Polling People & Pollsters: Facts & Fiction [1]

Dr. Kenneth F. Smith, PMP

Amongst other events, 2022 ushers in many new rounds of national, state and local elections in the US, the Philippines, and doubtless several other countries; so I thought it would be timely to offer some observations about and insights on statistical surveys for political polling -- a familiar phenomenon which will inundate us all again during the year.

In addition to monitoring and evaluating programs & projects, surveys are a prime tool political pollsters use to cite the status, track trends about issues of political import, as well as predict the outcomes of contending candidates. If conducted correctly and objectively, taking the pulse of the electorate political polls can be very informative. Otherwise, such surveys only become propaganda practices of the unscrupulous to deliberately distort public perception &/or persuade potential voters to favor particular candidates &/or particular positions on contentious issues.

Although there are many professional polling organizations, pollsters come in all colors, shapes and sizes with varying ethical standards, and ***I sometimes wonder whether partisan pollsters even really want to know the true situation***,[2] ***or whether -- at the outset -- they deliberately design and launch their surveys to distort the results*** in favor of their candidate, or a desired outcome.

In any event, here are a few guidelines regarding Survey Sampling, Size, Source, Structure & Statistical Significance **for poll watchers to assess the worth of the polls in which they have an interest -- and the results therefrom --** that unbiased poll practitioners use to gather data, analyze and report their findings.

SAMPLING TYPES

There are several different methods for conducting surveys, and sampling.

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[2] **"Newspaper Cancels Poll Because They Didn't Like the Results."** On December 15, The Guardian posted a piece about Time Magazine's decision to grant Elon Musk the title of "person of the year." At the end of the article was a poll, asking readers "Who would be your 2021 person of the year, and why?" Responses surged in and world-renowned author JK Rowling soared into the top spot. Soon after, the poll was nixed. The British newspaper took down their online poll after seeing that JK Rowling was in the lead. **BlabberBuzz. Saturday, 01 January 2022.** [*Rowling had recently been outspoken about gender, and in reaction was accused of being transphobic and a TERF — a scathing acronym that stands for "trans-exclusionary radical feminist."*]

Random Sampling

Random Sampling is probably the most often referred to, although -- *far from the common perception of 'randomness' as haphazard* – in professional sampling, **random** really means selecting individuals for the **representative** sample from the target population ***without conscious bias.*** To emphasize this distinction of objectivity, randomness is further qualified as **Scientific Random Sampling,** with prescribed objective ***Systematic*** procedures for selecting the samples.

At least theoretically therefore, each potential respondent in the target population should have an equal chance of being included in the sample. However, unless pollsters have access to a '**master-list**' of the total target population under study – *such as a list of registered voters* -- from which to draw samples; ***and use it appropriately*** -- this is all but impossible in many communities, &/or situations.

Cluster Sampling

Another common approach is Cluster Sampling **–** with groups of sampled individuals **pre-selected** on the basis of their different geographic area, persuasions or interests. Logistically, many more individuals can be reached in a shorter time by this method – such as a town hall, school board, or other pre-announced public meeting. However, without a master-list of the individuals and their commonality, again the actual composition and proportional makeup (and thus the representativeness) of the sample from the target population may be difficult to determine.

A related concern is how the individuals express their opinions to the pollster's representatives – whether individually and privately, or publicly in a "**Focus Group**" setting, as this could distort their objectivity. [*More on this aspect later.*]

Sample Size

Constructing, conducting, recording, tabulating and analyzing the results from a survey is a time-consuming and costly process. Furthermore, rapid turn-around time is often necessary to report and publicize the results for maximum beneficial effect. Thus, the sample size selected from a particular group is also a very important consideration. Given these constraints, short of a **census** *– i.e. a 100% sample* -- **how large should a sample be to represent the target population efficiently & effectively?**

It is often thought:

> **1) the bigger, the better**; and also
>
> **2) more samples should be taken from a large target population than from a small population.**

Consequently, many people instinctively reach for **a percentage** to express this felt need, with a *'ceiling estimate'* somewhere between **10%** and **25%.** However, contrary to popular perception -

- *apart from very small target groups* -- neither of these beliefs, approaches or practices is correct!

In determining the **accuracy** of a survey, the ***number* of responses is far more important than the percentage** of the target population which responded. Moreover -- especially for very large populations -- **the actual size of the target population is a relatively minor factor.**

Short of a census, **the size of an objective random sample survey** is dependent upon **four considerations** other than interviewing a preselected percentage of the population:

1. **Variability**[3] The extent of pertinent differences in the ***target population*** under study
2. **Tolerable Error** The amount of error the ***recipient*** of the survey ***is willing to accept*** in the findings — i.e. how close is "*close enough*"
3. **Confidence Level** The level of **assurance desired by the *pollsters that*** -- when presenting the findings -- ***the data is accurate within specified error ranges***
4. **Resource Availability** The amount of money, time, qualified personnel, equipment and other resources necessary **are *available to the pollsters*** to obtain the data, conduct the survey and process the findings

The first three criteria can be used directly in formulas to determine the appropriate sample size.

The fourth factor -- **resources -- is at *the poll manager's discretion***, to modify specifications of 2 and 3 above **for *efficiency*, while still retaining effectiveness.**

It is important to recognize at the outset that no survey can be 100% accurate, but -- as Warren Buffett once said -- **"*It is better to be approximately right, than precisely wrong!*"** Therefore, pollsters should establish how accurate the findings need to be, and qualify their confidence in the results based on the foregoing; as well as estimate the level of effort, time and costs involved to collect and process the data.

Since most polls ***report* results in percentage terms**, the formula to determine an appropriate sample size for a percentage is as follows:

$$\text{Sample Size} = \frac{2{,}500}{\left[\frac{E}{K}\right]^2}$$

[3] Variability — the amount of difference between individual members in a population

Where:

2,500 is a constant

E = Range of Tolerable Error: +/- 'x' percent

K = The Confidence Level: in standard deviations (sd's)

[*usually* 2 *sd's* = 95.74%, *but often treated as simply* 95%]

For Example:

What size sample should be taken to determine how many potential voters in a population are going to vote in favor of the incumbent candidate rather than the challenger, **given a tolerable error of +/- 3% and a confidence level of 2 sd's.**

Then:

$$\text{Sample Size} = \frac{2{,}500}{\left[\frac{3}{2}\right]^2} = \frac{2{,}500}{2.25} = 1{,}111$$

NOTE 1: Most legitimate polling organizations usually ***oversample*** and take ***at least 1,200 samples***, to allow for errors in collection, and other discards during processing

NOTE 2: Some polls can legitimately be taken with as few as 30 samples; however, the accuracy and confidence in their results from such a flimsy sampling may be substantially impaired. [**For example, with a sample of only 30, *the tolerable error rate* for the same level of confidence (95%) *would be 18%* -- which most likely would not be acceptable to the recipient population!***]**

Stratified Random Sampling

If distinctly different pertinent categories are already known in the target population, the requisite number of samples ***should be selected from each category***. The results from each category in the survey should then be adjusted to reflect their respective proportions, as illustrated in Figure 1.

Figure 1

STRATIFICATION for RANDOM SAMPLING

NORMALIZING for an AVERAGE &/or PERCENTAGE

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Enter data in Yellow cells below. Result will be shown in Green cells

A	B	C	D	E	E^	F	G		H	I
Areas	Target Population in each stratum	Percentage of Total Target Population in each stratum (B/Total B) x 100	Minimum Sample Size for criteria* i.e. variability, tolerable errors & confidence (Estimated at 100 for this example)	Actual Sample Size in each stratum	Caution: Sample size inadequate	Percentage of Actual Sample Size in each stratum (E / Total E) x 100	Survey Sample Results	Units or %	Normalizing Weighting Factor for the stratum C/F	Relative Weight of results for different strata population sizes contributing to the total (F x G x H) / 100
1	80	0.45 %	100	80	--	5.16 %	***50***	*kgs*	0.09	0.22
2	1,700	9.56 %	100	400	OK	25.79 %	***40***	*kgs*	0.37	3.82
3	2,000	11.25 %	100	35	--	2.26 %	***34***	*kgs*	4.98	3.82
4	2,500	14.06 %	100	496	OK	31.98 %	***55***	*kgs*	0.44	7.73
5	3,000	16.87 %	100	110	OK	7.09 %	***30***	*kgs*	2.38	5.06
6	3,500	19.69 %	100	90	--	5.80 %	***30***	*kgs*	3.39	5.91
7	5,000	28.12 %	100	340	OK	21.92 %	***32***	*kgs*	1.28	9.00
		NOTE Exception:	-- is OK If Actual Sample = Stratum Population, i.e. is a CENSUS							
Total Area	**17,780**	**100.00** %	**700**	**1,551**		**100.00** %			**Overall**	**35.6** *kgs*
			***Based on Mean or % Sample Size Formula**						**Average or Percentage**	

NOTE: Instead of Areas in Column 1, the different strata could represent different political persuasions.

SAMPLE SOURCE

As indicated in the comments on Stratified Random Sampling, the source of the samples selected is another major consideration. If known -- or suspected *a priori* - the extent of **Variability** in the target population makeup can also reduce the need for the larger number of samples somewhat. In such situations, the formula may be modified as follows:

$$\text{Sample Size} = \frac{(100 - P) \times P}{\left[\frac{E}{K}\right]^2}$$

Where:

100 is a constant

P = Estimated % of the target Population favoring a desired outcome

For Example:

If 70% of a target population is believed to favor a particular position -- given a tolerable error of +/- 3% and a confidence level of 2 sd's.

Then:

$$\text{Sample Size} = \frac{(100 - 70) \times 70}{\left[\frac{3}{2}\right]^2} = \frac{2{,}100}{2.25} = 933$$

SAMPLE SELECTION

There are several different methods for selecting the individuals to be sampled. These days, email and telephone solicitations are common. Impromptu 'Stop & interview' individuals-on-the-street sampling in crowded areas for their opinions is another. What is important is utilizing an approach to minimize selection bias in each circumstance. However, almost all approaches have constraints and flaws of some kind.

Selection bias of the medium for example is readily apparent in some situations. While phones and emails may seem almost ubiquitous these days, those who do not possess them are excluded from consideration. Also, when approaching a stranger on the street, the interviewer may favor an individual who seems more likely to respond, rather than following any strict skip-interval protocol.

Regardless of the approach taken, unless the sample is obtained by observation of the pollster rather than by interviewing individuals, '**volunteerism-bias**' – i.e. the willingness of the solicited individuals to participate – may distort the findings; as the opinions of those who choose not to participate (for whatever reason) are omitted.

Then again, some individuals hold very strong beliefs and opinions, as well as are outspoken and willing to share them; while others are reluctant to do so, or go so far as to lie for fear of disapproval for being seen to be holding dissenting views from the popular theme of the day.

STRUCTURE

The precise wording of the questionnaire is also important, as **leading questions often induce 'implied correct' responses**

STATISTICAL SIGNIFICANCE

Finally, results are usually reported as a single **percentage** – often to one or two decimal places – and much emphasis tends to be placed on **even slight differences** *vis a vis* other candidates standing, &/or their positions on various issues.

Sometimes the **margin of error** (**MoE**) may also be included in the summary, but if so, is rarely highlighted when making comparisons. Consequently, the MoE is often overlooked, whereas the **purpose of *the margin of error is the most useful element*** in determining the '***Statistical Significance***' of the findings.

For instance, given a **3% margin of error** for each,

If **Candidate A** reportedly has a **45%** favorable rating

while **Candidate B**'s is only **40%**

THE RANGE OF THEIR RESPECTIVE "*AURAS*" OVERLAP

from **42 to 45 to 48%**

and 37 to 40 to 43%

SO, DESPITE THE *DIFFERENCE* IN THEIR PERCENTAGES

THERE IS *NO SIGNIFICANT DIFFERENCE* IN THEIR RESULTS!

To that end, I developed a Template – see Figure 2 -- to compare the results of two surveys on a particular topic and simplify this analysis.

Figure 2

SIGNIFICANCE TEST FOR A PERCENTAGE

TO ASSESS THE SIGNIFICANT DIFFERENCE BETWEEN TWO SETS OF DATA

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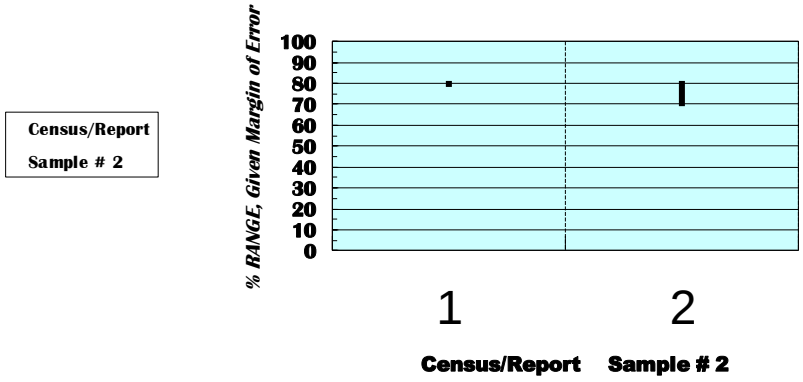
ENTER REPORTED CENSUS (or Baseline Sample) & Comparative SAMPLE RESULTS in YELLOW Cells Below

REPORTED BASELINE Census or SAMPLE # 1		***COMPARATIVE SAMPLE # 2***		
PERCENT RESULT =	80 %	PERCENT RESULT =	75 %	
CENSUS (or Sample#1) Size (N or n)	3000	Sample # 2 Size (n)	200	
Standard Error % (SEP)	0.73 %	Std Error % (SEP)	3.06 %	
Confidence Level Estimated:	95 %	Confidence Level Desired:	95 %	**for evaluation**
[Normally, From 95% to 99% is Acceptable]		that both the Sample and Census are from the same Population		
		NOTE: Higher Confidence Levels produce larger Margins of Error		
With Margin of Error = +/-	1.43 %	*With Margin of Error = +/-*	6.00 %	**which may not**
Lower Limit of :	78.6 %	*Lower Limit of :*	69.0 %	**be acceptable**
& Upper Limit of :	81.4 %	*& Upper Limit of :*	81.0 %	**to the survey**
# Standard Deviations =	*1.96*	# Standard Deviations =	*1.96*	**sponsor's**
		i.e. Favorable Odds of	20 :1	**management**

CONCLUSION: ***A STATISTICAL TIE - Ranges Overlap***
NO SIGNIFICANT DIFFERENCE BETWEEN THE TWO SETS OF DATA

TO SEE a Graph, HIT: [PgDn]

COMPARISON of PERCENTAGE RESULTS
CENSUS with SAMPLE Data; or Two Samples



CONCLUSION: **A STATISTICAL TIE - Ranges Overlap**
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I hope this brief summary of the practices and pitfalls in polling – as well as the formulas and templates -- will help you in your critical contemplation of issues of interest and make for the start of an ***Enlightened New Year!***

About the Author

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Initially a US Civil Service Management Intern, then a management analyst & systems specialist with the US Defense Department, Ken subsequently had a career as a senior foreign service officer -- management & evaluation specialist, project manager, and in-house facilitator/trainer -- with the US Agency for International Development (USAID). Ken assisted host country governments in many countries to plan, monitor and evaluate projects in various technical sectors; working 'hands-on' with their officers as well as other USAID personnel, contractors and NGOs. Intermittently, he was also a team leader &/or team member to conduct project, program & and country-level portfolio analyses and evaluations.

Concurrently, Ken had an active dual career as Air Force ready-reservist in Asia (Japan, Korea, Vietnam, Thailand, Indonesia, Philippines) as well as the Washington D.C. area; was Chairman of a Congressional Services Academy Advisory Board (SAAB); and had additional duties as an Air Force Academy Liaison Officer. He retired as a 'bird' colonel. After retirement from USAID, Ken was a project management consultant for ADB, the World Bank, UNDP and USAID.

He earned his DPA (Doctor of Public Administration) from the George Mason University (GMU) in Virginia, his MS from Massachusetts Institute of Technology (MIT Systems Analysis Fellow, Center for Advanced Engineering Study), and BA & MA degrees in Government & International Relations from the University of Connecticut (UCONN). A long-time member of the Project Management Institute (PMI) and IPMA-USA, Ken is a Certified Project Management Professional (PMP®) and a member of the PMI®-Honolulu and Philippines Chapters.

Ken's book -- **Project Management PRAXIS** (available from Amazon) -- includes many innovative project management tools & techniques; and describes a "**Toolkit**" of related templates available directly from him at kenfsmith@aol.com on proof of purchase of PRAXIS.

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