CENTRE FOR SOCIAL INFORMATICS

University of Ljubljana
Faculty of Social Sciences

Grid Questions in PC & Smartphone Surveys

Alternative Layouts & Implications for Data Quality & Survey Estimates

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Session: Overcoming Challenges in Mobile Questionnaire Design

ESRA 2023 CONFERENCE
MILAN, ITALY JULY 17–21

ESRA EUROPEAN SURVEY RESEARCH ASSOCIATION

Background & Motivation

- Grid refers to a table layout for a series of items with the same introduction and identical response categories. We focus here only on rating scales with a single answer.
- Some find negative effects of PC grids: item nonresponse, breakoffs, & satisficing behavior
- Others find benefits: improved duration & interitem consistency
- Layout options: saving space vs. decomposing into item-by-item layouts (with repeated response categories)
- Inconclusive research on SP grids: amplification of PC grid problems vs. minimal impact
- Approach: evaluating grids & item-by-item alternatives on PCs & SPs using response quality indicators (RQIs) & estimates

Grid layout on PCs

Please specify to what extent do you agree or disagree that the computers can be trusted to carry out the following tasks.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Auto completion of text	○	○	○	○	○
Spelling and grammar check	○	○	○	○	○
Selecting a playlist to match my musical preferences	○	○	○	○	○
Selecting the best and most efficient route in my GPS navigation app while driving	○	○	○	○	○
Autonomous driving of a motor vehicle	○	○	○	○	○
Diagnosis of my medical status by an AI system	○	○	○	○	○

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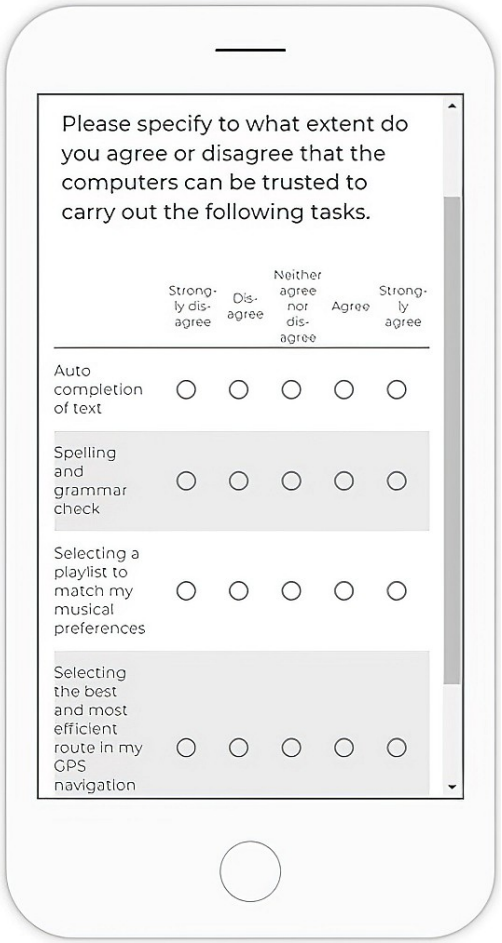
SP Layouts (1)

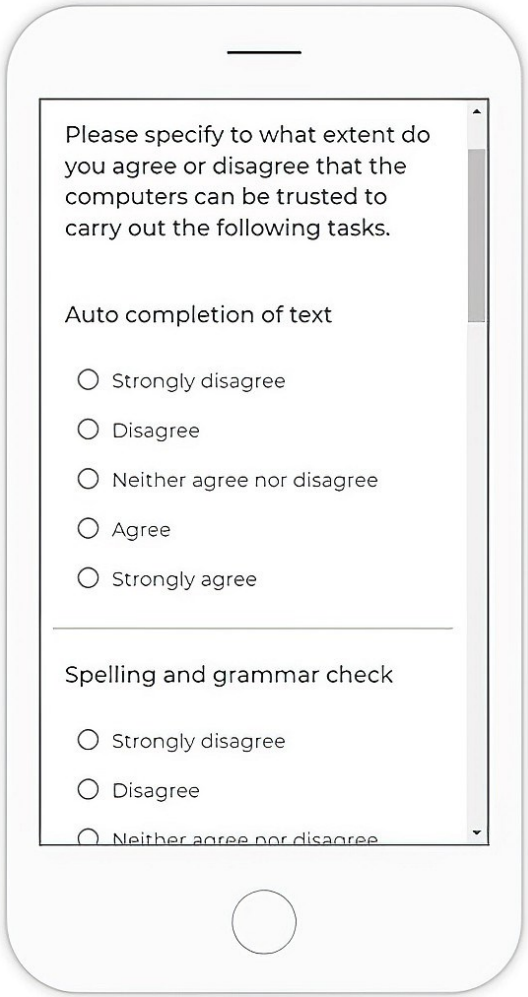
Grid



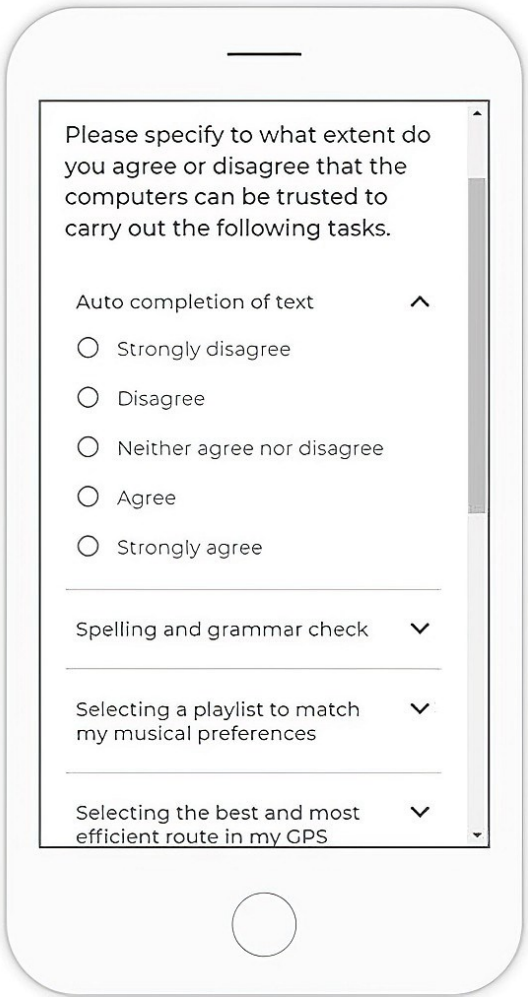
- Five layouts
- PC & SP layout harmonization across five experimental cells
- Mobile-friendly design (grids & visual elements)

SP Layouts (2, 3)

Scrolling

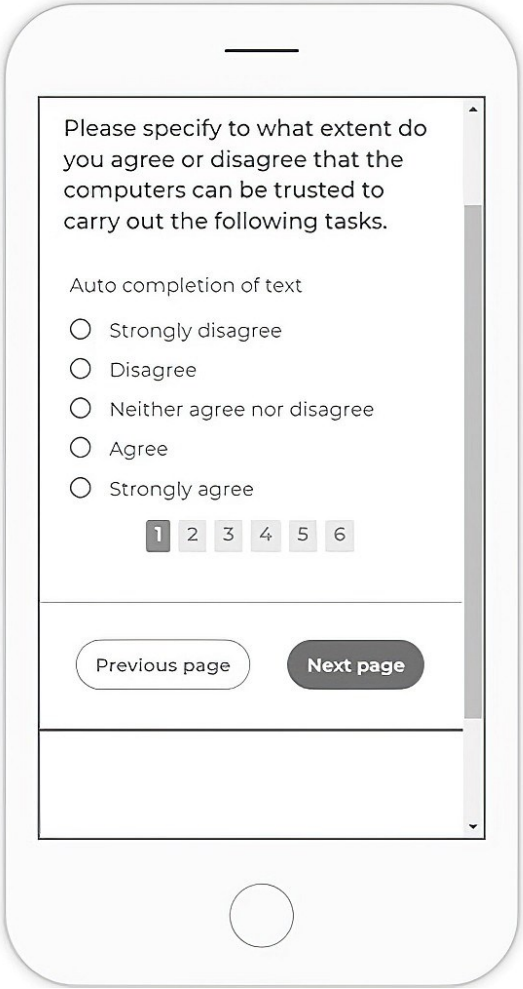


Unfolding

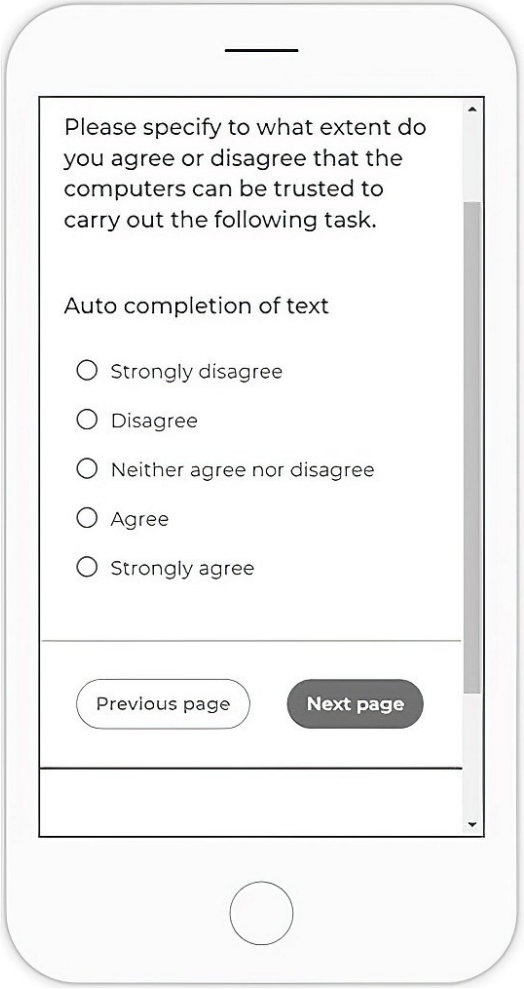


SP Layouts (4, 5)

Horizontal scrolling



Paging



First Study (2020) & Questionnaire

- **Spring 2020**, *n* = 4,644 (panel)
- Grids (5-point scales) & 4 item-by-item layouts (5 random cells)
- 20.6 (19.6–29.1) minutes (paging 50% slower)
- 42 questions, 15 grids (cumulative effects)
- Majority of items in grids
- Incentives (panel loyalty points)
- Soft reminders (possible to skip items)
- Device self-selection (PCs 54%, SPs 46%)
- 20 estimates from 4 attitudinal grids (Big Five personality dimensions, attitudes to online shopping, trust in computers)
- 10 RQIs

Response Quality Indicators

- ***Direct** RQIs* (reflecting actual response quality problems)
  1. Breakoff rate
  2. Item nonresponse rate (INR)
  3. Straightlining (attitudinal grids)
  4. Extreme & midpoint responses (attitudinal grids)
  5. Interitem consistency (Cronbach's α, Big Five grid, reverse-worded)
  6. Instructional manipulation check (IMC; level of inattentiveness)
  7. Outliers (attitudinal grids; Mahalanobis distance)

- ***Indirect** RQIs* (potential negative effects on response quality)
  8. Concurrent and sequential multitasking (MT; self-reported)
  9. Duration of grid questions (15 grids)
  10. Burden evaluation (self-reported)

2020 Results: Layout Effects

- **Response quality**
  - Grid: underperformed vs. unfolding & scrolling
    (PC & SP: INR, straightlining; SP: consistency, IMC; PC: outliers)
  - Unfolding: did not underperform in any RQI
  - Scrolling: similar perf. to unfolding (nonsig. diff. for INR, IMC)
  - Horiz. scrolling: severe drawbacks for INR
  - Paging: duration, breakoffs, MT (against) vs. consistency, INR (for)

- **Few differences in estimates** (20 estimates, 5 layouts by 2 devices)
  - Grid: **1** relative diff. >5%
  - Unfolding & Scrolling: no effects
  - Horiz. scrolling & Paging: **2** r.d. >5%

2020 Results: Device Effects

- **Response quality**
  - Grid: largest differential effects, particularly breakoffs & consistency
  - Unfolding: almost no neg. effects, SP burden 10% larger vs. PC
  - Scrolling: almost no neg. effects, SP respondents 11% faster vs. PC
  - Horiz. scrolling: large differential effects for INR and breakoffs (PC advant.)
  - Paging: lowest overall device effects, PC <50% breakoff rate vs. SP

- **Differences in estimates** (20 estimates, 5 layouts)
  - Grid: **3** relative diff. >5%
  - Unfolding & Scrolling: **1** r.d. >5%
  - Paging: **3** r.d. >5%
  - Horiz. scrolling: **7** r.d. >5%

Second Study (2022) & Questionnaire

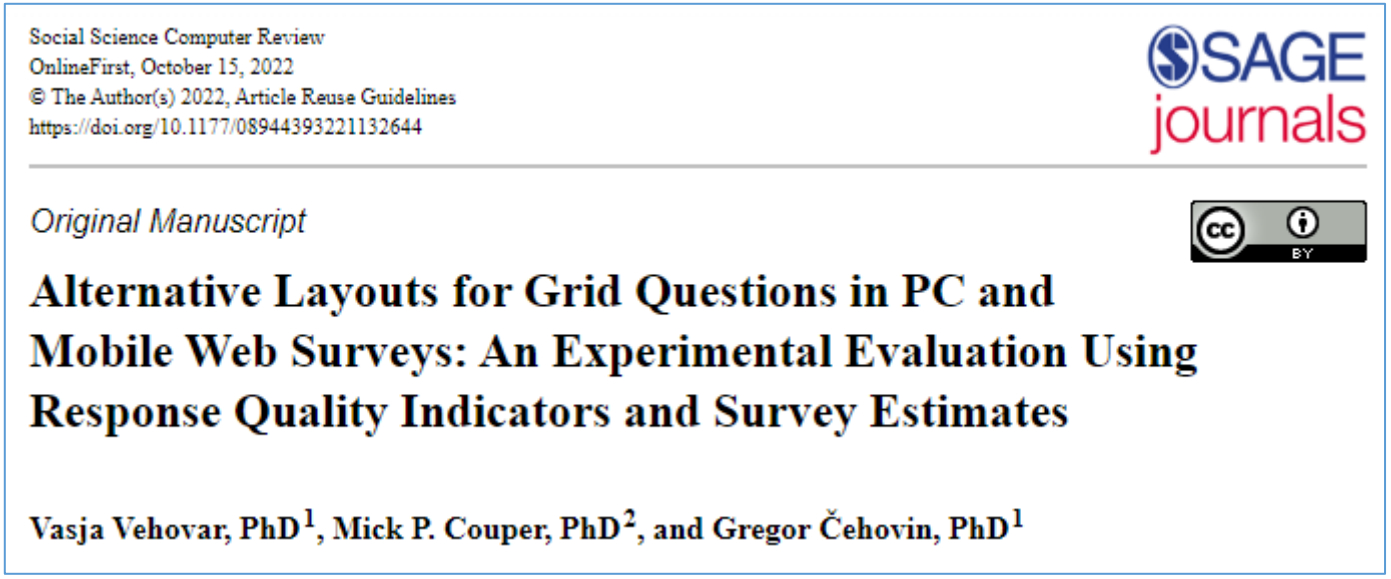
- **Winter 2022**, *n* = 1,546 (panel)
- 40% of items from grids (77 of 178 items)
- Paging vs. scrolling layout (2 random cells)
- 18.5 (17.9–19.4) minutes (paging 10% slower)
- Incentives (panel loyalty points)
- Soft reminders (possible to skip items)
- Device self-selection (PCs 37%, SPs 63%)
- 10 RQIs

2022 Results: Layout Effects

- Follow-up experiment on paging design
- Paging vs. scrolling: Response quality
- Effects from the first study existed but were not significant
  - Paging took 10% longer (median), had more breakoffs, & higher self-reported burden (nonsignificant)
  - Higher item nonresponse rate for scrolling ($p < 0.001$)
- Lower effects due to smaller share of grids

Discussion

- **Summary of findings** (SSCR, DOI: 10.1177/08944393221132644)
  - PCs & SPs: Grids can be safely replaced by scrolling or unfolding
  - Decomposing: Beneficial also on PCs
  - Grids were much faster vs. paging – but not vs. scrolling or unfolding
  - Precise choice of layout: Study circumstances & researcher's preferences
  - Reverse-worded items: Consistency advantage of grids diminishes



Social Science Computer Review
OnlineFirst, October 15, 2022

https://doi.org/10.1177/08944393221132644

SAGE journals

Original Manuscript

Alternative Layouts for Grid Questions in PC and Mobile Web Surveys: An Experimental Evaluation Using Response Quality Indicators and Survey Estimates

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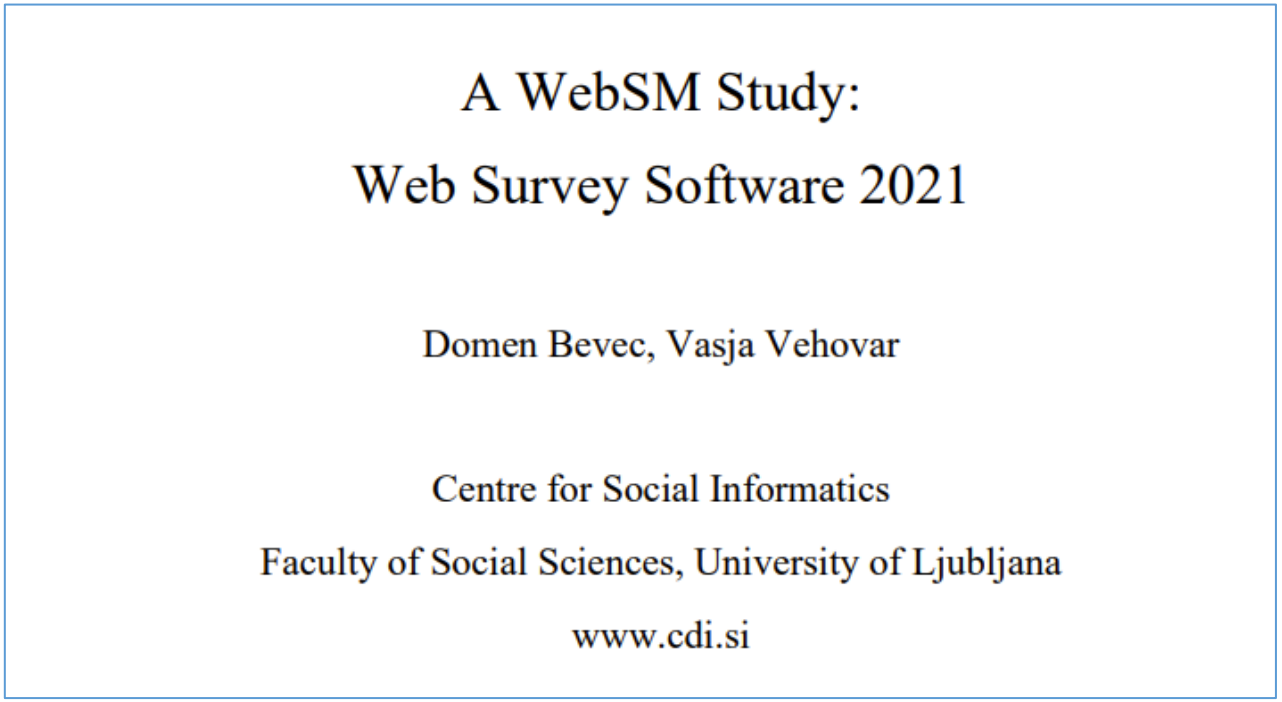
Survey Software

- **The role of survey software** (http://paperseries.cdi.si/)
  - Software routinely decompose grids on SPs, scrolling leads
  - Software routinely keep grids on PC
  - Suggestion 1: Incorporate item-by-item layouts on PCs
  - Suggestion 2: More item-by-item alternatives for researchers


A WebSM Study:

Web Survey Software 2021

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Challenges

- Grids do not seem to have an advantage (at least for rating scales)
- No definite answer for paging vs. scrolling:
  - Paging takes longer with more breakoffs and higher burden
  - Response quality might be better for cognitive processing
- Unclear which of the above prevails
- Internet and device speed
- Future research should also address validity, reliability, and accuracy (particularly bias) of survey estimates

Thank You for Attending

Questions & Discussion