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Understanding item nonresponse patterns in cross-national self-administered web and paper surveys

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Utrecht, Netherlands

europeansocialsurvey.org

ESS is a European Research Infrastructure Consortium (ESS ERIC)



Background and purpose

- The European Social Survey is moving to a self-completion web and paper approach after collecting data via face-to-face interviews for 11 rounds (over 20 years).
- We expect higher item nonresponse in self-completion – and have consistently observed this when conducting full-scale self-completion surveys across Europe.
- The aim of this presentation is to dive deeper into the patterns of item nonresponse in ESS self-completion surveys.
- This covers analysing nonresponse patterns across ...
 - web devices and the paper questionnaire
 - different types of questions in the questionnaire
 - respondent characteristics (i.e. socio-demographics)

Literature

- High item nonresponse can be a symptom of poor data quality (Groves et al. 2011) and lead to nonresponse bias for survey estimates (Bethlehem & Biffignandi, 2012)
- There is a general consensus that item nonresponse is more of an issue in paper than web surveys (Čehovin et al. 2023; Rada & Domínguez-Álvarez, 2014; Denscombe, 2009)
- Open-response and grid questions lead to higher item nonresponse compared to standalone response scales (Blumenberg et al. 2018; Rada & Domínguez-Álvarez, 2014; Messer et al. 2011) as well as questions that follow routing instructions (Wolfe et al. 2008; Messmer & Seymour, 1982)
- Older, lower-educated respondents are more likely to skip more questions in self-completion (Blumenberg et al. 2018; Messer et al. 2011). Results have been mixed concerning the effects of sex (Colsher & Wallace, 1989; Guadagnoli & Cleary, 1992) whilst the effects of citizenship status have been rarely explored.

Research Questions

For ESS self-completion surveys...

1. **Overall:** Does the level of item nonresponse vary by mode – **1a)** web vs paper and **1b)** device type among web responses?
2. **Questionnaire design:** Are particular types of questions more likely to be skipped on paper than on web (e.g. open response questions or questions with complex instructions)?
3. **Respondents: 3a)** Do demographic characteristics such as age and education affect a respondent's tendency to skip questions?
→ **3b:** Are relationships between respondent demographics and item non-response moderated by mode, including device type?

Analysis plan

Data Source

- Self-completion surveys conducted during or alongside Round 10 (2021-2022) in 12 countries with the same questionnaire
- Focus on the core questionnaire which is repeated each round – results will be more transferrable to future rounds

Definitions

- Item-level nonresponse rate = for a given **question**, the **proportion of missing answers** among respondents who were shown the question on web, or should have answered on paper.
- Respondent-level item nonresponse rate = for a given **respondent**, the **proportion of questions** that the respondent chose not to answer, out of the questions shown on web, or that they should have answered on paper
- Routed items = questions that follow routing (branching) instructions in the paper questionnaire

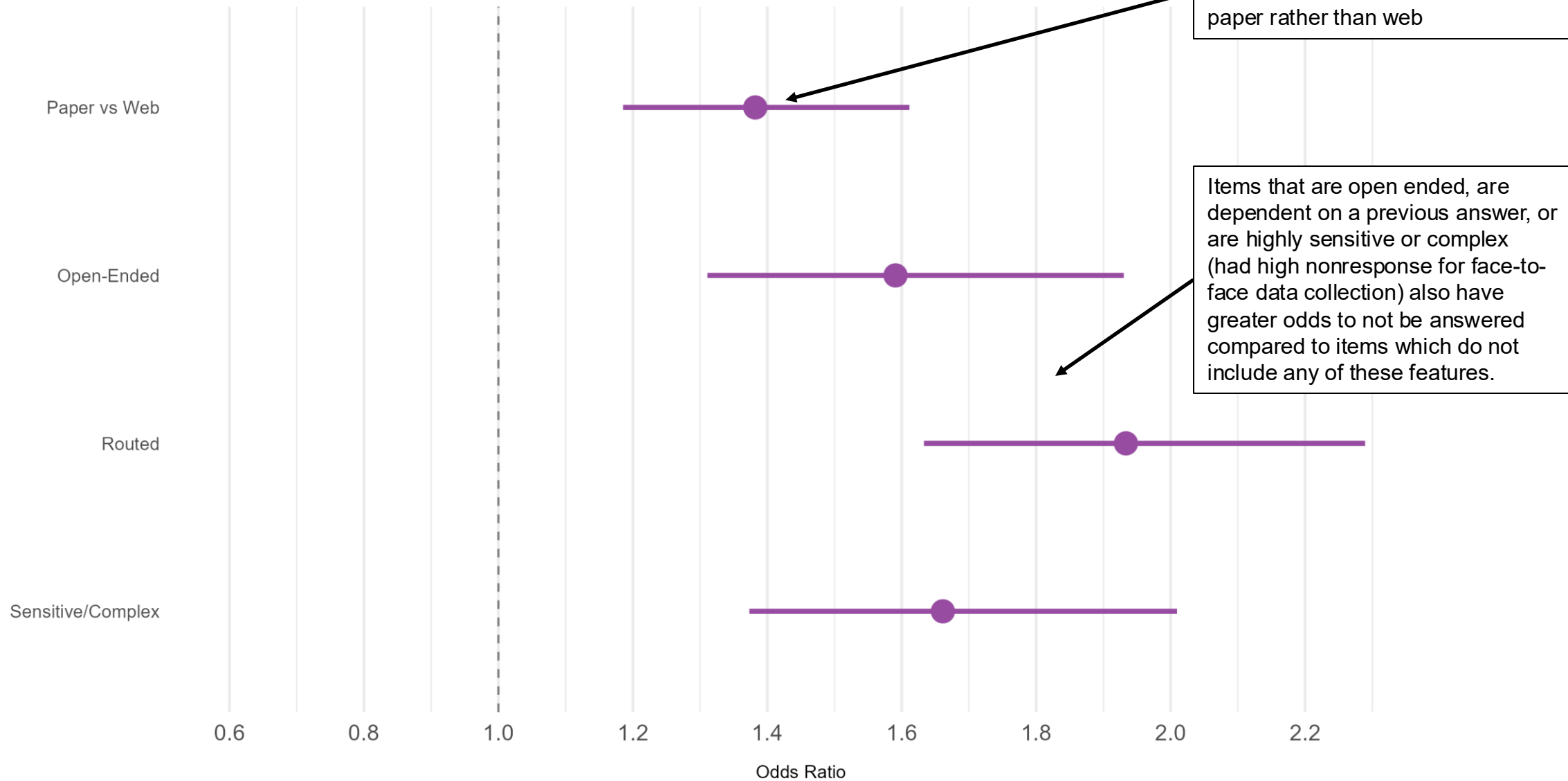
Analysis plan (2)

- **Beta regression** used to model the effects of variables on the proportion of non-response of either a question or a respondent
 - Best fit model when the variable of interest is continuous, restricted to the interval (0, 1) and a proportion or a rate. The model is based on the assumptions that the response is beta-distributed, is naturally heteroskedastic and easily accommodates for asymmetries (Ferrari & Cribari-Neto, 2004).
 - When the nonresponse rate was either 0 or 1 the proportion was converted to 1e-09 or 9.9999999e-01 respectively.
- **Generalised linear model** used to measure whether item non-response (1) is more likely to occur at questions preceded by detailed routing instructions in paper over web, controlling for demographic characteristics.

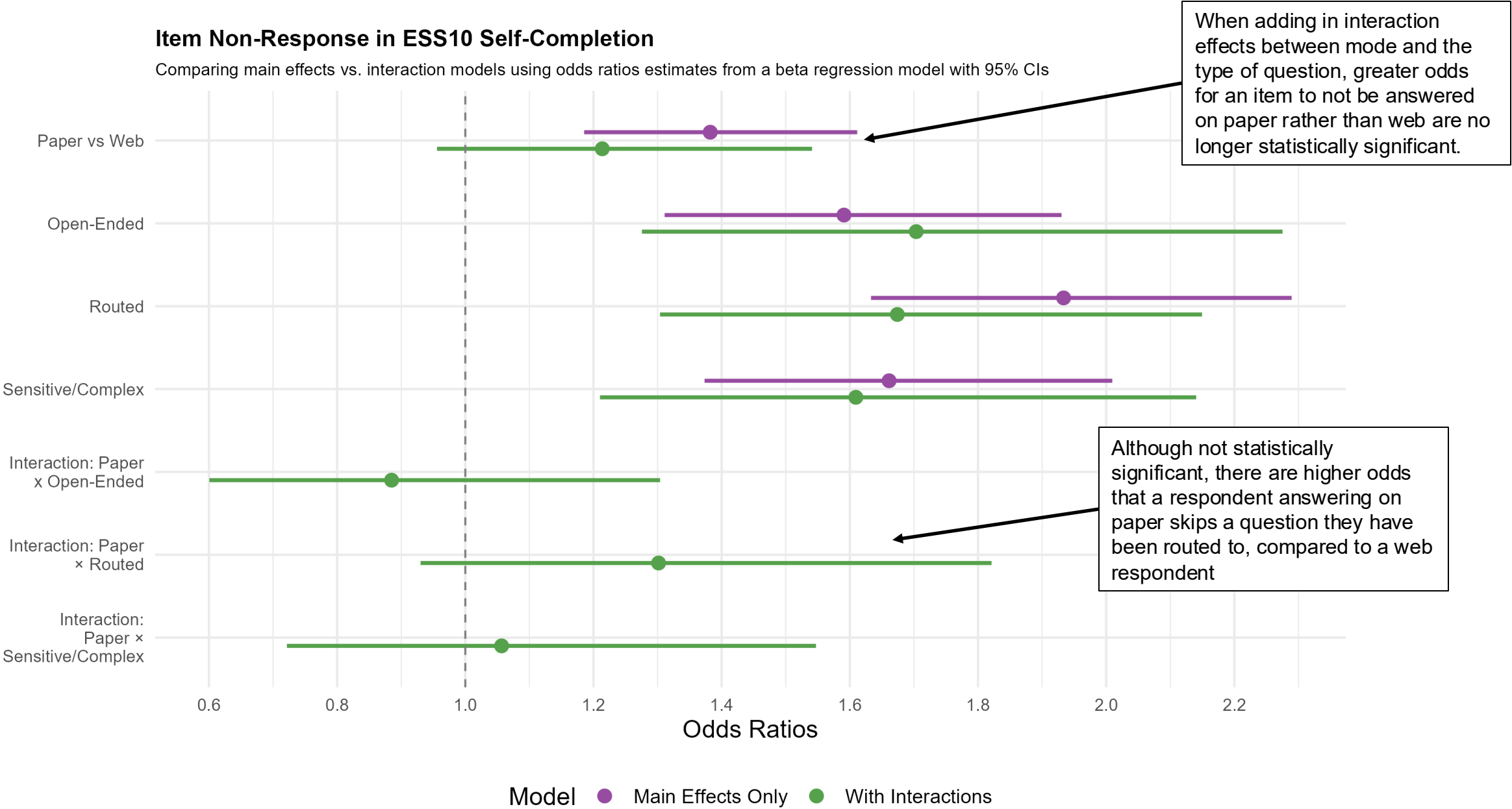
RQ1a: Does the level of item nonresponse vary by self-completion mode (web vs paper)?

Item Non-Response in ESS10 Self-Completion

Odds ratios from a beta regression main effects model with 95% confidence intervals



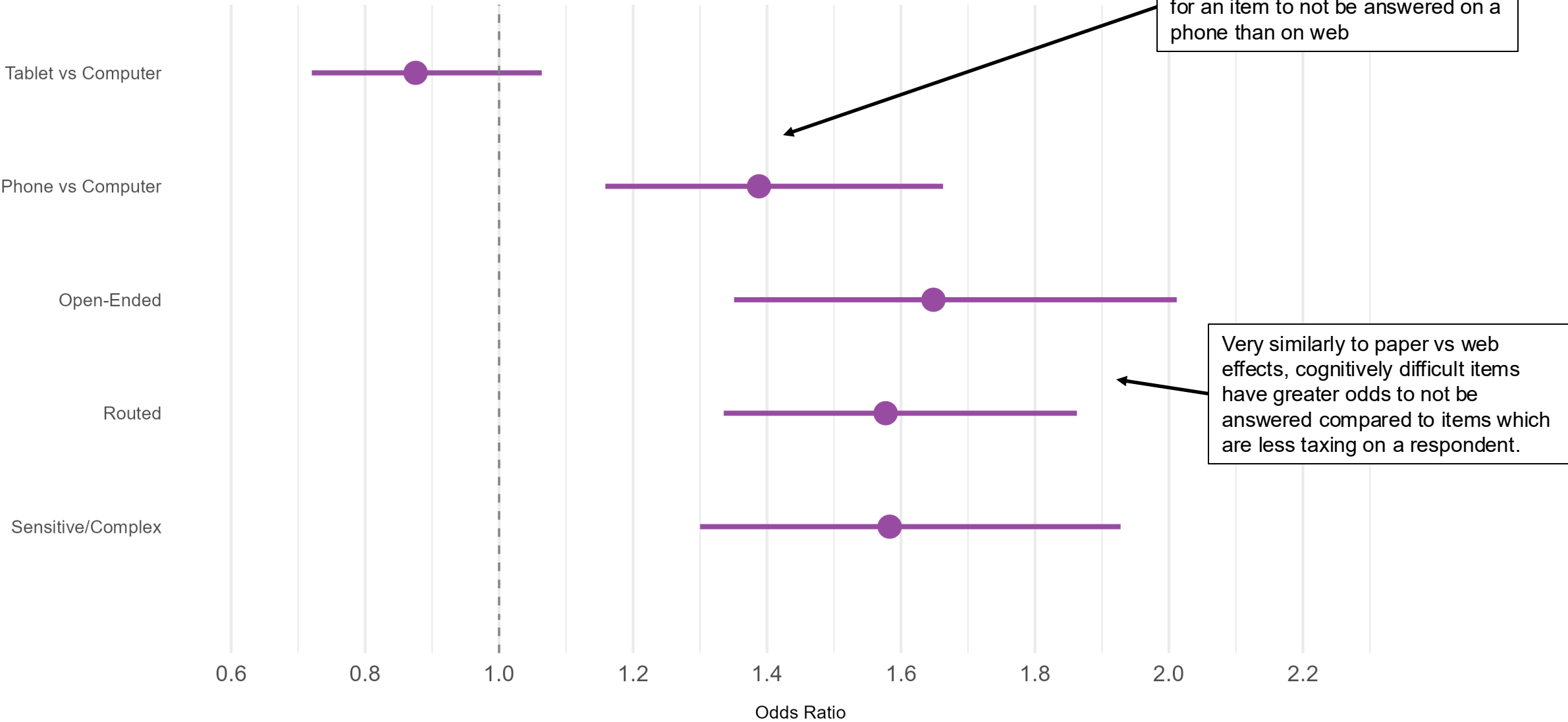
Is greater nonresponse on paper moderated by question type?



RQ1b: Does the level of item nonresponse vary by self-completion mode (web device type)?

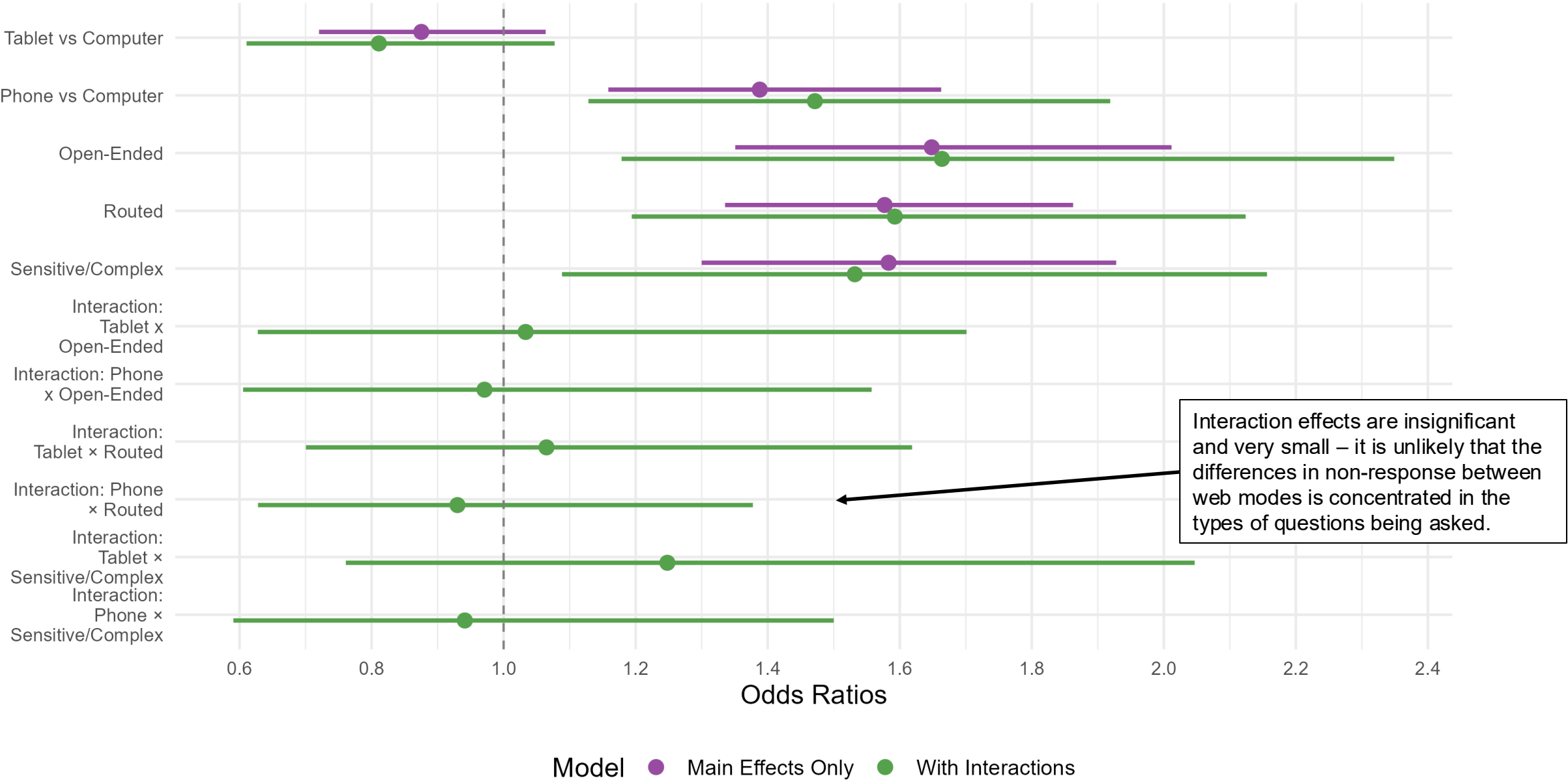
Item Non-Response in ESS10 Self-Completion

Odds ratios from a beta regression main effects model with 95% confidence intervals



Item Non-Response in ESS10 Self-Completion

Comparing main effects vs. interaction models using odds ratios estimates from a beta regression model with 95% CIs



RQ2: Are particular types of questions more likely to be skipped on paper than on web?

Key questions following routing instructions on paper

Household Composition Items

F1 Including yourself, how many people – including children – live here regularly as members of this household?

TYPE IN NUMBER:

(Refusal) 77
(Don't know) 88

[Programme F2 and F3 so that they are coded/asked first about the respondent, and then about each household member. Before asking F2 and F3 about the respondent, display the text below.]

C4 We would like to know about the other people – including children – who live in your household. By this we mean anyone else whose main residence is your home, who shares your living areas with you.

→ Please fill in the following questions on pages 14-15 for up to 8 people living in your household, starting with your direct relatives before adding in other household members.

→ If you are the only person in your household skip to C6 on page 16.

Details of other people who live in your household

Person 1	Person 3
First name or initial (optional)	First name or initial (optional)
Their sex is...	Their sex is...
1 ☐ Male 2 ☐ Female	1 ☐ Male 2 ☐ Female
Month and year they were born...	Month and year they were born...
This person is my...	This person is my...
1 ☐ Husband / wife / partner	1 ☐ Husband / wife / partner
2 ☐ Son / daughter (including step, adopted, foster, child of partner)	2 ☐ Son / daughter (including step, adopted, foster, child of partner)
3 ☐ Parent, parent-in-law, partner's parent, step parent	3 ☐ Parent, parent-in-law, partner's parent, step parent
4 ☐ Brother / sister (including step, adopted, foster)	4 ☐ Brother / sister (including step, adopted, foster)
5 ☐ Other relative	5 ☐ Other relative
6 ☐ Other non-relative	6 ☐ Other non-relative

- The items followed complex and lengthy instructions on paper which did not appear on web. These also included potentially misleading arrows.
- Other questions facing this issue included one asking respondents if they are/were an employee or self-employed in their most recent job.

Currently Employed Check

ASK IF NOT IN PAID WORK AT F17a (IF NOT 01 at F17a)

F18 Can I just check, did you do any paid work of an hour or more in the last seven days?

C15 → If you are in paid work (or temporarily away), skip to C18-33 across.

→ If you are not in paid work, please answer this question.

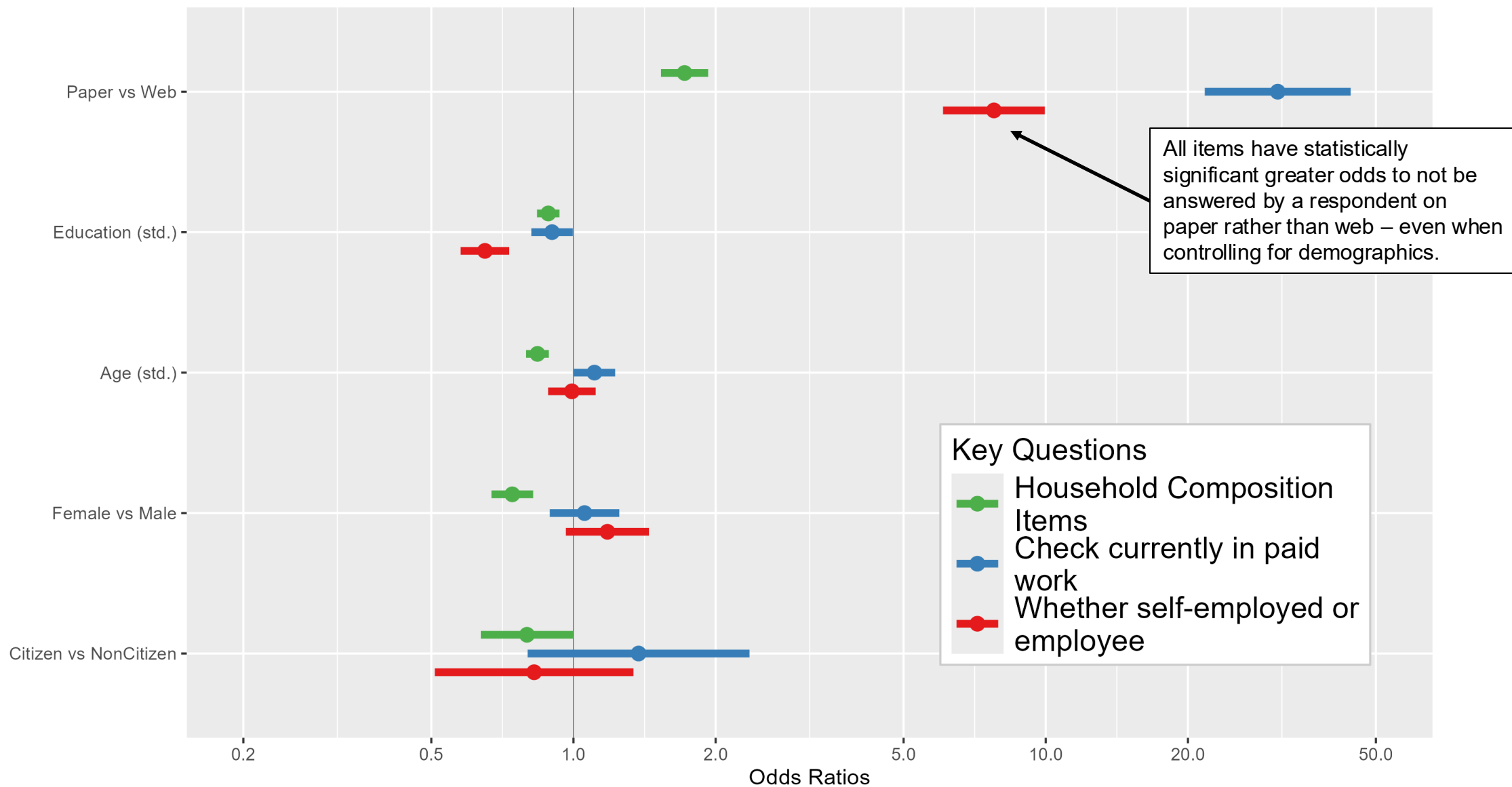
Did you do any paid work of an hour or more in the last 7 days?

1 ☐ Yes → Skip to C18-33 across

2 ☐ No → Continue to C16 below

- The item follows complex instructions on paper, these counterintuitively instruct a respondent to answer about having done any paid work if they are not currently in paid work – these did not appear on web.
- The question was asked more naturally in a face-to-face context (the mode for which the item was designed)

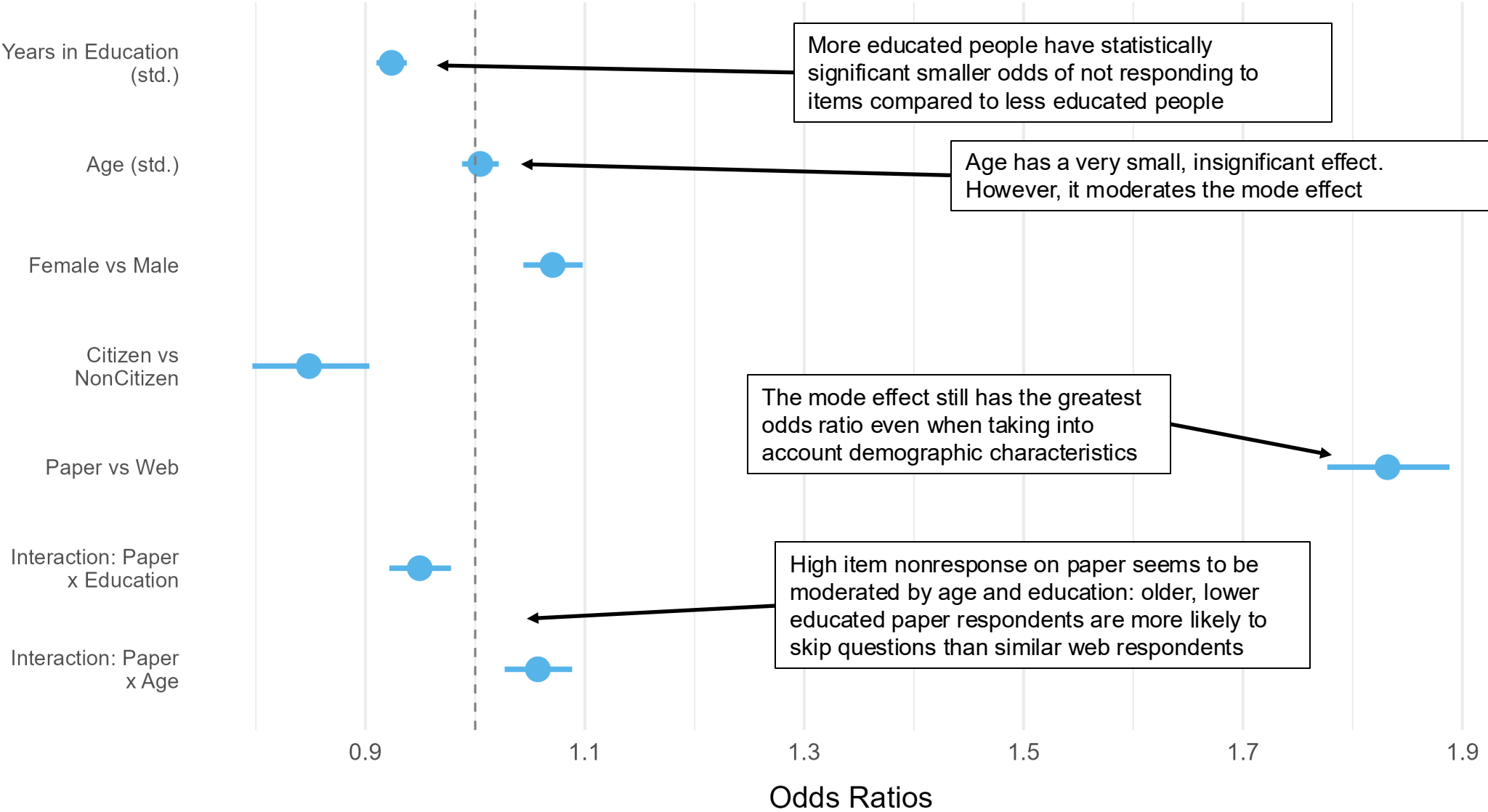
Predictors of nonresponse to items with complex instructions (Binomial Regression)



RQ3a: Do demographic characteristics affect a respondent's tendency to skip questions?

Respondent Item Non-Response in ESS10 Self-Completion

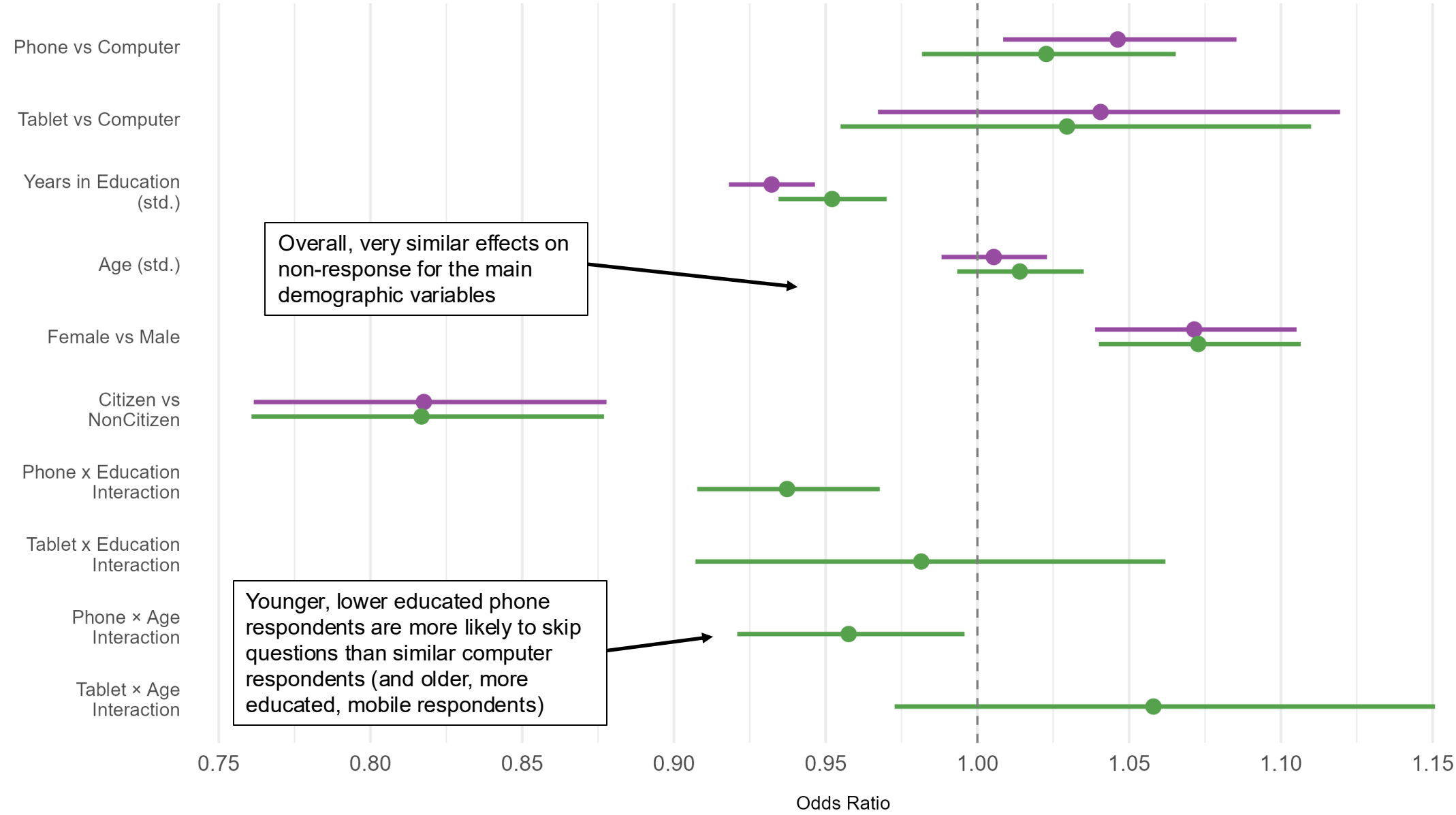
Odds ratios from a beta regression model with 95% confidence intervals



*Also controlling for country-level effects

Web Respondent Non-Response in ESS10 Self-Completion

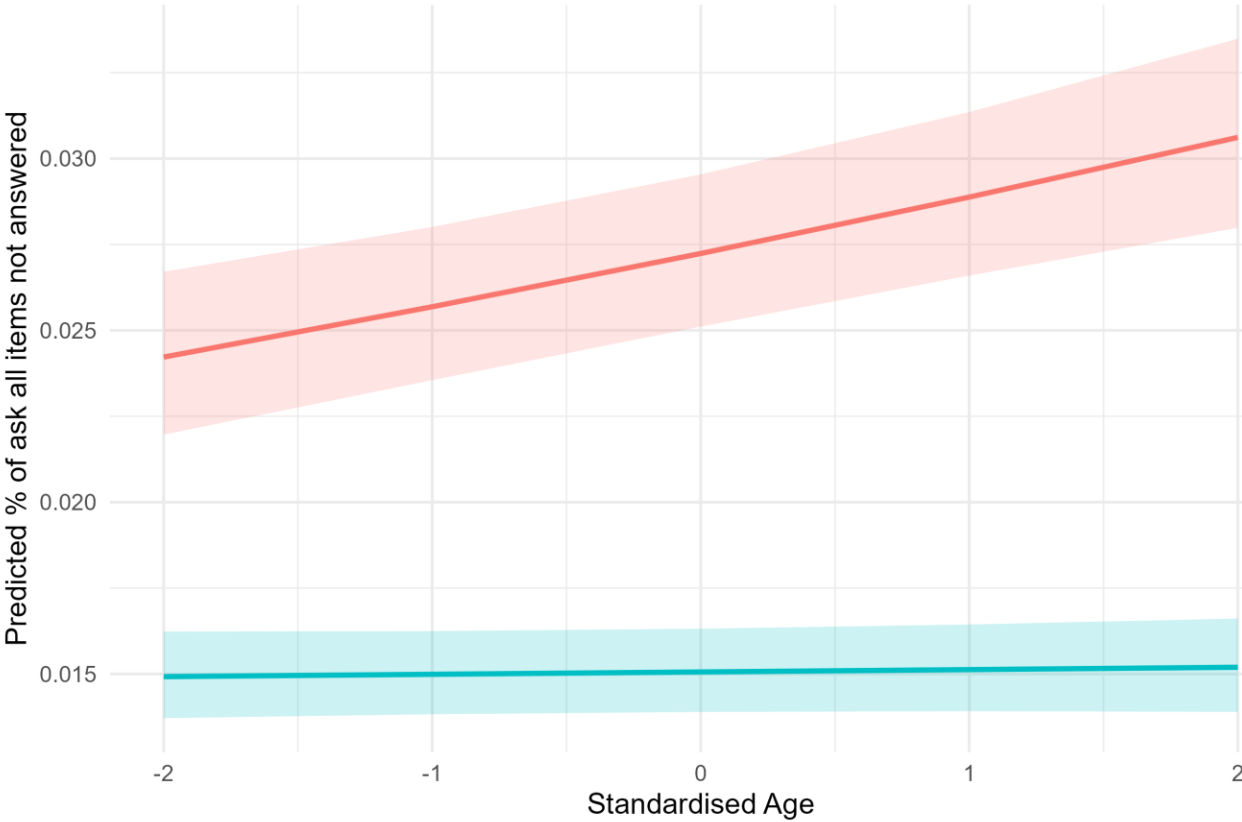
Comparing main effects vs. interaction model using odds ratio estimates from a beta regression model with 95% CIs



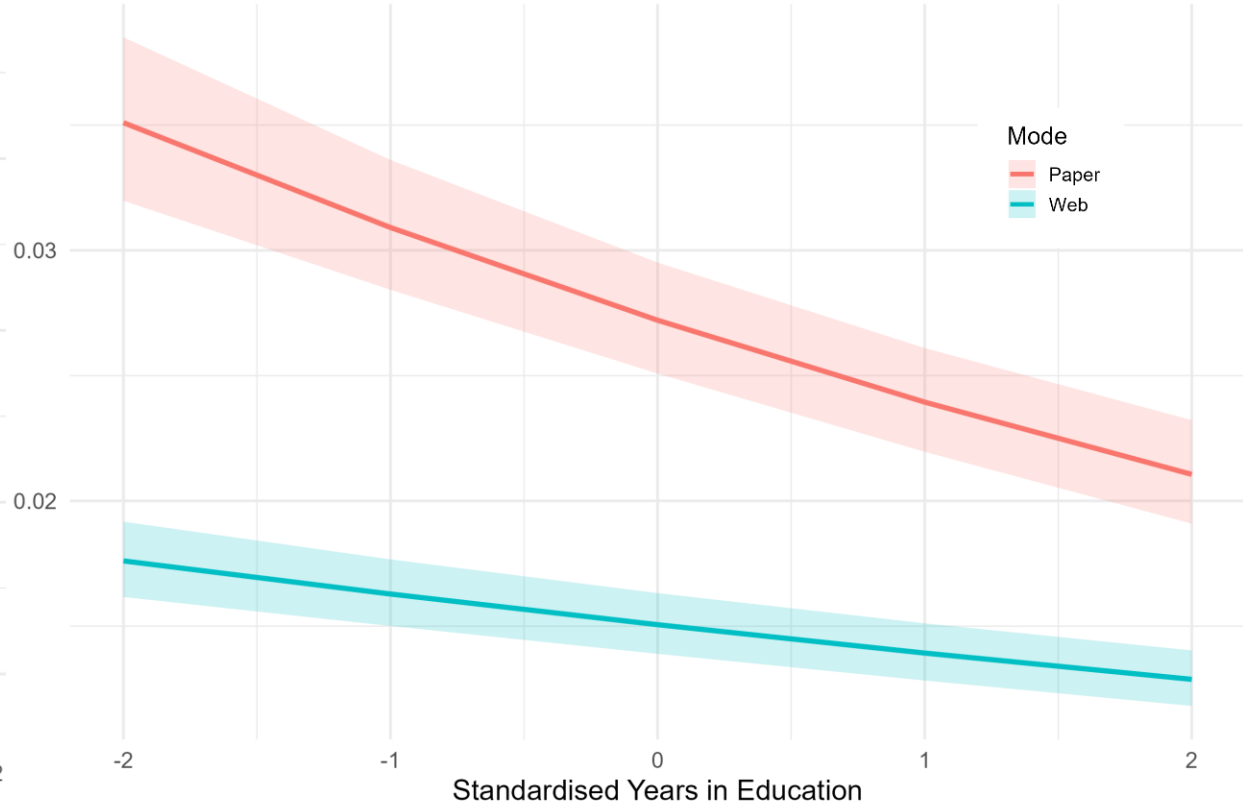
RQ3b: Are relationships between demographics and item non-response moderated by mode, including device type?

Interaction between mode and demographic characteristics

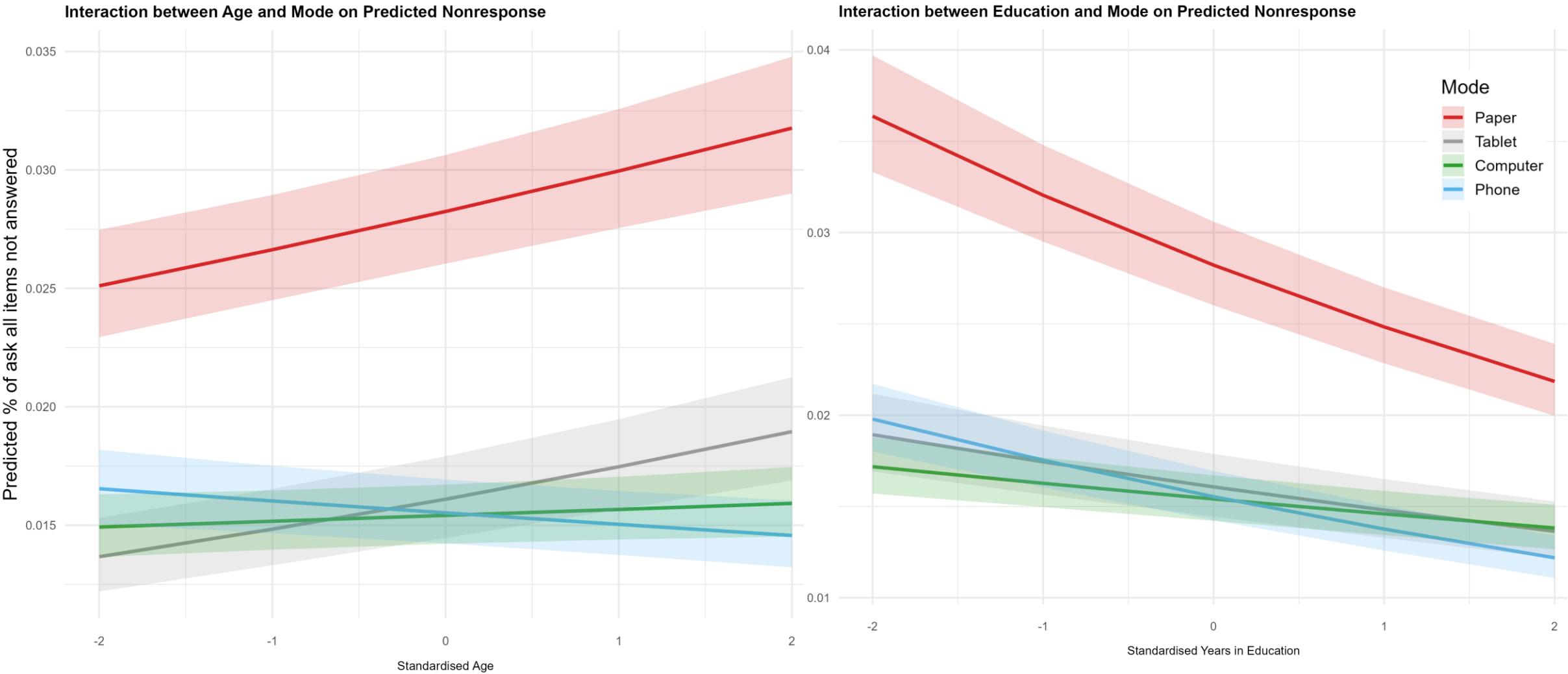
Interaction between Age and Mode on Predicted Nonresponse



Interaction between Years in Education and Mode on Predicted Nonresponse



Interaction between web device type and demographic characteristics



Conclusion

- In ESS Round 10, items had higher nonresponse in paper than web. Particularly routed items had much higher non-response amongst paper respondents than web ones, likely due to the complex, lengthy, and sometimes counterintuitive nature of the paper questionnaire routing instructions.
- Overall, percentage nonresponse is higher among respondents who are lower educated, women, non-citizens, and younger (although not always significant).
- However, on paper compared to web, older, lower educated paper respondents are more likely to skip questions than similar web respondents.
- Among web respondents, those answering on mobile devices were more likely to skip questions than computer respondents. Within the phone group, younger, lower educated respondents were more likely to skip questions than older, more educated ones.
- **Changes have already been made for Round 12 (starting September 2025):**
 - Paper: reviewed and adapted the layout of the questionnaire to hopefully increase the clarity of routing instructions.
 - Web: added soft prompts to some important questions and improved mobile friendliness.

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