Figure 2.2a. SURVEY SAMPLING: Introductory Illustrations 1

The five newspaper reports of sample surveys [*i.e.*, investigations with an observational Plan to answer Question(s) with a descriptive aspect] reprinted in this Figure 2.2a illustrate some main themes of Figure 2.1, together with other sample survey issues we will encounter; for example:

- **Plant, animal life damaged by acid rain in 19,000 lakes in Ontario, report reveals** shows a typical Question to be answered – what is the extent of environmental damage caused by acid rain in a target population of $\mathbf{N}_T = 250{,}000+$ lakes from which $n_S = 6{,}000$ lakes were selected for investigation; the data collecting for this sample survey took place over a *twelve*-year period, 1978-89.
  - The investigation involves the matter of *specifying* the study population (what is a lake?, which lakes are accessible?) and how to *measure* the amount of damage in a biological system as complex as a lake.
  - Answers are reported as *numbers* (or *frequencies*) of lakes with certain categories of damage.
- **Food bank use rises dramatically across Canada** refers to the numbers it reports for people dependent on food banks as *estimates,* reminding us of the inherent *uncertainty* in the process of answering Questions about a population based on data obtained from only a *sample* of that population.
  - The investigation was concerned with estimating a *total* (or *frequency*) and its regional breakdown.
  - The Question in this sample survey raises one source of possible *measurement* error – whether people respond *truthfully.*
- **Product expansion pays off** mentions 54 questionnaires mailed (presumably the number of businesses selected) and gives the overall response rate ($28/54 \simeq 52\%$). For a *mailed* questionnaire, a 48% *non*-response rate is *low* – a mailed questionnaire typically has a non-response rate of 90% or higher.
  - We can infer from the article the nature of some of the questions on the questionnaire.
- **Canadians frown on sanctions** is a typical example of a national poll with a sample size of around 1,500; it also gives the proportion of people who didn't know or wouldn't respond to this particular question. While this may *sometimes* be a valid response, it more often indicates flaw(s) in the questionnaire and/or in other component(s) of the measuring process.
  - A common dilemma in sample survey questionnaire design is how far to allow a respondent the opportunity to respond *Don't know* (with its attendant loss of information) and how far to 'force' a response (with its danger of distorting the real intention of the respondent).
- **What the numbers say** illustrates the use of a sample survey to estimate an important attribute of society and it shows the difficulty of accurate measuring of behaviour, particularly behaviour with negative connotations; the variation among the estimates for Canada is noteworthy.

EM9004: The Globe and Mail, January 16, 1990, pages A1 and A2

Plant, animal life damaged by acid rain in 19,000 lakes in Ontario, report reveals

BY CRAIG McINNES
The Globe and Mail

Acid rain is damaging plant and animal life in about 19,000 Ontario lakes, says a study released yesterday by the provincial Environment Ministry.

The report, which is the first to estimate with any accuracy the extent of acid rain damage to lakes in Ontario, found that there are more than 7,000 very acidic lakes in which most of the common fish have died, according to Bernie Neary, supervisor of Lake Management Studies at Dorset, Ont.

The other 12,000 lakes are acidic enough to damage other forms of plant and animal life, said the report, which is a statistical extrapolation of data collected between 1978 and 1989 from 6,000 of Ontario's more than 250,000 lakes.

Recent research is showing that biological damage is occurring in lakes that would not be considered acidified under the old definition, Mr. Neary said.

"The traditional yardstick was whether or not there are fish in a lake. We find that they are among the more tolerant organisms in a lake", Mr. Neary said.

"The take-home message here ... is that there are many parts of an aquatic food chain and there are varying levels of sensitivity."

Michael Perley of the Canadian Coalition on Acid Rain said yesterday that he was not surprised by the high number of damaged lakes. The study confirms rough estimates made five years ago by the department of Fisheries and Oceans.

"I don't think it will surprise very many people when they hear that order of magnitude, unfortunately."

About 7,300 of the lakes are in the Sudbury region, where acidification has been caused primarily by emissions from local Inco and Falconbridge smelters.

Another 11,000 are in areas affected by the long-range transport of sulphur pollution and delivered in the form of acid rain and snow.

The U.S. Congress will start again next week considering the clean-air bill sponsored by the administration of President George Bush. The bill is designed to cut sulphur dioxide emissions by 10 million tonnes a year by the year 2000 or, at the latest, 2004.

The Canadian government is counting on that legislation to cut U.S. acid rain emissions which damage Canadian lakes.

Last week, however, several governors from western states called a news conference to say that they did not want to have to pay for what they perceived to be a problem caused by eastern states.

Electrical utilities opposed to the bill have been exploiting the differences between states in an effort to scuttle the legislation, Mr. Perley said.

"I think what you are seeing is the battle

(*continued overleaf*)

lines forming up and the warning shots being fired across the bows", Mr. Perley said.

"We're really down to the very, very rough and ready struggle now."

EM9106: Kitchener-Waterloo Record, February 2, 1991, page A3

Food bank use rises dramatically across Canada

By Beth Gorham
The Canadian Press

ST. JOHN'S, Nfld. – A record 594,000 Canadians hit hard by the recession rely on food banks every month to feed themselves, a new study estimates.

The Canadian Association of Food Banks surveyed outlets last fall and concluded that dependence has risen about 54 per cent since a similar study in March 1989, president Gerard Kennedy said Friday.

"There is a punch line to all the things we hear about an economic slowdown", he told a news conference.

"The fact is people go hungry and kids go hungry because food banks by themselves can't prevent that from happening."

It's worst in Atlantic Canada, where an estimated 61,000 people are visiting food banks each month, up 64 per cent from March 1989, according to the study.

"Even that figure is probably conservative in terms of reflecting the need", said Kennedy, since many food banks are low on supply and are rationing food.

British Columbia and southern Ontario are also showing extreme increases because of a high number of layoffs. Children everywhere are twice as likely as adults to need food bank help, he said.

In Atlantic Canada, one in 11 people will use food banks this year. About 24,000 children rely on them and more seniors and working people are asking for assistance. Almost 70 per cent of food bank clients are on social assistance.

"These are people already being officially recognized as being in need", said Kennedy. "Support is being provided and by and large it isn't sufficent."

"I think it certainly calls into question the whole notion we have as Canadians of having a caring, compassionate society, of making provisions for people."

EM9012: Dryden Observer, January 24, 1990

Dryden retail survey

Product expansion pays off

By Sylvia Veal
Staff reporter

A survey conducted by the Economic Development Office indicates that Dryden retail business improved in 1989, contrary to rumours of doom and gloom. Of 54 surveys mailed, the office received 28 back.

"I think it gave us a pretty good sampling", said Jim Dayman, economic development officer for Dryden.

One question asked retailers to compare 1989 sales with the previous year. More than 60 per cent indicated there was an increase in business. Six said the business was about the same and an identical number indicated a decrease in sales.

Those businesses registering an increase reported it was up an average 16 per cent, while those reporting a decrease said sales were down an average 15 per cent.

Those who showed an increase in business were asked why they thought it had improved. Forty-six per cent credited expansion of products and product lines, while 33 per cent indicated business was maturing. Another 21 per cent said increased marketing helped.

The final question was directed at businesses which showed a decrease. The main reason for the downtrend appeared to be a feeling that people were not spending this year. Several also believe local consumers were spending in Winnipeg and Minneapolis rather than Dryden.

Mr. Dayman said it was interesting to note that even businesses which said sales were about the same felt consumers were just not spending.

Area financial institutions indicate that deposit growth is as good or better than other years.

"We're looking at things positively," said Cliff McGrimmon, Royal Bank manager. "For example in loans, there has not been an appreciable increase in delinquency."

Although a generally slowing economy is predicted for 1990, Mr. Dayman said many businesses look for a "flurry of spending in the last quarter of the year" before the Goods and Services Tax becomes a fact of life.

EM9105: Kitchener-Waterloo Record, January 26, 1991, page A3

Canadians frown on sanctions

By Allan McRae
Southam News

OTTAWA – A majority of Canadians don't think economic sanctions should be used to protest the Soviet crackdown on Lithuania, an Angus Reid-Southam News poll shows.

The telephone poll of 1,507 Canadians found 51 per cent of respondents oppose sanctions. Thirty five per cent favour sanctions while 14 per cent did not know or wouldn't respond.

The majority of the poll, conducted between Jan. 16 and Jan. 21, was completed before Soviet troops shot and killed five Latvians in an attack on government buildings in the capital of Riga, but the poll was conducted after 14 Lithuanians were killed in a similar crackdown in Vilnius on Jan. 13.

After the second attack, External Affairs Minister Joe Clark announced that Canada had withdrawn offers to the Soviets of technical help and a $150-million line of credit for food. He also

(*continued*)

Figure 2.2a. SURVEY SAMPLING: Introductory Illustrations 1 (continued)

said Canada would provide medical and other aid to the Baltic countries, which are trying to separate from the Soviet Union.

Pollster Angus Reid said the findings suggest Canadians "are willing to give (Soviet President Mikhail) Gorbachev the benefit of the doubt."

He said the poll would likely hold up if it had been conducted after the crackdown in Latvia because Canadians aren't ready to end the goodwill relationship developed between the Soviet Union and the west since Gorbachev took power.

The following article is taken from the first part of a two-part series in *The Globe and Mail*; the series began under a title of **Netherlands swims against the drug tide** on page A1 on Saturday, April 4, 1998, and continued on the whole of page A12. The theme of the articles is how the Dutch and the Swiss try to deal with some drug (mainly heroin) addicts, and what Canada might learn from these countries' experiences. The second part of the series appeared on Monday, April 6, on page A6, entitled **Enforcers challenge cannabis liberation movement**.

EM9801: The Globe and Mail, April 4, 1998, page A12

What the numbers say

Do liberal drug laws encourage abuse? In the case of the Netherlands, it appears not.

A national drug-use survey currently being assembled, the first of its kind in the Netherlands, is expected to conclude that about 14 per cent of Dutch citizens 12 and over have used cannabis.

Previous estimates have been much higher. But these are now thought to have been badly skewed by the heavy concentration of young adults, artists and other free thinkers in Amsterdam, where about 30 per cent of teen and adult residents admit to having smoked pot at some time.

That 14-per-cent figure compares with a slightly differently based Canadian statistic of 23 per cent, drawn from 1994 surveys of residents 15 or older by Ontario's Addiction Research Foundation and Ottawa's Canadian Centre on Substance Abuse.

But the Canadian numbers are probably higher now.

After years of decline, recreational cannabis useage among teenaged students in Ontario has more than doubled. In 1991, 12 per cent admitted using the drug at least once in the previous year, while the 1997 figure was 25 per cent.

A similar surge was seen elsewhere, notably the United States and the United Kingdom.

As for hard drugs, the Netherlands has a rate of 1.6 heroin and cocaine addicts per 1,000 population – unchanged for more than a decade. That compares to a figure of about three in Britain, seven in Switzerland and 10 in the United States.

A Canadian statistic is elusive: Both Health Minister Allan Rock's office and Health Canada say they do not know how many Canadians regularly abuse heroin and cocaine.

Using CCSA data, an estimate of about two per 1,000 emerges. The CCSA cautions, however, that because the methodology is based on telephone interviews, the real figure may be much higher. Two years ago, Maclean's magazine cited a figure of seven addicts per 1,000 population.

– *Staff*

1. For each of the five sample survey reports reprinted in this Figure 2.2a, give a concise (preliminary) assessment of the *limitations* on its Answer(s), based on the four questions about half way down the fourth side (page 2.6) of Figure 2.1.

2. Referring to the first report [on the first side (page 2.7) of this Figure 2.2a] entitled *Plant, animal life damaged ....*, explain the meaning in context of the phrase in the third paragraph .... *statistical extrapolation .....*

3. Referring to the third report (on the facing page 2.8) entitled *Product expansion pays off*, briefly describe what can be said about the survey *questionnaire* with respect to:
   - the questions it contained;
   - the possible responses to these questions;
   - the number of responses in each category.

   Outline how your findings are relevant to an assessment of the limitations on the sample survey Answers.

4. All five reports fail to mention one essential matter about their Answers; identify this matter and its importance.
   - Suggest plausible reason(s) why a media reporter would omit such important information from a sample survey report.

5. In light of the information given in the third paragraph of the article *What the numbers say* (reprinted above), what *precautions* should be taken in selecting a sample of Canadians from which to try to estimate the extent of:
   - cannabis use;
   - heroin use.

   Identify clearly in your discussion any difference(s), from a statistical perspective, in the two cases.

6. Discuss critically the apparently *in*consistent information given in the second and third-last paragraphs (*A national drug-use survey ....* and *As for hard drugs, ...*) of the article *What the numbers say* (reprinted above).

(*continued overleaf*)

7 Discuss the use of the word *statistic* near the beginning of the second-last paragraph of the article *What the numbers say* (reprinted overleaf on page 2.9), with particular reference to:

- how the 'average' reader of *The Globe and Mail* might reasonably be expected to interpret it;
- the statistical implications of the word in this context.

8 Outline the *statistical* issues raised by the statement in the last paragraph of the article *What the numbers say* (reprinted overleaf on page 2.9): .... *because the methodology is based on telephone interviews, the real figure may be much higher.*

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