PRE-ELECTION POLL RELIABILITY: RESULTS OF A SMALL CITY SURVEY

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1. BACKGROUND

Three major concerns of any pre-election poll are: (1) respondents who indicate they will vote but do not; (2) respondents who vote differently than they indicated; and (3) how to allocate the vote of undecideds and non-respondents: (for example, is it safe to regard these groups as having the same voting pattern as decided respondents?). These problems have been studied by Perry (1973 and 1979), Traugott and Tucker (1984) and others. The attack used on problem (1) has been to determine which questions best measure or predict the likelihood to vote. Perry used a Guttman scale to choose the best questions, and, from post-election validated studies, computed scores to rank the questions using Somer's D-statistic on 2X2 tables, with the dependent variable in each table being whether or not the respondent voted. Traugott and Tucker used maximum likelihood estimation in a logistic regression model to obtain probabilities of voting. Both authors found that whether or not the respondent was registered was the best predictor. Perry found that the next two most important variables were whether or not the respondent planned to vote and how likely he was to vote based on a ladder scale of 1 to 10. Traugott and Tucker found that past voting behavior and level of interest in the campaign were the second and third best predictors and that the three together were better predictors than self-described probability of voting. The question naturally arises as to which respondent base to use to estimate each candidates percentage of the vote. Mitofsky, 1981, and Kohut, 1981 showed that there was no significant difference in the distribution of the vote among the total respondent group and the likely to vote respondents in the 1980 presidential election, but Perry, 1979, observed a positive democratic bias in the total respondent group over the likely to vote group averaging 4% in congressional elections. Problem (2) is minimized if the poll is taken as closely as possible to the election (in which case, some may argue, what's the point of a poll!), but the momentum of change may at times not take effect until the last few days as in the 1980 presidential election (Kohut, 1981 and Mitofsky, 1981). As regards problem (3), Fenwick et al., 1982, used a stepwise discriminant model to classify undecided voters based on attitudinal, demographic, and candidate evaluation data obtained from a 1980 poll of registered voters in Massachusetts, but the method had little impact on the distribution of vote. Although there is evidence that respondents to the first telephone call differ in candidate preference to other respondents (Mitofsky, 1981), there appears to be little knowledge about how the distribution of vote among various non-respondent types compares to that of respondents.

Some of these problems were addressed in a poll designed by this author and conducted one week prior to the 1988 presidential election in Fairfax City, Virginia, a small suburban city of 22,000 located near Washington, D.C.. A follow-up visit to City Hall after the election identified whether or not each sampled person voted. This data was used to identify which questions are the best at predicting whether or not a respondent will vote and to compare the likelihood (of registered voters) to vote among the respondent and various non-respondent groups. Follow-up interviews with a subsample of the respondents and with all

members of the principal non-respondent groups who voted were used to identify shifts in the position of respondents and to compare the voting patterns of respondents and non-respondents. Sample sizes were too small to draw many meaningful conclusions with the follow-up interviews but the approach may merit a larger study.

2. SURVEY DESIGN

A systematic sample of 608 names was selected from the alphabetized voter registration list of 11,846 Fairfax City citizens, from which 253 complete interviews were obtained. Systematic sampling was preferred to simple random sampling as it avoided selecting two or more individuals from the same household. The sample was drawn from the most recently updated list, which was not available until 12 days before the election. Consequently, the survey was conducted in the week prior to the election, which was desirable to the extent of minimizing shifts in the positions of voters.

The disposition of the sample is given in the first two columns of Table 1. The registration list contains name, address, sex, and date of birth, but telephone numbers had to be obtained from the directory or information operator. There was no listed phone number for 180, or 29.6%, of the individuals in the sample, and up to three household visits to a random subsample of 58 resulted in only 16 completed interviews. The low completion rate resulted primarily because the visits took place after dark, correct apartment numbers could not be determined in 13 cases, and 10 people had moved. (The last two groups cannot wholly be regarded as ineligible, however, since it is known that several people in each group did vote.) From the 428 individuals with listed phone numbers, 237 completed interviews were obtained for a response rate of 55.4%. Of the 191 non-respondents to the phone interview, 95 were due to exhaustion of the three attempt call-rule, 37 to refusals, 32 people were unavailable during the survey period, and 27 were either not at the listed number or the number was disconnected. Note that declaring all of the latter group as non-respondents yields a conservative response rate since at least some of these probably moved out of the six square-mile city and should be classified as ineligible.

The short pre-election survey questionnaire contained many of the usual questions to help measure how likely the respondent is to vote. These "vote predictor" questions and the order in which they were asked included: Q1: "how much thought have you given to the election", Q2: "where do people in your neighborhood go to vote", Q5: "do you intend to vote", and if so "how certain are you that you will vote, absolutely certain, fairly certain, or not certain", Q6: "to what party do you consider yourself a member", and Q7: "did something come up to prevent you from voting in the 1984 election of Reagan versus Mondale, or did you happen to vote". Questions 3 and 4 asked, respectively, "if you were voting today for the next President of the United States, for whom would you vote" and "right now, how strongly do you feel about your choice".

After the election, City Hall records were used to determine whether or not each of the 608 registered voters in the sample actually voted, and 77.6% of them did. This figure was almost identical with the figure of 77.8% for the entire city. The sample was also representative of the city population with regard to sex, age, and race, eliminating the need for demographic weighting of the data. Post-election interviews were attempted with a random sample of the respondents *who voted*, and with *all* of the non-respondents *who voted* and either exhausted the call-rule, refused the pre-election survey, or were unavailable during the survey period. Persons with no listed phone number were excluded from this process. The pre-election poll questionnaire was appropriately modified to give to the original non-respondents in the post-election poll. The reason for following up the original respondents was to ask whom they voted for to see if this differed from their choice in the pre-election poll. Complete post-election interviews were obtained from 86% (54 of 66) of the sample of pre-election poll respondents who voted, 57% (42 of 74) of the "call-rule exhausted" group of non-respondents who voted, 44% (8 of 18) of those unavailable during the pre-election survey who voted, and 37% (12 of 33) of the original refusals who voted.

3. COMPARISON OF THE LIKELIHOOD TO VOTE AMONG GROUPS

In this section we compare the likelihood of *registered voters* to vote when classified by

demographic groups or non-respondent groups. There was no difference in the likelihood to vote by sex, income, education, or race (white versus non-white), but people under 25 are significantly less likely to vote (59.3%) than people over 25 (80.8%) as indicated by the chi-squared statistic [$X^2(1, n=608) = 19.02$, $p < .001$]. (Traugott and Tucker (1984) found that demographics had no effect on likelihood to vote among registered voters *after* past voting behavior and campaign interest were taken into account.) Individuals who have a listed telephone are much more likely to vote (84%) than those who do not (64%) [$X^2(df=1, n=608) = 29.47$, $p < .001$]. This does not mean that it is safe to ignore those without phones, since they may vote differently than those with phones.

Table 1 shows the number and percent of people who voted among the respondents and various types of non-respondents. Among the 180 individuals without listed phones, we selected a random subsample of 58 to interview in person. The subsample represented the whole group well with regard to the disposition to vote (61.4% of those in the subsample voted compared to 63.9% for the whole group). Respondents in the subsample were much more likely to vote than non-respondents by 87.5% to 51.2% [$X^2(1, n=58) = 6.39$, $p=.011$].

We now focus on the 428 registered voters in the sample with listed phones. The non-respondents fall into four disjoint and exhaustive groups: "three-attempt call-rule exhausted", "person moved", "unavailable during the survey period", and "refused to be interviewed". The results indicate that the "respondent" and "refused" groups have the highest voting percentage, and there is not much difference between them (91.1% and 89.2% respectively). The non-respondent group "moved" had the lowest voting percentage, 40.7%, which is not unexpected since several people probably moved out of Fairfax City and were ineligible to vote there. We delete this category from further analysis and focus on the resulting 4X2 Table 2. The "unavailable" group now has the lowest percentage of voters, 65.6%, and the likelihood ratio chi-square statistic indicates a highly significant difference in the percentage of voters in each group [$G^2(3, n=401) = 15.51$, $p=.001$]. Partition $G^2 = G_1^2 + G_2^2$ by comparing the three non-response groups (G_1^2) and then combining these and comparing the aggregate with the respondent group (G_2^2). The results [$G_1^2(2, n=164) = 6.10$, $p=.040$, and $G_2^2(1, n=401) = 9.41$, $p=.002$] indicate that there is a significant difference between the percentage of voters in the three non-response groups, and that the respondent group has a significantly greater percentage of voters than the non-respondent group as a whole (which agrees with the conclusion reached in the personal interview portion of the survey). Further partitioning of G_1^2 by comparing the "refused" against the "call-rule" group and then their combination against the "unavailable" group indicates the percentage of voters in the "unavailable" group (65.6%) is significantly lower than that among the other non-respondents (84.1%) [$G^2(1, n=164) = 5.03$, $p=.025$].

Another useful way to partition the 4X2 table is to compare the "complete" group against the "refused" group [$G_1^2(1, n=274) = 0.14$, $p=.708$], the "call-rule" group against the combined "complete or refused" group [$G_2^2(1, n=369) = 4.950$, $p=.026$] and these three groups combined against the "unavailable" group [$G_3^2(1, n=401) = 10.42$, $p=.001$]. We conclude that the percentage of voters among respondents and those who refuse the interview are about the same (90.9% in the sample), and that this percentage is significantly larger than the percentage of voters among the group unable to be reached in three attempts (82.1%).

4. PREDICTING THE LIKELIHOOD TO VOTE

Which of the "vote predictor" questions mentioned in Section 2 are effective in predicting the likelihood to vote among respondents? As expected, more people say they will vote than actually do: 96.4% of the 253 respondents said they would vote but only 90.9% of respondents did vote (Table 1). Among telephone households 96.2% of respondents said they would vote but only 91.1% did, whereas among non-telephone households 100% said they would vote but only 87.5% did. This is in agreement with what is already well-known: people in face-to-face interviews are more prone to say they will vote than those in a telephone interview. However, the bias disappears when the "level of certainty" is taken into account. Overall, 89.3% of respondents were "absolutely certain to vote", a good estimate of the actual 90.9% who voted. Likewise, among telephone respondents 89.9% said they were "absolutely certain to vote" compared with the actual 91.1% who voted, and among the face-to-face respondents

81.25% were "absolutely certain to vote" whereas 87.5% did.

This suggests the "how certain are you that you will vote" question is critical in predicting likelihood to vote, which supports Perry's (1979) ladder approach. Indeed, by combining the first two rows of Table 3, we see that 93% of those (96.4%) who said they would vote did. But 94.7% of those (89.3%) who said they were absolutely certain to vote actually did compared with only 72.2% of those (7.1%) who were either fairly or not at all certain they would vote. The chi-square test for significance is not valid here since some cells have expected counts less than 5. However, the proportional reduction in the uncertainty (entropy) of predicting whether or not the respondent voted given this three-category likelihood to vote variable is 17.9% as measured by the uncertainty coefficient U (Goodman and Kruskal, 1972), with asymptotic standard error of 7.4%. (The uncertainty coefficient given the variable with just the two categories "will or will not vote" is 12.5%.) The relative improvement in predicting whether or not the person voted given the likelihood category is 13% as measured by the Goodman-Kruskal asymmetric λ, although the asymptotic standard error of λ is 12.2%. Perhaps the simplest way to interpret the data is this: if a respondent was selected at random and we make the most likely guess of whether or not he/she voted, the probability of an incorrect guess is 9.1% with no information (because one would conclude the respondent voted) but only 7.9% given the likelihood to vote (because one concludes the respondent did not vote if he/she indicates not and that he/she did vote otherwise). If instead of guessing the most likely result (i.e. optimal prediction), we guess according to either the marginal distribution of the columns of Table 3 (using no row information, i.e. we guess a respondent voted with probability 90.9%) or according to the conditional distribution of the rows, the probabilities of misclassifications are 15.69% and 13.48% respectively. The proportional reduction in error using the row information (i.e. the likelihood to vote information) is thus τ=14.5%. This is the Goodman-Kruskal asymmetric tau-statistic (Reynolds, 1977). (If we use only a two-way classification "will or will not vote", then τ=10.2%.)

In an attempt to gain more predictive ability, we further break down the first group "absolutely certain to vote" by using the responses to one or more of the other "vote predictor" questions mentioned in Section 2. For example, we can partition the group into two subgroups: one in which the respondent knows where to go to vote, and one where he/she does not. As it turns out, this adds no predictive power: 94.1% of the first subgroup voted compared to 87.5% of the second, and the difference is not significant [$X^2(1, n=244) = 2.26$, $p=.133$]. Similar results occur with other vote predictor variables. We also found that no combination of vote predictor variables excluding the "how certain are you" variable does better than the latter variable alone. For example, among the respondents who thought very much about the election, knew where to vote, and voted in 1984, 94.1% voted, but so did 91.7% of those who met exactly two of these three conditions, and 77.3% of those who met one or less. This difference is significant due to the last category [$X^2(2, n=242) = 7.09$, $p=.029$] but provides no predictive power (λ=0 and τ=2.9%).

It appears that the auxiliary vote predictor questions other than "level of certainty", at least in this study, do not help in predicting the likelihood to vote. This differs from Traugott and Tucker's (1984) conclusion that campaign interest and past voting behavior is a better predictor of the likelihood of a registered voter to vote than self-described probability. Our results support Perry's (1979) conclusion that, for registered voters, whether or not the respondent planned to vote and his likelihood to vote based on a 10 point ladder scale are the strongest predictors. However, our results may be due to the small number of non-voters (23) among the respondents.

Since only 77.8% of all registered voters in the city voted, it is an interesting exercise to weight Table 3 so that the percent voted corresponds to the population (which has been rather constant in Fairfax City in recent presidential elections) and the row percentages stay as in the sample. We are then basically comparing the predictive power of row information versus no information at all (i.e., no knowledge of whether or not the registered voter is even a respondent). In this case, the measures λ=21.6% and especially τ=59.2% are dramatically greater than above. Their values reflect the fact that respondents vote in higher percentages than non-respondents.

5. VOTING PATTERNS OF RESPONDENTS AND NON-RESPONDENTS

Table 4 gives the distribution of the actual vote obtained from post-election interviews of members from the three pre-election non-response groups and the pre-election response group. When the non-respondent groups are combined the resulting distribution is not significantly different than that of the respondents with regard to the votes for Bush and Dukakis. (The votes for Bush are: 61.1% by respondents and 63.9% by non-respondents.) The Bush vote was 68.3% among the call-rule non-respondent group but this is not significantly different from the respondent group vote [$X^2(n=88, df=1)=1.1$, $p=.27$]. Sample sizes in the other non-response groups are too small to make any other pairwise comparisons.

Among the 54 pre-election poll respondents who gave a post-election interview, 27 originally said they would vote for either Bush or Dukakis and only two changed their minds. Four of six who originally said they would vote for a minor candidate voted for Bush, and 13 undecideds split 6 and 6 for Bush and Dukakis with 1 refusal. Six of eight who originally refused to say for whom they would vote actually voted for Bush and the other two for Dukakis. Fenwick et al. (1982) addressed the problem of predicting the undecided vote, but we show in the next section that predicting the "minor candidate" vote was more of a problem in this survey. Of course, our sample sizes are too small to draw any firm conclusions, but we think further research with very large samples is imperative to study the actual voting patterns of "undecideds", those with "minor candidate preferences", and those who "refuse to name preference".

6. PREDICTING THE VOTE

Table 5 gives the distributions of the pre-election poll candidate preference by three different respondent bases: those who said they will vote, those who said they were absolutely certain they will vote, and those who actually voted. The last base is used for comparison, since it cannot, of course, be used for prediction. Note that the distribution of the first two bases are virtually identical. In other words, even though the second base is more reliable as a predictor of likelihood to vote (Section 4), the effect on the distribution of the vote was minimal in this survey.

In view of the results of Section 5, we assumed the undecideds and those who refused to name a preference voted in the same proportions as those who named a preference. The results appear in Table 6 along with the actual city-wide election result. It is clear that the poll estimated the percentage vote each major candidate received and especially the spread between them extremely well. However, it estimated the minor candidate vote to be three times the actual vote. Thus, it could be critical in a close election to accurately predict how those who express a minor candidate preference will actually vote.

7. CONCLUSION

By means of a pre-election survey followed by a validation of voting and post-election survey of the original respondents and non-respondents, we examined the likelihood to vote among different non-respondent groups and compared them with the respondents. We found that there is no difference in the likelihood to vote among the respondents and those who refused to be interviewed, that the likelihood to vote was significantly greater in these "contact" groups than in the "call-rule exhausted" group, which in turn was significantly greater than the likelihood to vote in the "unavailable at time of interview" group. Post-election interviews did not show a significant difference in the voting distribution between the non-respondent and respondent groups. We found that the questions "do you plan to vote" and "how certain are you that you will vote" are the best predictors of whether or not a registered voter would vote. This is in agreement with Perry's (1979) results. The two questions together made a better predictor than the first one alone, but each base provided an accurate forecast of the election outcome except for the minor candidate vote. Further research is needed to forecast how respondents who prefer a minor candidate in the poll will actually vote. This will no doubt require a large sample.

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TABLE 1. VALIDATION RESULTS

LISTED PHONE	#IN GROUP	%WHO VOTED	%SAID WILLVOTE	%SAID CERT TO VOTE
COMPLETE	237	91.1	96.2	89.9
REFUSED	37	89.2	NOT APPLICABLE	
CALLRULE	95	82.1	NA	
UNAVAIL.	32	65.6	NA	
MOVED	27	40.7	NA	
ALL LISTED	428	83.9	NA	
NO PHONE LISTING: ALL	180	63.9		
COMPLETE	16	87.5	100	87.5
NONRESP	42	51.2	NA	
NO INTVW ATTEMPT	122	65.0	NA	
ALL COMPLETE	253	90.9		
SAMPLE	608	77.6		
CITY	11,846	77.8		

TABLE 2. TELEPHONE RESPONSE/NONRESPONSE GROUP BY WHETHER OR NOT VOTED

	VOTED	DIDN'T VOTE	TOTAL
COMPLETE	216	21	237
REFUSED	33	4	37
CALL RULE	78	17	95
UNAVAIL.	21	11	32
TOTAL	348	53	401

TABLE 3. PREDICTIVE POWER OF QUESTIONS ON LIKELIHOOD TO VOTE

Q. "HOW CERTAIN ARE YOU THAT YOU WILL VOTE?"

ANSWER	VOTED	DIDN'T VOTE	ROW PCT
ABSOLUTELY	94.7%	5.3%	89.3%
NOT/FAIRLY	72.2%	27.8%	7.1%
WON'T VOTE	33.3%	66.7%	3.6%
TOTAL	90.9%	9.1%	100%

TABLE 4. DISTRIBUTION OF VOTE FROM POST- ELECTION INTERVIEWS BY PRE-ELECTION DISPOSITION

	BUSH	DUKAKIS	OTHER	REFUSED
COMPLETE	33	18	2	1
REFUSED	6	5	0	1
CALL RULE	28	9	1	3
UNAVAIL.	5	2	0	1

TABLE 5. DISTRIBUTION OF PRE-ELECTION POLL PREFERENCE BY DIFFERENT BASES (%)

BASE	BUSH	DUK	OTHR	DK	REF	N
WILLVOTE	54.1	31.6	2.9	7.4	4.1	244
ABS CERT	53.5	32.3	3.5	7.1	4.0	227
VOTED	53.9	31.3	3.5	7.0	4.4	230

TABLE 6. DISTRIBUTION OF PRE-ELECTION POLL PREFERENCE BY DIFFERENT BASES (%) ADJUSTED FOR UNDECIDEDS/REFUSED

BASE	BUSH	DUK	OTHR	N
WILLVOTE	61.1	35.7	3.2	244
ABS CERT	59.9	36.2	3.9	227
VOTED	60.8	35.3	3.9	230
ACTUAL	61.3	37.7	1.0	9,220