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ERROR: Measurement Error – *Poorly phrased census questions costly*

The newspaper and other articles reprinted in this Highlight #11 provide an introductory overview of difficulties that can arise when questionnaires are used as measuring instruments.

EM8001: Kitchener-Waterloo Record, March 29, 1980, page 7

Poorly phrased census questions costly

By REUEL AMDUR

One of the intriguing spectacles in social life in Canada today is the process by which the Parti Quebecois government has been working out its referendum question. Early in the term of the Levesque government, it became clear that any question asking Quebecers whether they were for or against independence from Canada would lead to a resounding vote against independence.

When it was clear that independence would be rejected by a strong majority, various polling organizations began looking at what the answers would be to various other kinds of questions related to the issue of the tie between Quebec and the rest of Canada. Some of these surveys were con- ducted by the PQ itself, while others were done by polling organizations for the media and other consumers of such information.

Levesque and his colleagues followed these polls with great care. They found that in order to approach their majority in the referendum they would have to steer clear of any suggestion of a vote for separation. Instead, they would need to talk about getting a mandate to negotiate with the rest of Canada. So the final question for the referendum speaks of a mandate for negotiation.

A yes or no on the question of independence is quite straightforward, but the meaning of receiving a mandate to negotiate sovereignty-association with the rest of Canada is very ambiguous. The question had to be asked that way because otherwise Levesque was sure to lose, but the meaning of the answer the voters of Quebec give will undoubtedly be the subject of considerable debate.

In surveys and referenda, the way in which the question is phrased will affect the answers received. The same question phrased in different ways will receive different answers. In many cases the difference in phrasing will lead to a different understanding of a question by the person answering. For that reason, it is important to be sure that questions are phrased in ways that get the desired information back.

Our largest Canadian survey is the census, and the same principles apply to questions it asks. In the 1976 census, there was a question about school attendance. The answers to this question showed a massive school dropout rate, with 40 per cent of youth 15 to 17 not attending school full time in Metro Toronto. Similarly very high dropout rates were reported in other locations as well. It turned out that the high dropout rate was phoney, a result of the way the question was worded.

Statistics Canada asked people if youth in the household were enrolled in "an educational institution." Many people did not understand that term to mean, simply, a school.

More recently, the Social Planning Council of Metro Toronto conducted a survey of young people in Metro. A respondent in that survey was asked if he was "enrolled as a full-time student in the month of April, 1979." The results showed a drop-out rate below 10 per cent.

Statistics Canada themselves learned of the error in the census question. In one bulletin, they alert users of census data that "the population 15 years and over attending school full-time may be underestimated by as much as 25 per cent of the published figure at the Canada level." The inaccuracy of the census on this question may vary from place to place to some extent, so that it is not clear how inaccurate the figure will be in any given location.

Perhaps the information is even worse than useless, because users of the data who reacted before seeing the government's commentaries on the results may have engaged in planning for problems in inappropriate ways.

But could the mistake have been prevented? Users of census information have had a constant battle with the federal government to prevent cutbacks. The government has attempted to shorten the census and limit the budget of Statistics Canada. As a result, the kind of careful exploration of different forms in which to put the question that Levesque and the pollsters in Quebec have gone through must have been neglected with the question on school attendance.

A poorly phrased census question is more expensive than the spadework needed to ensure that the question is asked correctly. When it is asked incorrectly, it then becomes necessary to issue bulletins telling users to ignore the data accumulated. If enough poorly phrased questions are asked, the census as a whole becomes subject to lack of confidence.

The following questions refer to the two (longer) newspaper articles given above and overleaf on page HL11.2.

1. In the fifth paragraph of the *K-W Record* article EM8001 reprinted above, the effect of question *wording* is discussed.
   - What are the *positive* aspect(s) of this matter for investigations that involve survey sampling?
   - How is this matter open to *abuse*?
     - What *phrase* is often used to describe the wording of questions in such situations?
   - How can provision be made for readers of the final report of a survey to check any concerns they may have about either aspect of question wording?

2. List the essential characteristics of proper survey questions, and indicate why each characteristic is important. Present your discussion as a separate point for each characteristic you describe.

3. What does the *K-W Record* article above indicate as the danger(s) of inaccurate information? Identify explicitly where this matter is mentioned in the article.
   - How do these danger(s) bear on the problem of wrong information being published in papers in the scientific literature?

(*continued overleaf*)

4 In its third paragraph, *The Globe and Mail* editorial EM9017 below gives the *actual* wording of a sample survey question. On the basis of your answer to Question 2 overleaf on page HL11.1, write a critique of this question.

- Give a version of the question that should elicit the desired information from respondents, but without the drawbacks you (and *The Globe and Mail*) have identified. On a separate sheet of paper, print your version neatly by hand or, if possible, type it.

5 In the fifth paragraph of *The Globe and Mail* editorial EM9017 below, the matter is raised of *demonstrating* that a tax increase of 50 cents per pack of cigarettes would greatly reduce smoking among young people.

- Outline a proper Plan for investigating this matter.
  - Describe briefly the major sources of error in such an investigation, that would impose limitations on its Answer(s).
    - Do you regard actually *carrying out* such an investigation as realistic? Explain briefly.

EM9017: The Globe and Mail, February 6, 1990, page A6

Perhaps if you rephrased the question

The Non-Smokers' Rights Association has done this country a major service. Its influence has freed many non-smokers from having to breathe second-hand smoke and has persuaded many smokers to kick the habit. Long may its work continue.

It pains us, therefore, to toss cold water on the latest poll by Environics Research Group for the non-smokers group, the Canadian Cancer Society and the Heart and Stroke Foundation. The poll, intended to soften federal resistance to increasing taxes on tobacco, purports to show that 56 per cent of smokers themselves might either strongly or somewhat support increased taxes.

Alas, the ammunition is suspect. Consider the first question: "Some people have recommended that taxes on tobacco be increased – for example by 50 cents per pack – as part of an overall plan to reduce smoking. Other parts of the plan would include health warnings on cigaret packs, health promotion campaigns and restrictions on the sale of cigarets to children. Do you strongly support, somewhat support, somewhat oppose this idea?"

Support what idea? Restricting the sale of cigarets to children? An over-all plan to reduce smoking? Or, buried back at the beginning, a tax increase that might or might not be 50 cents per pack? The answers are meaningless because the question consists of several questions.

Another question asked whether respondents would support a tax increase of 50 cents a pack "if it were shown to greatly reduce smoking among young people." This is straightforward enough; if the groups can show that 50 cents will greatly reduce smoking among young people, they can cite the response with impunity. Good luck to them.

If smokers had simply been asked whether they would support a tax increase on cigarets, they would probably have said no; but the question should have been asked anyway, and followed by questions to determine in which circumstances their views would change. As it is, the survey is startling on the outside, but hollow at the core.

As a further point of interest, the *results* of the poll, which used the question discussed in *The Globe and Mail* editorial above, are summarized at the right; this brief article EM9018 is from the *Kitchener-Waterloo Record* of February 8, 1990.

EM9018: Smokers back anti-smoke tax

TORONTO (CP) – A majority of smokers support a 50-cents-a-pack tobacco tax increase as part of an over-all plan to reduce smoking, a new poll suggests.

The survey by Environics suggests 29 per cent of smokers strongly support, and 27 per cent somewhat support, the idea of increased taxes to support anti-smoking education, *The Globe and Mail* reported.

The survey says 14 per cent somewhat oppose, and 27 per cent strongly oppose, an increase.

The poll was conducted for the Non-Smokers' Rights Association.

REFERENCES

The following three books (with their University of Waterloo Arts Library call numbers) provide information on the issues raised by the two (longer) newspaper articles:

1. Payne, Stanley LeB.: *The Art of Asking Questions*. Princeton University Press, 1951. (LB 1027.P385)
2. Berdie, Douglas R.: *Questionnaires: Design and Use*. Scarecrow Press, Second Edition 1986. (BF 39.B445 1986)
3. Converse, Jean M.: *Survey Questions: Handcrafting the Standardized Questionnaire*. Sage Publications, 1986. (HN 29.C66x 1986)

6 Outline the *dangers* of the short *K-W Record* article EM9018, shown above at the right, considered as an *isolated* newspaper report of a poll; give your answer in point form.

- Outline the *additional* information that you would like to see in a report of the poll to overcome these dangers.
  - What would be the drawback(s) of your requirements? Explain briefly.
- Suggest how the *Record* might defend itself against a charge of poor journalism based on the dangers you identify.

(*continued*)

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ERROR: Measurement Error – *Poorly phrased census questions costly* (continued 1)

EM9615: The Globe and Mail, February 6, 1996, page B2

Royal's survey on home buying plans 'wonky'

Concluding that one in four Canadians will buy by the end of '97 too high, analyst says

BY LEONARD ZEHR
Real Estate Reporter

Royal Bank of Canada has vastly overstated the home buying intentions of Canadians to the point of being "wonky," some housing economists say.

The bank's latest home ownership survey, conducted by the Angus Reid Group Inc., concludes that one in four Canadians plans to purchase a home within the next two years.

On the basis of about 10 million households in Canada, the bank has created the impression that 2.5 million housing trans- actions could occur during the next two years, said Mary McDonough, a housing analyst who runs her own research firm.

"This is unheard of," she said, adding that housing transactions of all types in Canada average only about 400,000 annually. "I think [the survey] numbers are pretty wonky."

The Angus Reid poll of 1,028 Canadians found that 11 per cent of respondents were "very likely" to purchase a home within the next two years and 14 per cent were "somewhat likely" to take the plunge, for a total of 25 per cent or one in four Canadian households.

"Being somewhat likely [to purchase a home] does not indicate a strong intention to purchase," said another housing analyst, who asked not to be identified. "The thrust of the bank's press release is overstated based on the numbers."

John Wright, a vice-president of Angus Reid, disagreed. "The intentions or desires of one in four are that they want to take a look at [the purchase of a home]. Whether they are then somewhat likely [to purchase] as opposed to very likely just depends on other circumstances as they fall into place," he said.

At any rate, Mr. Wright doesn't find any inconsistencies with the firm's polling data and the bank's choice of words in its news release, specifically that these two categories of home buying intentions represent a plan to purchase. "We vetted the release in our offices."

What Angus Reid failed to catch, however, was an error in the comparisons with last year's survey.

According to the bank, the home buying intentions of Canadians this year represent a 5-per-cent jump from last year's findings, when one in five Canadians were likely to buy a home with the next two years – a forecast that also seems unlikely given last year's slump in sales.

The actual year-over-over change represents a gain of five percentage *points* or 25 per cent, not a 5-per-cent increase. "We use the numbers interchangeably," a spokeswoman for Angus Reid said.

Ms. McDonough, the housing analyst, also takes issue with the bank identifying potential home buyers as "mostly baby boomers with household incomes of more than $80,000" who have spent the past few years "sprucing up their homes with the intent to sell in the near term."

Many baby boomers in the 30- to 49-year-old group have seen the equity in their homes shrink during the nineties and are not a significant factor in the housing market, she contends.

"There are other groups ahead of baby boomers with more potential to influence the market," she said, adding that "it's a really big leap" to connect baby boomers' renovations with a desire to sell their homes.

"The problem with the survey is that it sets up big expectations of pent-up demand for bigger houses and the [home-building] industry responds in that way," Ms. McDonough said.

Last fall, Ms. McDonough published a housing market forecast that raised the spectre of "housing gridlock" caused by baby boomers unable to move up into bigger and more expensive homes.

"In this climate, niche markets have taken on tremendous importance," her study said. "There is no mass market for housing any more. The demand for new housing will come from various target groups, including move-downs, seniors, first-time buyers and move-out markets."

7 Describe, in point form, the *measuring* issue involved in the survey discussed in the article EM9615 reprinted above; identify explicitly the paragraph(s) from which you take your information.

8 Explain, as to a *non*-statistician, the point being made in the sixth paragraph of the middle column, which begins: *The actual year-over-year change .....*

- Comment critically on the statement: "*We use the numbers interchangeably.*"

9 Explain the meaning of the statement by John Wright given near the top of the middle column of the article reprinted above: *The intentions or desires of one in four are that they want to take a look at [the purchase of a home]. Whether they are then somewhat likely [to purchase] as opposed to very likely just depends on other circumstances as they fall into place.*

- What does this statement do to illuminate the matter in contention? Explain briefly.

(*continued overleaf*)

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The following humerous excerpt from *The Complete Yes Prime Minister* by Jonathan Lynn and Anthony Jay (BBC Books, London, 1989, ISBN 0 563 20773 6) also illustrates the importance of question wording for accurate measuring with questionnaires. [The dialogue involves Bernard Woolley, prime minister Hacker's Principal Private Secretary, and Sir Humphrey Appleby, Secretary of the Cabinet; it comes from *The Ministerial Broadcast*, pages 106-107.]

SIR BERNARD WOOLLEY RECALLS (in conversation with the Editors):

Yes, I remember that exchange of notes. Humphrey Appleby was not at all pleased that I had failed to have Hacker's speech watered down, in spite of my best efforts.

He asked me to drop in on him in the Cabinet Office, to discuss the situation. He was most interested in the party opinion poll, which I had seen as an insuperable obstacle to changing the Prime Minister's mind.

His solution was simple: have another opinion poll done, one that would show that the voters were *against* bringing back National Service.

I was somewhat *naif* in those days. I did not understand how the voters could be both for it and against it. Dear old Humphrey showed me how it's done.

The secret is that when the Man In The Street is approached by a nice attractive young lady with a clipboard he is asked a *series* of questions. Naturally the Man In The Street wants to make a good impression and doesn't want to make a fool of himself. So the market researcher asks questions designed to elicit *consistent* answers.

Humphrey demonstrated the system on me. 'Mr. Woolley, are you worried about the rise in crime among teenagers?'

'Yes', I said.

'Do you think there is a lack of discipline and vigorous training in our Comprehensive Schools?'

'Yes'.

'Do you think young people welcome some structure and leadership in their lives?'

'Yes'.

'Do they respond to a challenge?'

'Yes'.

'Might you be in favour of reintroducing National Service?'

'Yes'.

Well, naturally I said yes. One could hardly have said anything else without looking inconsistent. Then what happens is that the Opinion Poll publishes only the last question and answer.

Of course, the reputable polls didn't conduct themselves like that. But there weren't too many of those. Humphrey suggested that we commission a new survey, not for the Party but for the Ministry of Defence. We did so. He invented the questions there and then:

'Mr. Woolley, are you worried about the danger of war?'

'Yes', I said, quite honestly.

'Are you unhappy about the growth of armaments?'

'Yes'.

'Do you think there's a danger in giving young people guns and teaching them how to kill?'

'Yes'.

'Do you think it wrong to force people to take up arms against their will?'

'Yes'.

'Would you oppose the reintroduction of National Service?'

I'd said 'Yes' before I'd even realised it, d'you see?

Humphrey was crowing with delight. 'You see, Bernard', he said to me, 'you're the perfect Balanced Sample'.

Some or all of the four newspaper articles EM8001, EM9017, EM9018 and EM9615, and the excerpt above, reprinted in this Highlight #11, are also used in Figure 8.8a of the STAT 220 Course Materials, in Chaper 4 of the STAT 231 Course Materials and in Figure 3.5a of the STAT 332 Course Materials.