

Visual Design in Online Surveys: Lessons for the Mobile World

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Outline

- A brief detour: why mobile research?
- Display constraints in mobile devices
- Visual design elements in online surveys
- Final thoughts and recommendations for practice

Why Mobile Research? Two Key Questions

- What's in it for us?
 - "Us" is the research community—both vendors/suppliers and customers
 - What can mobile research do that cannot effectively be done with existing methods?
 - Why should we adopt mobile research?
- What's in it for them?
 - "Them" is the respondents
 - Why would they want to answer our surveys/provide the data we want?
 - Widespread use of mobile devices may not translate into widespread acceptance for research

Visual Design in Online Surveys

- There is a large—and growing—body of evidence that visual design affects answers to surveys
- Elements of a Web survey:
 - Verbal versus visual elements
 - Task versus style elements
 - Static versus interactive elements
- Visual elements change the context of the survey questions
- The display constraints of mobile devices may exacerbate some of these effects

Display Constraints in Mobile Devices

- The screen dimensions of mobile devices are very limited, and vary across platforms
- This has two types of implications:
 - Completion of existing Web surveys on mobile devices
 - Designing for mobile-only surveys

Example Screen Dimensions


- iPhone 3 GS, Palm Pre, Android G2: 320x480
- Blackberry Storm: 360x480
- Google Nexus One: 800x480
- Motorola Droid: 440x854



Mobile Devices for Regular Versus Mobile-Only Surveys

- Mobile Devices for existing surveys
 - With users increasingly using mobile devices for Web activities, what does this mean for how we design our existing surveys?
- Designing for mobile-only surveys
 - What visual design elements are important for designing for the mobile Web?
 - Designing for a single device versus platform-independent design
- The following examples are from one of our “regular” Web surveys, using a smart phone emulator

Viewing a Survey With a 320x480 Browser



Now for some questions on your perceptio
related risk...

Which of the following numbers represent
of getting a disease?

1 in 100
 1 in 1000
 1 in 10


Viewing a Survey With a 320x480 Browser



Indicate how much you favor or oppose each of the following statements.

| | Strongly oppose | Somewhat oppose | Neither favor nor oppose |
|-----------------------|-----------------------|-----------------------|--------------------------|
| Avoiding "fast food?" | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Viewing a Grid With 480x320 Browser 1



Indicate how much you favor or oppose each of the following statements.

| | | | Neither | | |
|--|--|--|---------|--|--|
| | | | | | |

Viewing a Grid With 480x320 Browser 2

Indicate how much you favor or oppose each of the following statements.

| | Strongly oppose | Somewhat oppose | Neither favor nor oppose | Somewhat favor | Strongly favor |
|-----------------------|-----------------------|-----------------------|--------------------------|-----------------------|-----------------------|
| Avoiding "fast food?" | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Viewing a Grid With 480x320 Browser 3

| | | | | | |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| closely? | | | | | |
| Emphasizing the taste of food rather than its nutritional value? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Paying close | | | | | |

Viewing a Grid With 480x320 Browser and Font Size Set to "Small" (-1)

Indicate how much you favor or oppose each of the following statements.

| | Strongly oppose | Somewhat oppose | Neither favor nor oppose | Somewhat favor | Strongly favor |
|-----------------------------|-----------------------|-----------------------|--------------------------|-----------------------|-----------------------|
| Avoiding "fast food?" | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Maintaining a healthy diet? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Monitoring cholesterol | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Viewing a Grid With 480x320 Browser and Font Size Set to "Very Small" (-2)



Indicate how much you favor or oppose each of the following statements.

| | Strongly oppose | Somewhat oppose | Neither favor nor oppose | Somewhat favor | Strongly favor |
|--|-----------------------|-----------------------|--------------------------|-----------------------|-----------------------|
| Avoiding "fast food?" | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Maintaining a healthy diet? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Monitoring cholesterol levels closely? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Emphasizing the taste of food rather than its nutritional value? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Paying close attention to the nutritional information on food packaging? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Limiting the amount of red meat in your diet? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Balancing one's diet across the key food groups? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Examples Using iPhone Emulator



Examples Using iPhone Emulator



Examples Using iPhone Emulator



2010 Census Form on iPhone



Same Question Viewed in a Browser

2010 Census Quality Survey
USCENSUSBUREAU
Helping You Make Informed Decisions

2. How is this person related to Person 1? Mark *X* ONE box.

Male Person's age and what is this person's race? Mark numbers in boxes.

Husband/wife
Natural-born son/daughter
Adopted son/daughter
Stepson/stepdaughter
Brother/sister

IF NOT RELATED to Person 1:
Roomer, boarder
Housemate, roommate
Other

Instructions FAQs Logout

Where You Are

Household Information
→ Person Information
Residence Information

Is Te E. Ve of Hispanic, Latino, or Spanish origin? ([Help](#))

No, not of Hispanic, Latino, or Spanish origin
 Yes, Mexican, Mexican Am., Chicano
 Yes, Puerto Rican
 Yes, Cuban
 Yes, another Hispanic, Latino, or Spanish origin - Enter origin, for example, Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.

<< Previous Next >>

2010 Census Form on iPhone

Back Race Next

Person 2 of 2

What is this person's race?
select any that apply

White
 Black, African Am., or Negro
 American Indian or Alaska Native
Print name of enrolled or principal tribe

Asian Indian
 Chinese
 Filipino
 Japanese
 Korean
 Vietnamese

Same Question Viewed in a Browser

2010 Census Quality Survey
USCENSUSBUREAU
Helping You Make Informed Decisions

Instructions FAQs Logout

2. How is this person related to Person 1? Mark ONE box.

Husband/wife Roomer, boarder
 Natural-born son/daughter Housemate, roommate
 Adopted son/daughter Other
 Stepson/stepdaughter Brother/sister

Where You Are

Household Information
 → Person Information
 Residence Information

What is Te E. Ve's race? You may select one or more races. For this survey, Hispanic origins are not races. ([Help](#))

White
 Black, African Am., or Negro
 American Indian or Alaska Native - Enter name of the enrolled or principal tribe
 Asian Indian
 Chinese
 Filipino
 Japanese
 Korean
 Vietnamese
 Other Asian - Enter race, for example, Hmong, Laotian, Thai, Pakistani, Cambodian, and so on.
 Native Hawaiian
 Guamanian or Chamorro
 Samoan
 Other Pacific Islander - Enter race, for example, Fijian, Tongan, and so on.
 Some other race - Enter race.

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Example Survey on Palm V

Palm V

What are you doing on the laptop/desktop right now?

Games Searching
 Browsing Pay bills
 Blogging Shopping
 Social Site Music/radio
 IM-ing TV/Videos
 Emailing File Sharing
 Business software Other software

Back Next

Does this mean there are more response options?

UNIVERSITY OF MICHIGAN Source: Lai et al., Survey Practice, February 2010 22

Example Survey on Samsung Blackjack

smartphonedev.rti.org/Default.aspx?tal

The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

2) Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports.

Yes, limited a lot. Yes, limited a little. No, not limited at all.

<< Back

Continue >>

Favorites

Menu

smartphonedev.rti.org/Default.aspx?Ca

5) How often do you eat vegetables?

Far more than I should More than I should Slightly more than I should As much as I should Slightly less than I should Less than I should Far less than I should

6) How often do you eat fruit

Far more than I should More than I should Slightly more than I should As much as I should Slightly less than I should Less than I should Far less than I should

Favorites

Menu

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Source: Peytchev & Hill (*Social Science Computer Review*, 2010)

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Do Sample Persons Try to Do Regular Surveys on Mobile Devices?

- We capture user metrics (including screen dimensions) on all opt-in panel members who click on the URL to our surveys
- Of 10,774 who did so in our last survey (December 2009), 40 (or 0.37%) had a screen width of less than 800 pixels, and 6 had a screen width of 480 pixels or less
- Of these 40, only 28 (or 70%) completed the survey, compared to a completion rate of 86% for those with screen ≥ 800 pixels

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Visual Design Examples of Relevance to Mobile Research

- What is visible affects response choices
 - [Order and response format experiment](#)
- Choice of input tool affects quality of answers
 - [Order and response format experiment](#)
 - [Date experiments](#)
- Spacing and layout affect answers
 - [Spacing and alignment](#)
- Screen and browser size matter
 - [Browser size](#)
- These studies are presented below

Visibility and Input Format Experiment

- Couper, Tourangeau, Conrad, & Crawford (2003)
 - *Social Science Computer Review*
- Demonstration of
 - Input format effects: choice of input tool matters
 - Primacy effects: early alternatives selected more often than later options
 - Visibility effects: visible options are selected more often than those requiring scrolling
- Survey of opt-in panel members (n=2,871) randomly assigned to conditions in a 2 (order of items) by 3 (format of question) experiment

Radio Button Version A



Questions about this survey?
Email us at
umlife@msiresearch.com
or call toll free 1.866.674.3375

Which of the following nutrients is most important to you when selecting breakfast cereal? *(Please select one)*

- Protein
- Carbohydrates
- Sugar
- Fat
- Fiber
- Vitamin A
- Vitamin C
- Calcium
- Iron
- Vitamin E
- None of the above

Next Screen

Previous Screen

Radio Button Version B



Questions about this survey?
Email us at
umlife@msiresearch.com
or call toll free 1.866.674.3375


Which of the following nutrients is most important to you when selecting breakfast cereal? *(Please select one)*

- Vitamin E
- Iron
- Calcium
- Vitamin C
- Vitamin A
- Fiber
- Fat
- Sugar
- Carbohydrates
- Protein
- None of the above

Next Screen

Previous Screen

Drop Box, None Visible: Before




Questions about this survey?
Email us at
umlife@msiresearch.com
or call toll free 1.866.674.3375

Which of the following nutrients is most important to you when selecting breakfast cereal? *(Please select one)*

Please select one ▾

Next Screen Previous Screen

Drop Box, None Visible: After



Questions about this survey?
Email us at
umlife@msiresearch.com
or call toll free 1.866.674.3375

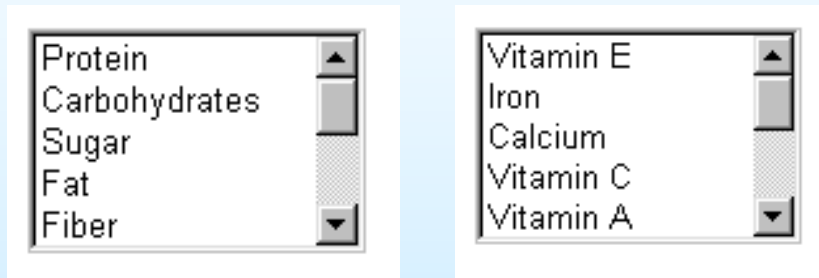
Which of the following nutrients is most important to you when selecting breakfast cereal? *(Please select one)*

Please select one ▾

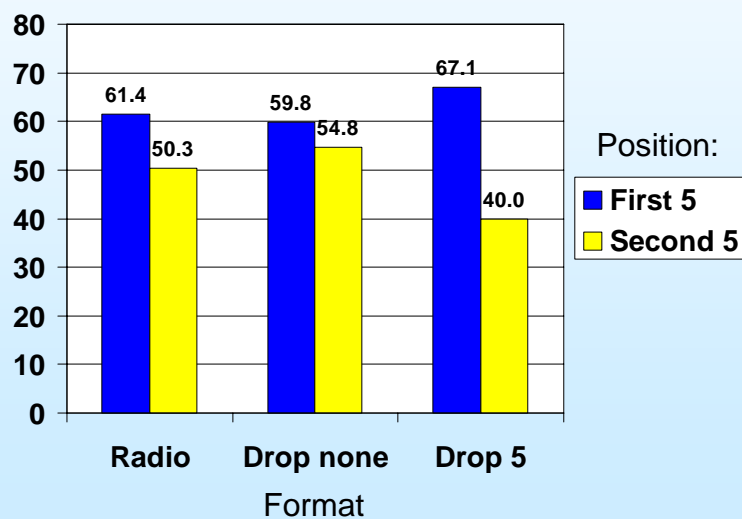
- Please select one ▲
- Protein
- Carbohydrates
- Sugar
- Fat
- Fiber
- Vitamin A
- Vitamin C
- Calcium
- Iron
- Vitamin E

Previous Screen

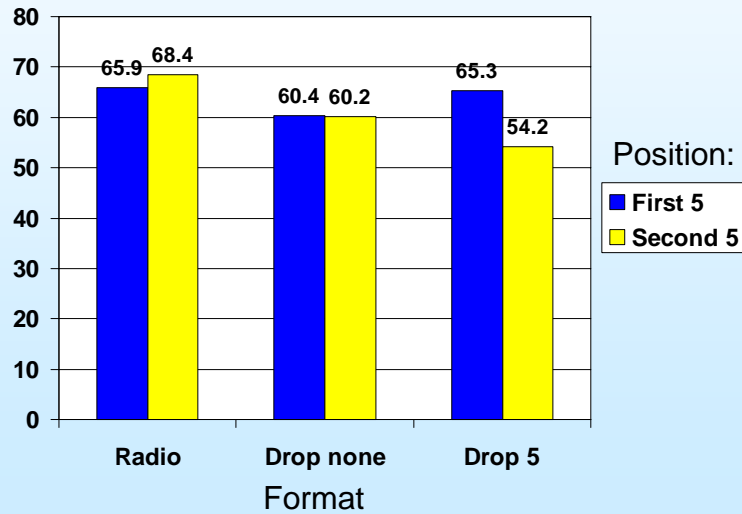
Drop Box, Five Visible, Versions A and B



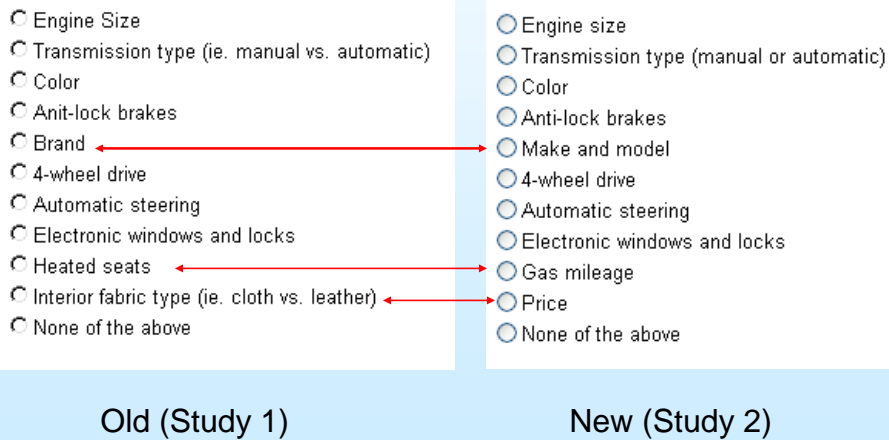
Cereal: Percent Choosing Protein-Fiber, by Position and Format



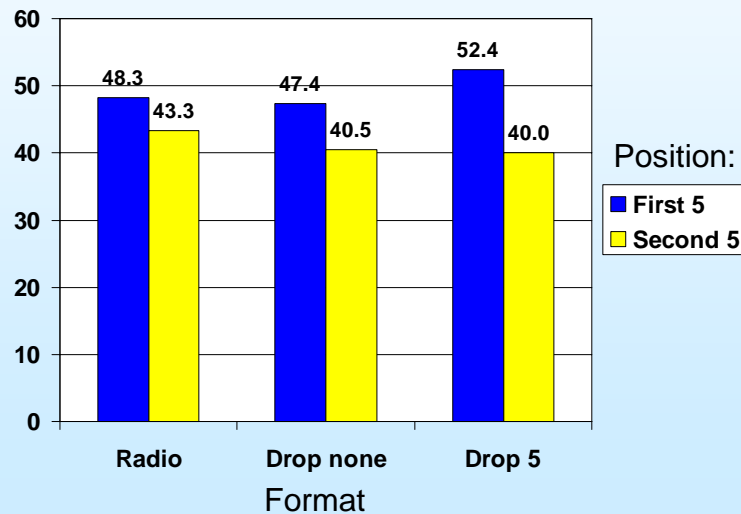
Car: Percent Choosing Engine Size-Brand, by Position and Format



Old and New Versions of Car Items



Study 2: Percent Choosing Options by Position and Format for Car Item



Conclusions

- Evidence of primacy effects
 - Earlier options selected more often than later options
- Magnitude of the effects depends on input format
- Support for visibility principle
 - Option that are visible are much more likely to be selected than options that require effort (e.g., scrolling) to see
- From a practical perspective, the choice of response tool in Web surveys does matter

Experiments on Measuring Dates

- Couper, Kennedy, Conrad, and Tourangeau
 - Paper under review
- Research on two types of dates
 - Month and year (e.g., “In what month and year did you last see a medical doctor?”)
 - Date of birth
 - The latter is a more common type of entry than the former, and thus more likely to have conventions
- Experiments with members of opt-in panel

Month/Year Experiment 1 Versions

In what month and year did you last see a medical doctor?

Next

In what month and year did you last see a medical doctor?

Month: Year:

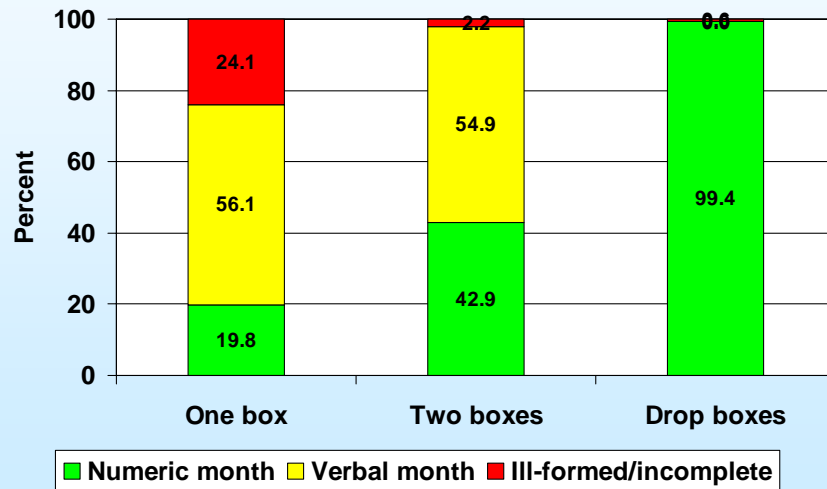
Next

In what month and year did you last see a medical doctor?

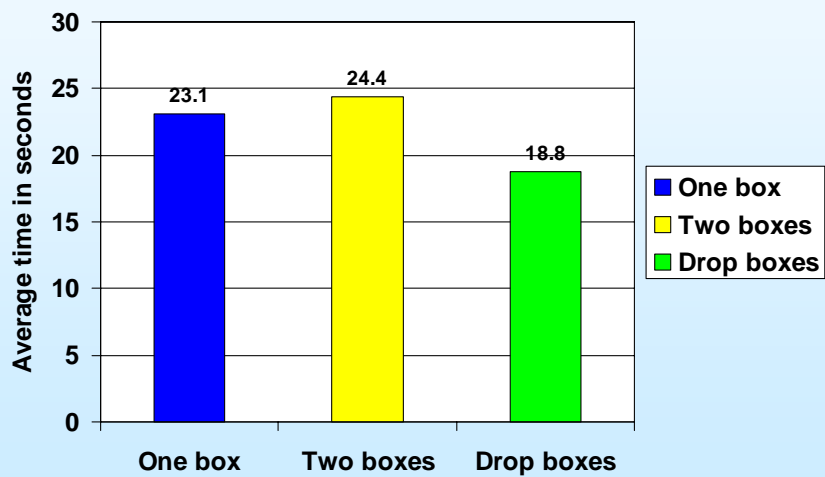
Month: Year:

Next

Responses by Input Type, Last Doctor Visit*



Completion Times by Input Type, Last Doctor Visit



Month and Year Experiment 2

- Same two questions as experiment 1:
 - “In what month and year did you last see a medical doctor?”
 - “In what month and year did you last see a dentist?”
- Three versions of input:
 - Two separate fields, labeled “Month” and “Year”
 - Two separate fields, labeled “MM” and “YYYY”
 - Drop boxes, one for month, another for year

Month/Year Experiment 2 Versions

In what month and year did you last see a medical doctor?

Month: Year:

Next

In what month and year did you last see a medical doctor?

MM: YYYY:

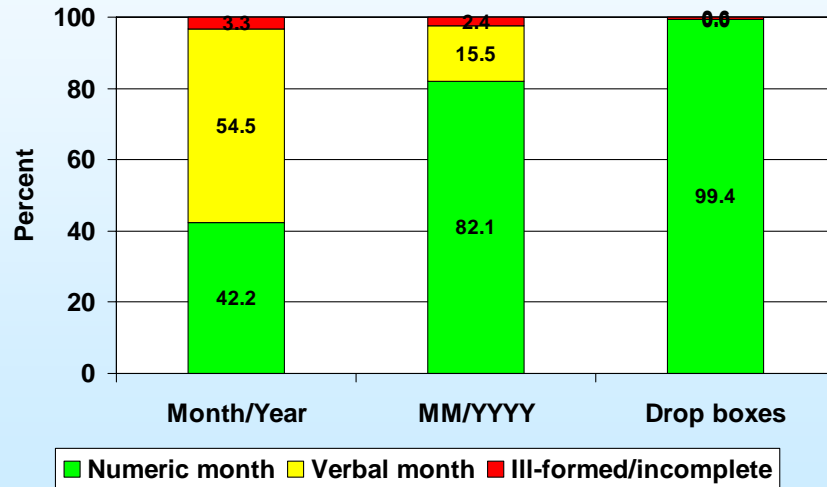
Next

In what month and year did you last see a medical doctor?

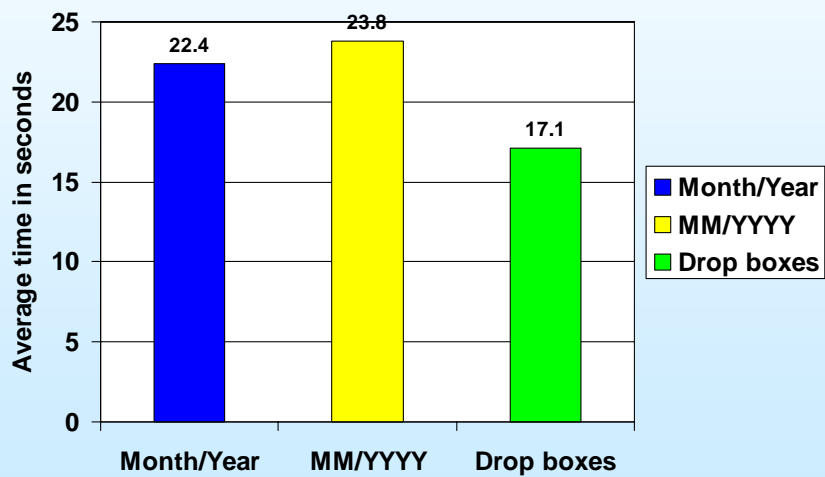
Month: Year:

Next

Responses by Label and Input Type, Last Doctor Visit*



Completion Times by Input Type, Last Doctor Visit



Month/Year Experiment: Conclusions

- With “Month and “Year” labels, the majority of respondents enter a month in words
- Changing the label to “MM” significantly increases the proportion entering numbers rather than words
- Both visual information (size of input field) and verbal information (field labels) guide respondent on response format
- Drop boxes help constrain input and reduce response time

Date of Birth Experiments

- Tested four versions of the date of birth question:
 - Short text box (10 characters) with instructions to enter in MM/DD/YYYY format
 - Long text box (40 characters) with instructions to enter in MM/DD/YYYY format
 - Three separate text boxes, with 3 and 6 characters respectively, and with MM/DD/YYYY labels below input fields
 - Three drop boxes
- Replicated in two different surveys

Date of Birth Versions

Short box:

What is your date of birth?
 (Please enter the date in MM/DD/YYYY format)

Next

Long box:

What is your date of birth?
 (Please enter the date in MM/DD/YYYY format)

Next

Three boxes:

What is your date of birth?

MM DD YYYY

 / /

Next

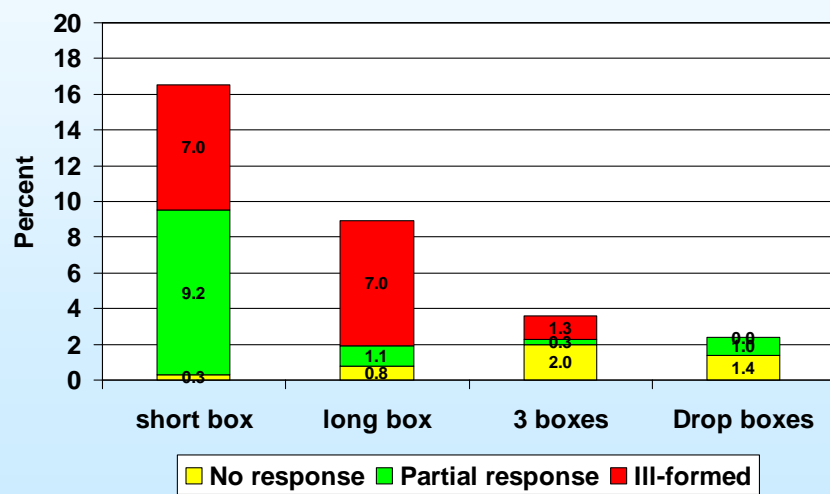
Drop boxes:

What is your date of birth?

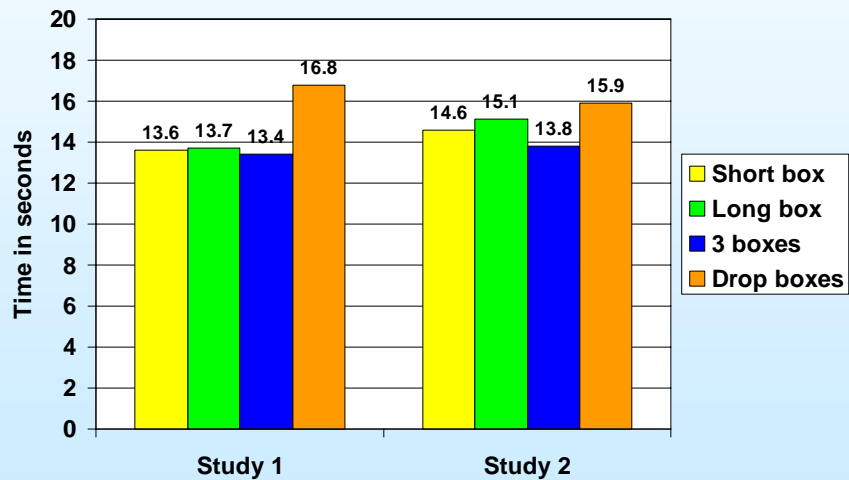
Select ▼ Select ▼ Select ▼

Next

Missing or Ill-Formed Responses, by Input Type, Study 2



Completion Time by Input Type



Drop box versus text boxes significant in both studies

Date of Birth Experiment: Conclusions

- Fewest well-formed responses in single-box versions, most (by definition) in drop box version
- Significantly more partial responses (e.g., providing year only) in short box version
- Time penalty for drop box version
- Trade-off between data completeness and completion time

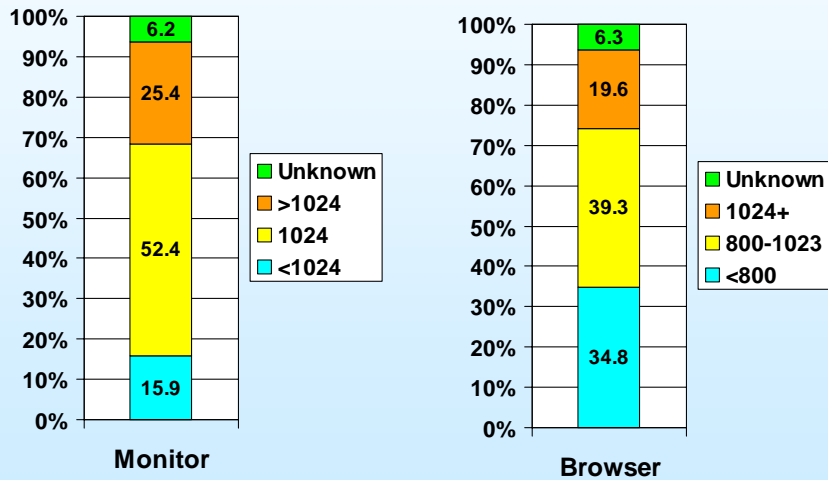
Spacing and Alignment Experiments

- Across several different studies, we have demonstrated the space allocated to response options affects their selection
 - More space = more often selected
 - Consistent with the visual heuristics literature (Tourangeau et al.)
- Christian and colleagues have conducted experiments on alignment of response options
 - Alignment of response options in columns versus grids affects choices
- Together, these studies suggest that how one organizes response options in a constrained space may affect which options are chosen

Experiment on Web Page Size

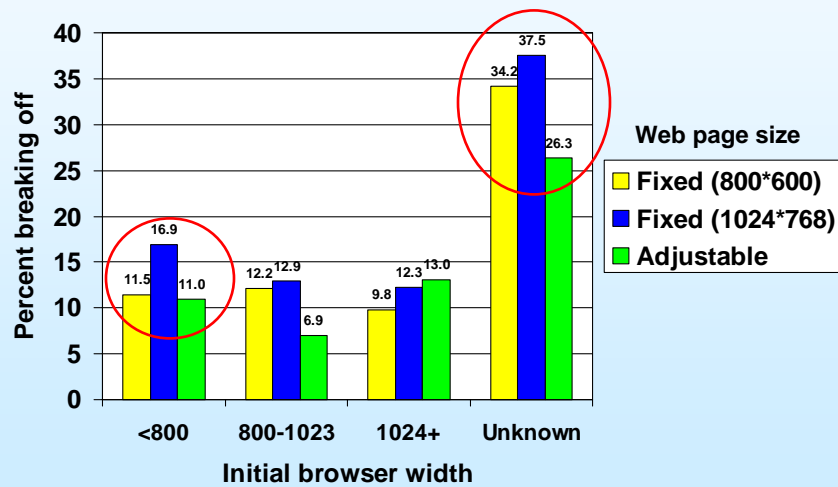
- Baker and Couper (2007), paper presented at GOR'07, Leipzig, March
- Experiment embedded in a survey on energy use (n=1727 starts, 1500 completes)
- We tested 3 versions of the Web survey layout:
 - Fixed (800*600)
 - Fixed (1024*768)
 - Adjustable
- We focus on browser width, given concerns about horizontal scrolling

Distribution of Monitor and Browser Width



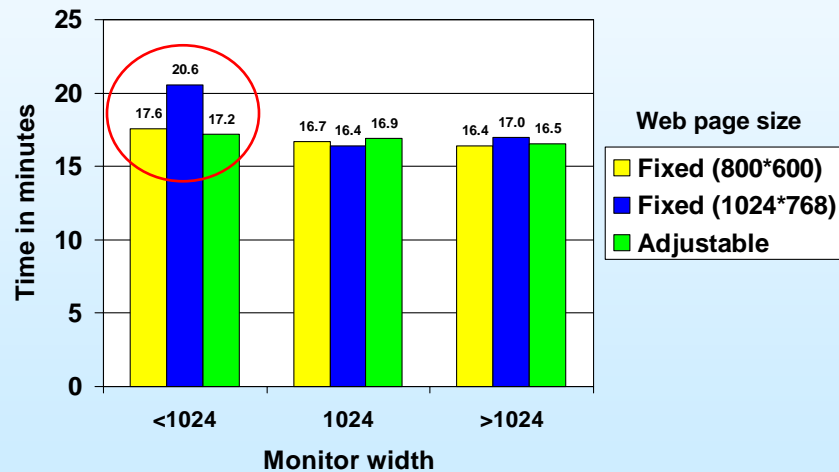
- A large majority (78%) of respondents have at least a 1024*768 monitor
- But about a third have their browser initially set at <800 pixels

Breakoff Rates, by Browser Width and Web Page Size



Browser width significant; interaction of page size and browser size not significant

Mean Time to Complete, by Web Page Size and Monitor Width



Significant ($p < .05$) interaction of page size and monitor size

Implications: Web Page Size

- Only 16% of respondents have a monitor width less than 1024 pixels, but these respondents are disadvantaged with fixed designs for larger screens
- If survey designed for larger page than respondent's display can accommodate, breakoffs and completion time increase
- Results support Jakob Nielsen's recommendation to "optimize Web pages for 1024x768, but use a liquid layout that stretches well for any resolution, from 800x600 to 1280x1024"
- How does this translate to the constrained size of typical mobile displays?
 - Again this suggests developing versions for mobile devices rather than expecting respondents to adapt

Observations and Implications for Practice 1

- Web surveys designed for typical browser and screen dimensions don't do well on mobile devices; this gives us two choices:
 - Discourage respondents from using mobile devices
 - Develop mobile versions of Web surveys
- There is great variation in mobile devices (screen size, OS, rendering of static and dynamic elements)
 - Consider providing respondents with a standard device, and designing for that device
 - Measure the device respondents are using as a source of potential variation in responses, i.e., collect paradata or user metrics
 - Test instruments on all major devices

Observations and Implications for Practice 2

- Visibility is a key factor in response choices
 - Make sure that question and all response options are visible without scrolling
 - Avoid compound questions (like grids)
 - Minimize visual clutter (like images)
- Alignment and spacing of response scales affects answer
 - Reduce number of scale points
 - Consider alternative input tools (e.g., enter a number rather than select an option)
 - Consider customized buttons (radio buttons present a small target)
- Don't assume the design findings from Web surveys apply to mobile research; conduct experiments on design alternatives

Thank You

To learn more:

www.WebSM.org

Self-promotion:

