

**INFLUENCE OF IMPORTANCE STATEMENTS AND BOX SIZE ON
RESPONSE RATE AND RESPONSE QUALITY OF OPEN-ENDED
QUESTIONS IN WEB/MAIL MIXED-MODE SURVEYS***

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ABSTRACT

To understand the thinking behind respondents' answers, researchers occasionally use open-ended questions. Getting a quality response to open-ended questions can be challenging but attending to the visual design of the question and using a motivational statement in the question can increase item response and data quality. To understand the use of open-ended questions in surveys further, we designed an experiment testing the effect of an importance statement (present/absent) and box size (large/small) on item response rate and response quality in a mixed-mode (web and mail modes) survey. Data for the study came from a survey of Florida Cooperative Extension Service (FCES) clients. The results showed that item response was improved with the importance prompt, irrespective of box size. The combination of importance statement and larger answer box also resulted in more words. Web responses produced more words than those on paper and words counts were significantly improved with an importance prompt for web responses. Overall, the combination of importance prompt, larger box size and web mode was most important in producing the best item response rate and response quality in our mixed-mode survey.

To understand the thinking behind respondents' answers, survey designers sometimes use open-ended questions in paper and web surveys. According to Dillman, Smyth, and Christian (2014), open-ended questions can be put into three categories: 1) numerical entry (e.g., count, date, frequency), 2) list of items (e.g., name of persons to whom you provided advice, places visited in the last week), and 3) descriptive open-ended questions (e.g., suggestions for ways to improve service delivery). Among all three, descriptive open-ended questions are often used by researchers because respondents can report rich and detailed information about the topic of interest (Tourangeau, Rips, and Rasinski 2000). Open-ended questions have

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the potential to generate thick, rich and descriptive responses (Israel 2010; Smyth et al. 2009) but getting a quality response and a high item response rate to these questions can be challenging (Dillman 2007; Israel and Lamm 2012; Reja et al. 2003; Smyth et al. 2009). Placement of open-ended questions in the questionnaire can also be problematic, as space on the page(s) is a constraint for mail surveys (Israel 2010). Even after getting high-quality responses to open-ended questions, data cleaning, coding, and analysis can be costly and time consuming (Denscombe 2008; Dillman 2007; Israel 2014; Smyth et al. 2009). All these issues make open-ended questions used less frequently by many researchers (Israel 2014).

Previous research provides considerable evidence for the influence of verbal and visual design elements (symbols, words, graphics and numbers) on response behavior for closed-ended questions (Christian, Dillman, and Smyth 2007; Dillman et al. 2014; Toepoel and Dillman 2010). Yet research on the effect of visual design elements on responses to open-ended questions is limited. Christian and Dillman (2004) found that the larger of two answer spaces in a mail survey of college students resulted in more words and themes. The findings of Christian and Dillman (2004) were corroborated by Stern, Dillman, and Smyth (2007), where they also found more words were written in the larger box of an open-ended question in a mail survey. On the other hand, Smyth et al., (2009) found that a larger box size for open-ended questions produced more words than did the smaller box for late respondents and, in comparison to mail surveys, web surveys produced more words with a larger box size. Recently, Israel (2010) experimented with a series of answer boxes ranging from 0.28 to 1.68 inches high for two open-ended questions in a mail survey and found a linear increase in the number of words was associated with an increase in the box size. These studies provide a clear indication that a larger answer space for an open-ended question acts as a visual prompt for respondents about the amount of information expected by survey researchers.

Besides box size, a motivating statement included with the stem of an open-ended question can improve response quality. In their web survey of college students, Smyth et al. (2009) found that an open-ended question stem that emphasized its importance increased the response length (as measured by the number of words), number of themes and the likelihood of elaboration in the answer, more so for later respondents. Likewise, Israel (2014) found that including an importance statement resulted in more words for both mail and web modes.

Beyond response length, several researchers studied the effect of an importance prompt and box size on item response rates (Israel 2010; 2014; Smyth et al. 2009; Stern et al. 2007; Zuell, Menhold, and Körber 2015). Israel (2010) found that box

size did not affect item non-response to open-ended questions for the sizes included in the experiment in a mail survey. On the other hand, Israel (2014) found that an importance prompt improved the item response rate for open-ended questions and especially for mail respondents in mixed-mode surveys. Recently, Zuell et al. (2015), in their web survey of university students, also found that a motivational statement in the question increased the response rate to an open-ended question irrespective of box size. Holland and Christian (2009) concluded that the item response rate for open-ended questions was increased when respondents were interested in the topic, which suggests that a motivating statement might focus attention and raise interest.

Researchers also have examined the effect of demographic characteristics of respondents on response quality across a variety of box size and importance statement combinations (Denscombe 2008; Israel 2010; Stern et al. 2007). Respondents more than 60 years of age, those with less than a college degree and women provided answers that were an average of one or two words longer than their comparison groups when provided with a larger box (Stern et al. 2007). Israel (2010) also found that respondents more than 60 years of age, females and those who were college educated wrote more words when provided with a larger answer box. Similarly, Denscombe (2008) found that gender and educational attainment influenced the length of response to open-ended questions. In addition, Israel (2010) found that respondents were more likely to write outside the designated answer space when they were provided with a short box height (e.g., .28 inches).

Although findings of Smyth et al. (2009), Israel (2010), and Israel (2014) were promising for web, mail and mixed-mode surveys respectively, additional evidence is needed to clarify how the *combination* of motivating statements and box size affect the item response rate and response quality of open-ended questions *across* web and mail survey modes. With more importance given to mixed-mode surveys, limited testing of questionnaire design with these surveys, and the need to further understand the use of open-ended questions in mixed-mode surveys, we designed an experiment that examined the effect of a motivating statement about importance (present/absent) and box size (large/small) on the item response rate and response quality of an open-ended question in a web/mail mixed-mode survey.

THEORETICAL FRAMEWORK

While answering descriptive open-ended questions, respondents employ cognitive processing that engages with visual and verbal language used in the self-administered survey (Dillman 2007; Krosnick 1999; Schaeffer and Presser 2003).

During this process, respondents employ four steps: question interpretation, retrieval of information from memory related to the question asked, conversion of the retrieved information into an answer, and reporting the response (Tourangeau and Rasinski 1988). Jenkins and Dillman (1997) suggested that before answering a question in a self-administered survey using the four above-mentioned steps, respondents pass through a perception stage where they use their previous knowledge and experiences to interpret the stimuli provided by the visual aspects of the questionnaire. The visual design aspects of the questionnaire help to guide the cognitive process of respondents (Jenkins and Dillman 1997). In open-ended questions, box size can indicate the expectation of the researcher for the amount of text needed for an optimal answer and a respondent tries to formulate her or his answer according to the size of the box (Israel 2010). A white answer space on a shaded background or a box with a black outline on a white paper questionnaire provide a similar visual cue that conveys the same message that respondents need to answer within the provided box space (Israel 2010; Stern et al. 2007). Based on findings of Israel (2010), we also think that in the mail survey with constrained space for an open-ended question, a smaller box size can prompt respondents to write outside the delineated answer space.

Miller and Cannel (1982), proposed that response quality (i.e., a complete or optimal response) especially for open-ended questions in telephone interviews can be improved by giving respondents clarifying and motivating instructions and feedback on questions. Following Miller and Cannel's (1982) reasoning, we think providing a motivating statement or using a prompt in the stem of an open-ended question can act as a motivating stimulus for respondents to focus their attention on the specific question, as well as convey a message that a more thorough answer is needed. This assumption is well supported by the findings of Smyth et al. (2009), Zuell et al. (2015) and Israel (2014). Based on findings of Israel (2010) and Stern et al. (2007), we adopted the view that respondents younger than 60 years of age and those with a higher formal education have greater cognitive processing ability to respond to open-ended questions in surveys as compared with older respondents and those with less education. These studies also provide support for the idea that changes in visual design (i.e., box size) or an importance prompt can improve the motivation and cognitive processing ability of some respondents, while the effect is smallest for respondents who have less education or are male (Israel 2010; Smyth et al. 2009).

Thus, literature provides reason to believe that the visual design of open-ended questions, that is box size, and motivating information at the introduction of a

question can improve the item response rate and response quality, at least to some extent, and this effect should occur in both web and mail modes. We tested this hypothesis below in our experiment.

METHODOLOGY

The data for this study came from the customer satisfaction survey of Florida Cooperative Extension Services (FCES). Customer satisfaction surveys have been conducted annually since 1997 using telephone (1997-2004), mail (2003-2011), web and mixed-mode (2008-2014) (Israel 2011, 2013). FCES provides an array of non-formal adult education programs on many topics, including water quality management, agricultural production, youth development, family finances and nutrition to address issues facing Florida's residents. A self-administered mixed-mode survey was delivered to a sample of clients who attended a workshop or seminar, called the Extension office, visited the Extension office, or exchanged emails with an agent during a designated 30-day period to solicit their feedback on service provided by FCES. The individuals were selected using stratified sampling design from lists provided by each Extension office. Out of the 67 counties in Florida, thirteen to fourteen counties participate each year such that each county could contribute data once every five years. The sample size for 2014 was 2,341. The selected sample was divided into three strata: those who provided both email and postal addresses, those who provided an email address only, and those who provided a postal address only. The clients in the first strata who provided both email and postal address were further randomly assigned to one of the three experimental groups:

1. *Mail only*: Five contacts consisting of a postal pre-letter, followed by a postal letter and questionnaire, then a reminder post card, a second postal letter and questionnaire, and a final postal letter and questionnaire.
2. *One mail + two email + two-mail questionnaire*: Five contacts using postal and email invitations. The first invitation was sent via a postal pre-letter. The second and third contacts were made using email letters containing a link to the survey. The fourth and fifth contacts switched back to a postal letter and questionnaire.
3. *Three email + two-mail questionnaire*: The first three contacts were sent by email, with each message including a link to the survey. The final two contacts each included a postal letter and questionnaire.

The composition of the second and third strata were, respectively:

4. *Mail only*: Included clients who just provided postal address and received the same set of contacts as group 1 above.
5. *Email only*: Included clients who provided email address and received five contacts sent by email with each message including a link to the survey.

This series of contacts yielded an overall response rate of 57.3 percent (RR2, AAPOR 2015) with 1,348 partial¹ and complete responses. Out of 1,348 respondents, 896 (527 via mail and 369 via web) provided a response to the experimental open-ended question.

The mail and web versions of FCES customer satisfaction surveys were designed in a way that they followed the uni-mode design principles of Dillman et al. (2014). This involved maintaining the same questions and question order in both versions and, most important, minimizing the visual design differences in both versions. The two-page mail questionnaire had 21 items and used grey shading to distinguish the blocks of related questions; in the same way the web survey presented the questions either in groups or singly on a separate screen. The web version of the questionnaire was implemented with Qualtrics survey software. Clients who received the survey invitation via email could click on the embedded link to access the URL for the survey's website, enter the personal identification number (PIN), and then agree to the informed consent to start responding to the questionnaire. The survey included questions on: overall satisfaction with services provided by FCES, satisfaction of clients on four aspects of quality of services provided, outcomes from use of information provided by FCES and clients' demographic attributes.

The experiment for this study consisted of one open-ended question, which asked clients how FCES can improve its services. For the open-ended question, clients were randomly assigned to one of the four groups: 1) no importance prompt and large box size ($n = 349$), 2) importance prompt and large box size ($n = 325$), 3) importance prompt and small box size ($n = 324$), and 4) no importance prompt and small box size ($n = 350$, see Figure 1). Five measures of response behavior were recorded for analysis: 1) item response rate, 2) response length (number of words), 3) number of themes, 4) elaboration rate, and 5) number of respondents writing outside the specified answer space in the mail survey. The number of themes and elaboration rate were coded by two independent coders and when a discrepancy

¹Because the questionnaire contained only 21 items, a partial response was defined as those where respondents answered at least one substantive question in the survey (cf., AAPOR 2015).

occurred, a third coder resolved the difference (Israel 2010; Smyth et al. 2009).² Following Smyth et al. (2009) and Israel (2010), a theme was defined as “a concept or subject that answered the question and was independent of all other concepts within the response” (Israel 2010:275–6). The elaboration variable was coded as 1 when there were added phrases on the suggestions for improvements. It was coded as 0 otherwise. Because the percent of respondents who wrote 3 or more themes was very small, we recoded this into a nominal variable with categories for 1 theme and 2 or more themes.

No importance prompt and bigger box size

8. What could we do to improve our services to you and others in the county?

Importance prompt and bigger box size

8. This question is very important, so please tell us all that you can. What could we do to improve our services to you and others in the county?

Importance prompt and smaller box size

8. This question is very important, so please tell us all that you can. What could we do to improve our services to you and others in the county?

No importance prompt and smaller box size

8. What could we do to improve our services to you and others in the county?

FIGURE 1. FOUR VERSIONS OF THE WAYS TO IMPROVE EXTENSION'S SERVICES QUESTION

²Of the 896 responses to the question, coders agreed on the number of themes 84.5 percent of the time (n=758) and 67.9 percent (n=609) on the presence of elaboration. Coder inexperience contributed to disagreements and the need for a third coder to resolve discrepancies.

The data were analyzed using SAS for Windows, version 9.3 (SAS Institute Inc.). Along with descriptive statistics, logistic regression was used to conduct tests of main effects for combinations of box size and importance prompt, as well as their interaction with response mode on the item response rate, responses with multiple themes, and elaboration rates. Logistic regression was also used to test the effect of the main effects of the importance prompt and box size on respondents writing outside the specified answer space provided for the open-ended question. Similarly, a negative binomial Poisson regression was used to conduct significance tests for the count of words and robust standard errors were used for parameter tests (see Agresti 2013).

RESULTS

Descriptive statistics show that use of the importance prompt resulted in higher item response rate (76 percent) compared with no prompt (57.7 percent), but box size did not affect response rate (Table 1). Among the combinations of importance prompt and box size, the one with the importance prompt and large box size produced highest item response rate, percentage of multiple themes and elaboration rate. The item response rate was also higher for web (75.5 percent) compared to mail (61.4 percent). Regarding demographics, the response rate was higher for respondents who were 60 years or older, had a bachelor's degree or higher education and were males. Use of an importance prompt or a large box size resulted in more words (27.2 and 26.5, respectively) than did the no prompt and small box size. Respondents also wrote more words for the combination of importance prompt and large box size than did respondents with no prompt and a small box size. With respect to mode, web respondents wrote more words compared to mail. Respondents below 60 years of age wrote one more word, on average, than those who were 60 years or older. For education, respondents with a bachelor's degree or higher wrote more words and for gender, females wrote an average of one more word than did males. For themes and elaboration, the percentage of multiple themes and elaboration rate was higher in the presence of the prompt, a large box size, the combination of prompt and large box size, and for the web mode of the survey. In demographics, the percentage of multiple themes and elaboration rate was higher for respondents who were below 60 years of age, had a bachelor's degree or higher education level, and were female, but some differences were too small to be statistically significant.

TABLE 1. ITEM RESPONSE RATE, RESPONSE LENGTH (NUMBER OF WORDS), MULTIPLE THEMES RATE, AND ELABORATION RATE FOR THE WAYS TO IMPROVE EXTENSION'S SERVICES QUESTION BY IMPORTANCE PROMPT, BOX SIZE, RESPONSE MODE AND DEMOGRAPHICS

	RESPONSE RATE	MEAN WORDS	MULTIPLE THEMES	ELABORATION RATE
Importance prompt				
No prompt	57.7%***	20.6***	10.2%	39.8%**
Prompt	76.0%***	27.2***	11.4%	48.4%**
Box size				
Small box	66.5%	22.0***	9.8%	41.5%*
Bigger box	66.5%	26.5***	11.9%	47.5%*
Combination of importance prompt and box size				
No prompt and				
small box size . .	58.0%***	19.8***	10.4%	40.4%**
No prompt and				
bigger box size .	57.3%***	21.4***	9.4%	42.4%**
Prompt and small				
box size	75.6%***	23.8***	10.0%	39.2%**
Prompt and bigger				
box size	76.3%***	30.7***	13.3%	54.3%**
Mode				
Mail	61.4%***	18.9***	9.0%*	39.7%***
Web	75.5%***	31.9***	13.6%*	51.4%***
Age				
Below 60 years . . .	63.2%**	24.8***	11.2%	45.0%
60 years and older .	70.4%**	23.7***	10.4%	44.0%
Education				
Some college or				
below	64.3%	21.7***	8.3%*	40.3%**
Bachelor's degree or				
higher	68.5%	26.6***	13.2%*	48.3%**
Gender				
Male	68.6%	23.8***	9.0%	41.6%
Female	64.8%	24.8***	12.2%	46.2%

NOTE: *significant difference at $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

The analysis of binary logistic regression results revealed that the likelihood of obtaining a response was improved with the inclusion of an importance prompt (Table 2). The probability of a response with the importance prompt and large box was significantly higher than the no prompt/small box combination, while the no prompt/large box combination decreased the probability of a response relative to

the no prompt/small box combination.³ One reason for the lower item response rate for the large box without the prompt might be a lack of motivation and higher perceived cognitive burden felt by respondent when seeing the box size (which indicated a need to write a lengthy answer). With respect to response mode, web significantly improved the likelihood of a response on the question as compared to mail. Also, respondents who were 60 years or older were more likely to respond to the open-ended question than were younger respondents. Educational attainment and gender did not significantly affect response probability.

TABLE 2. ODDS RATIOS AND ESTIMATES FOR RESPONSE RATE TO WAYS TO IMPROVE EXTENSION’S SERVICES QUESTION BY IMPORTANCE PROMPT, BOX SIZE, RESPONSE MODE AND DEMOGRAPHICS

	ESTIMATE	ODDS RATIO	WALD χ^2	<i>p</i> -VALUE
Intercept	0.89			
Prompt/small box vs. no prompt/small box	0.38	2.18	10.98	≤.001
No prompt/large box vs. no prompt/small box	-0.46	0.94	19.98	≤.001
Prompt/large box vs. no prompt/small box	0.48	2.41	17.10	≤.001
Web vs. mail	0.41	2.26	35.56	≤.001
Sixty years and older vs. below 60	0.18	1.44	8.50	.004
Bachelor’s degree or higher vs. less than BA degree	0.03	1.07	0.26	.611
Female vs. male.	0.08	1.17	1.53	.216

NOTE: Wald chi-square is reported for each test, controlling for other predictors. The overall model Wald chi-square was 94.066 with 7 degrees of freedom and *p*≤.001.

Next, we examined the effect of the importance prompt and box size on response quality (as measured by number of words) using negative binomial Poisson regression (Table 3). The combination of an importance prompt and a large box induced respondents to write significantly more words on the ways to improve Extension’s services question than did the no prompt/small box combination. The

³We also ran the model with main effects (importance prompt and box size) and their interaction. When we compared the model with main effects and their interaction and model presented in the manuscript, we found that both models had similar AIC (Akaike information criterion = 1535.005) values, which indicated both models provided similar information. We think that model presented in the manuscript tells a more nuanced story (and aligned with the descriptive analysis results better) compared with the model with the two main effects and their interaction.

no prompt/large box and the importance prompt/small box combinations were not significantly different from the no prompt/small box version. One interpretation is that when respondents are motivated by an importance prompt to answer, they are likely to write more when presented with a large box because the large box indicates visually that more words are needed for a complete answer.

TABLE 3. POISSON REGRESSION OF NUMBER OF WORDS IN THE RESPONSE TO WAYS TO IMPROVE EXTENSION'S SERVICES QUESTION BY IMPORTANCE PROMPT, BOX SIZE, RESPONSE MODE AND DEMOGRAPHICS

	ESTIMATE	WALD χ^2	<i>p</i> -VALUE
Intercept	2.76		
Prompt/small box vs. no prompt/small box	-0.04	0.14	.712
No prompt/large box vs. no prompt/small box	0.08	0.44	.508
Prompt/large box vs. no prompt/small box	0.31	8.41	.004
Web vs. mail	0.29	6.06	.014
Prompt/small box X Web.	0.45	7.86	.005
No prompt/big box X Web.	-0.01	0.00	.979
Prompt/big box X Web	0.30	3.41	.065
60 years and older.	0.02	0.11	.740
Bachelor's degree or higher.	0.12	3.86	.050
Male	0.07	1.34	.247
Dispersion	0.63		

NOTE: *P*-value is based on the type III Wald chi-square test using robust standard errors. The type III Wald chi-square for the prompt/box size treatments was 37.89 ($p \leq .001$) and for the interaction with response mode, it was 11.83 ($p = .080$). The overall model chi-square was 128.220 with 10 degrees of freedom ($p \leq .001$).

Response mode also significantly affected the number of words written, specifically web respondents wrote more words compared to mail respondents. This finding is consistent with those from Smyth et al. (2009). When the interaction of importance prompt/box size combinations with response mode was examined, we found the interaction approached significance ($p = .08$) and a larger scale survey would likely have been significant. We suggest that the interaction is nontrivial because the web X importance prompt combinations (both large and small box sizes) generate more words relative to other web and mail combinations (Table 3). Regarding respondents' demographic characteristics, age and gender were not significant in predicting the number of words written for the question. Respondents

who had a bachelor’s degree or higher wrote significantly more words than those who had some college or less for educational attainment.

When the predicted mean number of words written was calculated (Table 4), the average number of words written was highest for the combination of importance prompt and large box. The other combinations all resulted in a smaller (and similar) number of words. For mode of response, the predicted mean number of words for web respondents was substantially higher compared to mail respondents. When different combinations of the importance prompt and box size were compared with mode of survey, the highest mean number of words was predicted for combination

TABLE 4. PREDICTED MEAN NUMBER OF WORDS WRITTEN IN THE RESPONSE FOR THE WAYS TO IMPROVE EXTENSION’S SERVICES QUESTION BY IMPORTANCE PROMPT, BOX SIZE, RESPONSE MODE AND DEMOGRAPHICS.

	MEAN WORDS
Importance prompt/Box size Treatment	
No prompt and small box	19.6
No prompt and large box	21.1
Prompt and small box	23.6
Prompt and large box	30.9
Response Mode	
Mail	18.4
Web	29.8
Importance prompt/Box size Treatment X Mode	
No prompt/small box & mail	16.9
No prompt/large box & mail	18.2
Prompt/small box & mail	16.2
Prompt/large box & mail	23.0
No prompt/small box & web	22.7
No prompt/large box & web	24.3
Prompt/small box & web	34.3
Prompt/large box & web	41.5
Respondents’ age	
Below 60 years	23.2
60 years and older	23.6
Respondents’ educational attainment	
Some college or below education	22.1
Bachelor’s degree or higher	24.8
Respondents’ sex	
Male	22.6
Female	24.2

of importance prompt, large box size, and web mode (Table 4). This might be interpreted to suggest that respondents find typing to be easier in the web mode than writing on a paper instrument in the mail mode and, thus, using a motivational statement about the importance of answering and a large box encouraged respondents to type more words.

For respondent demographics, the predicted mean words were higher for respondents who were female, 60 years and older and had bachelor's degree or higher education. These results are consistent with findings of Stern et al. (2007) and Israel (2010), except Stern et al. (2007) found that respondents with less than college degree wrote more words.

With respect to whether a single theme or multiple themes were written for the ways to improve Extension's services question, the results of binary logistic regression revealed that combinations of importance prompt and box size, response mode, and demographic variables were not significant predictors of multiple themes (Table 5).

TABLE 5. ODDS RATIOS AND ESTIMATES FOR INCLUDING MULTIPLE THEMES IN THE RESPONSE TO WAYS TO IMPROVE EXTENSION'S SERVICES QUESTION BY IMPORTANCE PROMPT, BOX SIZE, RESPONSE MODE AND DEMOGRAPHICS.

	ESTIMATE	ODDS RATIO	WALD χ^2	p-VALUE
Intercept	-2.18			
Prompt/small box vs. no prompt/small box	-0.12	.91	0.35	.553
No prompt/large box vs. no prompt/large box	-0.08	.94	0.16	.686
prompt/small box	0.22	1.27	1.53	.216
Web vs. mail	0.19	1.46	2.88	.090
Sixty years and older vs. below 60	-0.05	0.09	0.02	.654
Bachelor's degree or higher vs. less than BA degree	0.19	1.49	2.79	.095
Female vs. male.	0.16	1.36	1.74	.188

NOTE: Wald chi-square is reported for each test, controlling for other predictors. The overall model Wald chi-square was 10.319 with 7 degrees of freedom and $p=.171$.

We also found respondents elaborated on a theme significantly more often when they were provided with both the importance prompt and a large box relative to the

no prompt/small box combination (Table 6). Moreover, the other combinations' elaboration rates did not significantly differ from the no prompt/small box combination. The web mode also significantly increased elaboration compared with the mail mode. None of the demographic variables significantly affected elaboration for the question.

TABLE 6. ODDS RATIOS AND ESTIMATES FOR ELABORATING ON THE RESPONSE TO WAYS TO IMPROVE EXTENSION'S SERVICES QUESTION BY IMPORTANCE PROMPT, BOX SIZE, RESPONSE MODE AND DEMOGRAPHICS.

	ESTIMATE	ODDS RATIO	WALD χ^2	<i>p</i> -VALUE
Intercept	-0.25			
Prompt/small box vs. no prompt/small box	-0.05	1.17	0.16	.688
No prompt/large box vs. no prompt/small box	-0.21	1.00	2.67	.102
Prompt/large box vs. no prompt/small box	0.46	1.95	15.57	≤.001
Web vs. mail	0.23	1.60	10.57	.001
60 years and older vs. below 60	0.00	1.01	0.00	.960
Bachelor's degree or higher vs. less than BA degree	0.12	1.27	2.84	.092
Female vs. Male	0.09	1.20	1.60	.205

NOTE: Wald chi-square is reported for each test, controlling for other predictors. The overall model Wald chi-square was 32.848 with 7 degrees of freedom and *p*≤.001.

Finally, we explored whether the importance prompt and box size affected the likelihood of a respondent writing outside the answer box for those responding by mail with a paper instrument. Neither the importance prompt nor box size were significant in explaining the likelihood of a respondent writing outside the provided answer box size (Table 7).

CONCLUSION AND DISCUSSION

This study conducted an experiment with a mixed-mode (web and mail) survey to examine the effect of an importance statement and box size combination on the item response rate and aspects of response quality for an open-ended descriptive question. We consider the use of a mixed-mode survey for the experiment was the

TABLE 7. ODDS RATIOS AND ESTIMATES FOR PERCENT WRITING OUTSIDE ANSWER BOX IN MAIL SURVEY TO WAYS TO IMPROVE EXTENSION'S SERVICES QUESTION BY IMPORTANCE PROMPT AND BOX SIZE, CONTROLLING FOR AGE, EDUCATION AND SEX

	ESTIMATE	ODDS	WALD	
		RATIO	χ^2	<i>p</i> -VALUE
Prompt versus none	-0.18	0.71	2.12	.146
Large box versus small box.	-0.04	0.92	0.14	.713

NOTE: Wald chi-square is reported for each test, controlling for other predictors.

most distinctive contribution of this paper. The results provide additional evidence to the existing literature on the visual and verbal design effects of open-ended questions. Specifically, the combination of an importance statement and large box size can have significant influence on response behavior in terms of the item response rate, response length (i.e., number of words) and elaboration rate. The motivating statement about importance improved the item response rate (irrespective of box size) and response quality (in combination with a large box size), whereas a large box size significantly reduced the item response rate without an importance prompt and significantly improved the item response rate in association with an importance prompt. These effects were not significantly different across web and mail modes. These results are partially consistent with findings of Christian and Dillman (2004), Israel (2010; 2014), Schaefer and Dillman, 1998, and Stern et al. (2007). The results of a significant effect of importance prompt on item response rate are consistent with findings of Israel (2014), Smyth et al. (2009), and Zuell et al. (2015).

Box size significantly improved response length but only when there was the combination of an importance prompt and a large box size. The significant effect of the importance prompt on response length is partially consistent with Israel (2014), because an importance prompt significantly predicted more number of words only in combination with bigger box size. This suggests that for response quality, an importance prompt will not have the desired effect when paired with a small box size. We speculate that this is because the small box communicates a conflicting expectation that limited information is needed for an adequate answer. In addition, we agree with Israel's (2014) observation that survey researchers should be careful in using an importance prompt for open-ended question, as all questions in a survey cannot be very important. Using an importance prompt for many questions will increase respondent burden and likely reduce response quality for the most important open-ended questions in the study.

For mode of response, we found the web mode had a significant influence on the item response rate, response length, and elaboration rate to the open-ended question. These findings are consistent with Israel's (2014) and Smyth et al.'s (2009) studies. We think that the results support the view that respondents are more comfortable typing on a computer, laptop or tablet in comparison to writing on a paper instrument. As more people are adopting computers and other devices to access the web, our findings suggest that researchers can successfully use open-ended questions in web and mixed-mode surveys. Carefully designed motivating statements and appropriate-sized answer spaces can increase the feasibility of collecting high quality data and gaining more insight into substantive topics (rather than relying almost entirely on closed-ended questions). On the other hand with the increased use of smartphones to answer surveys, these respondents may not be likely to type more and the benefit of using an importance prompt and larger box with web surveys may dissipate in the future. Although response length was higher for web mode compared to mail mode, we did not examine how the size of handwriting might have differed between the large and small answer boxes and consequently, confounded our results.⁴ We suggest future researchers measure size of respondents' handwriting on mail surveys to examine how handwriting size may affect the number of words written for open-ended questions.

Concerning demographics of respondents and response quality, only education (i.e., a bachelor's degree or higher) significantly predicted more mean words for the open-ended question, and for the item response rate, only age (more than 60 years) significantly predicted the response to the open-ended question. These findings for age and education are consistent with those of Israel, (2010) and Stern et al. (2007). Older people may be more willing to provide responses to open-ended questions compared with their younger counterparts because some may have more time or some have a history of civic engagement and these, in turn, lead them to answer the question. Still, we did not measure the motivations of people 60 years and older in providing a response to the open-ended question and future researchers might explore this issue. Due to the small proportion of racial and ethnic minorities in our sample, we were unable to explore these subgroup differences, and differences for other demographic segments. We recommend that future researchers should explore the possible effect of different subgroups (e.g., whites, African-American, Hispanics) on response rate and number of words written for open-ended questions when they are provided with motivating statement and varied box size.

⁴We thank an anonymous reviewer for bringing this issue to our attention.

We also examined multiple themes and elaboration for the open-ended question and found that study variables (importance prompt, box size, and demographic variables) did not significantly affect writing multiple themes. Nevertheless, elaboration rate was significantly improved with the combination of an importance prompt and a large box size and with web mode. The results for multiple themes were not significant, in contrast to Israel (2010) and Smyth et al. (2009). However, percentage of multiple themes written for each treatment (prompt and box size) were in the expected direction. One reason for the non-significant increase in multiple themes for the treatment might have been a consequence of too little variation in the number of themes for this question, as most of the respondents provided only one, two or three themes. The effect of the importance prompt and box size on the number of themes in an answer may vary with the type of open-ended question because respondents may have different perceptions of what and how much information is needed by a specific open-ended question.

While elaboration rate results are partially consistent with Israel (2010) and Smyth et al. (2009) as we found significant elaboration only for a combination of an importance prompt and a large box size. We also found that among mail survey respondents the tendency to write outside the box is not significantly predicted by importance prompt and box size, in contrast to Israel (2010) who found that respondents have more tendencies to write outside the provided box space when they were provided with smaller size box. One reason for the different findings is that the small answer space in the current study was twice the size as the smallest box in Israel's (2010) experiment and respondents were less constrained by the answer space in the current study.

Finally, our results support the view that open-ended questions can be used to capture detailed information from the public, when researchers employ a large answer box, use a motivating statement in the question stem, and emphasize responding via the web. Although the generalizability of this study is limited since we conducted only one experiment, it offers evidence to support exploration of other open-ended question topics and forms. Researchers might also consider exploring the cognitive process behind responses to open-ended questions to better understand the mechanisms that contribute to item response and completeness (Behr et al. 2014; Dillman et al. 2014).

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REFERENCES

- Agresti, Alan. 2013. *Categorical Data Analysis*. 3rd edition. Hoboken, NJ: John Wiley and Sons.
- American Association for Public Opinion Research [AAPOR]. 2015. *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys*. 8th edition. Retrieved from http://www.aapor.org/AAPORKentico/AAPOR_Main/media/publications/Standard-Definitions2015_8theditionwithchanges_April2015_logo.pdf
- Behr, D., W. Bandilla, L. Kaczmirek, and M. Braun. 2014. "Cognitive Probes in Web Surveys: On the Effect of Different Text Box Size and Probing Exposure on Response Quality." *Social Science Computer Review* 32(4):524–33.
- Christian, L. M. and D. A. Dillman. 2004. "The Influence of Graphical and Symbolic Language Manipulations on Responses to Self-Administered Questions." *Public Opinion Quarterly* 68(1):57–80.
- Christian, L. M., D. A. Dillman, and J. D. Smyth. 2007. "Helping Respondents Get it Right the First Time: The Influence of Words, Symbols, and Graphics in Web Surveys." *Public Opinion Quarterly* 71(1):113–25.
- Denscombe, M. 2008. "The Length of Responses to Open-ended Questions a Comparison of Online and Paper Questionnaires in Terms of a Mode Effect." *Social Science Computer Review* 26(3):359–68.
- Dillman, D. A. 2007. *Mail and Internet Surveys: The Tailored Design Method*. 2nd edition. New York: John Wiley.
- Dillman, D. A., J. D. Smyth and L. M. Christian. 2014. *Internet, Phone, Mail, and Mixed Mode Surveys: The Tailored Design Method*. 4th edition. Hoboken, NJ: John Wiley and Sons.

- Holland, J. L. and L. M. Christian. 2009. "The Influence of Topic Interest and Interactive Probing on Responses to Open-ended Questions in Web Surveys." *Social Science Computer Review* 27(2):196–212.
- Israel, G. D. 2010. "Effects of Answer Space Size on Responses to Open-ended Questions in Mail Surveys." *Journal of Official Statistics* 26(2):271.
- _____. 2011. "Strategies for Obtaining Survey Responses from Extension Clients: Exploring the Role of Email Requests." *Journal of Extension* 49(2). Retrieved January 10, 2017 (<http://www.joe.org/joe/2011june/a7.php>).
- _____. 2013. "Using Mixed-mode Contacts in Client Surveys: Getting More Bang for Your Buck." *Journal of Extension* 51(3). Retrieved January 10, 2017 (<https://joe.org/joe/2013june/a1.php>).
- _____. 2014. "Using Motivating Prompts to Increase Responses to Open-ended Questions in Mixed-mode Surveys: Evidence on Where the Prompt Should Be Placed." Paper presented at the annual conference of the American Association for Public Opinion Research (AAPOR), Anaheim, CA.
- Israel, G. D. and A. J. Lamm. 2012. "Item Non-response in a Client Survey of the General Public." *Survey Practice*. Retrieved January 10, 2017 (<http://surveypractice.wordpress.com/2012/04/17/itemnonresponse-in-a-client-survey-of-the-generalpublic/#more-6070>).
- Jenkins, C. R. and D. A. Dillman. 1997. "Towards a Theory of Self-administered Questionnaire Design." Pp. 165–96 in *Survey Measurement and Process Quality*, edited by L. Lyberg, P. Biemer, M. Collins, E. de Leeuw, C. Dippo, N. Schwarz, and D. Trewin. New York: Wiley.
- Krosnick, J. A. 1999. "Survey Research." *Annual Review of Psychology* 50:537–67.
- Miller, P. V. and C. F. Cannell. 1982. "A Study of Experimental Techniques for Telephone Interviewing." *Public Opinion Quarterly* 46(2):250–69.
- Reja, U., K. L. Manfreda, V. Hlebec and V. Vehovar. 2003. "Open-ended Vs. Closed-ended Questions in Web Questionnaires." *Developments in Applied Statistics* 19:159–77.
- SAS Institute, Inc. Version 9.3. SAS Institute Inc., CARY NC.
- Schaeffer, D. R. and D. A. Dillman. 1998. "Development of a Standard E-mail Methodology: Results of an Experiment." *Public Opinion Quarterly* 62:378–97.
- Schaeffer, N. C. and S. Presser. 2003. "The Science of Asking Questions." *Annual Review of Sociology* 29:65–88.
- Smyth, J. D., D. A. Dillman, L. M. Christian, and M. McBride. 2009. "Open-ended Questions in Web Surveys: Can Increasing the Size of Answer Boxes and

- Providing Extra Verbal Instructions Improve Response Quality?" *Public Opinion Quarterly* 73(2):325–37. Doi:10.1093/poq/nfp029.
- Stern, M. J., D. A. Dillman, and J. D. Smyth. 2007. "Visual Design, Order Effects, and Respondent Characteristics in a Self-Administered Survey." *Survey Research Methods* 1(3):1–11.
- Toepoel, V. and D. A. Dillman. 2010. "Visual Displays and Question Formats." Pp. 165–90 in *Social Research and the Internet: Advances in Applied Methods and New Research Strategies*, edited by M. Das, P. Ester, and L. Kaczmirek. Arlington, VA: Taylor & Francis.
- Tourangeau, R. and K. A. Rasinski. 1988. "Cognitive Processes Underlying Context Effects in Attitude Measurement." *Psychological Bulletin* 103(3):299–314.
- Tourangeau, R., L. J. Rips, and K. A. Rasinski. 2000. *The Psychology of Survey Response*. New York: Cambridge University Press.
- Zuell, C., N. Menold, and S. Körber. 2015. "The Influence of the Answer Box Size on Item Nonresponse to Open-ended Questions in a Web Survey." *Social Science Computer Review* 33(1):115–22.