Election Night
on Television

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During the evening of the first Tuesday in November in even-numbered years, millions of people all over the United States watch the election shows provided by the three major networks. The viewers see a rapid tabulation of the votes cast for the major state offices of senator and governor, and in years when a president is elected, a rapid tabulation of the presidential vote by state and for the nation. They also see a tabulation of the votes for members of the House of Representatives. They usually hear an announcement of the winner after only a small percent of the vote has been reported, often within minutes of the closing of the polls. As the evening progresses they are treated to analyses that explain how given candidates won, that is, where their strength and weakness lay and why it appeared that they won.

Massive machinery operates behind this effort. This machinery is physical in the sense that it requires a very elaborate communications network and extensive use of computers, but it is also statistical and mathematical in the sense

that it requires rapid summaries and interpretations so that the findings can quickly be passed to the viewing public.

I shall not attempt to describe the complete organization necessary to produce the election night show, but shall describe the three parts of the show that lean most heavily upon computer and statistical technology: vote tabulation, projection of winners, and detailed analysis of the vote. The three networks use basically the same vote tabulation system, but they differ in their methods for projecting winners and in their analysis of the vote. I shall describe only the method of projection used by one network (NBC), at least until 1988.

Before discussing the procedures and methods used today, let's look at a brief history of the reporting of election night results to give a feel for why and how today's shows came about.

A BRIEF HISTORY OF ELECTION REPORTING

Persons living in the United States, as in other free societies that hold elections, have always had an intense interest in the outcome of elections. Interest is most intense for the elections that involve the presidency, is reasonably high for gubernatorial and senatorial elections, and at least the numbers of Republicans and Democrats composing the House of Representatives are of concern, even though the election of a particular member usually does not have national significance.

Thus election results have always been news of great interest. Until about 1928, this news reached the public via the newspapers. In general the coverage was relatively slow and incomplete. Radio changed this situation, and election reporting was speeded up. For example, radio reported the upset victory of Harry S. Truman in the early hours following election day in November 1948. Television began to report elections on a national scale in 1952 and has increased its scope and coverage and speed of gathering the vote since then. Extensive coverage of election primaries was introduced during the presidential year of 1964 and continues to be a feature of television reporting today even in "off-years."

Two factors influence speed of coverage: how quickly the vote is obtained from its source (basically a precinct), and then how soon it is reported. The speed of reporting the vote, once collected, was greatly increased by reporting via radio as opposed to reporting via newspaper. This reporting speed has not been particularly increased by television. Both radio and television are capable of essentially instantaneous reporting. The speed of vote collection, however, has been greatly increased by the television networks. It is worth reviewing the collection procedures utilized in the past and today.

The United States has approximately 175,000 precincts. In the official electoral machinery, the precinct vote is usually forwarded to a county collection center, and then to a state center, often to the Secretary of State there, who then certifies the official vote. Final official collection and certification frequently take several months. The precinct vote, however, is forwarded to the county level fairly rapidly, perhaps by phone or courier, and the vote at the county

level is often quickly available on an unofficial basis. The job of collecting the vote at the county level is much less arduous than that of collecting at the precinct level since there are only about 3,000 counties in the country. The vote can be collected faster, nonetheless, if it is collected at the precinct level, and this is the basic innovation that television introduced to vote collection. The networks with their large economic resources were instrumental in establishing a mechanism for obtaining the vote at the precinct level and communicating it by phone to a central location where it could be processed by a computer.

Competition by television networks in the area of extensive vote collection became very intense by the primary elections of 1964. That year the New Hampshire primary saw all three of the major television networks collecting and reporting the vote at the precinct level. In fact, some wags have said that there were more television workers in New Hampshire during the 1964 primary than voters, or to put it another way, that it would have been cheaper to bring the New Hampshire voters to New York to vote at a central location than to collect the vote in New Hampshire. Needless to say, these remarks are exaggerated, but they do emphasize the magnitude of the expense involved. The competition in collection became more intense that spring, and culminated in the reporting of the California presidential primary where each of the three networks collected the vote in the more than 30,000 precincts in California. This enormous expense brought only a mixed blessing. The newspaper wire services continued to collect and report the vote in the traditional manner, from complete county returns, so that on the day after the election, after the television networks had reported Goldwater the winner, the newspapers all showed Rockefeller with a substantial lead. The reason for this disparity was that Los Angeles County, with approximately a third of the precincts in the state, did not have a complete county report until too late to meet the newspaper deadlines, and Goldwater ran very strongly in Los Angeles.

This confusion was coupled with another, arising from the fact that each network would report its own vote totals at any instant of time, and, since they were being collected independently, at any given moment their totals were all different. All this led to the formation of an organization called the News Election Service (NES) whose sole purpose is to collect the vote and report it to its members. This service was formed by a cooperative effort of the three television networks (ABC, CBS, NBC) and the two wire services (AP, UPI). The NES releases its figures to its members simultaneously, so that at any instant all networks and news services are able to report the same basic data to the public.

THE NEWS ELECTION SERVICE

The massive NES operation functions in the following manner. Reporters, called stringers, are on duty at more than 100,000 of the largest of the 175,000 precincts in the country and at each of the 3,000 county reporting centers. These

reporters collect the vote at the precinct and county levels and then phone the vote to a central location, adding enough information to identify the source of the report. The vote information is then put into a computer that checks its apparent validity; for example, if it is a precinct report, it checks that the vote does not exceed registration in that precinct, or if a county report, that the number of precincts in the county has not been exceeded. Because registration figures and data on number of precincts are not exactly accurate at this time the check depends upon a statistical tolerance rather than an absolute cutoff. Once the report has been checked, if it is a precinct report it is added to the precinct results already reported for that county. If it is a county report, it replaces the previous county report (the county reports are made on a cumulative basis). At regular intervals the computer generates a vote report for each election race for each county in the state and also provides a state total for the presidential, senatorial, and gubernatorial races and a national total for the presidential race. The summary report is generated by comparing the county votes from the county reports with the votes in the county calculated from the precinct reports. It uses the larger figure for the county figure, and then sums over the counties in the state to obtain a state figure. In presidential years an additional summation is made over the states to obtain a national vote figure for the presidency. In addition to providing summary vote totals, percentages for each candidate are reported, as is the fraction of precincts reporting. Similar summaries for precincts are grouped for congressional districts to evaluate races for the House.

Once the information has been calculated, the computer releases the information to its clients. It provides this information in printed form both at the computer location and at the television studio, and it also makes the information available via telephone lines that can be used for input into the various network computer systems.

Extensive preparations must be done before the election not only to train the stringers but also to gather the registration figures for the precincts, to find the number of precincts in each county, and to collect other basic data. This information is essential for the checking process and for accurate reporting of the fraction of the vote that has been counted.

Additional preparation must also go into the operation that gets the vote into the computer and into the programming of the computer to accept the vote, add it properly, and report it correctly. The general name of the operation that prepares the computer to work properly is called *coding*. Its importance cannot be overestimated. In 1968 mistakes made in the instructions for the computer caused the computer to malfunction, and the vast stream of votes from NES dried up to a trickle shortly after midnight (EST) election night. This malfunction was partly responsible for the uncertainty about the winner in the presidential race, which was not reported by the television networks until Wednesday morning.

This brings us to an area that is still the subject of intensive competition among the three networks. Although they are all constrained by their common

use of NES totals to report the same vote totals, they are not constrained in the interpretation of these vote totals; for although the vote total at any instant in time may be informative, the real interest in an election lies in who wins, by how much, and why.

PROJECTING ELECTION WINNERS

The rapid collection and reporting of the vote requires a great deal of organization, computer capability, and communication equipment. All that activity, nonetheless, goes simply to adding up the vote. The question for the election forecaster always remains: When can I be reasonably sure I have tabulated enough of the vote to decide who will be the ultimate winner?

An easy answer to that question is: Wait until all the votes are counted—but this may take days. Statistical theory, however, sometimes allows us to give an answer earlier. Sometimes it allows us to determine the winner of an election when only a fraction of 1% of the vote has been reported to the analyst. It happens frequently that projections can be made on the basis of information collected by the network and available to the analysts in the television studio before a single vote has been posted for the television audience because NES has not yet produced vote totals (which, by agreement, are the only ones that can be released to the public).

The projection of election night winners requires a combination of historical information, statistical theory for the construction of an appropriate mathematical model of the vote and for deciding when one is sure enough to make a projection, and the actual election night vote. The networks have different schemes for projecting winners, but all of these schemes have the basic elements we have described. Let's now look at the general scheme used by one network, NBC. We begin with the projection of the winner in a state race, then the projection of the winner in a presidential election, and, finally, the projection of the composition of the House of Representatives.

STATE RACES

The information for projecting the winner of a state race comes from four separate sources. First, a preelection estimate of the percentage each candidate will get is obtained from public opinion polls, newspaper reporters, politicians in the state, and similar sources. This initial estimate, often quite accurate, may give a definite indication of how the race will turn out. Second, interviews of voters as they leave selected voting places provide the Election Day Voter Poll. Respondents fill in the questionnaires themselves so that their responses are not known to the person conducting the poll. Third, the network collects the vote of specially selected precincts, called key precincts, in addition to the vote collected by NES. Typically the network collects votes from 50 to 150 such pre-

cincts for each state. Thus a network may have a national precinct collection system utilizing reporters at over 5,000 precincts completely independent of the NES effort. The voting behavior of these key precincts in past elections will already have been carefully analyzed. Fourth, the information from NES is available at a county level.

The information from these four sources is ordered in time. The initial estimate is obviously available first because it comes before election day. The results from the Election Day Voter Poll respondents will be phoned in during the day and processed by computer so that the approximate results for a given race in a given state will be known well before the polls have closed in that state. The vote of the key precincts, which the networks collect themselves, is usually the first actual vote information available to the network. By the agreement forming NES, this key precinct vote information cannot be displayed on the air but it can be used to project winners. If a race is one-sided in a state, the results of the Election Day Voter Poll by itself may be used to call the race as soon as the polls in the state close. If a race is less one-sided but still fairly clear as to its outcome, it may be callable after a few key precincts have reported.

If the race is close, however, more of the special precincts are needed before a winner may be projected, and often it is necessary to use the county information available from NES.

To use the information from the counties, it is necessary to develop a mathematical model. The reason is that different counties have different voting behaviors. For example, New York City is always more Democratic in its vote than the rest of the state of New York. This kind of difference in voting behavior in terms of relative Democratic or Republican leanings can be incorporated into a mathematical model.

The statistical model uses the voting patterns from the recent past. For example, the fraction of the New York State vote in New York City is typically 0.4, and the fraction in the rest of the state 0.6. In a typical past election for governor, the Democratic candidate got 50% of the vote in New York City and 40% of the vote in the rest of the state. His statewide vote, then, was $0.4(50\%) + 0.6(40\%) = 44\%$. Thus New York City was 6% more Democratic than the state average, and the rest of the state was 4% less Democratic than the state average. The fractions can be incorporated into a model so that in this simplest instance, if in a new election the early returns from New York City show 54% for the Democratic candidate and the rest of the state shows 48% for the Democratic candidate, the state projection in percent would be $0.4(54\%) + 0.6(48\%) = 50.4\%$. This indicates that the Democratic candidate would win, although if the returns were very early, this projection would not be considered sufficiently accurate to make an announcement of a victory.

Another factor considered in the statistical model is whether the fraction of the vote assigned to the various parts of the state is accurate for this election. If it snowed heavily in upstate New York, but not in New York City, thus cutting the vote upstate, but not in New York City, the fraction of the vote in the election might be 0.5 for New York City and 0.5 for the rest of the state;

that is, the relative voter turnout in New York City would be higher than normal. In this case the projection would be 0.5(54%) + 0.5(48%) = 51%, indicating a better chance for Democratic victory. Thus the differential turnout must also be considered in the model in order to make vote projections.

The use of computers allows such a model to be constructed using detailed information for all the counties of a state rather than just the two regions in our example, to provide not only a projection but also an indication of the accuracy of the projection, so that one can decide when a projection may safely be announced.

It is useful for the model to include the prior estimate available to the network and results for the special key precincts, so that all information available to the network is effectively utilized. Such a model sometimes allows the results of a race to be called with near certainty, even though only a small fraction of the vote is reported and the race is relatively close.

It is network policy not to predict the winner unless it is almost a certainty that the predicted winner will actually win. The accuracy of the predictions can be gauged by the fact that, during a given evening when over a hundred predictions may be made, there is usually at most one mistake. The use of such models, developed by statistical theory, allows the networks to enforce their policy and at the same time "call" close races because the precision of the estimates developed by the models is always known. One of the most important outputs of the statistical model in this decision problem, as in many others, is the estimated precision of the result.

PRESIDENTIAL RACE

The Election Day Voter Poll revolutionized the way the networks were able to call the results of presidential races. This was the basic device that allowed NBC to announce at 8:15 P.M. (EST) on November 4, 1980 that Ronald Reagan had been elected the fortieth president of the United States. By using the Election Day Voter Poll, NBC was able to ascertain that Reagan would receive 270 electoral votes from states whose voting places had closed by 8:00 P.M. (EST). All the networks made similar early calls in 1984.

Because many people in the West had not yet voted for the president and other candidates at such an early hour (5:00 P.M. P.S.T.), this new technology led to some controversy. Various political solutions have been proposed, such as having a uniform poll closing time across the country. Other solutions that involve news censorship raise severe constitutional problems. Carried to a ridiculous extreme, one might suggest keeping the results secret until the electoral college meets the following January!

When presidential races are not so one-sided, the results may still not be known until the early hours of the morning after election day. In 1968 the NES computers were down for a while, and because this was a very close election, the final result was not known for the many hours it took the networks to gather

sufficient information to make a responsible projection of the winner. Even if the Election Day Voter Poll technology had been available in this election, the projection of the winner would have come very late.

HOUSE RACES

A projection of the composition of the House of Representatives requires a model similar to the one used for projection of presidential races, the main difference being that each house seat counts as 1, the prior estimates are ordinarily less reliable than those for states in presidential elections, and the vote is reported only by house district. In addition to the projection and vote information, the networks also provide an *analysis* of the vote. This is the next topic we shall consider.

NEWS ANALYSIS

The Election Day Voter Poll questionnaire has questions about various issues that the candidate may have discussed during the campaign and about the characteristics of the person filling out the questionnaire, such as age, sex, race, religion, income, and so forth, and questions about whom the respondent may have voted for. By using cross tabulations it is possible to analyze the vote in terms of various demographic factors (such as sex, race, and so forth) and various issues. These analyses help explain what the election meant to the electorate. For example, a majority of the electorate might favor freedom of choice even though a candidate who opposed abortion was elected. This means that other factors played a more important role in the candidate's election, and that the candidate cannot correctly claim to have a mandate for his or her position on abortion. Such analyses enable network commentators to flesh out their opinions and qualitative insights with quantitative information, thus offering the viewers a more informed view of the election's context than would otherwise be available.

CONCLUSION

The reporting effort of the television networks represents an area of activity that could not exist without the computer and without modern statistics. It represents a blend of modern technology and the traditional skills of the reporter.

The statistical techniques of vote projection may have other applications. For example, it might be possible by similar methods to establish the pattern of yields of corn county by county in Iowa from historical records, and accurately to estimate the state yield from the yields of only a few early harvesting counties.

PROBLEMS

1. What are the three parts of the election night show that rely most heavily on computer and statistical technology?

2. What are the advantages of precinct level vote collection by the media? The disadvantages?

3. Why was the NES formed? Does this mean that the only data available to the networks are from the NES?

4. Statistical theory enters into winner projection in two ways. Describe them.

5. What are *key precincts*? Are they the same for all networks?

6. A gubernatorial candidate in New York is assured of 60% of the New York City vote and 50% in the rest of the state. As stated in this article, the New York City vote usually represents 40% of the statewide total. What percentage of the total vote can our candidate expect?

7. Our candidate is dismayed. A sudden blizzard has hit New York City on the first Tuesday in November, cutting the city's voter turnout to 30% of the state total. Can the candidate still win?

8. Why is the precision of an estimate important in winner projection?

9. Besides the estimated voting percentages themselves, what is an equally important output of the projection models discussed?