

The Effects of Leading Questions



Julia Di Bella

MDM 4U1

June 11, 2009

For Mr. Boulton

Table of Contents:

Introduction	3
Background	3
Methods and limitations	
Methods	5
Limitations and sources of error	7
Results	9
Future work	12
Conclusion	13
References	14
Appendices	
Appendix A: Classes surveyed	15
Appendix B: Surveys	16
Appendix C: Summary table	18

Introduction:

When designing a survey, one is always advised to avoid leading questions. A leading question is a question that leads a respondent to a certain answer.¹ Examples of leading questions include questions that include additional information that may influence a respondent's answer (e.g. 'Many people think that Product A is unreliable. Would you rather buy Product A or Product B?') and questions that have more negative than positive answers or vice versa (e.g. 'What is your opinion of Product A? Very negative, negative, neutral or positive?').¹ Leading questions can influence the results of surveys, making them less reliable and useful because the results do not reflect reality. As a result, it is important to know the effects of leading questions, which types are most effective, and what influences someone to be swayed by a leading question. In this study, leading questions will be studied to determine if they have an effect, and if so, how much of an effect they have.

Background:

A leading question is a question that leads the respondent to a specific answer.¹ This can be done by the form of the question, its phrasing or the possible answers.² Questions can be leading by making an assumption about the respondent or the situation, by adding additional, unnecessary information which may influence a respondent's answer, by having an uneven number of positive and negative responses, or even by a single word.² For example, in a 1975 study by Loftus and Zanni, it was shown that the question "Did you see the broken headlight?"

got more positive responses than the question "Did you see a broken headlight?" even though in both cases there was no broken headlight.²

There are many psychological reasons why someone might be led by a leading question. Wanting to choose the 'best' response, not knowing all the information about the subject and being unsure on the topic are all factors that can influence someone to be led by a leading question. A 2002 study by Hong and Howard found that people with "emotion-based" coping styles were more likely to be influenced by a leading question than people with "problem-based" coping styles, suggesting that differences in personality have an influence on how likely one is to be led by a leading question.⁴ Another variable that can influence one's response to survey questions is other leading questions on the survey. A 1983 survey by Fischer and Lewis gave respondents the same survey with different "lead-up" questions, in which the "lead-up" questions were designed to be positively leading, negatively leading, or neutral.³ The "lead-up" questions influenced the respondents' answers to the survey with no leading questions, showing that leading questions can influence the respondents' answers to other questions on a survey.³

Because leading questions can influence a respondent's answers to questions on a survey, it is important to avoid putting them on surveys. The answers to a leading question may be skewed, and the leading question may even influence the answers on other questions on the survey. As a result of this, the survey is less useful and credible because it may not accurately reflect the respondents' actual opinions. This is of particular concern not only for surveys but in the legal system, where witnesses may be asked about the crime they witnessed. If asked a leading question, they could give inaccurate information about the crime. Several studies have shown that asking leading questions can change the information a witness gives, causing him or her to think they remember details that did not happen or omit details that did.⁵

The effects of leading questions are difficult to predict because they affect people differently. Leading a question one way on one question may not work on a different question. Because the effects of leading questions are unpredictable, it is very difficult to correct the results for them after the survey is done. Leading questions can have a large influence on any study that involves questioning respondents, so it is important to understand the effects they can have on the responses of a survey.

Methods and limitations:

Methods:

Ten classes were randomly selected using clustered random sampling. The classes were clustered by floor, and the number of classes surveyed per floor was proportional to the number of classes on each floor. The classes were randomly selected by assigning a number to each class, then randomly selecting numbers using a random number generator. Some classes were not included in the random selection of the classes, because in those classes, the students were rarely at their desks so writing a survey there would be difficult (e.g. the theatre, the gym, etc.). *(See Appendix A for the list of classes chosen for random selection.)*

Two surveys were made, each with questions about the same topics, but worded different ways. *(See Appendix B for the two surveys.)* The surveys were designed to appear to be about school dances. Questions that were leading on one survey were neutral on the other survey, and some questions were neutral on both surveys. In each survey, there was one question worded in a leading way by mentioning the number of people who attended the dance, (question 4 in survey 1, question 5 in survey 2), one where the "neutral" and "very negative" options were taken off,

causing there to be more positive than negative responses (question 7 in survey 1, question 8 in survey 2), one where negative information was added to the question and the "very positive" option was taken off (question 13 in survey 1, question 9 in survey 2) and one where the "very positive" option was taken off but no change was made to the phrasing of the question (question 11 in survey 1, question 10 in survey 2). Questions 6 and 12 were the same on both surveys. The other questions (questions 1 to 3 and 14) were added to the survey only to make it seem more like a legitimate survey about school dances, and the answers to those were not used in any calculations. A random number generator was used to determine how many of each survey to hand out to each class. In total, 86 copies of survey 1 and 101 copies of survey 2 were collected.

The answers to the survey were entered on an Excel spreadsheet by recording a "very negative" answer as 1, a "negative" answer as 2, a "neutral" answer as 3, a "positive" answer as 4, and a "very positive" answer as 5. (The exception was question 6, which only had three options. In this survey, the negative answer was recorded as 1, the neutral answer was recorded as 2, and the positive answer was recorded as 3.) "No opinion," "not applicable," and non-answered questions were left blank on the table and not included in the calculations.

For each question on each survey, the mean, median, mode, standard deviation, and 95% confidence range were calculated on an Excel spreadsheet. For questions where one or more options were removed from the survey (questions 7, 8, 9, 10, 11, and 13), a modified average, standard deviation and 95% confidence range were also calculated by weighting "very negative" and "negative" answers as 1, neutral answers as 2 and "positive" and "very positive" answers as 3. This was done because removing some of the options could mathematically skew the results of the survey, causing an apparent statistical difference between the answers even when no psychological skewing happened. Only counting answers as negative, neutral or positive

decreased the ability of the survey to detect small changes in the data, but decreased the chance of skewing for non-psychological reasons. The 95% confidence intervals were then compared between both surveys for each question to determine which questions had a statistical difference between surveys.

Limitations and sources of error:

There are several limitations and sources of error for this project. One main source of error is the use of surveys, which are always slightly unreliable because they rely on people's self-reported answers, which are prone to bias. To reduce bias in the surveys, I randomized the surveys and handed them out in class, where people were more likely to want to stop working to do a survey, reducing non-responses. However, not all bias could have or should have been eliminated, for the purpose of the survey was to determine how changes in the survey questions could bias the results of the survey.

One thing that could have influenced the results of the survey was the kind of question asked. Some questions are probably more susceptible to bias because of phrasing than others. For instance, if one already had a strong opinion on a subject, they would be less likely to be swayed by the phrasing of a question than someone who was unsure about a subject and did not know much about it. As a result, some effects of leading questions may have been missed because the topic of the question made people less likely to be influenced by the question's phrasing. This is particularly important for this survey because different types of leading questions were tested (i.e. changing phrasing, options, or combinations of both). This survey had to be brief, so there was only room for two to four of each type of leading question. If the topic of the question affects how likely one is to be affected by leading questions, it is likely that different types of

leading questions will not be able to be properly compared. Because there are only a few of each kind of leading question on each survey, the effect of the topic of the question may be too large to get meaningful results about the relative effects of different kinds of leading questions.

Another source of error is the effect that leading questions may have had on other questions on the survey. Someone who has answered a question earlier in the survey which was designed to make the dances seem more negative may have their perception of the dances slightly skewed negatively for the rest of the survey. This may have a small effect on the answers for the rest of the survey. Also, if a respondent noticed that a question was leading, he or she may be more wary when answering it and other questions on the survey, causing the leading question to have less of an effect or even an opposite effect than it was intended to have.

Lastly, eliminating options on some questions may have caused bias both psychologically (which is intentional, because that is what is being measured for this survey) and mathematically (which is unwanted because it makes it more difficult to analyze the survey results). For example, a survey missing the "very positive" option would have a lower average than one including it even if an equal number of people answered positively on each survey simply for mathematical reasons. This could cause apparent differences between the surveys when no psychological differences actually exist. To try to reduce this, I used the "modified average" for questions in which options have been eliminated, so it only notes whether someone's answer was negative, neutral or positive. In the example given above in which the "very positive" option was eliminated, using the "modified average" would eliminate the apparent difference because the number of people who answered positively in both surveys is the same. This technique reduces the bias caused by mathematical effects of eliminating options on surveys. However, because it only considers whether an answer is negative, neutral or positive, it reduces the ability to notice

small psychological effects. As a result, some small psychological effects may have been missed in the analysis using the modified average.

Results:

Three out of eight of the leading questions had a statistically significant effect on the average answer of the survey. Two of them skewed the results in the direction they were designed to; one did not. *(See Appendix C for a data table summarizing the results of the survey.)*

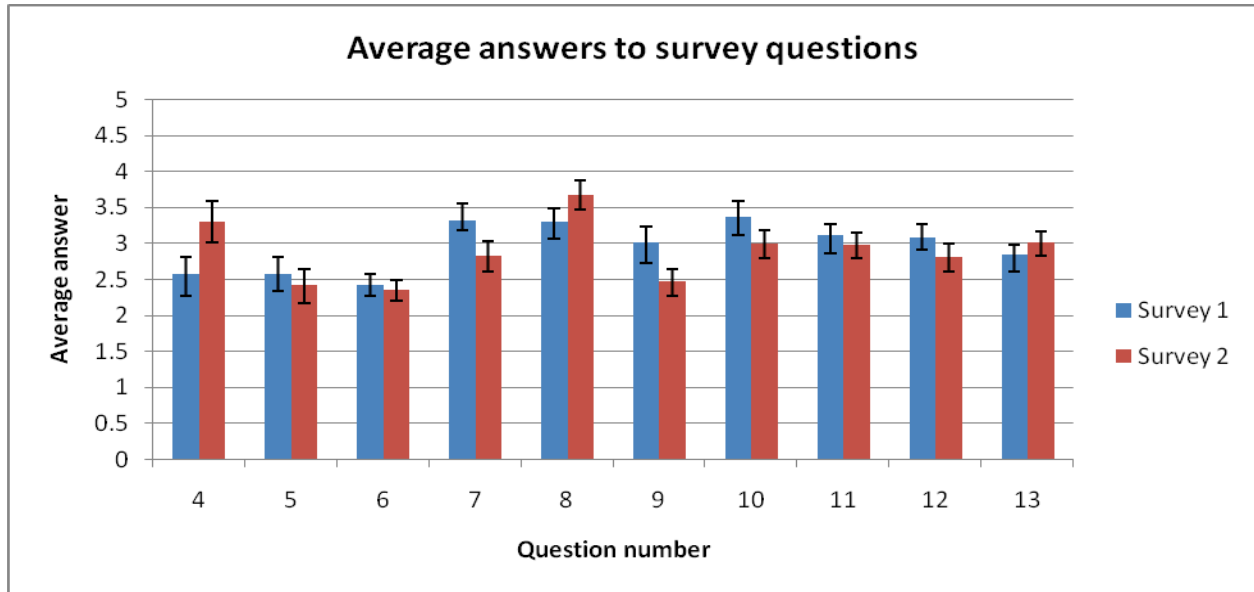
Questions 8 and 9 produced a statistically significant skew in the direction they were supposed to. In both questions, answer options were taken off of the questions, causing an asymmetry between positive and negative possible answers. For question 8, the neutral and very negative options were taken off survey 2, and the results for that survey were 11.52% more positive than those of the same question on survey 1. This may have been caused by a psychological effect caused by seeing more positive than negative options, by a mathematical effect caused by having more positive options than negative options (though this would be partially corrected by the modified average), by making it impossible for people to choose a neutral option, causing people to choose positive options over negative options, or by statistical discrepancy due to the fairly small sample size. For question 9, the phrasing of the question in survey 2 was negative and the very positive option was taken off the survey. The results for that survey were 18.41% more negative than those for the same question on survey 1. This may have been caused by psychological effects due to the phrasing and asymmetry of available responses, by mathematical effects because of the lack of a very positive option (though, again, the modified average would have corrected this somewhat), or by statistical discrepancy.

Question 4 produced a statistically significant skew in the direction opposite to what it was supposed to. For this question, the phrasing was made more positive on survey 1, but the answers to that survey were 22.28% lower than those to survey 2. This may have been caused for psychological reasons caused by the phrasing of the question (for example, people not wanting to attend dances many people would be at), or statistical discrepancy.

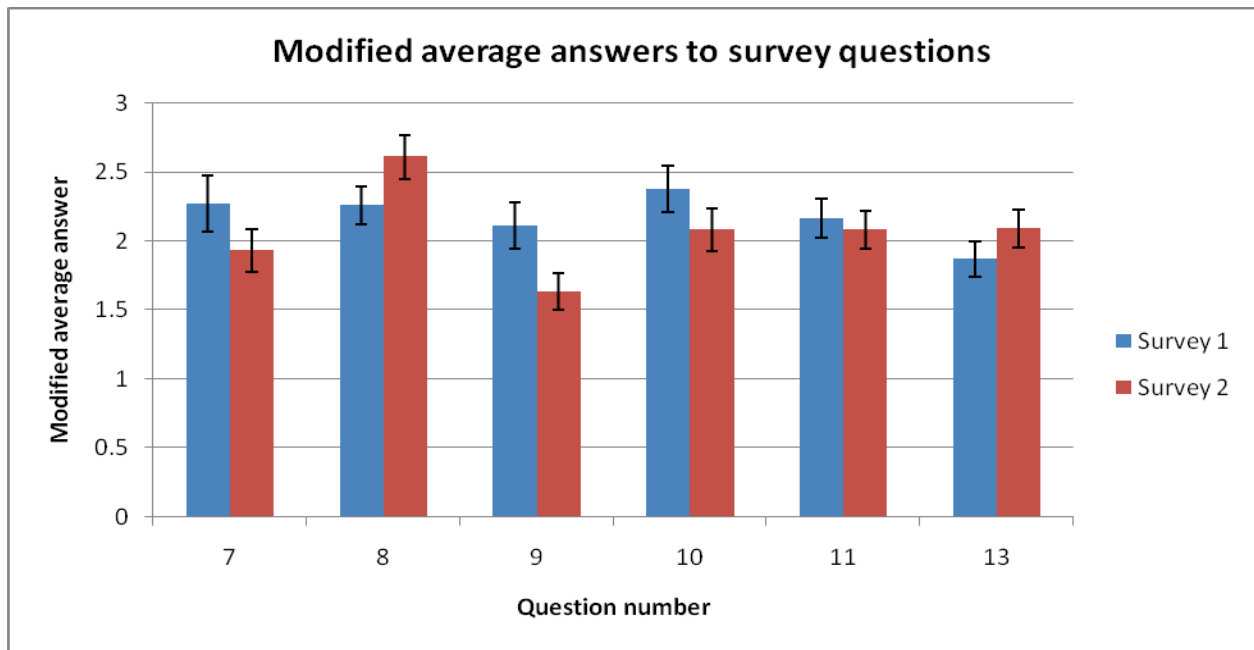
The rest of the questions did not show a statistically significant trend. This was expected for questions

6 and 12, which had no difference between the two survey, but unexpected in the other questions. The lack of a difference may have been caused by the leading questions having no effect, by the respondents having a strong opinion about the topics being asked about, making them less susceptible to the effects of leading questions, by the effect being too small to be measured by the fairly small sample size, or statistical discrepancy.

It is very difficult to make predictions on how or if putting leading questions on a survey will skew the data. Many questions that were designed to be leading had no effect, while others did, and one skewed the results in the opposite direction than expected. Two of the three leading questions that had an effect were missing some of the response options, so having more negative answers than positive or vice versa seems to be likely to skew the results of the survey. However, the results were largely unpredictable, and therefore more data are needed before any predictions can be made.



(Figure 1: The average answers to each survey question on each survey. Error bars are shown to show statistical significance.)



(Figure 2: The modified average answers for the survey questions in which a modified average was necessary, that is, where options were taken off the survey. Error bars are shown to show statistical significance.)

Future work:

One limitation of this survey was that the effects of different types of leading questions could not be compared because of the small sample of leading questions from each category. An interesting future development of this survey could be to lead the same question in different ways to see if some types of leading question have more of an effect than others. However, this study would require more variations on a survey, and therefore a larger sample size, than this study, and therefore would be more difficult.

Another limitation was that different questions were skewed by different amounts not because of the way the question was skewed, but because of the topic of the question. In the future, it would be beneficial to do similar studies using different survey topics to see if they produce similar results. One factor that may influence how much a leading question skews the data is how opinionated one is on the topic. It would be interesting to add questions to surveys such as "How strong is your opinion about this topic?" to see if there is a correlation between strength of opinion and effects caused by leading questions.

Lastly, removing options from surveys, though effective in skewing the results, was problematic because it made it very difficult to analyze the results. In the future, these types of questions should not be studied unless the researcher knows of a more effective way to analyze them.

Conclusion:

Leading questions sometimes skew the results of survey questions but how and if the results will be skewed is largely unpredictable. Out of the eight leading questions, three produced a statistically significant difference between the two surveys: two in the intended direction (11.52% difference for question 8, -18.41% difference for question 9), and one in the direction opposite to the intended direction (-22.28% difference for question 4). The two leading questions that skewed in the intended direction both had options taken off the list of possible responses on the leading question, so that may be an effective way of skewing data using leading questions.

There were several limitations of this study that future studies should take care to address. Firstly, it was very difficult to compare different ways of writing leading questions because there were only two types of leading question per survey. Also, there are many factors that may affect the influence a leading question has on respondents' answers, such as the strength of their opinion, the topic of the survey, whether they notice that the question is leading, or the effect on other leading questions on the survey. Lastly, it was difficult to analyze the results of questions where responses were taken off. Any of these factors may have influenced the results of the survey.

In conclusion, leading questions should always be avoided in surveys. Often, they significantly skew the results of the survey, and their effects are unpredictable and difficult to correct. More data are needed to determine what types of leading questions have the greatest effect and to determine what factors influence a respondent's likelihood to be swayed by a leading question.

References:

1. "Leading Questions." 2009. ChangingMinds.org. Retrieved June 9, 2009.
<http://changingminds.org/techniques/questioning/leading_questions.htm>
2. Caudle, Audrey D. "Leading Questions and Student Evaluations." May 4, 1999. Missouri State Western University. Retrieved June 8, 2009.
<<http://clearinghouse.missouriwestern.edu/manuscripts/112.php>>
3. Fischer, A.J., and Lewis, R.D. "Deliberately Biasing Survey Questions." (Abstract.) *Australian and New Zealand Journal of Statistics*. Volume 27, issue 1. Feb. 26, 2008. Wiley InterScience. Retrieved June 8, 2009.
<<http://www3.interscience.wiley.com/journal/119516131/abstract?CRETRY=1&SRETRY=0>>
4. Howard, Rick, and Hong, Ng Seok. "Effects of coping style on interrogative suggestibility." (Abstract.) *Personality and Individual Differences*. Volume 33, issue 3. July 20, 2002. ScienceDirect. Retrieved June 9, 2009.
<http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6V9F-46B4PKG-C&_user=10&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=581ce2b3febf71890e73c153eb366766>
5. Scheer, Jennifer B. "The reliability of eyewitness reports: The effect of accurate and inaccurate information on memory and bias." *Colgate University Journal of the Sciences*. 2002. Retrieved June 9, 2009.
<http://groups.colgate.edu/cjs/student_papers/2002/JScheer.pdf>

Appendices:

Appendix A

List of rooms chosen for random selection. Bolded classes were randomly selected to be surveyed.

First floor:

107, **111**, 113, 131, 135, **139**, 144

Second floor:

203, 204, 205, 206, 207, 211, **213**, 215, 216, **217**, 223, 225, 227, **220**, 222, 224, **228**, 230

Third floor:

301, **303**, 304, 305, **306**, 310, 311, 315, **317**

Appendix B

The two surveys used.

Survey 1

School Events Survey

Please circle the answer that best describes your opinion.

1. What grade are you in?
9 10 11 12+
2. What is your gender?
male female
3. Circle the dances that you attended this year.
Grade 9 Dance Halloween Dance Winter Dance Semiformal
4. The Halloween Dance is the most popular dance of the school year. How likely are you to attend the Halloween Dance next year?
will not attend probably will not attend unsure probably will attend will attend not returning next year
5. How likely are you to attend the Semiformal next year?
will not attend probably will not attend unsure probably will attend will attend not returning next year
6. Compared to this year, how many dances would you like to have next year?
fewer around the same amount more not applicable/no opinion
7. How informed were you about upcoming dances?
not well-informed well-informed very well-informed
8. What is your opinion on dances with themes?
strongly dislike dislike neutral like strongly like
9. What is your opinion about the music played at dances?
very poor poor average good very good did not attend dances
10. What is your opinion about the atmosphere of the dances?
very poor poor average good very good did not attend dances
11. What is your overall opinion of the dances?
very negative negative neutral positive
12. How many of your friends normally attend dances?
none of them few of them some of them most of them all of them
13. Most people thought the dances this year were not as good as the dances last year. How would you rate the overall opinion of the dances among your friends?
very negative negative neutral positive
14. Write any additional comments or concerns you may have:

Survey 2

School Events Survey

Please circle the answer that best describes your opinion.

1. What grade are you in?
9 10 11 12+
2. What is your gender?
male female
3. Circle the dances that you attended this year.
Grade 9 Dance Halloween Dance Winter Dance Semiformal
4. How likely are you to attend the Halloween Dance next year?
will not attend probably will not attend unsure probably will attend will attend not returning next year
5. Fewer people attended Semiformal this year than last year. How likely are you to attend the Semiformal next year?
will not attend probably will not attend unsure probably will attend will attend not returning next year
6. Compared to this year, how many dances would you like to have next year?
fewer around the same amount more not applicable/no opinion
7. How informed were you about upcoming dances?
not at all well-informed not well-informed average well-informed very well-informed
8. What is your opinion on dances with themes?
dislike like strongly like
9. Many people complained about the music played at dances. What is your opinion about the music played at dances?
very poor poor average good did not attend dances
10. What is your opinion about the atmosphere of the dances?
very poor poor average good did not attend dances
11. What is your overall opinion of the dances?
very negative negative neutral positive very positive
12. How many of your friends normally attend dances?
none of them few of them some of them most of them all of them
13. How would you rate the overall opinion of the dances among your friends?
very negative negative neutral positive very positive
14. Write any additional comments or concerns you may have:

Appendix C

Table 1: Table summarizing the results of the survey.

Question	Survey	n	μ	σ	95% confidence	Modified μ	Modified σ	Modified confidence	Significant?	% difference
4	1	83	2.57	1.11	0.24	n/a	n/a	n/a	yes	-22.28%
	2	96	3.30	1.44	0.29	n/a	n/a	n/a		
5	1	83	2.57	1.11	0.24	n/a	n/a	n/a	no	n/a
	2	98	2.41	1.18	0.23	n/a	n/a	n/a		
6	1	63	2.41	0.66	0.16	n/a	n/a	n/a	no	n/a
	2	77	2.35	0.64	0.14	n/a	n/a	n/a		
7	1	85	3.32	1.09	0.23	2.27	0.96	0.20	no	n/a
	2	99	2.82	1.10	0.22	1.93	0.77	0.15		
8	1	85	3.29	0.88	0.19	2.26	0.64	0.14	yes	11.52%
	2	97	3.67	1.06	0.21	2.61	0.79	0.16		
9	1	73	3.01	0.96	0.22	2.11	0.73	0.17	yes	-18.41%
	2	85	2.46	0.88	0.19	1.64	0.63	0.13		
10	1	72	3.36	1.00	0.23	2.38	0.73	0.17	no	n/a
	2	87	2.99	0.92	0.19	2.08	0.75	0.16		
11	1	85	3.11	0.80	0.17	2.16	0.67	0.14	no	n/a
	2	100	2.97	0.92	0.18	2.08	0.72	0.14		
12	1	86	3.08	0.87	0.18	n/a	n/a	n/a	no	n/a
	2	99	2.80	0.97	0.19	na	n/a	n/a		
13	1	84	2.83	0.69	0.15	1.87	0.61	0.13	no	n/a
	2	100	3.00	0.88	0.17	2.09	0.71	0.14		