

Re-examining the middle means typical heuristic using eye-tracking methodology

Höhne¹², Lenzner³, Neuert³, & Yan⁴

¹University of Mannheim, Germany

²RECSM-Universitat Pompeu Fabra, Spain

³GESIS – Leibniz Institute for the Social Sciences, Germany

⁴Westat, USA

73rd AAPOR CONFERENCE

Denver, CO (USA) – May 16 to 19, 2018

Introduction I

- Web surveys use written language to convey information.
 - *Textual information.*
- This language is accompanied by visual cues.
 - *Non-textual information.*
 - *Additional source of information.*
- Reasons for the use of visual material.
 - *Helping respondents to correctly fill out questionnaires.*
 - *Making the survey experience more enjoyable.*

Introduction II

- Visual cues/material can affect response behavior.
 - *Cognitive question processing.*
 - *Response distributions.*
 - *Data quality (e.g., reliability and validity).*
- “Cooperative communicators” (Schwarz, 1996).
 - *Respondents use any information provided by the instrument.*
- Application of interpretive heuristics in survey responding (Tourangeau et al., 2000).

Interpretive Heuristics I

- Tourangeau et al. (2004) proposed five interpretive heuristics in survey responding:
 - *Middle Means Typical,*
 - *Left and Top Means First,*
 - *Near Means Related,*
 - *Up Means Good,*
 - *Like means close.*

THESE HEURISTICS ASSIGN MEANING TO SPATIAL AND/OR VISUAL CUES IN SURVEYS.

Interpretive Heuristics II

- Middle Means Typical (MMT):
 - *The middle option is used as a reference point.*
 - *It serves as a standard of comparison.*
- Tourangeau et al. (2004, p. 373-76) manipulated the presentation of the midpoint (see Experiment 1 and 2).
 - *Conceptual = visual midpoint vs. conceptual \neq visual midpoint.*
- The authors report the following results:
 - *Shift in responses if conceptual \neq visual midpoint.*
 - *Higher amount of non-substantive responses if conceptual \neq visual midpoint.*

Screenshots: Tourangeau et al. (2004)

Think of how much the federal government is doing to make sure women have the same job opportunities as men. Would you say the federal government is doing too much, about the right amount, or too little about this?

- Far too much
- Too much
- About the right amount
- Too little
- Far too little
- Don't know
- No opinion

< Back | Next >

Conceptual midpoint \neq visual midpoint

Conceptual midpoint = visual midpoint

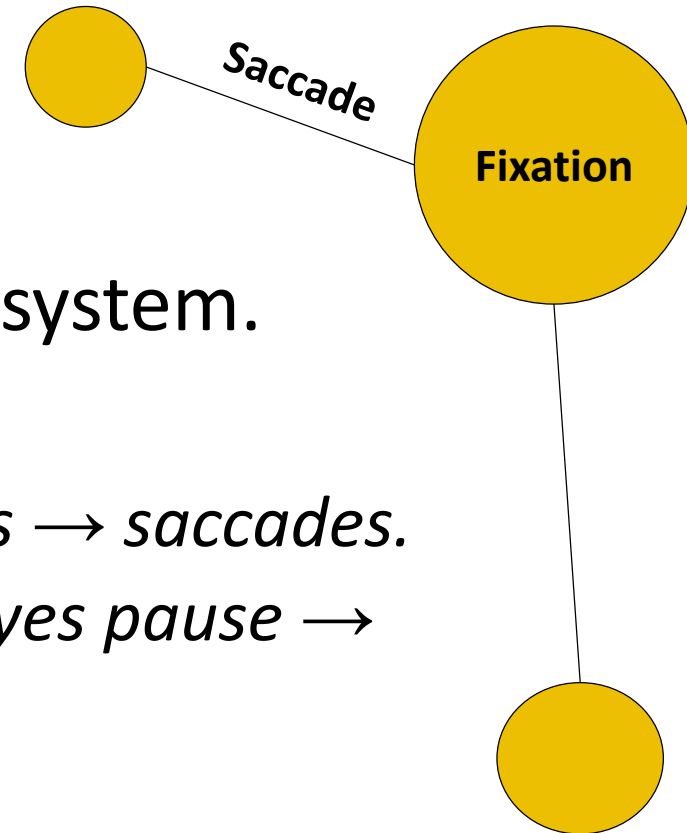
Think of how much the federal government is doing to make sure women have the same job opportunities as men. Would you say the federal government is doing too much, about the right amount, or too little about this?

- Far too much
- Too much
- About the right amount
- Too little
- Far too little
- Don't know
- No opinion

< Back | Next >

Note. Screenshots were taken from Tourangeau et al. (2004, p. 375).

Eye-tracking methodology



- We used a SMI RED250 mobile eye-tracking system.
- Gaze behavior classification:
 - *During reading the eyes make quick movements → saccades.*
 - *They are accompanied by moments when the eyes pause → fixations.*

Immediacy assumption

Interpretations at all levels of processing are not deferred.

Eye-mind assumption

Fixation time corresponds to the duration of central processing.

Research Hypotheses

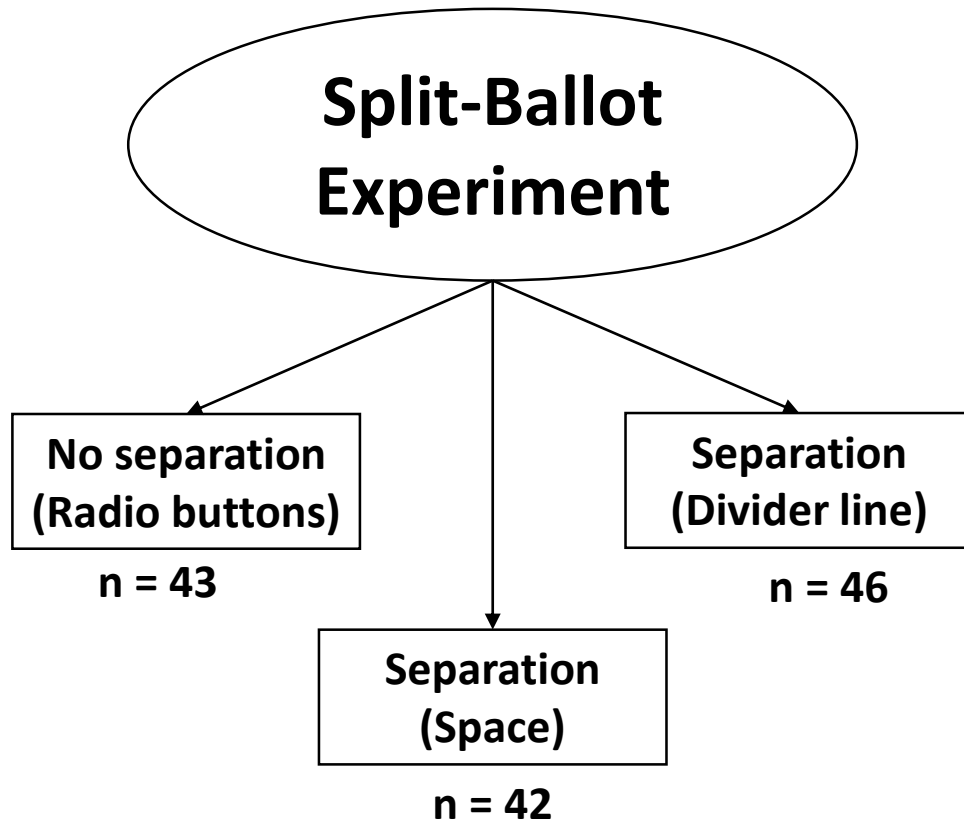
H1: Respondents fixate equally long and often on the visual midpoint, irrespective of whether it coincides with the conceptual one.

H2: Respondents fixate longer and more often on the visual midpoint than on the conceptual one if the visual midpoint is unequal to the conceptual one.

H3: If the visual midpoint is placed to one side of the conceptual one, respondents fixate longer and more often on the substantive options of this side.

H4: Respondents fixate longer and more often on the non-substantive response options if these are separated from the other options by a space or divider line.

Methods: Research Design



- The experiment is a “direct” replication of Tourangeau et al. (2004) → N = 131.
- All groups received 2 questions dealing with the performance of the government.
- We used response scales with a vertical alignment.
- Each question was presented individually.
- We used black text with a white background.

Methods: Participants

The study was conducted in the pretest lab at the GESIS – Leibniz Institute for the Social Sciences in April 2017.

Final Sample Size: *N = 114*
Gender: *50% female*
Age (in years): *38% (18-24), 38% (25-44), 19% (45-64), 5% (65 or older)*
Education: *7% lower secondary school*
14% intermediate secondary school
79% at least college preparatory secondary school
Survey Experience: *37% participated in a web survey once before*

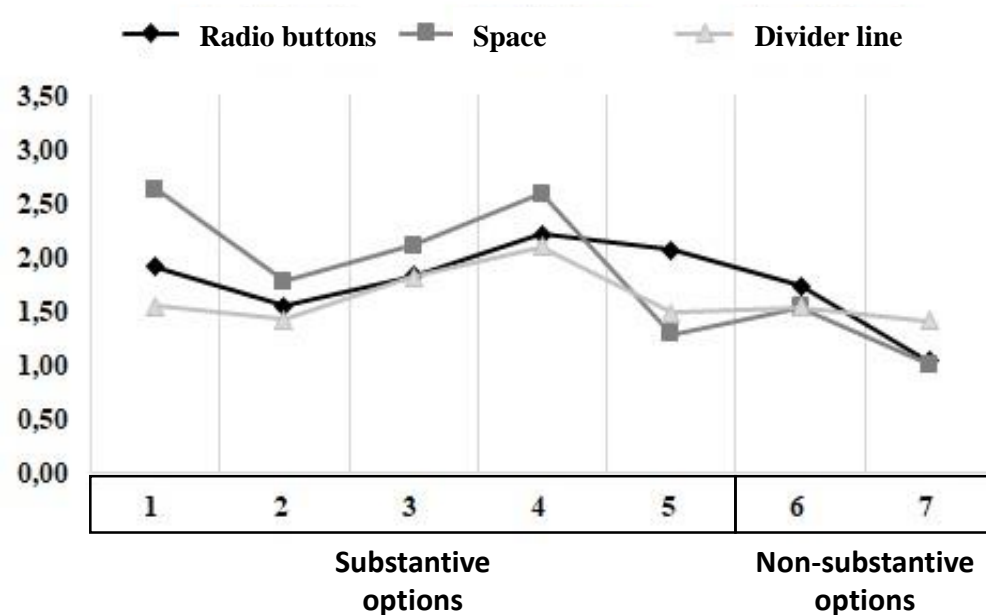
Note. We conducted chi-square tests to evaluate the random assignment. There were no significant differences between the three experimental groups regarding gender, age, education, and survey experience.

Methods: Analytical Strategy

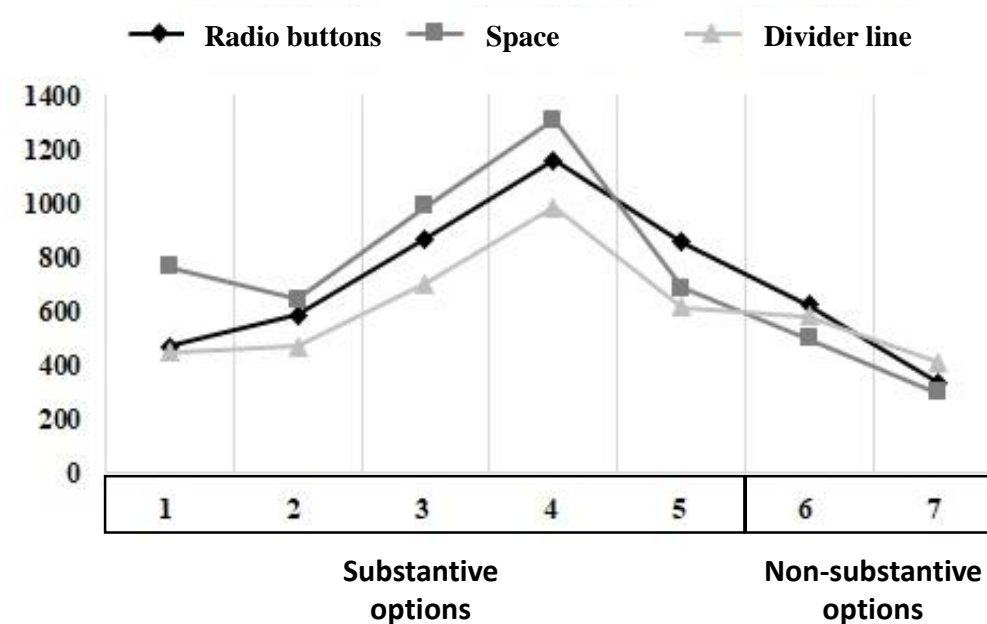
- Eye-tracking parameters:
 - *Fixation count,*
 - *fixation time.*
- General linear models and effect sizes.
 - *ANOVA and Cohen's d.*
- Eye-tracking data aggregation for the two questions.
 - *No substantial differences between questions.*
- All analyses were conducted with Stata version 13.

Results: Mean Fixation Count and Time

FIXATION COUNT



FIXATION TIME



Note. Conditions: 1) radio buttons, 2) space, and 3) divider line. Response options: 1) far too much, 2) too much, 3) about the right amount, 4) too little, 5) far too little, 6) don't know, and 7) no opinion. Fixation time is stated in milliseconds (ms).

Results: Statistical Tests (Fixation Count)

Research Hypotheses	Results
H1: Visual midpoints <i>(between conditions 1, 2, and 3)</i>	$p = 0.685$ ($d < 0.20$) <i>Supporting evidence</i>
H2: Conceptual vs. visual midpoint <i>(within condition 1)</i>	$p = 0.061$ ($d > 0.30$) <i>Supporting evidence</i>
H3: Option 4 (too little) and 5 (far too little) <i>(between conditions 1, 2, and 3)</i>	$p = 0.562$ ($d < 0.20$) <i>No supporting evidence</i>
H4: Non-substantive options <i>(between conditions 1, 2, and 3)</i>	$p = 0.589$ ($d < 0.30$) <i>No supporting evidence</i>

Results: Statistical Tests (Fixation Time)

Research Hypotheses	Results
H1: Visual midpoints <i>(between conditions 1, 2, and 3)</i>	$p = 0.141$ ($d < 0.50$) <i>Supporting evidence</i>
H2: Conceptual vs. visual midpoint <i>(within condition 1)</i>	$p = 0.034$ ($d > 0.30$) <i>Supporting evidence</i>
H3: Option 4 (too little) and 5 (far too little) <i>(between conditions 1, 2, and 3)</i>	$p = 0.530$ ($d < 0.30$) <i>No supporting evidence</i>
H4: Non-substantive options <i>(between conditions 1, 2, and 3)</i>	$p = 0.503$ ($d < 0.30$) <i>No supporting evidence</i>

Limitations

- Small sample size (N = 131).
- Highly educated respondents.
- Only two questions.
- No investigation of data quality.
 - *E.g., criterion validity.*

Summary & Conclusion

- The results only partially support the assumptions made by Tourangeau et al. (2004).
 - *Some evidence for H1 and H2.*
- The visual midpoint does not always get most attention.
- No differences in the shift of attention can be observed.
- Separation of non-substantive options does not draw attention towards these options.
- Overall effects of the MMT heuristic seem to be relatively weak.

Many thanks for your attention!

Contact: hoehne@uni-mannheim.de

Literature

- Schwarz, Norbert. 1996. *Cognition and communication: Judgmental biases, research methods, and the logic of conversation*. Mahwah: Lawrence Erlbaum Associates.
- Tourangeau, Roger, Mick P. Couper, and Frederick G. Conrad. 2004. "Spacing, position, and order. Interpretive heuristics for visual features of survey questions." *Public Opinion Quarterly* 68(3):368–393.
- Tourangeau, Roger, Lance L. Rips, and Kenneth Rasinski. 2000. *The Psychology of Survey Response*. New York: Cambridge University Press.

Appendix: Question Wording

Experimental Question (EQ) 1:

Think of how much the federal government is doing to make sure women have the same job opportunities as men. Would you say the federal government is doing too much, about the right amount, or too little about this?

Experimental Question (EQ) 2:

Think of how much the federal government is doing to provide day care centers for the children of working parents. Would you say the federal government is doing too much, about the right amount, or too little about this?

Response options (EQ 1 & 2):

1) far too much, 2) too much, 3) about the right amount, 4) too little, 5) far too little, 6) don't know, 7) no opinion

Appendix: Screenshots of Conditions



Denken Sie daran, wie viel die Bundesregierung unternimmt, um sicherzustellen, dass Frauen die gleichen Beschäftigungsmöglichkeiten haben wie Männer: Würden Sie sagen die Bundesregierung unternimmt zu viel, ausreichend oder zu wenig?

- Viel zu viel
- Zu viel
- Ausreichend
- Zu wenig
- Viel zu wenig
- Weiß nicht
- Habe keine Meinung

Weiter



Denken Sie daran, wie viel die Bundesregierung unternimmt, um sicherzustellen, dass Frauen die gleichen Beschäftigungsmöglichkeiten haben wie Männer: Würden Sie sagen die Bundesregierung unternimmt zu viel, ausreichend oder zu wenig?

- Viel zu viel
- Zu viel
- Ausreichend
- Zu wenig
- Viel zu wenig
- Weiß nicht
- Habe keine Meinung

Weiter



Denken Sie daran, wie viel die Bundesregierung unternimmt, um sicherzustellen, dass Frauen die gleichen Beschäftigungsmöglichkeiten haben wie Männer: Würden Sie sagen die Bundesregierung unternimmt zu viel, ausreichend oder zu wenig?

- Viel zu viel
- Zu viel
- Ausreichend
- Zu wenig
- Viel zu wenig
- Weiß nicht
- Habe keine Meinung

Weiter