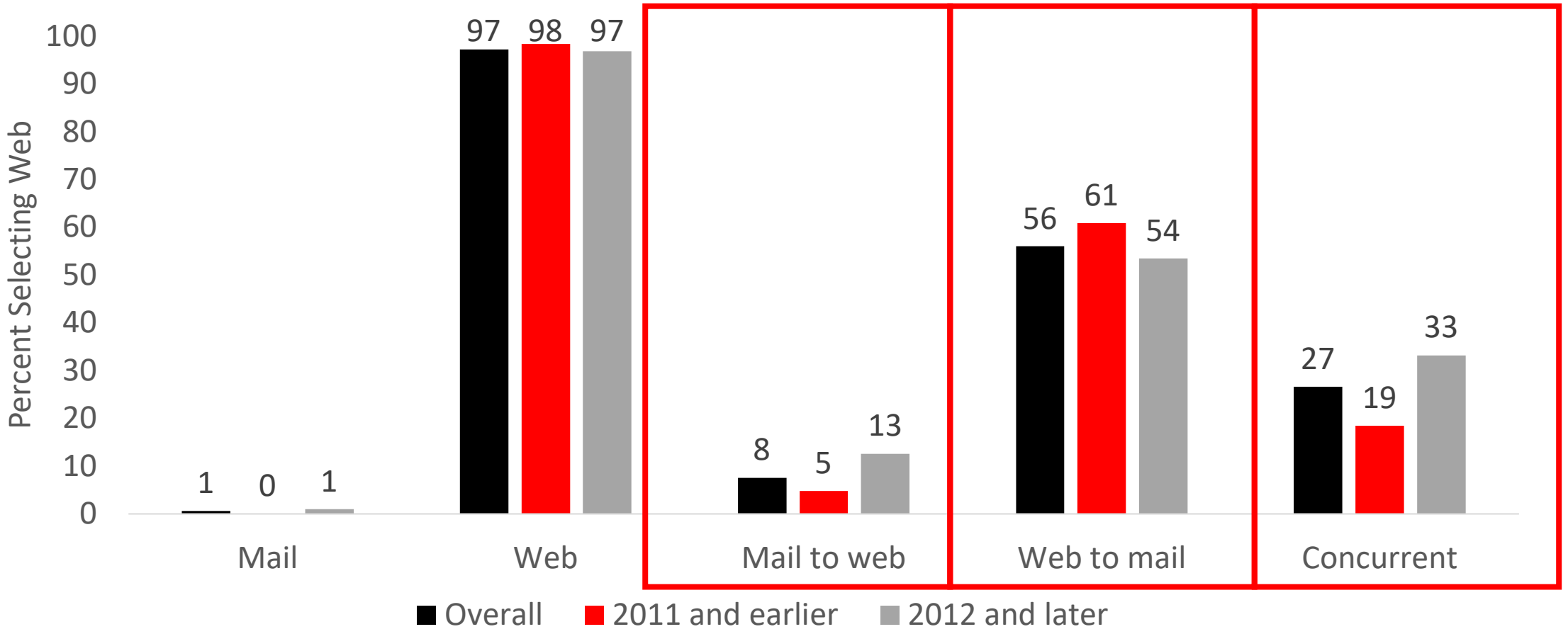
- Web surveys alone differ from mode combinations that contain mail on direct measures of familiarity and access to media.

- Other estimates may differ.

If mail is so great, why use web?

Cost!

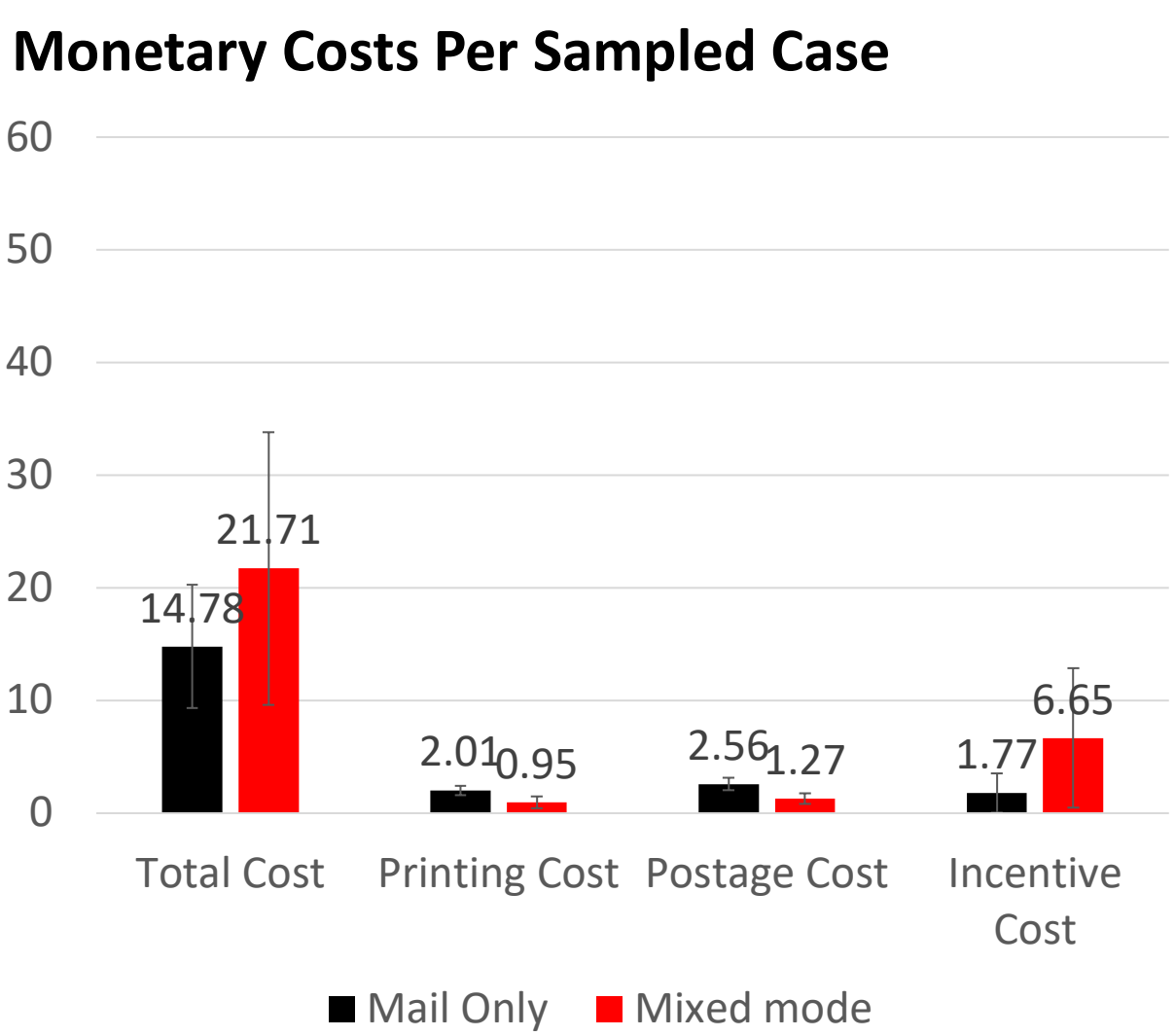
This pattern is seen in the meta-analysis.

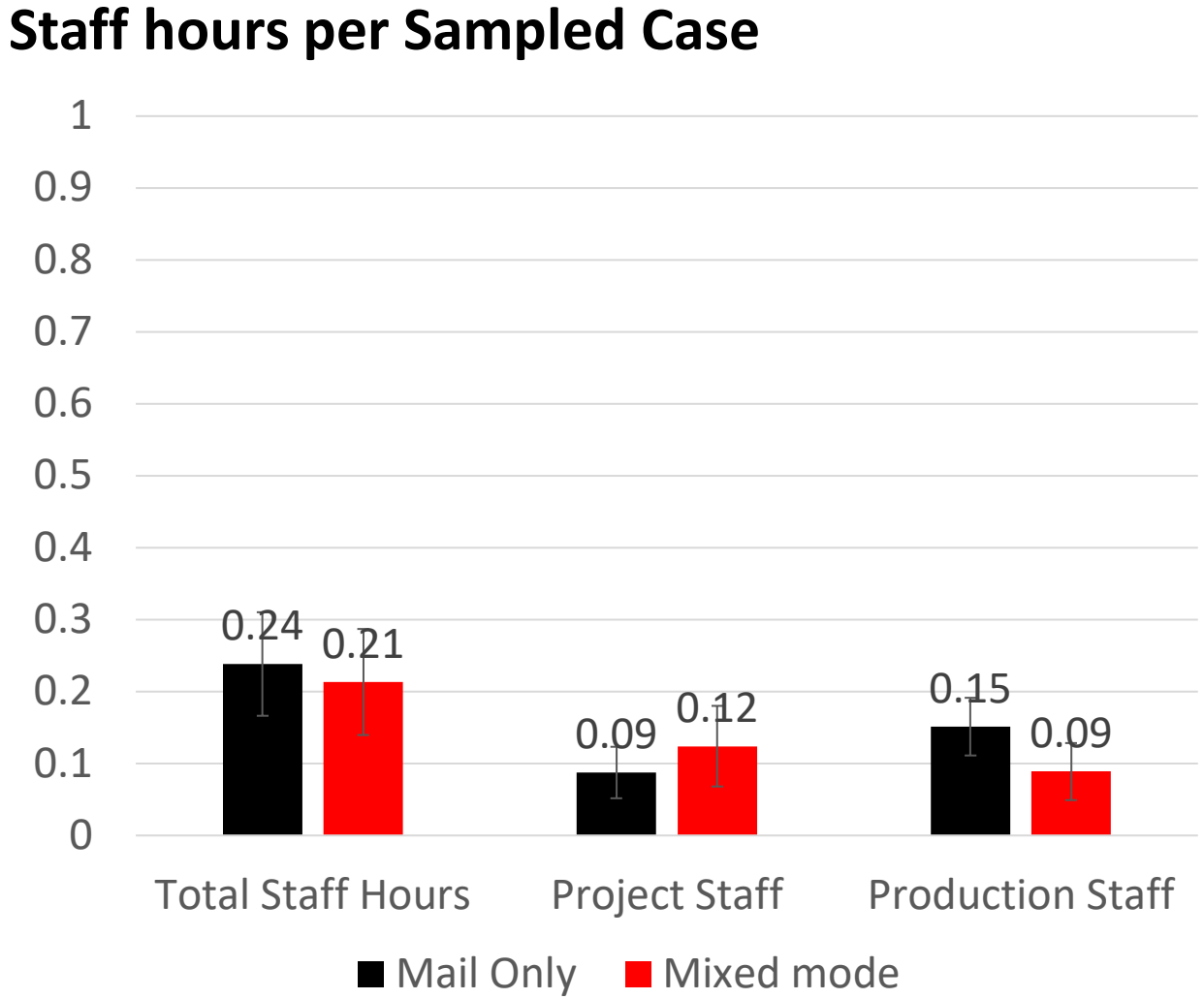


Some actual cost data

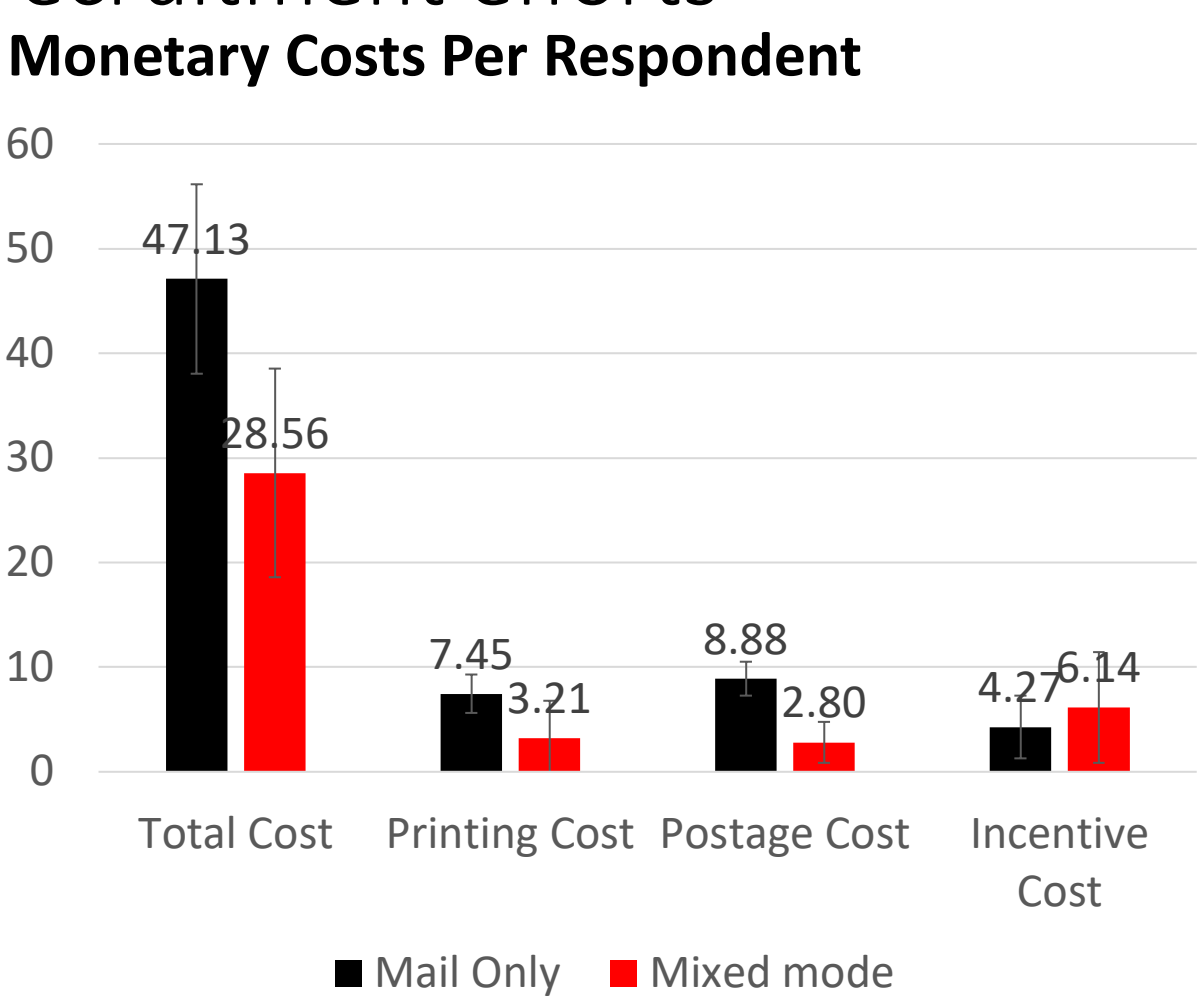
- Administrative data from self-administered studies at two Midwest academic survey research centers on 37 mail or mixed-mode surveys with at least one mailed contact attempt conducted between January 1, 2018 and December 31, 2019
  - Bureau of Sociological Research at the University of Nebraska-Lincoln
  - University of Wisconsin Survey Center at the University of Wisconsin-Madison
- Similarities
  - Located at state universities in the Midwest; serve multiple faculty, state, and community clients; conduct surveys in multiple modes with varying designs
- Differences
  - Salary structure and cost of living differences; printing and mailing differences (e.g., outsourced printing; stamps vs. business-reply envelopes); constraints on use and amount of incentives; unmeasured differences in study complexity
- Monetary cost measures: Total costs, Printing costs, Postage costs, Incentive costs
- Nonmonetary cost measures: Total staff hours, Project staff hours, Production staff hours
- “Standardize” costs across studies by calculating costs per sampled case and costs be responding case

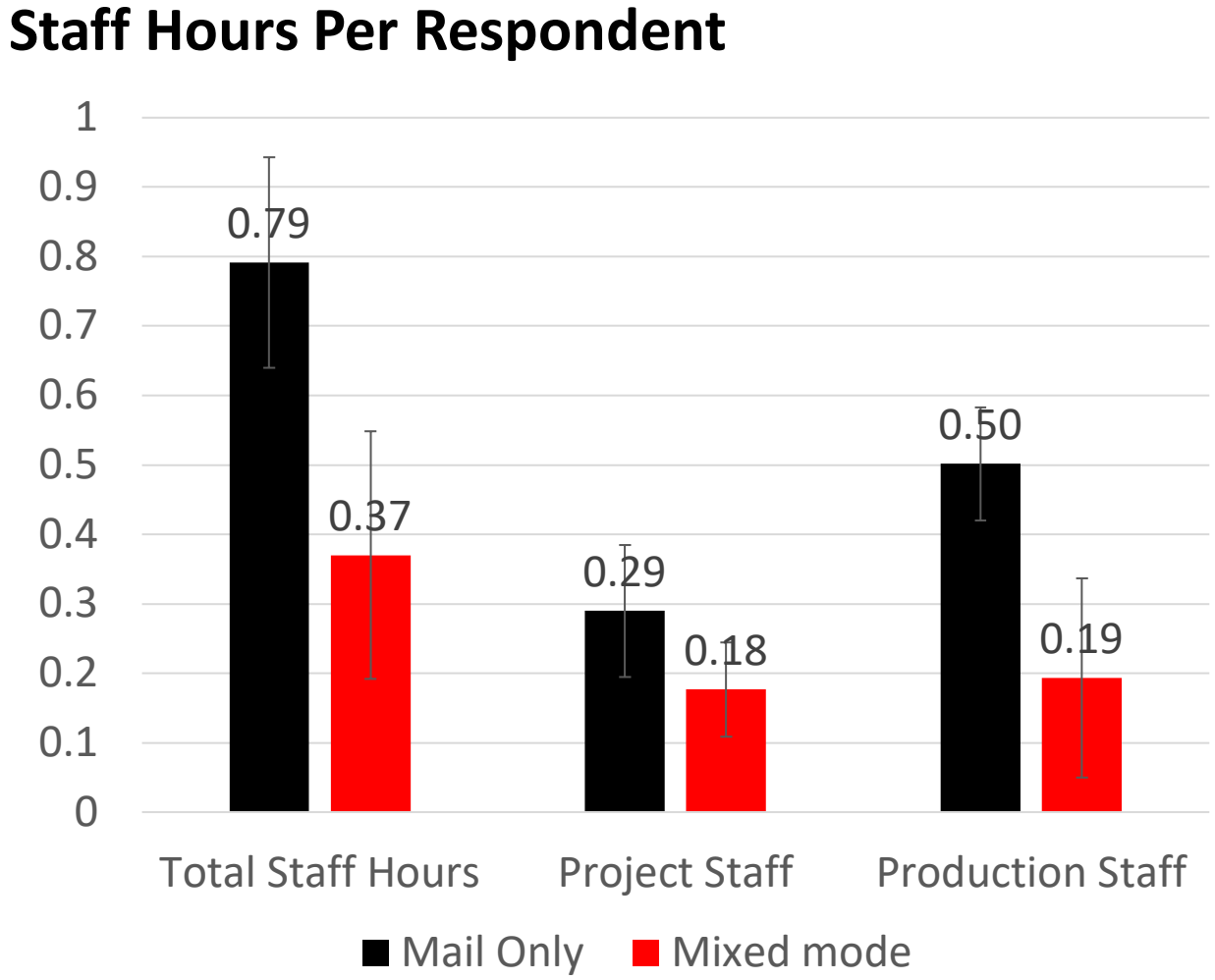
Costs per sampled case are similar for mail-only and mixed-mode surveys





Costs per respondent are lower for mixed-mode surveys, largely because of reallocation of budget to incentives or other recruitment efforts





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- Response rates for mode combinations that contain or start with mail are higher than web surveys alone or those that start with web.

- Representation is similar across mode combinations for demographic characteristics. Web surveys differ from mode combinations that contain mail on direct measures of familiarity and access to media.

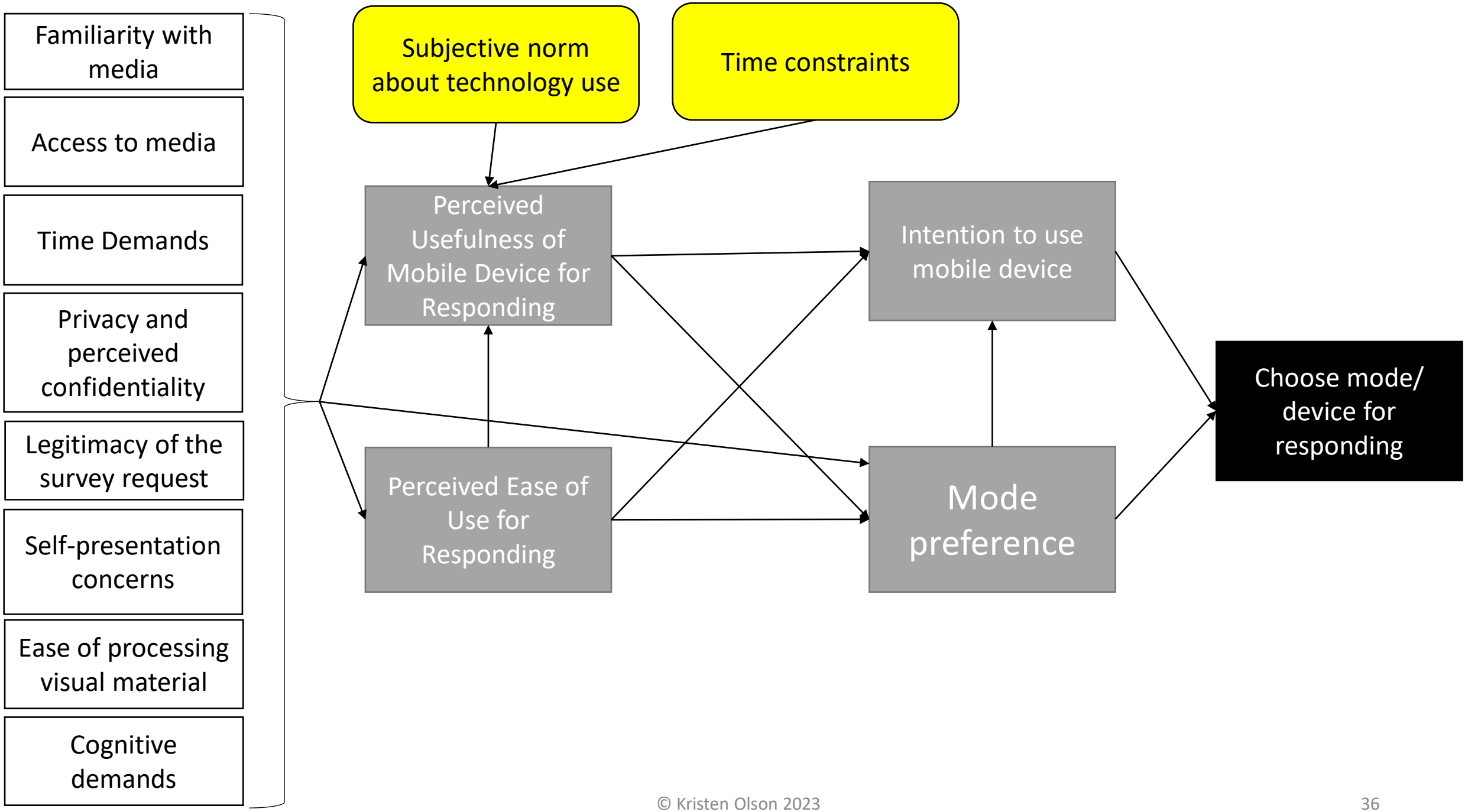
- Costs are lower per complete, although the total budget may not differ.

Takeaway #1: Mail surveys still matter.

Takeaway #2: Make participation in a mode easy. Communicate about that mode clearly.

Takeaway #2: If we want people to go on the web, then make web survey access information clear and motivated.

- People don’t necessarily read cover letters. But sometimes they do.
- Methods to increase web participation may not shift overall participation rates or who participates.
- The framing and visibility of the mode information may change the proportion of people who participate in different modes or devices.



	Mailing 1: Postal mail invitation to web survey March 8, 2017	Mailing 2: Postal mail invitation to web survey March 22, 2017	Mailing 3: Postal mail invitation to web survey plus enclosed mail questionnaire April 10, 2017
Busy push	**Because many people have busy lives that take them away from access to a computer at home**, we have optimized this survey to be taken on mobile devices.	**We know that people are busy these days.** To give you the most flexibility and make the survey as easy as possible **for people on the go or with lots of demands on their time**, we have optimized this survey to be taken on mobile devices.	We hope that the enclosed mail survey makes it easy for you to complete this questionnaire **on the go or wherever your time takes you.**
Tech push	**Because so many Nebraskans have access to the internet on a smartphone or tablet**, we have optimized this survey to be taken on mobile devices.	**We know that Nebraskans have many different ways of accessing the internet.** To give you the most flexibility and make the survey as easy as possible **for people with any type of technology**, we have optimized this survey to be taken on mobile devices.	We hope that the enclosed mail survey makes it easy for you to complete this questionnaire **when you are away or don't have easy access to the internet**.

University of Nebraska Lincoln

<DATE>
<CITY> Resident
<ADDRESS>

Dear <CITY> Resident,

We are writing today to ask for your help with an important statewide survey at
your community and in Nebraska today. This survey is being conducted by res
Nebraska-Lincoln with the goal of gaining a better understanding of what Nebr
of important community resources and issues facing the state today. The only w
is to hear the experiences and opinions of people like you.

Your household was one of a small portion of Nebraska households randomly s
survey. To assure that we have heard from people of all types, we ask that the a
household who will have the **next birthday** complete the enclosed survey.

To access this survey, please go to the link listed below and enter your unique i

Survey link: <WEB_SURVEY_LINK>
Unique identification number: <UNIQUE_ID>

Because many people have busy lives that take them away from access to a con
optimized this survey to be taken on mobile devices. Of course, it can be easily
laptop computer as well.

Participation in the survey is voluntary, but will help us understand this importa
you about 15 minutes to complete this survey. The answers you provide will be

If you have any questions or would like more information about this study, plea
4549 or by email at bosr@unl.edu. This study has been approved by the UNL I
(XXXX; irb@unl.edu; 402-472-6965).

Thank you in advance for participating in this study. We look forward to receiv
you enjoy answering the questionnaire.

Sincerely,

Jolene Smyth
Director, Bureau of Sociological Research

University of Nebraska Lincoln

BUREAU OF

<DATE>
<CITY> Resident
<ADDRESS>

Dear <CITY> Resident,

We recently sent your household a request to help with an important statewide survey a
going in your community and in Nebraska today. This survey, the Community Values a
Nebraska Survey, asks about a wide range of topics that we think are important to Nebr
researchers have been asking Nebraskans about some of these topics for over 30 years.
continue to understand how Nebraskans feel about the important issues facing your con
hear what you think about these topics, whether or not you feel strongly about them.

Your household was one of a small portion of Nebraska households randomly selected
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Sincerely,

Jolene Smyth
Director, Bureau of Sociological Research

University of Nebraska Lincoln

BUREAU OF SOCIOLOGICAL RESEARCH

Department of Sociology
907 Oldfather Hall
P.O. Box 880325
Lincoln, NE 68588-0325
(402) 472-3672
FAX (402) 472-4568
1-800-480-4549
Email: bosr@unl.edu

<DATE>
<CITY> Resident
<ADDRESS>

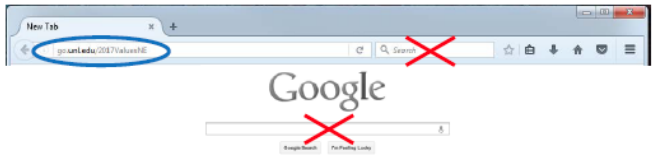
Dear <CITY> Resident,

We recently sent your household a request to help with the Community Values and Opinions in Nebraska Survey. We haven't yet heard from your household. Because hearing from your household is important to our study, we have enclosed a mail version of the questionnaire in case this is easier for the **person with the next birthday** (age 19 or older) in your household to complete. We hope that the enclosed mail survey makes it easy for you to complete this questionnaire on the go or wherever your time takes you.

The survey is also still available to complete online. To access this survey, please go to the link listed below and enter your unique identification number:

Survey link: <WEB_SURVEY_LINK>
Unique identification number: <UNIQUE_ID>

A few people called to say that they are unable to find the web survey. We learned most had accidentally put the address into the Google, Yahoo, or Bing search bar. Here's an example of where the address should and should not go:



The survey is also optimized to be taken on mobile devices or can be easily completed on a desktop or laptop computer.

Participation in the survey is voluntary, but will help us understand this important topic. It should only take you about 15 minutes to complete this survey. The answers you provide will be kept confidential.

If you have any questions or would like more information about this study, please contact me at 1-800-480-4549 or by email at bosr@unl.edu. This study has been approved by the UNL Institutional Review Board (20161216 11EX; irb@unl.edu; 402-472-6965).

Thank you in advance for participating in this study. We look forward to receiving your responses and hope you enjoy answering the questionnaire.

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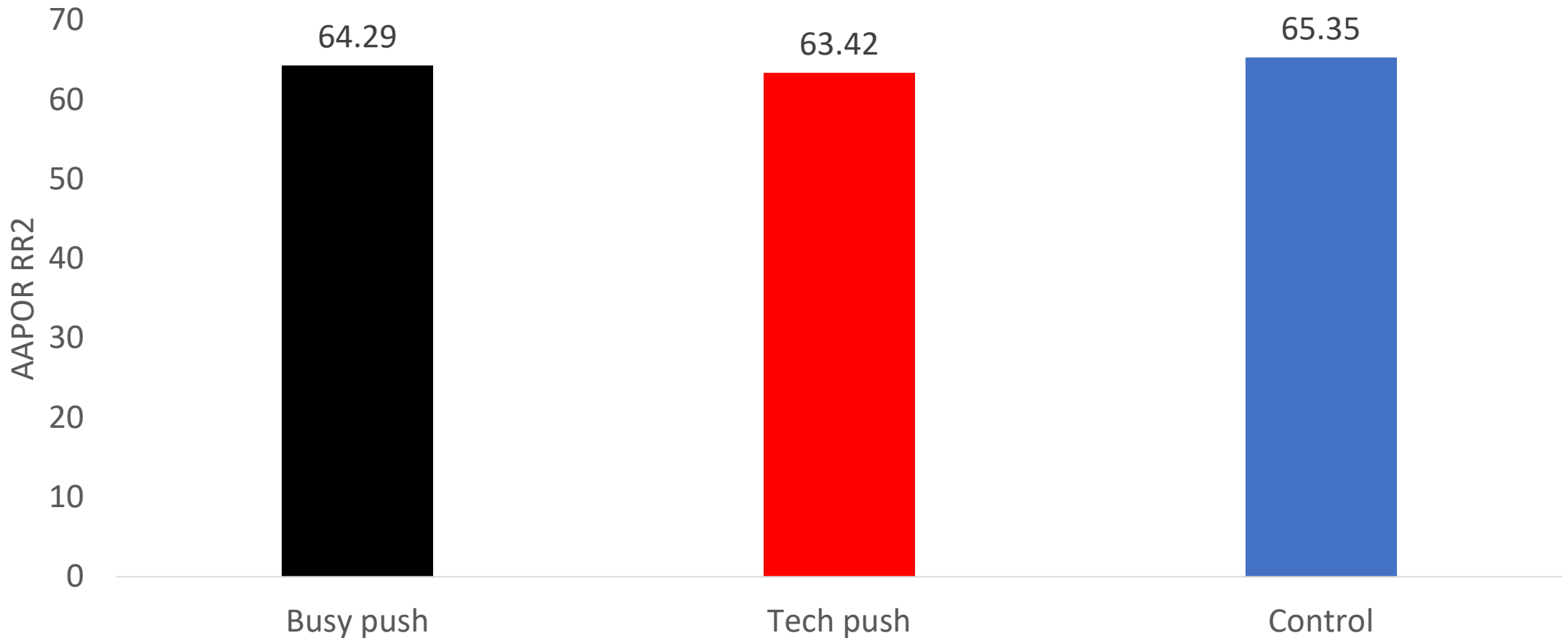
Jolene D. Smyth

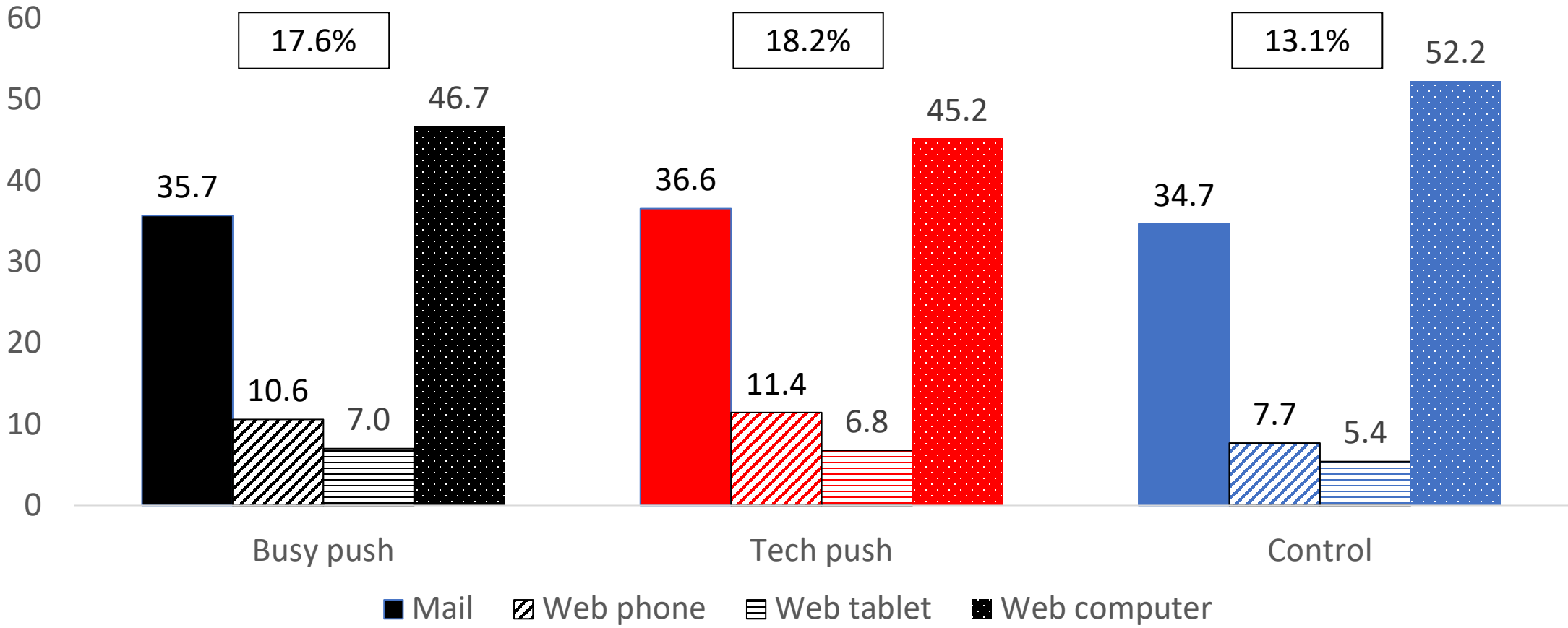
Jolene Smyth
Director, Bureau of Sociological Research

No difference in the % of respondents who responded by web.



χ^2=0.74, p=0.689

But, more people participated via mobile devices in the busy and tech pushes than the control condition.



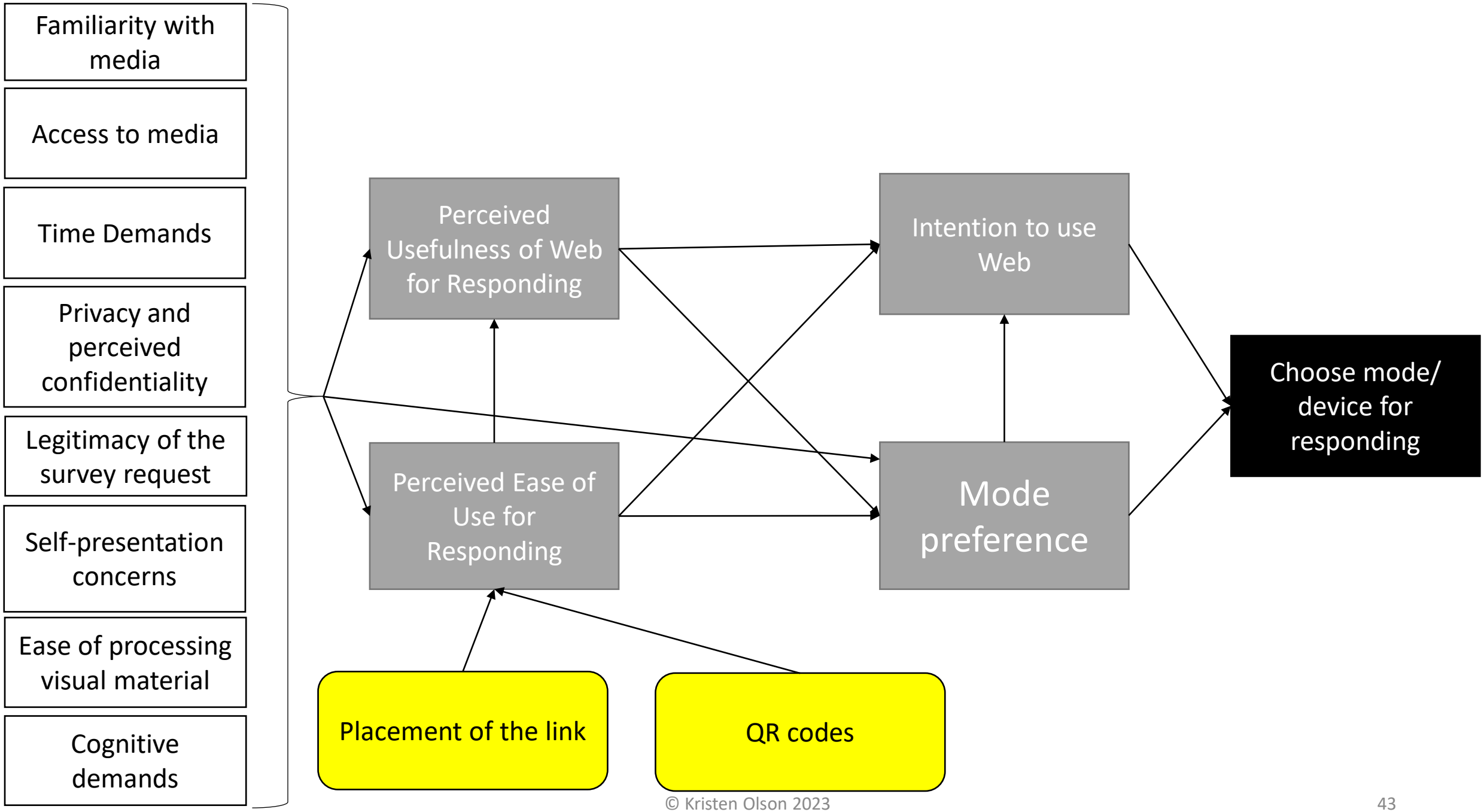
χ^2=14.65, p=0.023

Any effect of the framing on sample composition?

- Time demands variables: No difference on 7 different variables
- Technology access variables: No differences on 5 variables; small differences on 2 variables
- Technology familiarity: No difference on 5 variable, small difference on 1 variable

What do we learn from emphasizing mobile optimization?

- Emphasizing the ability to complete the survey on a mobile device increases proportion of respondents who do so
- It doesn't necessarily bring in people who only have internet access through their phone.
- We may want to encourage this kind of response for some types of surveys (e.g., ecological momentary assessments), but not others



Greater Omaha Labor Availability Survey

Bureau of Sociological Research
University of Nebraska – Lincoln

Remember, you can complete this survey online!

To complete this survey on the web, go to https://go.unl.edu/laboromaha
Enter your unique identification number: [ID]

NEBRASKA Good Life. Great Opportunity. | DEPARTMENTS OF LABOR & ECONOMIC DEVELOPMENT | GREATER OMAHA CHAMBER

Start here

Are you the adult age 19 or older in your household who will have the next birthday?

- ○ Yes ⟶ Please continue.
- ○ No ⟶ Please have the adult in your household who will have the next birthday complete the survey.

Greater Omaha Labor Availability Survey

Bureau of Sociological Research
University of Nebraska – Lincoln

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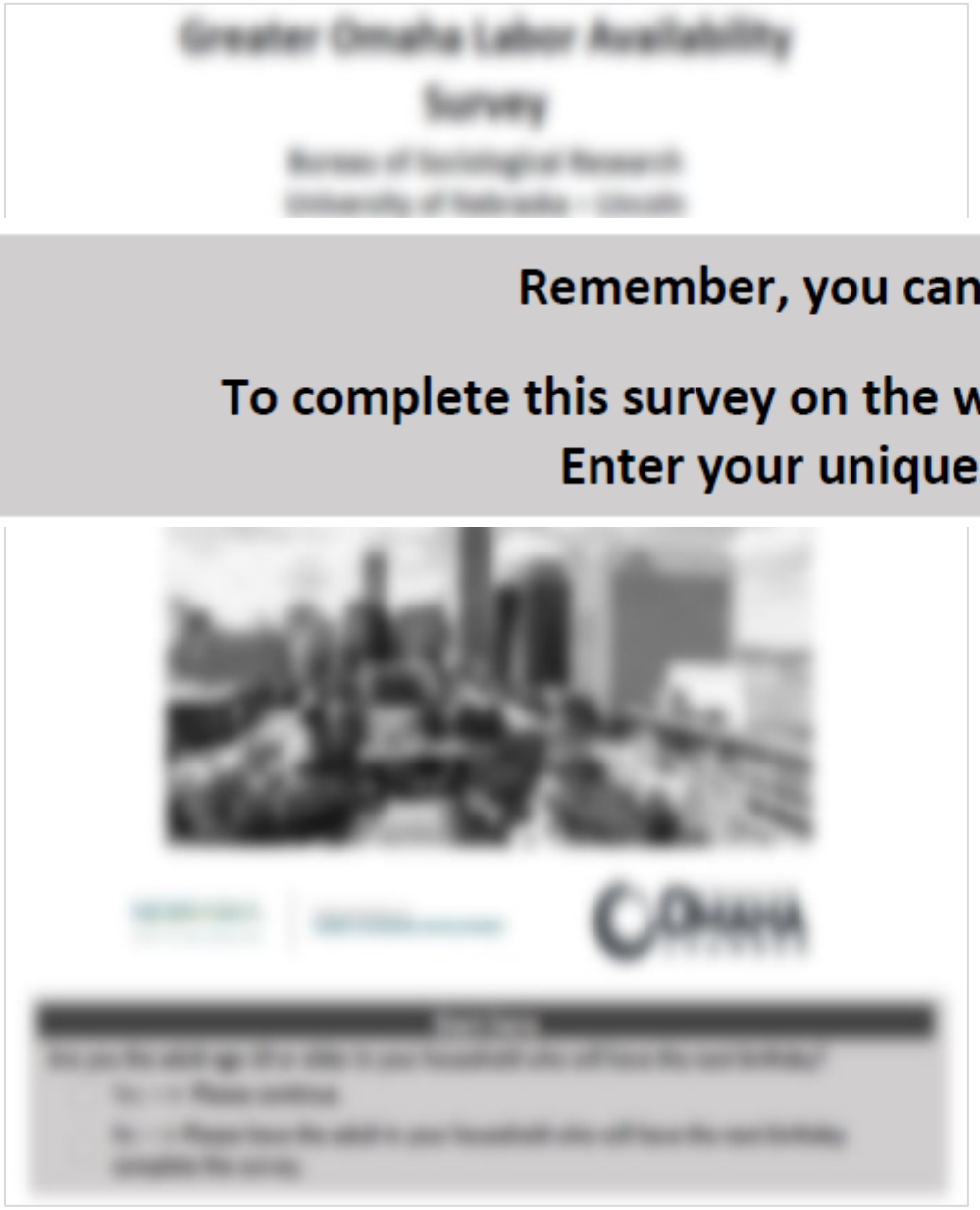
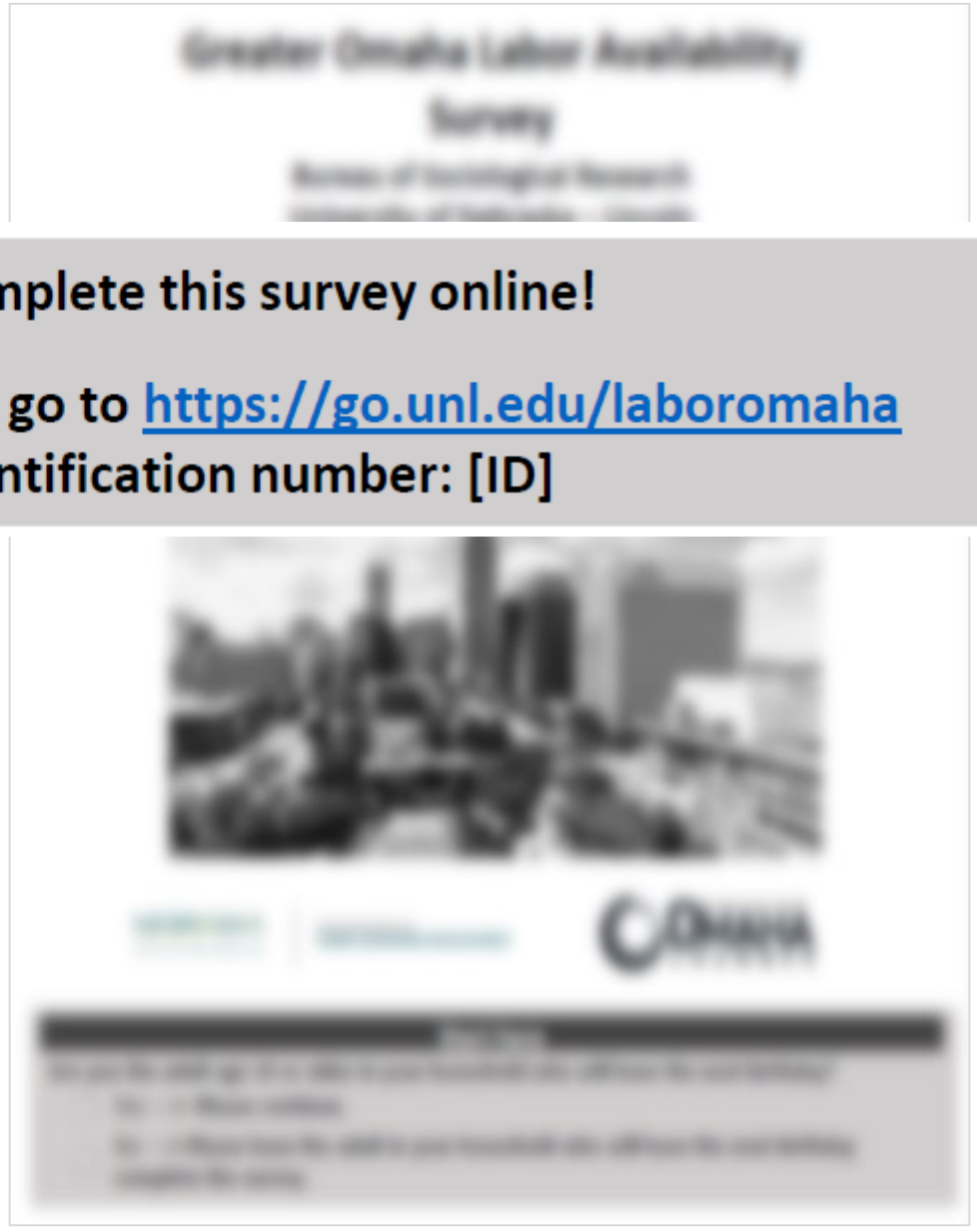
Ganshert, Witt-Swanson, and Olson 2022; Ganshert and Olson 2022



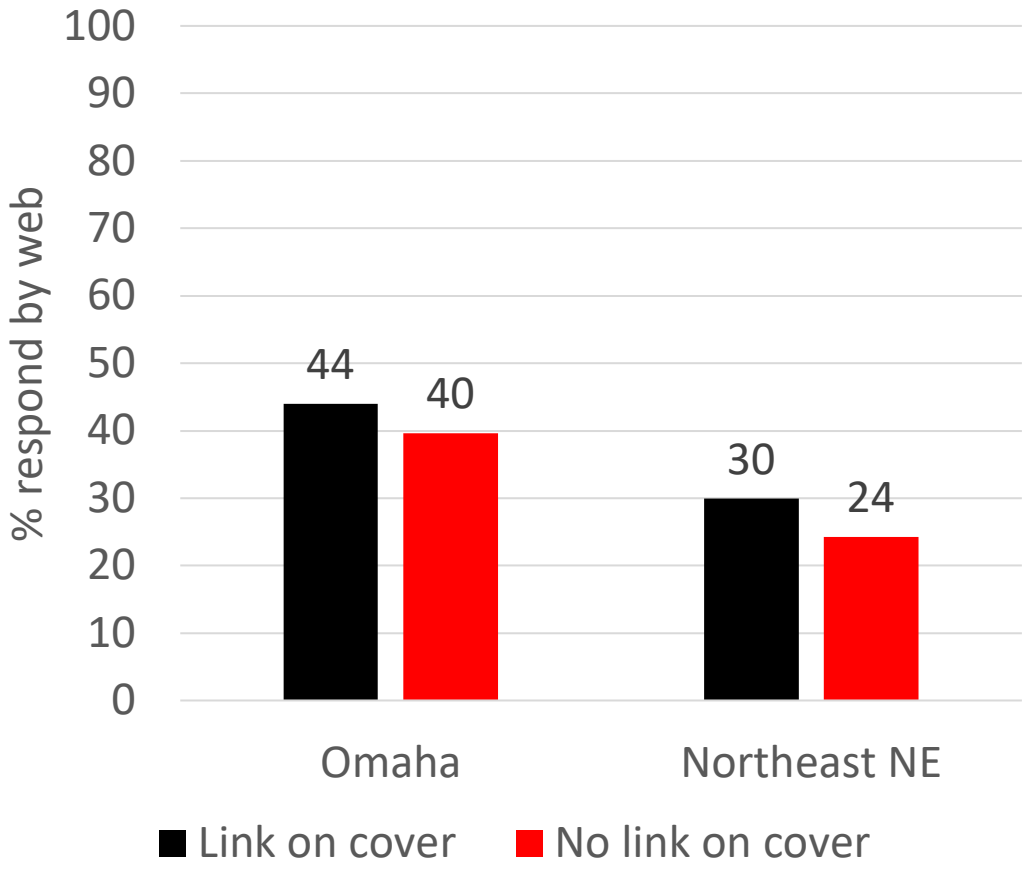


Remember, you can complete this survey online!

To complete this survey on the web, go to https://go.unl.edu/laboromaha
Enter your unique identification number: [ID]

More people responded via web when the link was on the cover

- There was no difference in overall response rate by survey cover condition (14.6% in each condition in Omaha; 18.6% vs. 19.3% in Northeast Nebraska).
- But more people participate by the web when the link is on the survey cover.
- People respond about a day faster with the link on the cover (21.8 days vs. 22.8 days Omaha; 20.9 days vs. 21.2 days Northeast Nebraska).



NEBRASKA
Good Life. Great Opportunity.

DEPARTMENTS OF
LABOR & ECONOMIC DEVELOPMENT

DATE

[City] Resident
Addy
City, STATE ZIP

IRB# 20211021519EP
Date Approved: 10/21/2021

Dear [City] Resident:

We are writing today to ask for your help with a study aimed at improving the economy in the Northeast area. Your help is needed to learn more about the current employment situations of Northeast area residents, as well as those who live within commuting distance. The questions are for both workers and non-workers. This survey asks questions about employment history, education, pay, and benefits, as well as obstacles and challenges you may be facing. Your participation in the survey should only take 20 minutes and is important to help ensure that the data and the conclusions drawn from it are accurate. **Even if you are retired, self-employed or out of the workforce, we would like your response**.

This study is being conducted by the Nebraska Department of Labor (NDOL) with support from Nebraska Department of Economic Development (DED). In order to help with this effort, NDOL and DED have asked the Bureau of Sociological Research at the University of Nebraska-Lincoln to conduct this survey.

We ask that the **adult age 19 or older in your household who will have the next birthday** complete the questionnaire and return it in the enclosed envelope. Hearing from the person with the next birthday is important because it ensures that we get responses from a variety of current and potential workers.

We have made the survey available online because it allows us to collect the information more quickly and to be more responsible with our research money. However, because some people don't use the internet and it is important that we hear from all households, we've also enclosed a paper copy and a postage-paid return envelope. To access this survey online, please go to the link listed below and enter your unique identification number.

Survey Link: https://go.unl.edu/laborNE1
Unique Identification Number: [ID]

If you do not want to do the survey online, please complete and return the enclosed paper questionnaire. This survey is completely voluntary. You might notice that there is a unique identification number on your questionnaire. This number simply allows us to keep track of which households have already responded. When you return your questionnaire, we will use this number to remove your address from our list. This allows us to make sure the answers you provide remain confidential and that we are not sending you reminders after you have responded. All results will be reported so that no individual can be identified.

If you have any questions about this survey please contact the Bureau of Sociological Research by telephone at 1-800-480-4549 or by e-mail at bosr@unl.edu.

Thank you for participating in this Northeast Nebraska Labor Availability Survey.

Sincerely,

Anthony L. Goins
Director
Nebraska Department of Economic Development

John H. Albin
Commissioner
Nebraska Department of Labor

Kristen Olson
Director
Bureau of Sociological Research

University of Nebraska Lincoln
Bureau of Sociological Research
907 Oldfather Hall | P.O. Box 880325 | Lincoln, NE 68588-0325 | 402.472.3672 | 1.800.480.4549 | bosr@unl.edu
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DEPARTMENTS OF
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DATE

[City] Resident
Addy
City, STATE ZIP

IRB# 2021:021519EP
Date Approved: 10/21/2021

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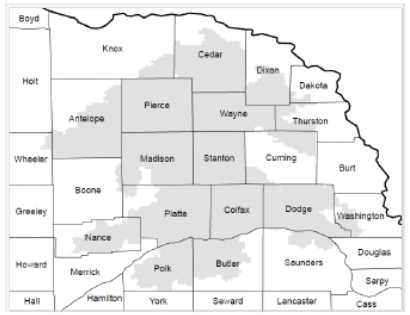
Northeast Nebraska Labor Availability Survey

Bureau of Sociological Research
University of Nebraska – Lincoln



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Columbus Area Chamber of Commerce

norfolkarea economic development council NEBRASKA

NORFOLK AREA Chamber of Commerce

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FREMONT AREA CHAMBER OF COMMERCE

Start here

Are you the adult age 19 or older in your household who will have the next birthday?

- ○ Yes ⟶ **Please continue.**
- ○ No ⟶ **Please have the adult in your household who will have the next birthday complete the survey.**

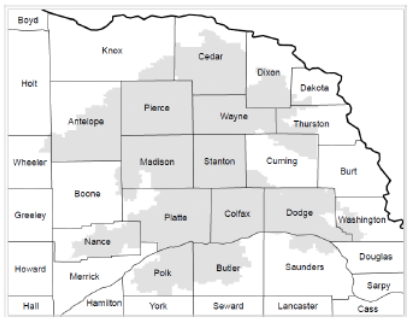
Northeast Nebraska Labor Availability Survey

Bureau of Sociological Research
University of Nebraska – Lincoln

Remember, you can complete this survey online!

To complete this survey on the web, go to https://go.unl.edu/laborNE2

Enter your unique identification number: [ID]



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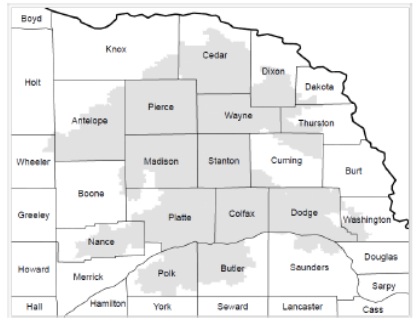

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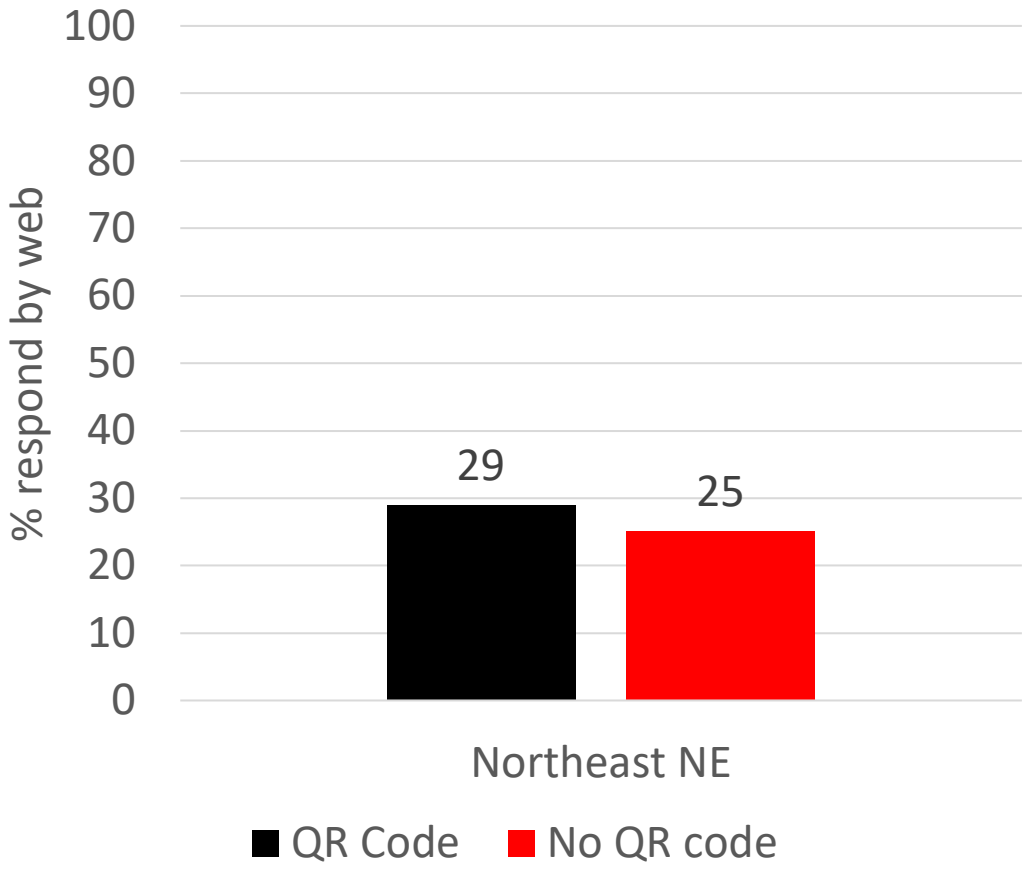
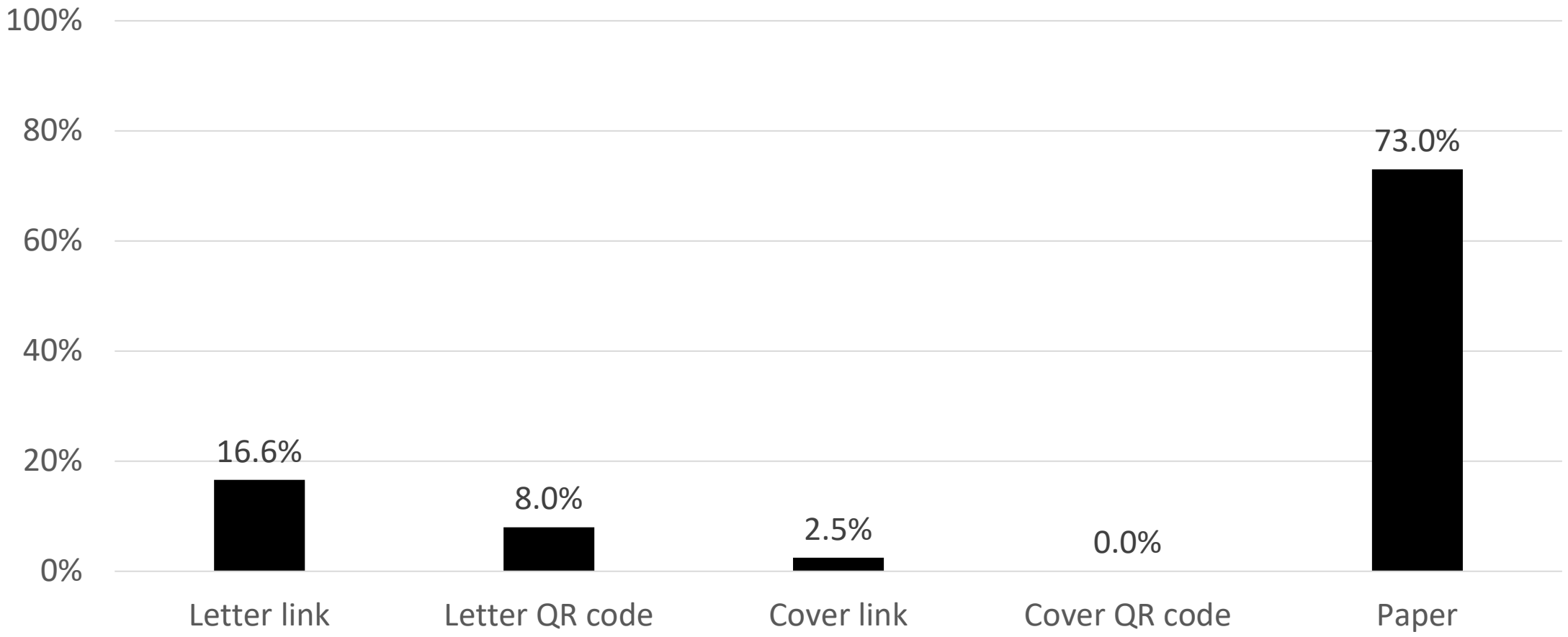
- ○ No ⟶ **Please have the adult in your household who will have the next birthday complete the survey.**

More people responded via web when the QR code was on the cover

- There was no difference in overall response rate by survey cover condition (18.6% with QR code; 19.3% no QR code).
- But more people participate by the web when given a QR code.
- There was no difference in speed of response with a QR code (21 days for each condition).



Which link was used?



Takeaway #2: If we want people to go on the web, then make web survey access information clear and motivated.

- People don’t necessarily read cover letters. But sometimes they do.
- Methods to increase web participation may not shift overall participation rates or who participates.
- The framing and visibility of the mode information may change the proportion of people who participate in different modes or devices.

Takeaway #2: Make participation in a mode easy. Communicate about that mode clearly.

Takeaway #3: Selecting someone in the household is hard and important.

Takeaway #3: Selecting someone in the household is hard and important.

- Making the within-household selection task an active part of the survey taking process is important.

- Getting the right person may yield tradeoffs between nonresponse and coverage errors.

- Estimates related to the selection process may be affected when things go awry.

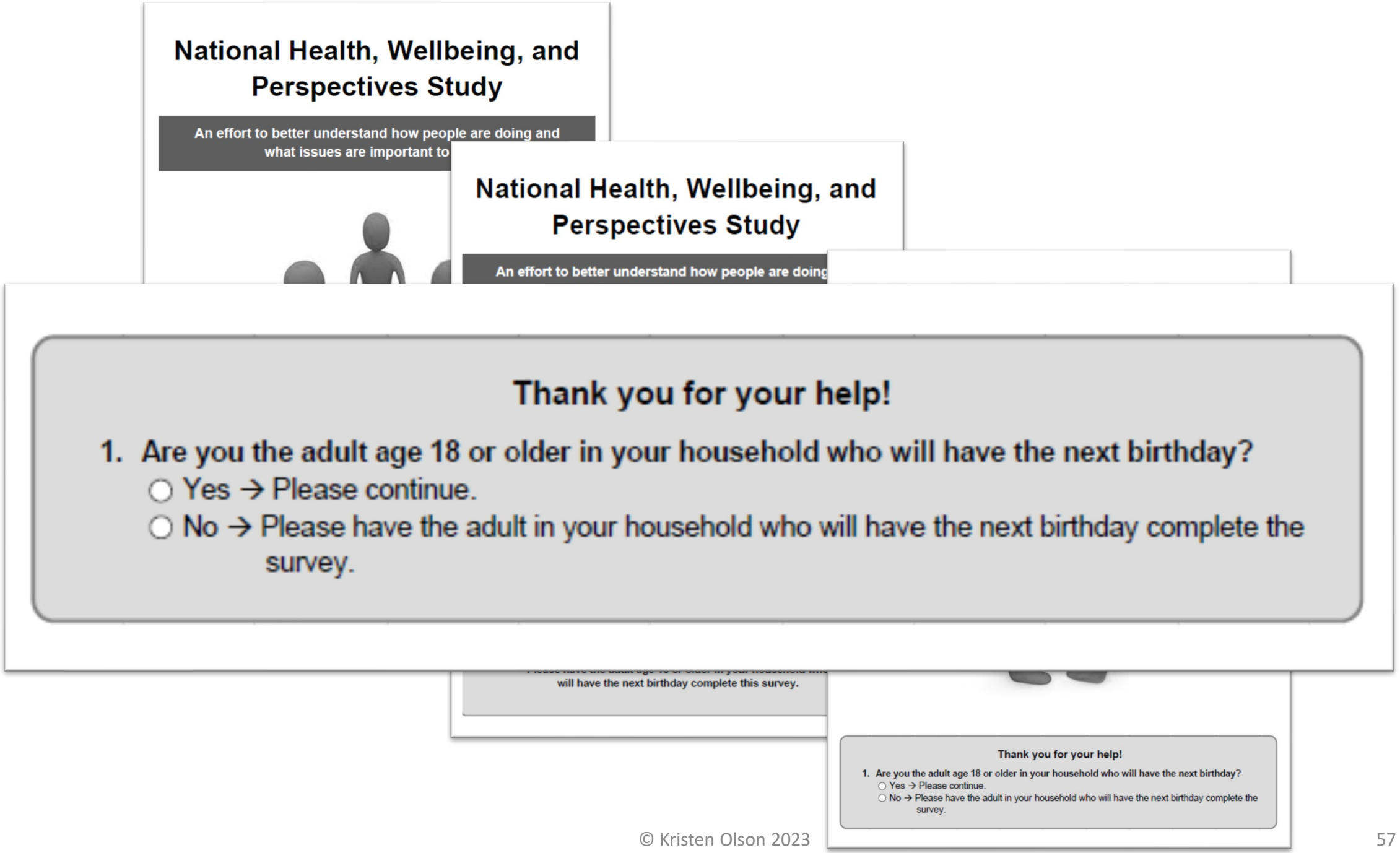
Design decisions that don't improve demographic composition, proxies for confusion, commitment, and concealment, or the accuracy of within-household selection

- Mode of data collection (Olson and Smyth, 2014, Field Methods; Olson and Smyth 2021 *AAPOR*)
- Type of quasi-probability within-household selection method (Olson, Stange, Smyth, 2014, POQ)
- Including a visual aid (calendar) to help place household birthdays relative to the selection date (Stange, Smyth, Olson, 2016, Field Methods)
- Explanatory language in the cover letter about the importance of following the instructions (Stange, Smyth, Olson, 2016, Field Methods)
- Incentives tied to the person who should be selected in the within-household selection procedure (Smyth, Olson, and Stange 2020, Lavrakas, et al. *Experimental Methods in Survey Research;* Olson and Smyth 2017 *POQ*)
- Asking about the number of people in the household as the first questions in the questionnaire or in the cover letter (Olson and Smyth 2021 *AAPOR*)

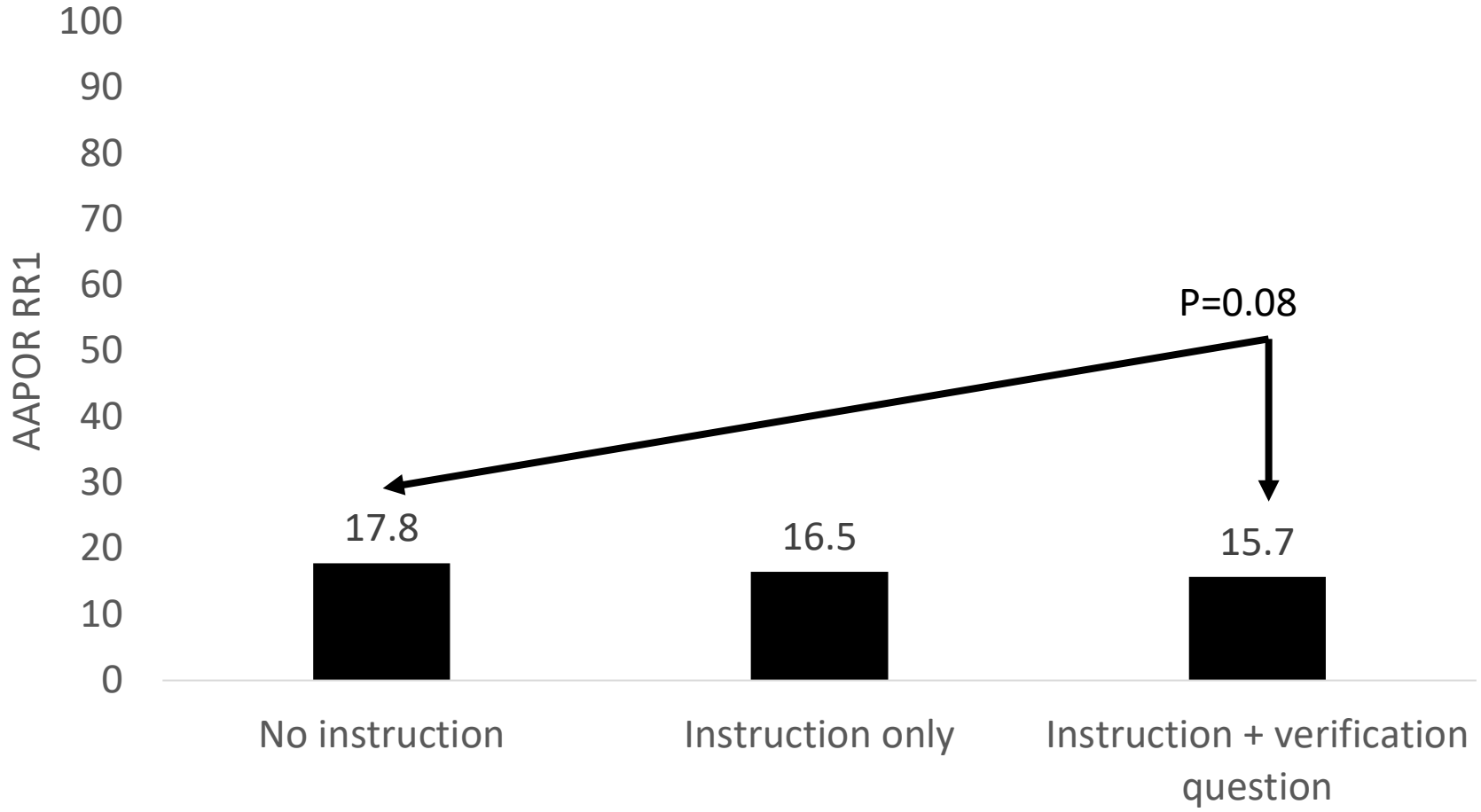
Verification question

- Does changing the placement of the instructions from the cover letter to the questionnaire affect composition and accuracy?
  - What if there is a verification question?

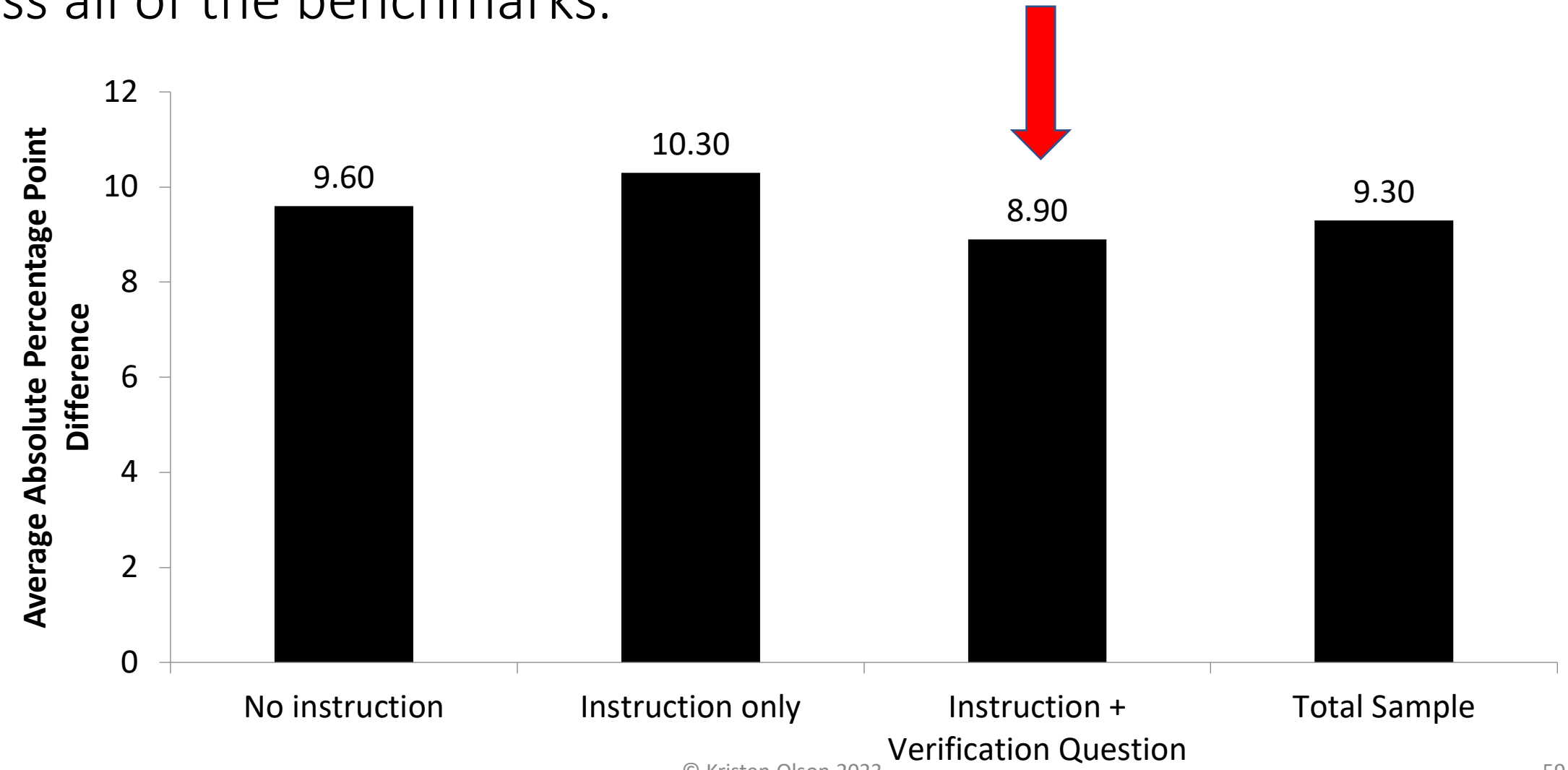
- Selection instructions: Your household was one of a small portion of US households randomly selected to complete this survey. To assure that we have heard from people of all types, we ask that the adult (age 18 or older) in your household who will have the **next birthday** complete the enclosed survey.



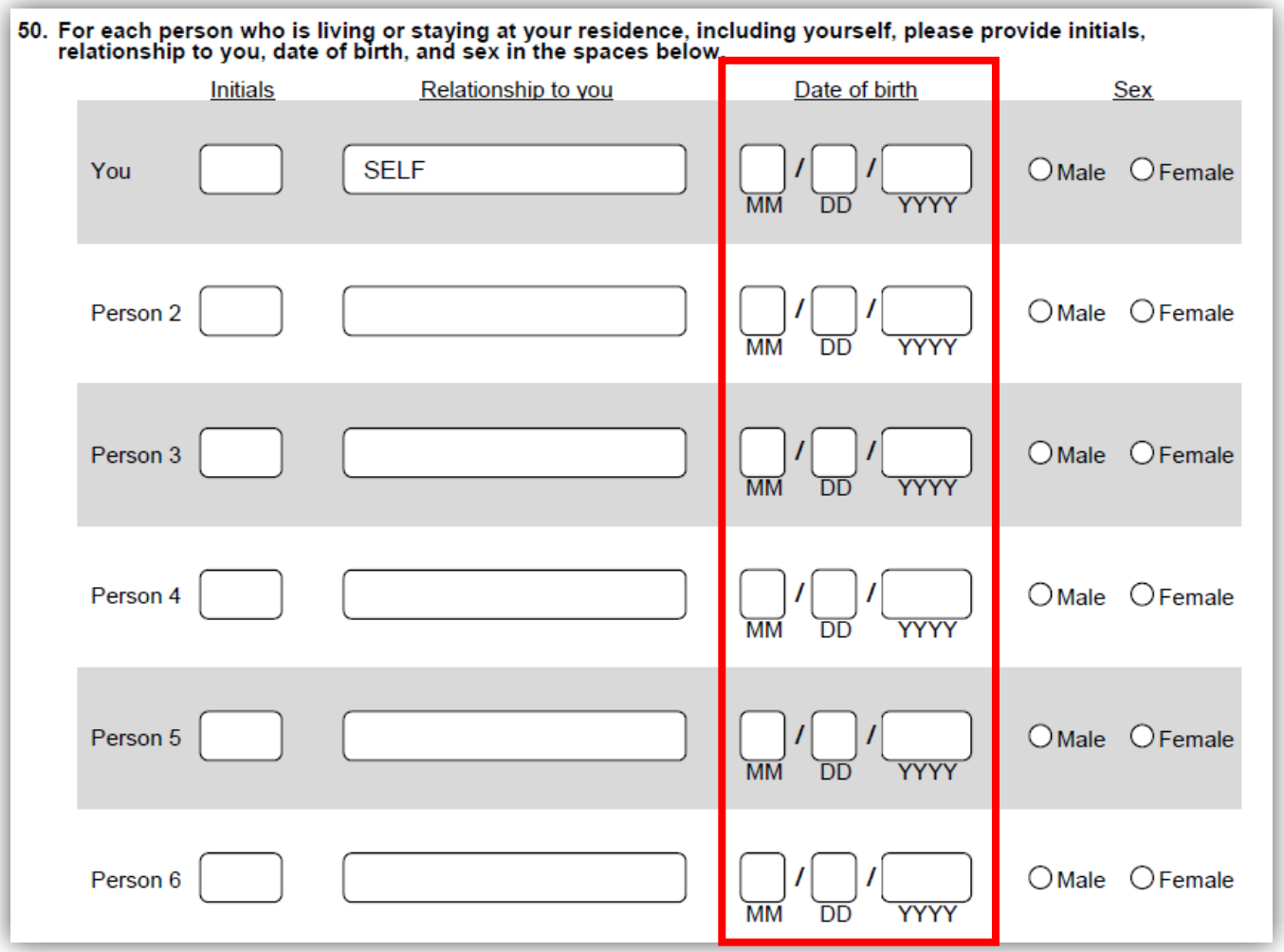
Marginal difference in AAPOR RR1 between question on cover and no instruction



Demographics for all treatments differed from the ACS, but on average, the instruction with the verification question on the cover was closest across all of the benchmarks.



Household roster and evaluating accuracy of selection



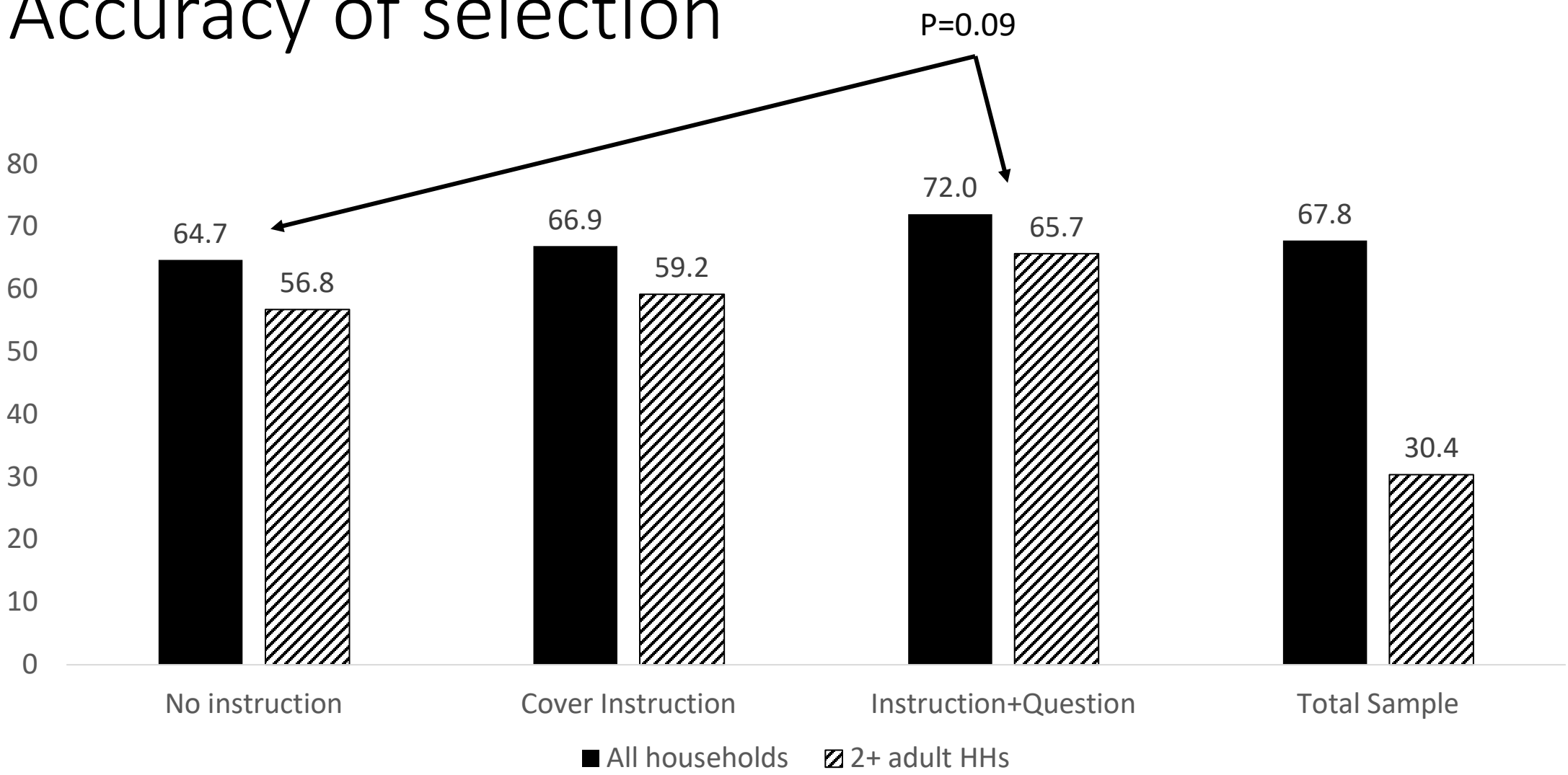
50. For each person who is living or staying at your residence, including yourself, please provide initials, relationship to you, date of birth, and sex in the spaces below.

	Initials	Relationship to you	Date of birth	Sex
You		SELF	MM / DD / YYYY	○ Male ○ Female
Person 2			MM / DD / YYYY	○ Male ○ Female
Person 3			MM / DD / YYYY	○ Male ○ Female
Person 4			MM / DD / YYYY	○ Male ○ Female
Person 5			MM / DD / YYYY	○ Male ○ Female
Person 6			MM / DD / YYYY	○ Male ○ Female

Identify the adult (age 19+) whose birthday will be the next birthday following September 1, 2020.

If that individual is Person 1 (You), then the respondent is accurately selected.

Accuracy of selection

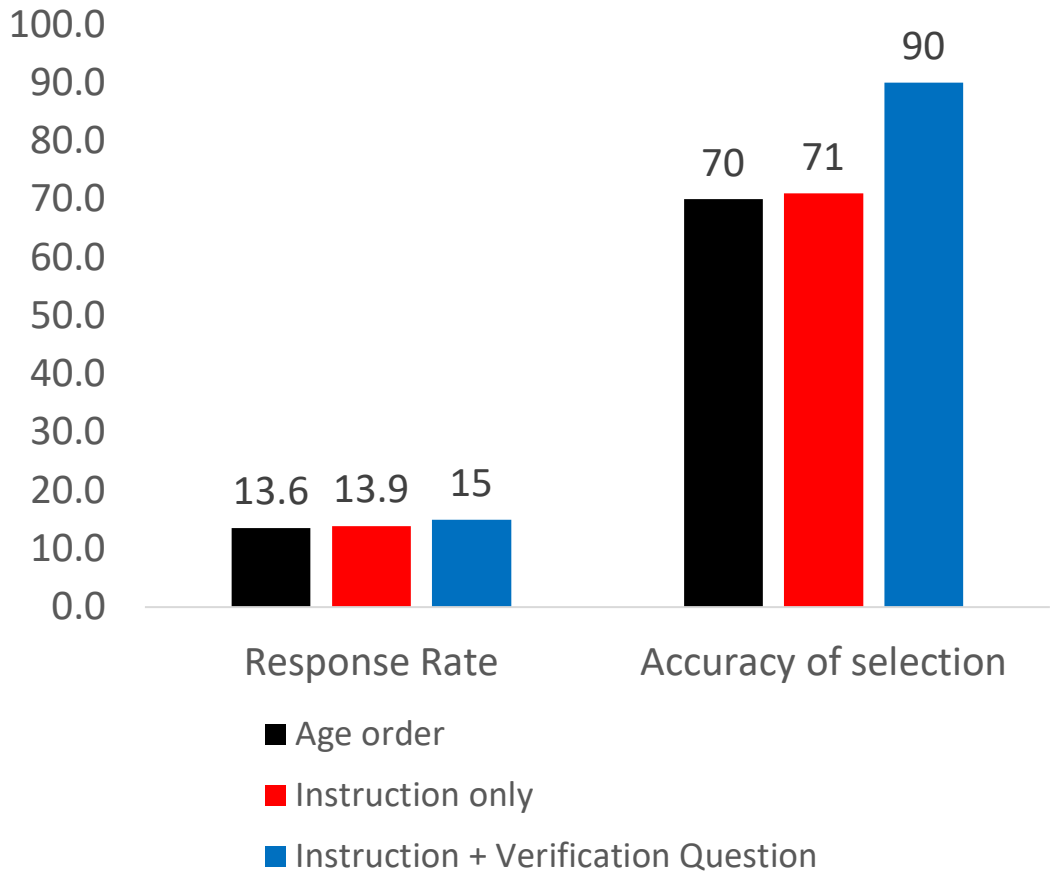


The verification question works!

But don’t take our word for it…

CHIS replication in web (targeted areas)

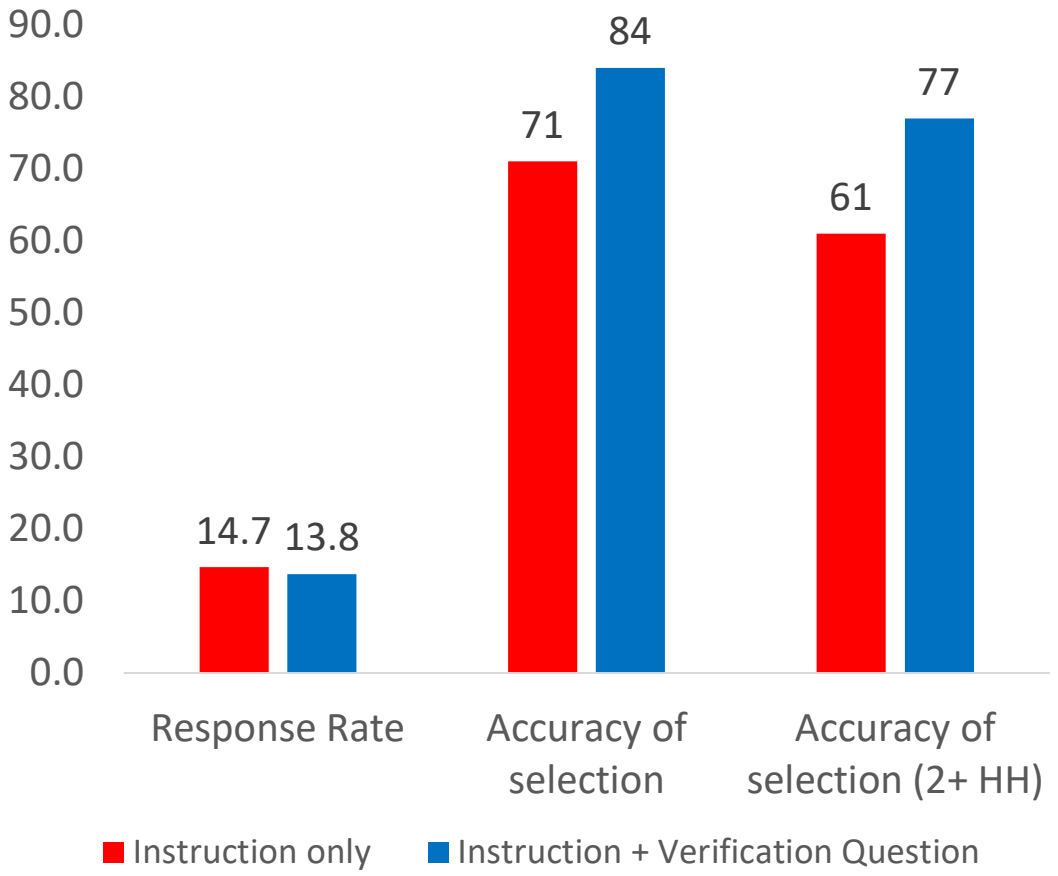
- Web + telephone modes in select areas of California
- Randomly assigned sample to (1) instruction only, (2) instruction only with verification question, (3) age order
- Little difference in response rates across conditions
- Significant increase in selection accuracy with verification question.



https://healthpolicy.ucla.edu/chis/design/Documents/CHIS%20Spring%202018%20ABS%20Web%20Field%20Experiment%20Report.pdf

CHIS replication in web (statewide)

- Web + telephone modes in full state of California
- Randomly assigned sample to (1) instruction only and (2) instruction only with verification question
- Slight decrease in response rates with verification question
- Significant increase in selection accuracy with verification question.



https://healthpolicy.ucla.edu/chis/design/Documents/CHIS%20Fall%202018%20ABS%20Web%20Pilot%20Report%20for%20DHCS%20(July%202019).pdf

Summary

- There is a tradeoff between nonresponse and accuracy of selection in making the within-household selection instructions part of the cover
  - But this improves the composition of the completed sample!

- Survey estimates related to household tasks vary across those who are selected accurately vs. not.
  - Other estimates benefit from (presumed) homogeneity within households.

So, what have we learned?

- Making the household selection task an active part of the survey taking process improves accuracy of selection and composition.
  - Asking respondents to confirm their eligibility as part of the questionnaire.
  - Reinforcing household size in the questionnaire.
  - Accurate and inaccurately selected householders have different roles in the household.

- There is evidence that respondents follow within-household selection procedures to some extent
  - However, many do not. And it's roughly a coin flip as to whether the procedures are followed or not.

Takeaway #3: Selecting someone in the household is hard and important.

- Making the within-household selection task an active part of the survey taking process is important.
- Getting the right person may yield tradeoffs between nonresponse and coverage errors.
- Estimates related to the selection process may be affected when things go awry.

Takeaway #3: Selecting someone in the household is hard and important.

Some closing thoughts

- There is not one “best” way to do a mixed-mode survey.
- Making materials work together as a whole is important.
- There is lots of room for more experimentation.

Main points for today

- Takeaway #1: Mail surveys still matter.
- Takeaway #2: Make participation in a mode easy. Communicate about that mode clearly.
- Takeaway #3: Selecting someone in the household is important.

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