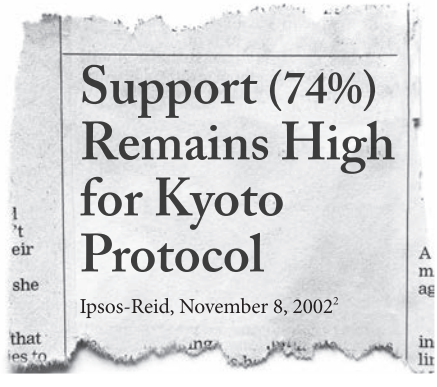
CHAPTER 3

POLLING: THE BASICS



THE KYOTO POLLS

Polls are everywhere. From small non-profits to large companies, everyone commissions polls. The media is often filled with reports of polls, sometimes as contradictory as those reported above. What are we to make of these claims? Should we give them any weight or merely dismiss them as more "damnable" statistics? I once heard someone argue, "Never been polled myself; don't see how they could be polling Canadians and not ask me now and again." And it is true

1 Patrick Brethour, "Support for Kyoto Plunges," *The Globe and Mail*, November 2, 2002.

2 "Support (74%) Remians High for Kyoto Protocol…," Ipsos-Reid, November 8, 2002, http://www.ipsos-na.com/news-polls/pressrelease.aspx?id=1667.

that remarkably few people are polled in national opinion polls—little more than 1,000 usually—so how can such polls claim any validity?

Let's begin to answer these questions by looking at the polls referred to in the above headlines using relevant critical questions:

1. What is being claimed?
2. How good is the evidence?

? *Critical Question 1:* What Is Being Claimed?

As we will repeatedly learn, newspaper summaries are often misleading—and headlines are even worse. So the first thing we have to do is distinguish between what the headlines claim and what the actual poll claims. You may remember the worldwide controversy surrounding whether countries should sign the Kyoto Accord to pledge reduction in greenhouse-gas emissions. Most countries did sign, but the US and a few others refused. After the US refused, Canada had to decide whether it would go along. Some of the provinces were opposed on the basis that following the Accord would be bad for their economy. In particular, Alberta, which produces proportionately more greenhouse gases because of its oil and gas industry, was strongly opposed. So Alberta launched a political effort to convince Canadians that Kyoto would be bad for Canada. Subsequently, the province commissioned a poll by Ipsos-Reid in an attempt to show that there was nationwide opposition to signing the protocol.[3] The problem for Alberta was that the federal government had been doing extensive polling and found consistently strong support for signing the protocol. No problem—just ask a slightly different question.

Comparing the Kyoto Polls

The poll from November 8, 2002, which supplied the headline "Support (74%) Remains High for Kyoto Protocol," asked:

> As you may know, the Kyoto Accord on climate change requires Canada to reduce its emissions of greenhouse gases to 6% below what they were in 1990 over the next 10 years. This means that Canada would have to reduce its current emissions by about 20% to meet its target. Based on what you have seen, read or heard, do you personally support or oppose implementing the Kyoto Accord?

3 Robert Babe, "Newspaper Discourses on Environment," *Filtering the News: Essays on Herman and Chomsky's Propaganda Model*, ed. Jeffery Klaehn (Montreal: Black Rose Books, 2005), 187–222.

But the Alberta survey asked the following instead:

> Which of the following three options do you support?
> 1. Withdraw from the Kyoto Protocol and develop a made-in-Canada plan for reducing greenhouse gas emissions,
> 2. Ratify the Kyoto Protocol, or
> 3. Do nothing?[4]

Given the Alberta choices, 45 per cent of respondents preferred that the federal government withdraw from the Kyoto Accord and develop a "made-in-Canada plan." The apparent difference in poll results was clearly the result of asking different questions. The article in the *Globe* with the "plunges" headline actually admits that the Alberta poll cannot be compared to other polls because it asked a different question, but the headline writer clearly ignored that observation.[5]

? *Critical Question 2:* How Good Is the Evidence?

The way the question is worded is one of the first things to look at when assessing how good the evidence is for a poll's claim.

Question Bias

Everyone recognizes that the phrasing of questions can influence the answers one receives. This is known as **question bias**. As the Kyoto polls quoted above show, how one phrases a question (e.g., "made-in-Canada plan"), or even the choice of answers given, can affect people's responses.

We can see how dramatic the effect of wording can be in an example from US research. A US survey of attitudes toward welfare found that only 13 per cent of people thought that the government was "spending too much on assistance to the poor," while 44 per cent believed that "too much money was being spent on welfare."[6] Imagine if they had asked whether the US was spending too much money for people on "the dole."

---

4 Ibid.

5 Richard L. Scheaffer et al., *Survey Sampling* (Boston: Brooks/Cole Cengage Learning, 2012), 5, reviews a similar discrepancy of results when different questions were asked of US citizens about the Holocaust.

6 David S. Moore and William I. Notz, *Statistics: Concepts and Controversies*, 5th ed. (New York: W.H. Freeman, 2001), 55.

The wording of the actual question asked is one of the most crucial pieces of information we need to know before assessing just what a poll is claiming. Like the headline in the *Globe*, polls are often reported without attention to the actual questions asked. Without knowing the wording, we cannot make an accurate judgment about the meaning or significance of the poll results. We also need to know how the poll was done. To evaluate the polling process, we therefore need a basic understanding of the theory behind polling.

UNDERSTANDING THE THEORY BEHIND POLLING

? *Critical Question 1:* What Is the Poll Result Really Claiming?

One of the most common misleading ways in which polling claims are stated is by presenting the percentage of the sample as if it were a percentage of the population. An example of that confusion occurs when the media reported that "74% of Canadians support Kyoto." Such a claim fails to make clear that the percentage supporting Kyoto is actually the percentage of the sample, *those actually questioned*, not a percentage of all Canadians.

The key to understanding polling is to recognize that a pollster questions only a small number of people known as a sample. A sample is a group of people identified to provide evidence about the **population** the pollster is studying. We are not really interested in just those few who were sampled and questioned. We want to know what Canadians (the population the pollster is studying) *generally* are thinking. The real claim of the pollster is that, based on this sample, *probably about* "74% of all Canadians support Kyoto." As Ipsos-Reid stated of one of its Kyoto polls:

> The poll is based on a randomly selected sample of 1,002 adult Canadians. With a sample of this size, the results are considered accurate to within ± 3.1 percentage points,[7] 19 times out of 20, *of what they would have been had the entire adult Canadian population been polled*.[8]

What the pollster is claiming is that given the percentage in their sample, the result they would have obtained if they had polled the entire population would very likely be between 70.9% and 77.1% (i.e., 74% minus 3.1% and 74%

7 Note that the plus or minus is 3.1 *percentage points*, not plus or minus 3.1 *percent*.

8 "Support (74%) Remains High for Kyoto Protocol"; my italics.

plus 3.1%). Plus or minus (±) 3.1 percentage points leaves quite a range for variation or error. Similar error ranges apply to other polling results.

How do pollsters get these error range numbers? They use a form of math called "probability theory."

What is Probability?

The **probability** of an event is the rate at which the event would happen over the long run. Probability or chance is expressed in two different ways: either as a percentage or as a fraction. The probability of flipping a fair coin and it coming up heads is 50% or one half.[9] That means that if you were to flip a fair coin (that is, one not weighted to come up one way more often than the other) a large number of times, it will come up heads close to 50% or one half of the time. In any small number of flips, the percentage of heads may be quite different from 50%. Getting 7 heads in 10 flips is not that rare. Getting 700 heads in 1,000 flips, however, would be very rare. We intuitively expect to get closer to 50% heads the longer we flip.

Probability is thought of as what happens in the long run because of the amount of variation that is possible in the short run. A short run of heads in a row says nothing about the long-run tendency of coins to turn up heads. Variations from the long-run frequency happen in the short run. Variation from the true population value also happens with small samples in polling. If you ask ten people what they think of Kyoto, you are unlikely to get a percentage of support and rejection that is reflective of the country's population. It's more likely that you'll get a closer estimate of the whole country's feelings if you ask a larger number of people.

---

9 You might think it makes little difference how we express the probability of something, whether as a fraction or a percentage, but a study from the University of Texas suggests that the form of expression can make a significant difference. I must say the findings agree with my own reactions. We will look at this phenomenon when we think about using statistics to make decisions in Chapter 12. But for now try the following:

> You are a juror in a murder trial. The defense attorney presents you with the latest DNA evidence: the suspect has only a 0.1 per cent possibility of matching the DNA purely by chance. Hmm ... it sounds like there's a 99.9 per cent chance that the suspect is the source of the DNA. Accordingly, you conclude that the DNA belongs to the suspect.
>
> Then the defense attorney re-presents the probabilities in a different—yet mathematically equivalent—way: one in 1,000 other people in the population also match the DNA. This time, you and the other jurors are less certain that the DNA came from the suspect. ("Numbers can confuse jurors," *Science News* 153.9, February 28, 1998)

Probability and Polling

To understand how probability applies to polling, imagine an enormous, well-stirred bowl full of thousands of red and green marbles in equal number. The bowl is the *population* we are interested in. Now *sample* the marbles by reaching in and grabbing 10 marbles. If you got all red you'd be surprised. But if you reached in and grabbed 100 and all of them were also red you'd be stunned. Even at 70 red out of 100 you'd be very surprised, but not surprised if you got 47 or 55 red out of 100.

As we sample again and again, our intuition is that the larger the number of marbles sampled, the closer the percentage of red in the samples will come to the actual percentage of red marbles in the bowl—in this case, 50%. The point is simple: the larger the random sample, the more it tends to get percentages close to the real population value. A **random sample** is an unbiased sample—a sample in which every member of the population has an equal chance of being selected. Using probability theory, statisticians can calculate the likelihood, given a random sample of a population, how close the sample will be to the actual value. They express these calculations in terms of margin of error and confidence level.

Margin of Error and Confidence Level

When Ipsos-Reid states,

> MARGIN OF ERROR ↓ CONFIDENCE LEVEL ↓
>
> the results are considered accurate within ± 3.1 percentage points, 19 times out of 20, of what they would have been had the entire adult Canadian population been polled,

the polling firm is indicating both the margin of error and the confidence level. The **margin of error** is the range of percentage points around the sample percentage where the true population average is likely. If the pollster gets a sample result of 48% with a sample of 1,200, then the margin of error is ± 3 percentage points given a confidence level of 95%; that means that the pollster can claim that the true population percentage would be somewhere between 45% and 51%, 19 times out of 20. (Other margins of error are shown in Table 3.1; for a discussion of how these calculations are reached, see below.) The likelihood ratio of 19 out of 20 is how likely it is that the true answer is within the margin of error of the sample. This ratio is called the **confidence level**. The ratio can also be expressed as a percentage: 95% confidence level. What this means is that the pollster believes that 95 times out of 100, the true

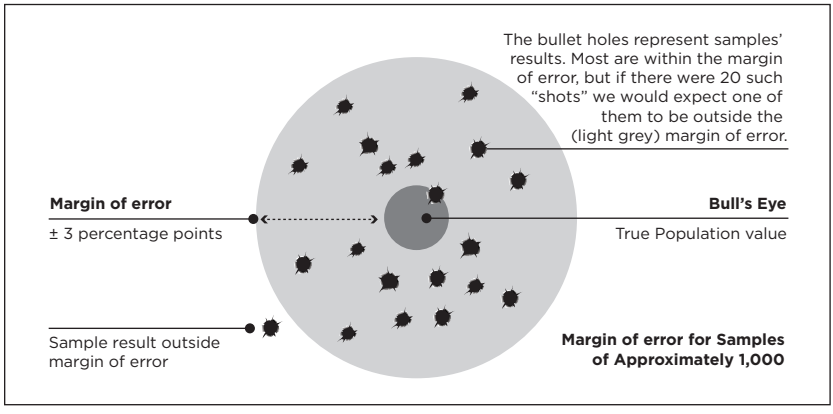
population percentage will be within the margin of error of the sample percentage. Referring back to the Kyoto example, Ipsos-Reid is saying that they are 95% confident that support for the Kyoto agreement among all Canadians is between 70.9% and 77.1%.[10]

TABLE 3.1

Margins of Error for 95% Confidence Level	
Sample Size	Margin of Error
100	± 10%
300	± 6%
500	± 5%
1,000	± 3.1%
1,200	± 3%

An illustration may help. If we think of a target with the bull's eye representing the true percentage in the population (the target of the pollster), we can think of the margin of error as a circle surrounding the bull's eye. What the pollsters claim when they say their confidence level is 95% is that they will hit inside the circle of ± 3 percentage points 95 out of 100 times (see figure 3.1). 95% accuracy is pretty good, though you should remember that the polling companies do a huge number of polls, and 5% of them—not a small number—will give results outside the margin of error.

FIGURE 3.1



10 Technically the confidence level is about the mathematical likelihood that a random sample will have a percentage that is within the margin of error of the true population 95% of the time. While most people talk about using the sample percentage to infer the likely range of values in the population, the mathematics is based on calculating the likelihood of a sample having a percentage within the margin of error—as illustrated by the bull's-eye image in Figure 3.1. For practical purposes, the distinction is not important.

Sample Size

You may have noted the small sample size used by pollsters in order to be 95% confident that their result is within 3.1 percentage points of the true value. In the news release for one of the Kyoto polls, Ipsos-Reid explained, "The poll is based on a randomly selected sample of 1,002 adult Canadians."

Just 1,002 Canadians? Out of 35 million Canadians? Or, just counting adults, out of 27 million? How can that be right? How can the opinions of 1,002 Canadians represent the opinions of 27 million Canadians? After all, 1,002 Canadians is less than 0.003% of all Canadians. Most people would probably not believe that such a small number of people could provide any kind of reliable guide to what Canadians on the whole believe. Yet the national polls we read and hear about daily are typically based on just such small samples. (Note that pollsters use samples of about the same size to survey the US population, which is ten times larger!) How can a sample of a mere 1,000 people tell us anything about the national population?

Let's return to our bowl of marbles. You will note that I never gave a figure for how many marbles were in the bowl. Yet it seemed plausible that the larger the number of marbles sampled, the closer the results would be to the true ratio of red to green marbles. That is exactly how polling works.

People either favour or don't favour Kyoto. They are like red and green marbles in this way. Just yes or no, red or green, Kyoto or not. The key to getting a sample that is accurate to plus or minus three percentage points is to get a random (unbiased) sample of a little more than 1,000 people.[11] If you wanted a smaller margin of error (i.e., a more accurate indication of the population value) you would need a larger sample. Just as with the bowl, the larger the sample, the more accurate it will be—regardless of the size of the population. Because of the cost of sampling, pollsters (and readers) have come to accept the plus or minus 3 percentage points level of accuracy as standard for national polls.

I realize that this might not persuade you. If that is the case, this is one of the "trust me" moments in the text. The problems with polling are numerous, but the mathematics of the theory of sampling is not where the problems lie. The main challenge in real polling is asking appropriate questions and actually getting a random and unbiased sample. Here's how a leading US polling firm, Harris, used to state the problem at the end of all their polls:

> In theory, with a probability sample of this size (i.e., 1,000), one can say with 95 per cent certainty that the results have a *statistical precision* of plus

11 If you are interested, the mathematics of this is well explained by Jessica Utts, *Seeing Through Statistics*, 4th ed. (Boston: Cengage Learning, 2015).

> or minus 3 percentage points of what they would be if the entire adult population had been polled with complete accuracy.
>
> Unfortunately, there are several other possible sources of error in all polls or surveys that are probably more serious than theoretical calculations of sampling error. They include refusals to be interviewed (non-response), question wording and question order, interviewer bias, weighting by demographic control data.... It is impossible to quantify the errors that may result from these.[12]

As you can see, pollsters occasionally admit that the mathematical precision they claim cannot really be justified.

Sample Size, Sub-Polls, and Increasing Margin of Error

There is another possible source for error that is sometimes not easy to notice. Even when a poll has a large sample, any sub-poll information will be based on the smaller sample. A sub-poll samples only a particular selected sub-group. So, for example, the poll sampling 1,000 Canadians may subdivide them into male and female; but there will be fewer than 1,000 (approximately 500), of course, in each sub-sample, so there will be a larger margin of error. In the Ipsos-Reid Kyoto poll, for example, the polling company states:

> The poll is based on a randomly selected sample of 1,002 adult Canadians. With a sample of this size, the results are considered accurate to within ± 3.1 percentage points, 19 times out of 20, of what they would have been had the entire adult Canadian population been polled. *The margin of error will be larger within regions and for other sub-groupings of the survey population*. (My italics)

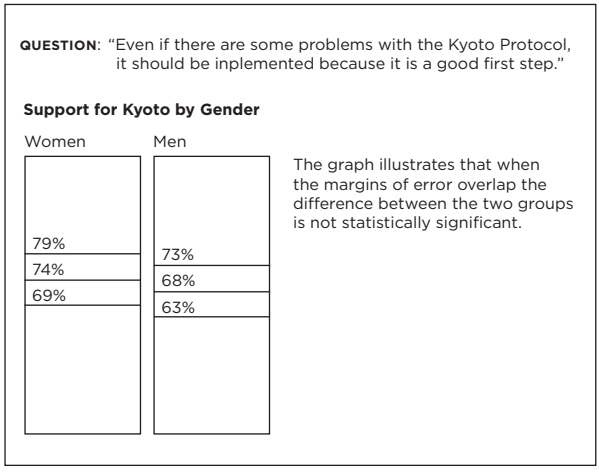
The fact that a smaller sample results in a larger margin of error has significant implications for comparing groups within a poll (see Table 3.1).

Large polls provide the opportunity to subdivide the information collected into sub-polls on the basis of such obvious criteria as age, gender, and geographic location. Using sub-polls allows the pollster to contrast the views of men and women, young and old, east and west, for example. The problem is that these sub-polls are smaller samples (e.g., women or Albertans) than the national sample and therefore have larger margins of error.

---

12 Accessed at http://www.harrisinteractive.com/harris_poll/index.asp?PID=309.

FIGURE 3.2



Most responsible journalists and pollsters provide a warning that the sub-polls have a larger margin of error. What is seldom emphasized is that not only do the sub-polls have larger margins of error, but when two polls or sub-polls are used to make comparisons, we have to take into account two margins of error. When pollsters compare the percentage of women and men who hold a view on some issue, they refer to the percentages *in their sample* (e.g., 74% vs. 68%). Unless the difference in the sample percentages is large, there is not a valid statistical basis for claiming that there is a real difference in attitude among men and women in the population. In statistical terminology, the difference is not **statistically significant**—that is, we can't be confident that the apparent difference is not just the result of the natural variation involved in sampling. We can't be 95% confident that there is a real difference in the population.

In their press release, Ipsos-Reid warned about larger margins of error in sub-polls. Nonetheless, they contrasted the statistically small differences between views of the 71% of Canadians who agreed with the claim that "even if there are some problems with the Kyoto Protocol, it should be implemented because it is a good first step." They reported the information as follows:[13]

13 Notice again how changes in the wording of the questions affects people's responses. While 74% of people surveyed initially said that they supported Kyoto, when the question was changed to "even if there are some problems with the Kyoto Protocol, it should be implemented because it is a good first step," the support for Kyoto fell from 74% to 71%. No doubt this small drop occurred because the probe reminded people that indeed there might be some problems!

- Quebecers (89%) and those in Atlantic Canada (82%) are the most likely to agree compared to the views of those in Ontario (68%), Saskatchewan/Manitoba (65%) and British Columbia (62%), while Albertans (45%) are the least likely to agree with this view.
- Canadians in lower (78%) and middle (74%) income households are more likely to agree with this position than are those in upper income households (65%).
- Women (74%) are more likely to hold this view than are men (68%).

While the differences between the provinces look statistically significant, those between genders do not. Looking at the gender difference we can see that the 74% figure for women would have a margin of error of ± 5 percentage points; i.e., the true percentage is somewhere between 69%–79% and the 68% men in the sample agreeing means that the true rate for men is likely from 63% to 73%. The extensive overlapping of the margins of error as shown means that we can't be 95% confident that the difference in the sample between men and women reflects a real difference in the populace. In fact, because of these margins of error, men and women might equally support the claim that "even if there are some problems with the Kyoto Protocol, it should be implemented because it is a good first step" (see Figure 3.2), or it might even be the case that more men than women support the claim, since a 70% figure for women and a 72% figure for men could be possible within the margin of error.

The problem with comparing the provinces is even greater. The size of the sample per province would be between 150 and 200, with a margin of error of between 8 and 10 percentage points, thus requiring the difference between the samples to be greater than 20 percentage points to be statistically significant. The only reported result that would appear to meet this criterion is the difference between Alberta and the Eastern provinces.

POLLING: A FUNDAMENTAL PROBLEM

In the next chapter I will review the myriad sources of bias that plague polling in the real world. But before that I should point out that even well-done polls often suffer from a fundamental difficulty: pollsters are asking people to give "off the top of their heads" answers to questions that are usually about complex issues. The answers respondents give are seldom a product of careful deliberation, but rather an immediate, often poorly informed reaction to

what is being asked. Often people will give answers about issues about which they know nothing. Studies of respondent behaviour have discovered that, on average, about 30–40 per cent of those polled offer opinions on subjects about which they could not know anything, though it is sometimes even worse than that. For example, when a poll in the US asked about a Metallic Metals Act, over 70 per cent offered opinions, even though there was no such act![14]

I have some sympathy for people who are being asked to answer questions about issues they haven't really thought about. No one likes to admit ignorance, and pollsters often encourage responses despite people's reluctance to answer. I had a personal experience of this when I was phoned years ago by a national pollster about the North American Free Trade Agreement. Knowing that I was one of a mere 1,000 to be asked, I was pleased to have this opportunity to speak out on a major national issue. I was unlikely to get such a chance again. While I had a general understanding and opinion about the free trade agreement, it wasn't adequate for the follow-up questions I was asked. I was repeatedly asked questions about which I knew too little to have an opinion. For example: "What did I think the effect of the agreement would be on Saskatchewan wheat prices?" "Did I think labour unions in the lumber industry would be hurt?" I was never given the option of answering "Don't know"—indeed I was encouraged to have a position despite my proclaiming ignorance. Only reluctantly did the interviewer admit that I could say "Don't

14 S. Plous, *The Psychology of Judgment and Decision Making* (New York: McGraw-Hill, 1993), 55.

know." I assume that pollsters do not want poll results that say "Most people don't know"!

But not surprisingly, the respondents often *don't* know. Ipsos-Reid in the 2002 Kyoto poll found that "two-thirds (63%, up 4 points since early October) of Canadians agree with the statement that they don't have enough information about the Kyoto Protocol to say whether they support or oppose it." This result also illustrates the effect of question order. The question about whether the respondent had enough information was asked after the question about whether the respondent supported signing the Accord. Presumably the number of people willing to have an opinion on the Kyoto Accord would have been reduced after they acknowledged that they didn't have enough information. The fact that a large percentage of people will answer questions and offer opinions about issues that they then admit to being poorly informed about probably causes you no surprise. For one thing, we all do it. But this perfectly natural human failing underlines the very great danger of allowing polls to influence public policy in a representative democracy.

The ideal of democracy is, in principle, to have the citizens make their own political decisions. Representative democracy (as opposed to pure or direct democracy, in which every citizen has a vote on every public matter) is a kind of compromise that recognizes the impossibility of such active citizen involvement in a large nation. Some people argue that polling provides a means for more democratic input from the citizens. By finding out the opinions of citizens, pollsters could, in principle, provide a means for greater citizen input to the democratic process.

In principle, polls might provide such an input, but, as we have seen, there is often a major problem of lack of information. In this age of political cynicism, we may wonder just how well informed our representatives are, but we know that on most issues, we, the people, are usually uninformed. Approximately 63 per cent of Canadians polled indicated that they did not have enough information about Kyoto. I think we should take comfort from the fact that at least that many were prepared to admit that they were short of information about Kyoto. Something like that percentage is probably true about most complex issues. Since people are often under-prepared to be polled, it is disturbing to see the often cynical role that polling can play in politics.[15]

---

15 For example, Dick Morris, a consultant who used to work for Bill Clinton, describes the way he and Clinton managed public policy in light of polling results; *The New Prince* (New York: St. Martin's, 1999). See also the transcript of a May 17, 2000 interview with Morris by Kerry O'Brien of the Australian Broadcasting Corporation (ABC): http://www.abc.net.au/7.30/stories/s127980.htm.

If politicians really wanted to know what the people thought given sufficient information and time for reflection, there is a method called deliberative polling that has been developed by John Fishkin of Stanford University as a means for getting people's more considered opinions. Fishkin's website (Center for Deliberative Democracy) describes the process as follows:

> A random, representative sample is first polled on the issues. After this baseline poll, members of the sample are invited to gather at a single place to discuss the issues. Carefully balanced briefing materials are sent to the participants and are also made publicly available. The participants engage in dialogue with competing experts and political leaders based on questions they develop in small group discussions with trained moderators. Parts of the weekend events are broadcast on television, either live or in taped and edited form. After the weekend deliberations, the sample is asked the same questions again. The resulting changes in opinion represent the conclusions the public would reach, if people had a good opportunity to become more informed and more engaged by the issues.[16]

But the media and politicians have shown little interest in such a process. There have been only twenty-two such polls conducted worldwide so far. Perhaps there is little interest because politicians recognize that it is the unreflective and uninformed beliefs of many people that determine how they vote.

Since polls usually reflect people's "off the top of the head" reaction to a question, we need to take polls' claims about what "Canadians *think* ..." with considerable reservation. The role that polls often appear to play in influencing governmental decision making is troubling. In the next chapter, I will review in more detail how polls are actually conducted and the challenges faced by pollsters in trying to get an unbiased poll.

16 Center for Deliberative Democracy, http://cdd.stanford.edu/what-is-deliberative-polling/.