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Do Audio Buttons Matter? Evidence on Recruitment Outcomes, Response Behavior, and Survey Evaluation from a Web-Based Panel Recruitment Survey

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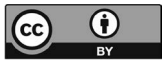
Abstract

Audio support has been proposed to facilitate web survey completion, yet little is known about how respondents actually use it or how it affects participation, response behavior, and survey evaluation. We analyzed a randomized experiment embedded in the 2024 Recruitment Survey of FReDA – The German Family Demography Panel Study, a probability-based mixed-mode panel. Respondents were randomly assigned to a web questionnaire with or without audio buttons that read aloud question texts and response options. Results showed that the availability of audio buttons did not affect overall survey completion or panel consent. Only a minority of respondents used the audio feature, with usage being more likely among younger and male respondents, those with lower education, and respondents with migration-related characteristics. Audio users showed higher item nonresponse, longer completion times, and slightly more critical survey evaluations. However, after accounting for respondent characteristics associated with audio button use, the association with item nonresponse was fully attenuated, suggesting that this difference is mainly due to who uses the audio feature rather than the feature itself. The associations with completion time and survey evaluations decreased but remained significant, suggesting these differences may partly be due to audio button use itself rather than respondent characteristics. Overall, audio buttons appear to function less as a general usability enhancement and more as a targeted accessibility feature, supporting the inclusion of vulnerable respondent groups who may face comprehension challenges in web surveys.

Keywords: audio recording, questionnaire design, reading comprehension, survey accessibility, web surveys



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Self-administered web surveys have become a central mode of data collection in the social sciences. Due to its flexibility, cost-efficiency, and broad reach, the web mode is particularly attractive for large-scale probabilistic panel studies. In general, successful recruitment and continued participation across diverse population subgroups are essential for the quality of such panels. However, because web surveys rely on respondents' reading skills and ability to process written information without interviewer assistance, individuals with lower literacy skills, limited language proficiency, visual impairments, or situational constraints may have difficulty completing purely text-based web surveys, potentially reducing participation and response quality (Bauer et al., 2025; Couper & Rowe, 1996; Wenz et al., 2021).

Reading-related barriers are widespread. In Germany, according to the 2018 Level One Study (LEO), 12% of adults face difficulties with basic reading and writing skills (Grotlüschen et al., 2020), while recent data from the Programme for the International Assessment of Adult Competencies (PIAAC) indicated that 22% of adults score at low literacy levels (Massing et al., 2025). Moreover, data from the German Health Interview and Examination Survey for Adults (DEGS) showed that 12% of German adults experience near-vision difficulties (Schuster et al., 2018). Such challenges suggest that a substantial minority of the adult population may have difficulty completing purely text-based web surveys.

Difficulties in reading and comprehending survey questions can profoundly impact both participation and response behavior. Respondents with lower levels of education or literacy skills who perceive the response task as difficult and burdensome are more likely to refuse participation or break off early (Beier & Schulz, 2015; Stein et al., 2025; Steinbrecher et al., 2015); they are also more prone to panel attrition (Kleinert et al., 2021; Kocar & Biddle, 2023; Lugtig, 2014). As prior survey experience and perceived burden have been shown to influence respondents' willingness to participate in subsequent panel waves (Gummer & Daikeler, 2020; Kostadintcheva et al., 2026; Roberts et al., 2022), a more positive recruitment survey experience could increase respondents' willingness to commit to future panel participation. Moreover, respondents perceiving the response task as difficult and burdensome are also more likely to engage in satisficing behaviors, such as straightlining, answering "don't know," or selecting the first plausible response option (Kunz & Gummer, 2025; Wenz et al., 2021), especially when surveys involve high task difficulty and complexity, for example, due to extensive text, complex vocabulary, or intricate sentence structures (Lenzner, 2012). In reverse, making the response task easier, especially for those

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with lower skills or motivation (Bauer et al., 2025; Lenzner, 2012), may reduce respondents' likelihood of engaging in satisficing behavior.

Audio support represents a promising strategy for mitigating cognitive and literacy-related barriers in web surveys by complementing text with spoken content. A meta-analysis in educational research found that dual-modality approaches, such as audio-assisted reading via text-to-speech or read-aloud tools, can improve reading comprehension, particularly among individuals with weaker reading skills (Wood et al., 2018). In web surveys, audio buttons that enable question texts and response options to be read aloud may facilitate comprehension, reduce reading demands, and assist respondents, particularly those who have difficulty with text-based formats (Beier & Schulz, 2015; Couper et al., 2009). Thus, providing audio support may help ensure that all respondents can properly comprehend the survey content without undue strain, regardless of their literacy level or other reading barriers, thereby benefiting both survey participation and response behavior.

Despite this potential, empirical evidence on the actual use and effects of audio support in web surveys remains limited. Prior studies examining the use of audio recordings in audio computer-assisted self-interviewing (audio-CASI) have largely focused on the impact on respondents' reporting sensitive behaviors and on reductions in social desirability bias, rather than on their motivations for using the audio function itself. In a study comparing audio-CASI and text-only conditions, Couper et al. (2009) found that 18.9% of respondents used the audio function at least once. However, the authors observed no significant differences in respondents' survey evaluations or completion times between conditions. More recent research on audio support in web surveys has focused on respondents' stated willingness to use the audio channel rather than its actual use. In a nonprobability online panel, over 50% of respondents reported being willing to have survey questions read aloud. This willingness was mostly attributed to openness to new technologies (41.8%) and the expectation that audio support could ease survey completion (13.8%); only a few respondents mentioned overcoming visual impairments (1.2%). Stated willingness was higher among younger, tech-savvy, and frequent smartphone users, while women and highly educated respondents reported lower willingness (Lenzner & Höhne, 2022). Evidence from a probability-based online panel suggested considerably lower levels of willingness: Only about 25% of respondents indicated that they would be willing to use audio buttons. Similarly, men, younger respondents, and smartphone users reported higher willingness, whereas no association with education was observed (Höhne, 2023).

Taken together, prior research suggests that audio support is perceived as helpful by at least some respondents, and that stated willingness to use it varies substantially across samples and respondent characteristics. However, these studies provide limited insight into whether respondents actually use such fea-

tures when completing web surveys and the consequences of providing and using them for survey participation, response behavior, and survey evaluation. The present study addressed this gap by examining audio buttons in a web-based recruitment survey for a mixed-mode probability panel, asking:

a. Does the provision of audio buttons affect survey completion and panel consent?

b. How frequently are audio buttons used, and for which survey questions?

c. Are certain respondent groups more likely to use audio buttons?

d. How is audio button use associated with item nonresponse, completion time, and survey evaluation?

Data and Methods

Sample

We analyzed data from the 2024 FReDA Recruitment Survey conducted to refresh FReDA – The German Family Demography Panel Study, a self-administered, mixed-mode probability panel in Germany. A sample of 50,270 individuals aged 18–49 was drawn from municipal registers. Invitations were sent by mail, including a 5-euro prepaid incentive, and respondents could choose between web and paper modes. Data collection took place from September 5 to December 31, 2024. The response rate (RR2; American Association for Public Opinion Research, 2023) was 31.6%, with 93.4% completing the survey via the web (n = 14,856). Because audio buttons were only available in the web survey, the analytical sample was restricted to web respondents. Respondents could use any device to complete the web survey; 75.8% used a smartphone. Average completion time among web respondents was 19.4 minutes.

Experimental Design

Assignment to the experimental conditions was conducted at the level of the gross sample, prior to fielding: 50% of sample members were randomly assigned to the experimental group and informed in the invitation letter that they could have the survey questions read aloud in the web questionnaire; the remaining 50% constituted the control group and received no such information. The audio buttons were only displayed in the web questionnaire for respondents who were assigned to the experimental group (n = 7,472), including a brief explanation on the introductory web page on how to use the audio buttons; respondents in the control group (n = 7,384) did not see the audio feature.

The web questionnaire consisted of 64 screens in both experimental conditions. Most questions were displayed on separate screens, except multi-item batteries (presented in grid or item-by-item formats, with up to four items per screen). In the experimental group, each screen included an audio button that provided spoken versions of the question text, instructions, and response options (see Figure A1 in the Appendix). For multi-item batteries, separate buttons were provided for the question stem (including instructions) and each item (including response option labels). In total, 162 audio buttons were available.

Audio files were recorded by a human speaker reading the text verbatim (with minor adjustments for fluency). Playback had to be initiated manually by clicking the corresponding audio button. It continued until it was finished or stopped prematurely (by pressing the same or a different audio button on the same screen).

Measures

All analyses were based on preliminary prerelease data from the 2024 FReDA Recruitment Survey. Except for the analysis of the final disposition of cases and web survey completion, which were based on the gross sample of all invited individuals, the analytical sample was restricted to web respondents who answered at least 50% of the applicable questions.

Recruitment outcomes. We calculated web survey completion based on the gross sample of all invited individuals, considering respondents who answered at least 50% of applicable questions as complete (AAPOR, 2023). Moreover, we calculated a binary panel consent variable (0 = no, 1 = yes) indicating whether respondents agreed to join the panel after completing the recruitment survey. The consent question was asked at the end of the questionnaire.

Audio button use. We counted the total number of activations per respondent, including repeated activations of the same button. To examine question-level patterns, we additionally calculated the number of activations separately for each survey question.

Respondent characteristics. Sociodemographic variables included gender (male, female), age (18–29, 30–39, 40–49), and education (low, middle, high) based on respondents' highest school-leaving certificate. Low education comprised no school-leaving qualification, a lower secondary school qualification (*Hauptschulabschluss*) or equivalent, or currently being enrolled in school; middle education comprised an intermediate secondary school qualification (*Realschulabschluss*) or equivalent; and high education comprised a qualification granting access to higher education (*Fachhochschulreife* or *Abitur*) or equivalent. Further variables were country of birth (Germany vs. others), citizenship (German vs. non-German), and device type (desktop/other vs. smartphone). In addition to gender, age, and education, native language is considered an important correlate of low

literacy (Durda et al., 2020). As this variable was not available in the recruitment survey, we used country of birth and citizenship as proxy indicators.

Response behavior and survey evaluation. Respondents were not required to answer any question and were not prompted to complete items they had skipped. We operationalized item nonresponse as the proportion of unanswered questions among all applicable questions (multiplied by 100), with higher values indicating a higher rate of nonresponse. Because respondents who answered less than 50% of applicable questions were excluded from the analytic sample prior to analysis, this indicator ranges from 0 to 50 rather than the theoretical 0 to 100 range. In addition, we measured survey completion time (in minutes) using client-side, page-level timestamps. Survey evaluations captured respondents' subjective ratings of the questionnaire as *interesting*, *varied*, *important for science*, *long*, *difficult*, and *too personal*, each rated on a five-point scale ranging from 1 (*not applicable*) to 5 (*fully applicable*).

Results

Does the Provision of Audio Buttons Affect Survey Completion and Panel Consent?

Provision of audio buttons did not meaningfully affect overall recruitment outcomes (see Table 1). In the gross sample, web completion rates were nearly identical between the control and experimental groups (29.4% vs. 29.7%), while refusals, noncontacts, breakoffs, and other disposition categories showed minimal differences. When considering only web respondents, completion was slightly higher in the control group (95.2% vs. 94.4%), whereas breakoffs were marginally higher in the experimental group (5.6% vs. 4.8%). Panel consent among respondents completing the web questionnaire was identical across groups, with 84.3% agreeing to join the panel. Overall, these findings indicate that providing audio buttons did not influence respondents' decision to participate in the survey or consent to panel membership.

How Frequently Are Audio Buttons Used, and for Which Survey Questions?

Usage of audio buttons was limited. Among respondents provided with the feature, 83.4% did not use it at all, whereas 16.6% activated an audio button at least once during survey completion. Most respondents used the audio buttons only once or twice (10.9%), while repeated use across multiple questions was rare (1.9% used it three or four times, and 3.7% used it five or more times). Among

users, the mean number of activations was 10.81, with some respondents activating audio buttons up to 236 times, indicating substantial heterogeneity in usage intensity.

At the question level, most questions showed only minimal activation rates (approximately 1% of respondents; see Figure A2). However, a few questions showed noticeably higher activation rates, including a clear peak at the beginning of the web questionnaire. The first question, a semantic differential on life satisfaction, prompted audio usage by 5.8% of respondents, suggesting initial exploration of the audio feature.

Table 1

Survey Completion and Panel Consent (in %), Depending on Audio Button Provision

Audio buttons provided	No	Yes	χ^2	*p*	Cramer's *V*	*n*
Web completes	29.4	29.7	10.11	.072	–	50,270
Web breakoffs	1.5	1.8				
Refusals	6.0	5.9				
Noncontacts	49.7	48.8				
Other completes	1.9	2.0				
Other outcomes	11.5	11.7				
Among web respondents:						
Web completes	95.2	94.4	5.34	.021	.018	15,681
Web breakoffs	4.8	5.6				
Among web completes:						
Consent provided	84.3	84.3	0.01	.944	–	14,828
Consent not provided	15.7	15.7				

Are Certain Respondent Groups More Likely to Use Audio Buttons?

Analysis of respondent characteristics revealed that audio button use (i.e., at least once during survey completion) was not uniform across demographic groups. Chi-square tests (see Table 2) and logistic regression analyses (see Table A1 in the Appendix) indicated higher usage among men, younger respondents, individuals with lower levels of education, and those born abroad or with foreign citizenship. Device type, in contrast, was not significantly associated with usage.

Table 2

Relationship Between Audio Button Use (At Least Once) and Respondent Characteristics

	%	χ^2	*p*	Cramer's *V*	*n*
Male	18.2	13.61	<.001	.043	7,392
Female	15.0				
18–29	21.3[bc]	100.34	<.001	.116	7,396
30–39	14.6[ac]				
40–49	11.1[ab]				
Less educated	26.6[bc]	70.51	<.001	.099	7,152
Moderately educated	17.7[ac]				
Highly educated	14.2[ab]				
Born in Germany	14.8	81.17	<.001	.104	7,458
Born abroad	25.1				
German citizenship	15.0	93.04	<.001	.112	7,449
Non-German citizenship	28.0				
Desktop	15.0	3.63	.057	–	7,436
Smartphone	16.9				

Note. Superscripts (a/b/c) indicate statistically significant post-hoc pairwise differences ($p \leq .05$).

How is Audio Button Use Associated with Item Nonresponse, Completion Time, and Survey Evaluation?

Comparisons between audio button users and non-users using analyses of variance (ANOVAs) showed systematic differences in response behavior and survey evaluation (see Table 3). Respondents who activated an audio button at least once during survey completion had higher item nonresponse rates, with an average of 1.61% of applicable questions left unanswered, compared to 1.00% among non-users. Completion times were longer for users, averaging 23.64 minutes compared to 18.60 minutes for non-users. Survey evaluations revealed that audio button users perceived the questionnaire as slightly more important for science and rated it as longer, more difficult, and somewhat more personal. However, effect sizes were small. There were no significant differences in how interesting or varied respondents found the survey.

To assess whether these associations between audio button use and item nonresponse, survey completion time, and survey evaluation hold under more conservative operationalizations of audio button use, we replicated the analyses using four categories reflecting the frequency of audio button use (0, 1–2, 3–4, ≥5 activations). As shown in Table A2 in the Appendix, item nonresponse, completion time, and several survey evaluation items increased significantly with more frequent audio button use, consistent with the results for the binary

comparison. Respondents with five or more audio button activations showed significantly higher item nonresponse and longer completion times, as well as also reported significantly higher perceived length, difficulty, and personal intrusiveness than less frequent users or non-users.

Table 3

Item Nonresponse, Survey Completion Time, and Survey Evaluation (Means), Depending on Audio Button Use (At Least Once)

Audio buttons used	0	≥1	*F*	*p*	η^2_p	*n*
Item nonresponse	1.00	1.61	46.24	<.001	.006	7,472
Completion time	18.60	23.64	261.25	<.001	.034	7,472
Survey evaluation*						
Interesting	3.88	3.91	1.21	.271	–	7,312
Varied	3.91	3.95	2.17	.141	–	7,312
Important	3.91	3.97	4.56	.033	.001	7,312
Long	2.67	2.86	27.44	<.001	.004	7,312
Difficult	1.65	1.82	37.51	<.001	.005	7,312
Too personal	2.39	2.51	11.57	.001	.002	7,312

Note. * Higher values indicate a higher level of agreement.

To further assess whether the associations between audio button use and item nonresponse, survey completion time, and survey evaluation reflect selection on respondent characteristics rather than a direct effect of audio button use, we compared unadjusted linear regression models (number of activations) with adjusted models additionally controlling for gender, age, education, country of birth, citizenship, and device type (see Table 4). For item nonresponse, the small unadjusted association (B = 0.011, $p < .001$) was fully attenuated after controlling for respondent characteristics (B = 0.002, $p = .255$), indicating that this association was largely attributable to differences between more and less frequent audio button users rather than to a direct effect of audio button use. For completion time, the association, although somewhat weakened, remained significant after adjustment, suggesting that selection alone does not fully account for this association. A similar pattern emerged for perceived length, difficulty, and personal intrusiveness, where associations were also reduced after adjustment but remained statistically significant.

Table 4

Linear Regression for the Association Between Number of Audio Button Activations and Item Nonresponse, Survey Completion Time, and Survey Evaluation, Unadjusted and Adjusted for Respondent Characteristics

	Model 1			Model 2		
	B (SE)	β	p	B (SE)	β	p
Item nonresponse	0.011 (0.003)	.044	<.001	0.002 (0.002)	.013	.255
Completion time	0.135 (0.010)	.157	<.001	0.108 (0.010)	.127	<.001
Survey evaluation*						
Interesting	−0.001 (0.001)	−.018	.122	−0.001 (0.001)	−.019	.110
Varied	−0.001 (0.001)	−.019	.110	−0.001 (0.001)	−.020	.099
Important	0.000 (0.001)	.001	.962	0.000 (0.001)	.003	.793
Long	0.007 (0.001)	.068	<.001	0.004 (0.001)	.039	.001
Difficult	0.008 (0.001)	.105	<.001	0.005 (0.001)	.070	<.001
Too personal	0.007 (0.001)	.075	<.001	0.004 (0.001)	.042	<.001

Note. * Higher values indicate a higher level of agreement. Model 1 includes audio button use (number of activations) only. Model 2 additionally controls for gender, age, education, country of birth, citizenship, and device type.

Summary and Conclusions

Audio features in web surveys have been proposed to reduce comprehension barriers and support inclusive participation. However, empirical evidence on their actual use and consequences for survey participation, response behavior, and survey evaluation remains limited, especially in the context of panel recruitment surveys. This study examined the role of audio buttons in a web-based recruitment survey for a mixed-mode probability panel, focusing on their impact on survey completion and panel consent, actual usage patterns, respondent characteristics associated with use, and consequences for response behavior and survey evaluation.

Providing audio buttons did not meaningfully affect overall recruitment outcomes. Completion rates and panel consent were nearly identical across experimental conditions. Actual use of the audio feature was limited: only 16.6% of respondents activated an audio button at least once, and repeated use was rare. Usage was highest at the beginning of the questionnaire, suggesting that some respondents initially explored the feature before deciding whether to continue using it.

Usage patterns varied by respondent characteristics. Consistent with prior research examining respondents' willingness to have survey questions read

aloud (Höhne, 2023; Lenzner & Höhne, 2022), we found that males and younger respondents were more likely to use audio buttons. As prior studies reported higher willingness among tech-savvy respondents, the higher usage among younger respondents may reflect greater openness to new technologies. Moreover, respondents with lower levels of education and those with migration-related characteristics (i.e., those born abroad or with foreign citizenship) were more likely to use audio buttons. These patterns suggest that audio support is primarily used by respondents who may experience greater difficulty completing the survey—for example, due to lower literacy skills or language barriers—and who may therefore rely on audio assistance to facilitate comprehension and survey completion.

Audio button users also showed higher item nonresponse, longer completion times, and slightly more critical survey evaluations than non-users. These differences were more pronounced among more frequent users: Item nonresponse, completion time, and evaluations of the survey as long, difficult, and too personal all increased with the number of audio button activations, with respondents using the audio button five or more times showing the most pronounced differences from non-users. At the same time, when we accounted for respondent characteristics associated with audio button use, such as age, education, and migration background, the association between audio button use and item nonresponse was fully attenuated, while associations with completion time and survey evaluation were reduced but remained significant. This pattern suggests that the differences in item nonresponse are best explained by selection: Respondents who face comprehension or task-related challenges are more likely to leave survey questions unanswered, regardless of whether they use the audio button. However, for completion time and certain survey evaluation aspects, selection alone does not fully account for the differences observed. This suggests that the use of the audio button itself affects response processes and shapes how respondents experience the survey, beyond who chooses to use it.

Overall, the findings suggest that audio buttons function less as a general tool to reduce cognitive burden and more as a targeted accessibility feature for specific subgroups of respondents. While overall usage was modest, audio support appears particularly valuable for respondents who encounter difficulties during the survey. By providing situational assistance, audio buttons may help respondents overcome comprehension barriers and remain engaged in the survey, thereby contributing to the inclusion of groups that might otherwise be at risk of disengagement.

Limitations

Several limitations should be noted. The survey did not include a sound check, so it is unclear how many respondents were unable to use the audio feature due

to technical (e.g., devices without audio output) or situational constraints (e.g., completing the survey in the presence of others without headphones). In addition, the invitation letter only briefly mentioned the audio availability, which may have limited awareness during the initial recruitment phase. Furthermore, providing a paper-based invitation letter may have created additional barriers to accessing the web questionnaire, particularly for respondents with lower literacy skills.

Future Research

Current findings also point to several directions for future research. First, future studies could examine audio features in multilingual survey environments and among populations that may particularly benefit from audio support, such as respondents with limited literacy, language barriers, or age-related reading difficulties (e.g., children or the elderly).

Second, investigating respondents' motivations for using or not using audio buttons would shed light on situational factors driving engagement. Moreover, differences between probability and nonprobability panels also warrant further investigation, as prior research suggests usage willingness may vary by panel type (Höhne, 2023; Lenzner & Höhne, 2022).

Finally, technological advances, including AI-based text-to-speech systems, offer opportunities for scalable and customizable audio support (e.g., multiple languages and voice characteristics such as gender, tone, or accent). These developments could be combined with alternative design features, such as more accessible interface elements, including visual cues or on-screen avatars that guide respondents through the survey.

Data and Code Availability

The data and code used in this study are not publicly available because they are based on preliminary data that have not yet been published through the designated repository.

Conflict of Interest

The authors declare no conflicts of interest.

Ethics

The study was conducted as part of an established probability-based online panel and followed the applicable ethical standards for survey research; no formal ethics approval was obtained for this study.

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Appendix

Audio Button Implementation and Supplementary Analyses

Figure A1

An Example Question (i.e., Semantic Differential on Life Satisfaction) With an Audio Button That Provided Spoken Versions of the Question Text and Response Options

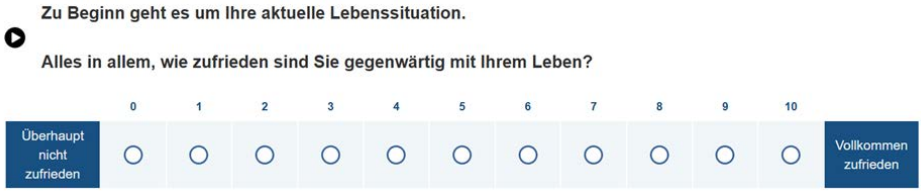

Figure A2

Percentage of Respondents Using Audio Buttons Per Question

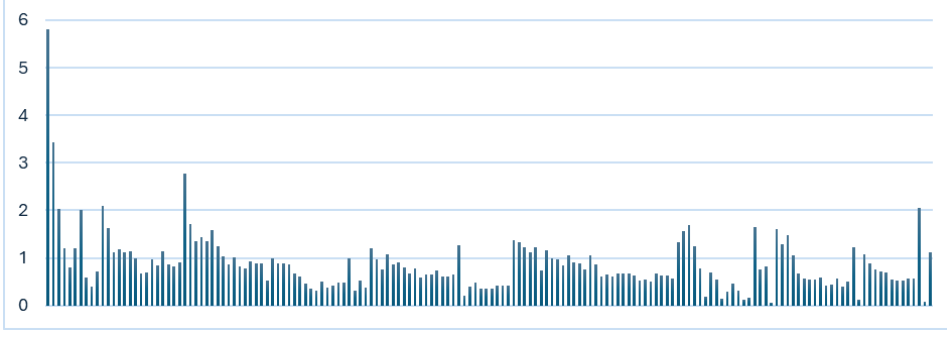

Table A1

Logistic Regression on the Relationship Between Audio Button Use and Respondent Characteristics

	B	SE	Wald	*p*	Exp(B)
Gender (ref. male)	−0.228	0.067	11.59	.001	0.796
Age (ref. 18–29)					
30–39	−0.501	0.079	40.72	<.001	0.606
40–49	−0.865	0.088	95.89	<.001	0.421
Education (ref. low)					
Medium	−0.325	0.113	8.22	.004	0.722
High	−0.638	0.103	38.33	<.001	0.529
Country of birth (ref. Germany)	0.463	0.122	14.36	<.001	1.589
Citizenship (ref. German)	0.322	0.140	5.25	.022	1.379
Device (ref. desktop)	0.067	0.083	0.64	.422	1.069

Table A2

Item Nonresponse, Survey Completion Time, and Survey Evaluation (Means), Depending on Audio Button Use Frequency

Audio buttons used	0	1–2	3–4	≥5	*F*	*p*	η^2_p	*n*
Item nonresponse	1.00^{bd}	1.44^{ad}	1.62	2.12^{ab}	19.33	<.001	.008	7,472
Completion time	18.60^{bcd}	21.36^{acd}	24.92^{abd}	29.67^{abc}	138.22	<.001	.053	7,472
Survey evaluation*								
Interesting	3.88	3.91	3.95	3.87	0.70	.552	–	7,312
Varied	3.91	3.95	4.02	3.90	1.40	.242	–	7,312
Important	3.91	3.99	3.80	3.99	3.46	.016	.001	7,312
Long	2.67^{cd}	2.74^{d}	2.93^{a}	3.20^{ab}	20.11	<.001	.008	7,312
Difficult	1.65^{d}	1.71^{d}	1.82^{d}	2.13^{abc}	28.69	<.001	.012	7,312
Too personal	2.39^{d}	2.40^{d}	2.54	2.81^{ab}	13.30	<.001	.005	7,312

Note. * Higher values indicate a higher level of agreement. Superscripts (a/b/c/d) indicate significant post-hoc pairwise differences ($p \leq .05$) between the 0, 1–2, 3–4, and ≥5 activation groups, respectively.

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