



Choice of Content Presentation Mode in Web-Based Survey Administration

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Introduction

Survey research often involves information provision to respondents in questionnaires. The information provision allows for measurement of research subjects' reactions, attitudes, and opinions regarding the supplied information. Web-based survey administration, since it supports multimedia, allows for multiple modes to provide such information, including on-screen text, video, and audio. Empirical data on the optimal mode(s) of information provision would help researchers determine the most appropriate mode(s) to use, given demographic characteristics of their sample. Recently, Knowledge Networks' KnowledgePanel® surveyed a nationally representative sample on views concerning global climate change and climate engineering technologies (i.e., technologies designed to cool down the planet by addressing potential causes of global warming). The study, conducted for researchers from the U.S. Government Accountability Office (GAO), provided an opportunity to examine the use of multiple modes of information provision. Below, we describe the study and its findings.

Methods

The Internet-based survey was conducted with United States residents aged 18 and older who were members of Knowledge Networks' KnowledgePanel®, a probability-based web panel designed to be representative of the United States. A random sample of households was selected for the survey, and a single member within each household was further randomly sampled for participation. All sampled panelists were eligible for the survey; there were no screening criteria. Of the 1,623 panelists assigned to the survey, 1,006 responded, resulting in a completion rate of 62%.

The survey included some initial questions on opinions surrounding global climate change, followed by the presentation of content outlining specific examples of climate engineering technologies. Respondents were randomized to one of two example sets, and were initially offered the choice of reviewing this content in one of three modes—video with audio, audio-only, or as on-screen text. Respondents were subsequently allowed to review the content in one or both of the remaining alternative modes, if desired. The survey system recorded the use of each mode and, when applicable, the order in which the modes were implemented.

The text content consisted of two paragraphs of approximately 100-150 words each. The video used the same text, with illustrative visuals, and ran for approximately 2 minutes. The audio version consisted of the audio track from the video.

Once data collection was completed, a set of study-specific post-stratification weights was constructed for the study data to adjust for the study’s sample design and survey non-response. Demographic and geographic distributions (including age, gender, race/ethnicity, education, Census region, and metropolitan status) for the non-institutionalized, civilian population were derived from the most recent Current Population Survey, for use as benchmarks in this adjustment.

Results

Results of the study were reviewed to examine key analysis questions. First, are there respondent characteristics related to initial mode preference and/or switching to other modes? Second, are there respondent characteristics related to single-mode choice versus multiple mode choices? Finally, are there presentation modes that appear to be more or less effective (as measured by survey length, item nonresponse, and satisficing behavior) based on analysis of combined initial and subsequent content reviews by respondents? In this section, we begin with a general overview of mode choice, followed by analyses to address the questions outlined above.

Of the 1,006 survey respondents, 83% selected a single content presentation mode, followed by 13% who chose to review in two modes and 4% who reviewed in all three of the available modes (Table 1).

Table 1. Number of Modes Selected by Person

Number of Modes Selected	N	%
One	832	83%
Two	128	13%
Three	46	4%
TOTAL	1,006	100%

Since respondents were able to review in multiple modes, the total number of reviews was actually greater than the 1,006 respondents. Among all respondents, the content was reviewed a total of 1,226 times across the three modes—742 as text, 370 via video, and 114 via audio. As would be expected, all 1,006 reviewed the content in at least one mode. As their first choice, 64% selected text, 32% video, and 4 audio (Table 2). Of those who reviewed the content in a second mode, 39% chose text, 26% video, and 35% audio. Of those respondents who reviewed the content in a third mode, 65% selected text, 9% video, and 26% audio.

Table 2. Mode Choice Summary: Total and By Number of Choices

Mode	Total Times Chosen		Chosen as 1 st Mode		Chosen as 2 nd Mode		Chosen as 3 rd Mode	
	N	%	N	%	N	%	N	%
Text	742	61%	645	64%	67	39%	30	65%
Video	370	30%	321	32%	45	26%	4	9%
Audio	114	9%	40	4%	62	35%	12	26%
TOTAL	1,226	100%	1,006	100%	174	100%	46	100%

As the numbers in Table 2 on the prior page illustrate, on-screen text was the most often chosen mode initially, and at each subsequent chance to review the content. Video was popular as a first choice, but less so subsequently. Audio, while least selected generally was comparatively popular as a second choice.

Table 3. Mode Choice Combinations

Combinations	N	%
One Mode Only		
Text	595	72%
Video	216	26%
Audio	21	2%
TOTAL	832	100%
Two Modes Only		
Video/Text	52	41%
Text/Video	29	23%
Video/Audio	20	16%
Text/Audio	13	10%
Audio/Text	7	5%
Audio/Video	7	5%
TOTAL	128	100%

All Three Modes		
Video/Audio/Text	27	59%
Text/Video/Audio	6	13%
Video/Text/Audio	6	13%
Audio/Video/Text	3	7%
Text/Audio/Video	2	4%
Audio/Text/Video	2	4%
TOTAL	46	100%

Table 3 provides information on mode choice for those choosing only one mode of presentation, two modes, and all three modes. For those choosing a single mode, text was most popular as noted above, accounting for 72% of the single-mode reviews. Video was initially selected in 26% of cases, with audio selected in just 2% of cases.

Mode combinations for those reviewing in two ways varied, but the combination of text and video (in either order) accounted for 64% of the cases. For those reviewing in all three ways, the progression from video to audio to text accounted for almost two-thirds of the cases.

Of those who chose text as their initial mode, only 8% selected an additional mode for review, compared with 28% for video cases and 48% for audio cases. For those choosing text as their second mode, 12% went on to the third mode, compared with 20% for the video group and 47% for the audio group.

The final mode choice was text for 68% of all respondents. Video was the final mode choice for 25% while audio was the final choice for 7% of respondents. The results suggest that on-screen text was likely considered to describe the study with the most clarity since it was the most popular mode choice with the least amount of switching to other modes after review. In addition, anecdotal evidence from survey pretesting indicated that respondents may prefer text, at least initially, because they believed it would allow them to more quickly complete the survey (because they believed they would easily comprehend the text and/or they had concerns about potential technical difficulties with the video format). While video was also a popular choice as the initial mode, a large number of respondents preferred to review in a second and then a third mode. Audio was presumably the least descriptive, since almost half of all respondents choosing the audio format as either the first or second options proceeded to choose another format.

Demographic Characteristics by Mode Choice

Next, we examine whether respondent characteristics are related to initial mode preference and/or switching to other modes. Using weighted data with Chi-square analysis, the interaction between selected demographic characteristics (age, gender, race/ethnicity, education, and income) and initial mode choice was examined (Table 4). When interpreting the results, it should be noted that the number of cases with initial audio mode selection was comparatively small (n=40).

All demographic characteristics except for gender were significantly related to mode choice. Interestingly, younger age groups tended to initially select the on-screen text option more often than those who were older, while older respondents were more likely to select the video and audio modes. A higher proportion of White respondents chose to review the text version first, with similar results (though somewhat less striking) for video. There were also differences in initial mode choice by education with those at high school level or less being considerably more likely to choose the video or audio options first. Those in the highest income category were more likely to choose the text mode, while those in the lowest category were more likely to choose the audio mode initially. There was not a significant difference in mode choice by gender.

When examining demographic characteristics by second mode choice, cell sizes are considerably smaller, limiting precision. However, the results by age group are still significant (Table 5), with a sizeable proportion of older adults moving to text and audio modes. Small cell sizes for the third mode choice precluded further analysis in this area.

Table 4. Demographic Characteristics by Initial Mode Choice

Characteristic	Text (n=645)	Video (n=321)	Audio (n=40)
Age (p=0.0001)			
18-29	26.1	15.2	6.8
30-44	27.7	21.6	43.2
45-59	26.5	30.7	27.3
60+	19.7	32.5	22.7
Gender (p=0.20)			
Male	46.5	52.3	45.5
Female	53.5	47.7	54.5
Race/Ethnicity (p=0.0001)			
White, Non-Hispanic	72.4	62.6	48.9
Other Race/Hispanic	27.6	37.4	51.1
Education (p=0.0001)			
Less than High School/High School	38.1	52.6	79.5
Some College	30.3	25.1	13.6
Bachelor's Degree or Higher	31.6	22.2	6.8

Income (p=0.009)			
Less than \$25,000	20.5	28.1	35.6
\$25,000 - \$49,999	28.9	28.1	28.9
\$50,000 - \$74,999	19.0	21.3	17.8
\$75,000 or More	31.6	22.5	17.8

Table 5. Demographic Characteristics by Second Mode Choice

Characteristic	Text (n=67)	Video (n=45)	Audio (n=62)
Age (p=0.001)			
18-29	7.4	20.0	14.3
30-44	35.8	20.0	7.1
45-59	21.0	31.1	40.0
60+	35.8	28.9	38.6
Gender (p=0.20)			
Male	41.3	40.9	54.3
Female	58.8	59.1	45.7
Race/Ethnicity (p=0.62)			
White, Non-Hispanic	51.3	55.6	46.4
Other Race/Hispanic	48.8	44.4	53.6
Education (p=0.69)			
Less than High School/High School	58.8	65.9	68.6
Some College	23.8	15.9	18.6
Bachelor's Degree or Higher	17.5	18.2	12.9
Income (p=0.41)			
Less than \$25,000	35.0	34.1	30.0
\$25,000 - \$49,999	25.0	27.3	40.0
\$50,000 - \$74,999	16.3	22.7	12.9
\$75,000 or More	23.8	15.9	17.1

Moving now to an examination of demographic characteristics by single versus multi-mode review, significant differences in age, race/ethnicity, education, and income were found (Table 6). Older adults, non-Whites, those with less education, and those with lower income were more likely to view the content in more than one mode. Again, no significant difference in results by gender was observed.

Table 6. Demographic Characteristics by Mode Switching

Characteristic	One Format Only (n=832)	Two Formats Only (n=128)	All Three Formats (n=46)
Age (p=0.0001)			
18-29	23.7	11.0	16.3
30-44	27.3	25.5	12.2
45-59	27.4	28.3	34.7
60+	21.5	35.2	36.7
Gender (p=0.52)			
Male	49.0	47.6	40.8
Female	51.0	52.4	59.2
Race/Ethnicity (p=0.0001)			
White, Non-Hispanic	72.2	53.8	40.8
Other Race/Hispanic	27.8	46.2	59.2
Education (p=0.0001)			
Less than High School/High School	40.2	66.9	55.1
Some College	29.8	17.9	26.5
Bachelor's Degree or Higher	30.0	15.2	18.4
Income (p=0.0001)			
Less than \$25,000	21.4	26.9	52.1
\$25,000 - \$49,999	28.0	35.9	18.8
\$50,000 - \$74,999	20.6	15.9	16.7
\$75,000 or More	30.0	21.4	12.5

Data Quality by Mode Choice

An important question is whether there are presentation modes that appear to be more or less effective. For purposes of this paper, we have concentrated on three areas to define “effectiveness”: survey length, item nonresponse, and potential satisficing behavior, all focused on survey items after treatment administration in the various modes.

First, survey length for items administered post-treatment was calculated separately for those choosing a single treatment mode, two modes, and all three modes. (There was no difference in survey content after treatment by mode.) Survey lengths varied from 7.7 minutes to 9.6 minutes, with no statistically significant difference (Table 7).

Table 7. Survey Length (Post-Treatment) by Mode Switching

	One Format Only (n=832)	Two Formats Only (n=128)	All Three Formats (n=46)
Survey Length in Minutes	7.7	9.6	7.8

$p=.61$

Next, item-level refusals for quantitative items administered post-treatment were tallied and compared across mode groups. Item nonresponse was very low universally, and no statistically significant difference across the groups was observed (Table 8).

Table 8. Mean Number of Quantitative Item-level Refusals (Post-Treatment) by Mode Switching

	One Format Only (n=832)	Two Formats Only (n=128)	All Three Formats (n=46)
Survey Length in Minutes	1.1	0.8	0.6

$p=.23$

Finally, distributions on four key survey items assessing concerns or actions related to global warming were examined in conjunction with mode selection, in an attempt to determine whether mode choice might contribute to satisficing behavior as defined by straight-lining of responses, “over-agreement” with statements, or excessive use of the offered “don’t know” response option. As noted above, in addition to mode choice, respondents were also randomized to one of two content treatments (i.e., examples of climate engineering technology) regardless of mode. Therefore, differences in response to these follow-up items may also be influenced by the content of the treatment that they saw.

The first of the four items has “yes/no/don’t know” response options for evaluating general support of climate engineering research (with a “yes” response indicating support). For the remaining three items, the categories can generally be divided into four groups—those indicating greater interest, concern, or action related to global warming; those indicating lesser interest, concern or action; those indicating a middle ground; and those with a “don’t know” response. Statistically significant differences were observed for two of the four items (Table 9). The results suggest a somewhat higher rate of “don’t

know” responses among those choosing two modes for content review, though for one of the items those in the two-format group were more likely to have a positive response toward climate engineering and in the other the group was spread more evenly between positive and middle-ground responses. Thus, the statistical differences may suggest satisficing in terms of increased use of the “don’t know” response for those viewing content in two modes, but it is unclear whether it supports satisficing behavior such as straight-lining or over-agreement for questionnaire items.

Table 9. Analysis Items by Mode Switching

Item	One Format Only (n=832)	Two Formats Only (n=128)	All Three Formats (n=46)
Item 1 (p=0.014)			
Yes, Support Research	63.9	54.9	68.1
No, Do Not Support Research	20.0	18.1	10.6
Don't Know	16.1	27.1	21.3
Item 2 (p=0.075)			
Higher Interest/Concern/Action	14.4	17.8	21.3
Middle-Ground	30.3	36.3	34.0
Lesser Interest/Concern/Action	40.8	27.4	31.9
Don't Know	14.4	18.5	12.8
Item 3 (p=0.314)			
Higher Interest/Concern/Action	31.4	37.8	34.0
Middle-Ground	31.0	29.4	38.3
Lesser Interest/Concern/Action	26.2	25.9	14.9
Don't Know	11.4	7.0	12.8
Item 4 (p=0.013)			
Higher Interest/Concern/Action	20.8	29.9	25.5
Middle-Ground	37.6	32.6	38.3
Lesser Interest/Concern/Action	29.9	18.8	23.4
Don't Know	11.7	18.8	12.8

Discussion

When designing surveys, particularly those that require imparting information for participants to consider (for example, discrete choice, referendum, and willingness to pay studies), researchers must keep in mind the optimal mode(s) for providing that information.

In this study, on-screen text was the most often-chosen mode for content review and was the last chosen mode for more than two-thirds of study respondents. Video was a popular initial choice as well, but was often followed up by a second and sometimes third mode, being the last choice for just one-quarter of all respondents. Audio seemed to be least effective since it was chosen most infrequently and almost never as the final choice.

There were observed demographic differences in initial mode choice with younger, White, higher educated, and higher income respondents more likely to review the content in text format first, while older, non-White, lower educated, and lower income groups chose an initial review via video or audio. Following on the results discussed in the prior paragraph, older respondents were significantly more likely to switch to the text mode for their second choice.

There were also statistically significant demographic differences observed in selection of single versus multi-mode review options, with older adults, non-Whites, those with less education, and those with lower income more likely to view the content in more than one mode. This may be related to the fact that these groups were more likely to review the content in a non-text mode initially.

Measures of survey effectiveness as defined by survey length, item nonresponse, and potential satisficing behavior on survey items after treatment administration in the various modes showed some mixed results. There was no statistically significant difference in survey length by number of review modes, nor was there any statistically significant difference in item-level nonresponse. However, those who chose two content modes had a somewhat higher rate of “don’t know” responses for subsequent key survey items. Those in the two-format group were also more likely to have a positive response toward climate engineering issues in one item and a more positive to middle-ground response for another item, though these differences may be at least partly attributable to difference in treatment content as well as mode.

Recommendations and Future Work

While it may be tempting to provide multi-media content in web-based survey administration, the results of this study suggest that traditional on-screen text may be best to convey information that requires respondent understanding, consideration, and translation into “action,” particularly if that information is somewhat lengthy or complex. While different groups of people preferred different modes for initial content review, the video and audio modes alone seemed not to be sufficiently explanatory for most respondents. However, given the preference of some demographic groups for alternative modes, it may be useful to consider their inclusion when survey length and context allow as a supplement to text-based content.

Further experimentation in which treatment content is held static across modes is recommended to provide a better examination of mode effects alone on subsequent survey data. Once the potentially

confounding factor of more than one treatment is removed, modeling to examine the impact of additional non-demographic factors on mode choice would also be useful. It would also be of interest to conduct a similar cross-mode comparison for studies that require less intensive cogitation of treatment content, to see if video and/or audio modes are more effective in that context. Finally, another issue to explore with further experimentation is whether we received a higher completion rate as a result of the multiple mode options. Some of the people who first watched the video and then read the text might have been less likely to complete the survey if they had only the text option.

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