The Polling Narrative is Wrong

... but there is still work for us to do

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Knox College

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Presentation Outline

1. Introduction: Why this is important
2. PLTH 101: Polling Theory
3. These Polling Results
4. How We Can Improve
5. End matter
1. Introduction: Why this is important

2. PLTH 101: Polling Theory

3. These Polling Results

4. How We Can Improve

5. End matter
A few days before the election, I asked two acquaintances whom they were going to vote for. They knew I supported Biden. “I’m undecided,” they each independently said, looking around a bit uneasily. They both ended up choosing Trump. I was struck, though, that neither initially wanted to admit what he really thought.

As election night revealed, they were hardly alone. Almost all major pollsters were wrong, predicting far more support for Biden than he, in fact, received in Florida, Pennsylvania and other key states. Why were the pollsters so off?

Source:
https://thehill.com/opinion/campaign/525966-why-the-polls-were-wrong/
What the Press Said

New York Post

*Why election polls were so wrong again in 2020*

Once again, reality has humiliated the polling industry.

Far from the Democratic landslide that the RealClearPolitics polling average and prognosticators like Nate Silver at FiveThirtyEight anticipated, Tuesday’s presidential election was agonizingly tight....

Source:

https://nypost.com/article/the-real-reason-election-polls-were-so-wrong-again-in-2020/
What the Press Said

National Public Radio

*Were The Polls Wrong? A Look At The Future Of The Polling Industry*

So you have been writing about this today, and it looks like your big takeaway is that once again, polls underestimated the support for President Trump.

Source:

https://www.npr.org/2020/11/04/931435976/were-the-polls-wrong-a-look-at-the-future-of-the-polling-industry
Human beings are social animals, and that’s just as true when they’re answering a telephone survey as when they’re arguing on Twitter. In an America where Trump supporters are routinely called “racist” (or worse), it’s no surprise that many of them prefer to keep their political leanings to themselves.

Often ridiculed as the “shy Trump voter” hypothesis, the technical name for this phenomenon is social desirability bias. It’s the most obvious explanation for the fact that while other pollsters predicted a Biden blowout, the Rasmussen poll showed a narrow lead for Trump.
On the other hand...
Also What the Press also Said

The Hill

Poll: Graham leads Harrison by 6 points in SC Senate race

South Carolina Republican Sen. Lindsey Graham is leading his Democratic opponent Jaime Harrison by 6 points in the race for the state’s Senate seat, according to a new recent New York Times/Siena College poll released Thursday.

According to the poll, Graham registered 46 percent support among likely voters in comparison to Harrison, who received 40 percent support in the poll. Graham leads Harrison 1.5 points outside of the poll’s 4.5 percent margin of error, but the numbers indicate that the race may still be tight.

Source:
Also What the Press also Said

New York Post

*Biden leads by 10 points, majority say Trump could’ve avoided COVID-19: poll*

Among those adults who are expected to cast ballots in the Nov. 3 election, the poll found that 51% were backing Biden, while 41% said they were voting for Trump. Another 4% were choosing a third-party candidate and another 4% said they were undecided.

Biden’s 10-point edge over Trump is 1 to 2 points higher than leads Biden posted over the past several weeks, though the increase is still within the poll’s precision limits of plus or minus 5 percentage points.

Source:

What the Press *also* Said

**National Public Radio**

*Poll: Biden Takes Double-Digit Lead Over Trump*

The former vice president leads Trump 54% to 43% among likely voters in the poll. It’s the highest level of support Biden has achieved since the poll began testing the head-to-head matchup in February. Biden has never been below 50% in the question in the Marist poll, and Trump has never been above 44%.

Source:

https://www.npr.org/2020/10/15/923946468/poll-biden-takes-double-digit-lead-over-trump
What the Press *also* Said

**The Sydney Morning Herald**

*Biden maintains convincing lead over Trump in final election polls*

The polls show only around 3 per cent of voters remain undecided, with a similar percentage supporting a third-party candidate. Over 93 million Americans — 67 per cent of the total turnout four years ago — have participated in the election.

... 

Biden has a 7.2 percentage point lead in the RealClearPolitics national average, down from a peak of 10.3 points after the first presidential debate but more than twice as large as Clinton’s final polling lead in 2016.

Source:

Introduction: Why this is important

PLTH 101: Polling Theory

These Polling Results

How We Can Improve

End matter
How is the polling done?
- Contact people
- Analyze the data

This process raises several important questions:
- What people should be contacted?
- How are the people to be contacted?
- What should we do if the right people are not contacted?

Ultimately, this leads to the fundamental question in statistics:  
- How do we ensure that the sample is representative of the population?
How is the polling done?
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Ultimately, this leads to **the** fundamental question in statistics:
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Weighting the Polling Results

To handle skewed samples, polling houses will use weighting.
— This helps to adjust for several things, including skewed samples.

It is a very powerful technique that only assumes the sample within each category is representative of the population.

Unfortunately, weighting requires knowing population ratios.

- Population proportions of the United States
- Population proportions of the US voters

Since the population of US voters is unknown when polling (does not even exist yet), polling houses have to estimate it. This leads to reputations for some firms being “left-leaning” and some being “right-leaning.”
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Weighting Example

I perform a poll estimating the support level for each of the two major-party candidates in the 2020 election. The following are my results from asking 1000 people:

<table>
<thead>
<tr>
<th>Identification:</th>
<th>Democrat</th>
<th>Other</th>
<th>Republican</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our Sample</td>
<td>502</td>
<td>314</td>
<td>184</td>
</tr>
<tr>
<td>Biden Support</td>
<td>477</td>
<td>151</td>
<td>4</td>
</tr>
<tr>
<td>Trump Support</td>
<td>15</td>
<td>116</td>
<td>178</td>
</tr>
<tr>
<td>Neither Support</td>
<td>10</td>
<td>47</td>
<td>2</td>
</tr>
</tbody>
</table>

Thus, if we treat our poll naively, we would conclude that Biden was ahead with 63.2%, and Trump was far behind with 30.9%.
Weighting Example

To illustrate the importance of weighting, let us first weight the results according to the 2016 results to see how it affects our estimates:

<table>
<thead>
<tr>
<th>Identification:</th>
<th>Democrat</th>
<th>Other</th>
<th>Republican</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biden Support</td>
<td>95%</td>
<td>48%</td>
<td>2%</td>
</tr>
<tr>
<td>Trump Support</td>
<td>3%</td>
<td>37%</td>
<td>97%</td>
</tr>
<tr>
<td>Neither Support</td>
<td>2%</td>
<td>15%</td>
<td>1%</td>
</tr>
<tr>
<td>Turnout 2016</td>
<td>37%</td>
<td>31%</td>
<td>33%</td>
</tr>
</tbody>
</table>

Biden support = $0.95 \times 0.37 + 0.48 \times 0.31 + 0.02 \times 0.33 = 50.7\%$

Trump support = $0.03 \times 0.37 + 0.37 \times 0.31 + 0.97 \times 0.33 = 44.6\%$
Weighting Example

Let us weight the results according to a “right-leaning” polling house:

<table>
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<th>Republican</th>
</tr>
</thead>
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<tr>
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<td>3%</td>
<td>37%</td>
<td>97%</td>
</tr>
<tr>
<td>Neither Support</td>
<td>2%</td>
<td>15%</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Right Polling House</strong></td>
<td>30%</td>
<td>30%</td>
<td>40%</td>
</tr>
</tbody>
</table>

\[
\text{Biden support} = 0.95 \times 0.30 + 0.48 \times 0.30 + 0.02 \times 0.40 = 43.7\% \\
\text{Trump support} = 0.03 \times 0.30 + 0.37 \times 0.30 + 0.97 \times 0.40 = 50.8\%
\]
Finally, to drive this point home, let us weight the results according to a “left-leaning” polling house:

<table>
<thead>
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<td>97%</td>
</tr>
<tr>
<td>Neither Support</td>
<td>2%</td>
<td>15%</td>
<td>1%</td>
</tr>
<tr>
<td>Left Polling House</td>
<td>40%</td>
<td>30%</td>
<td>30%</td>
</tr>
</tbody>
</table>

Biden support  = $0.95 \times 0.40 + 0.48 \times 0.30 + 0.02 \times 0.30 = 53.0\%$

Trump support  = $0.03 \times 0.40 + 0.37 \times 0.30 + 0.97 \times 0.30 = 41.4\%$
Confidence Interval

The confidence interval...  
- is a set of reasonable values for the population parameter  
- depends primarily upon the sample size (and the confidence level)  
- does not always contain the population parameter  
- arises from random sampling

**Rule of thumb**: The margin of error is \( E = \frac{1}{\sqrt{n}} \):

<table>
<thead>
<tr>
<th>n</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>5.0%</td>
</tr>
<tr>
<td>500</td>
<td>4.8%</td>
</tr>
<tr>
<td>750</td>
<td>3.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>n</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000</td>
<td>3.2%</td>
</tr>
<tr>
<td>2,000</td>
<td>2.2%</td>
</tr>
<tr>
<td>5,000</td>
<td>1.4%</td>
</tr>
</tbody>
</table>
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<tbody>
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</tr>
</tbody>
</table>
Three Important Take-Aways

There are three important take-aways from this discussion:

- Candidate support varies over time
- Polling houses weight their results to better estimate their voting population
- The confidence interval should contain the population parameter only a specified proportion of the time

The next slides illustrate the change in support over time for several states. They also show that there is a third “person” in the polls, one that is ignored (unfortunately).
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Introduction: Why this is important

PLTH 101: Polling Theory

These Polling Results

How We Can Improve

End matter
Results Overview

To see how well the polls did, I looked at polls in the final two weeks of the election season. Then, in each of the following groupings, I calculated the proportion that had the election results in their confidence intervals.

- All polls
- Online, telephone, mixture
- University
- Partisan
- Battleground states
- Polling house

As you look at the tables, be a good scientist and look for patterns... stay especially aware of the coverage rates and the average errors; these indicate average performance.
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- Partisan
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# Polling Results: By General Groups

<table>
<thead>
<tr>
<th></th>
<th>$n$</th>
<th>Conf.Int Hits</th>
<th></th>
<th>Average Miss (se)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Biden</td>
<td>Trump</td>
<td>Biden</td>
</tr>
<tr>
<td>All Polls</td>
<td>174</td>
<td>85%</td>
<td>43%</td>
<td>−0.09</td>
</tr>
<tr>
<td>Online only</td>
<td>23</td>
<td>96%</td>
<td>30%</td>
<td>−0.79</td>
</tr>
<tr>
<td>Online + telephone</td>
<td>26</td>
<td>92%</td>
<td>54%</td>
<td>−0.78</td>
</tr>
<tr>
<td>Telephone</td>
<td>125</td>
<td>82%</td>
<td>42%</td>
<td>−0.18</td>
</tr>
<tr>
<td>University</td>
<td>60</td>
<td>92%</td>
<td>27%</td>
<td>−0.09</td>
</tr>
<tr>
<td>Non-university</td>
<td>114</td>
<td>82%</td>
<td>51%</td>
<td>−0.09</td>
</tr>
<tr>
<td>Partisan</td>
<td>52</td>
<td>79%</td>
<td>75%</td>
<td>+0.62</td>
</tr>
<tr>
<td>Non-partisan</td>
<td>122</td>
<td>88%</td>
<td>29%</td>
<td>−0.40</td>
</tr>
</tbody>
</table>
Polling Results: By Battleground State

<table>
<thead>
<tr>
<th>State</th>
<th>n</th>
<th>Biden</th>
<th>Trump</th>
<th>Conf.Int</th>
<th>Hits</th>
<th>Average</th>
<th>Miss (se)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona</td>
<td>12</td>
<td>83%</td>
<td>92%</td>
<td>+0.75</td>
<td></td>
<td>+1.37</td>
<td></td>
</tr>
<tr>
<td>Florida</td>
<td>24</td>
<td>96%</td>
<td>38%</td>
<td>−0.34</td>
<td>+2.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Georgia</td>
<td>12</td>
<td>75%</td>
<td>83%</td>
<td>+1.37</td>
<td></td>
<td>+0.74</td>
<td></td>
</tr>
<tr>
<td>Michigan</td>
<td>19</td>
<td>89%</td>
<td>32%</td>
<td>+0.12</td>
<td></td>
<td>+2.44</td>
<td></td>
</tr>
<tr>
<td>North Carolina</td>
<td>18</td>
<td>94%</td>
<td>72%</td>
<td>+0.19</td>
<td></td>
<td>+1.57</td>
<td></td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>23</td>
<td>96%</td>
<td>48%</td>
<td>+0.08</td>
<td></td>
<td>+2.00</td>
<td></td>
</tr>
<tr>
<td>Wisconsin</td>
<td>14</td>
<td>86%</td>
<td>21%</td>
<td>−0.84</td>
<td></td>
<td>+2.85</td>
<td></td>
</tr>
</tbody>
</table>
## Polling Results: By Polling House

<table>
<thead>
<tr>
<th>Polling House</th>
<th>Sample Size $n$</th>
<th>Biden (%)</th>
<th>Trump (%)</th>
<th>Conf. Int</th>
<th>Biden (%)</th>
<th>Trump (%)</th>
<th>Average Miss (se) Biden</th>
<th>Average Miss (se) Trump</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change Research</td>
<td>11</td>
<td>91%</td>
<td>45%</td>
<td>0.76</td>
<td>-0.76</td>
<td>2.28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emerson College</td>
<td>14</td>
<td>100%</td>
<td>64%</td>
<td>0.36</td>
<td>-0.36</td>
<td>1.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOX News</td>
<td>4</td>
<td>100%</td>
<td>0%</td>
<td>0.13</td>
<td>-0.13</td>
<td>3.57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>InsiderAdvantage</td>
<td>8</td>
<td>88%</td>
<td>75%</td>
<td>0.88</td>
<td>+0.88</td>
<td>1.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ipsos</td>
<td>13</td>
<td>100%</td>
<td>23%</td>
<td>0.51</td>
<td>-0.51</td>
<td>2.22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quinnipiac University</td>
<td>8</td>
<td>88%</td>
<td>0%</td>
<td>0.41</td>
<td>-0.41</td>
<td>5.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rasmussen Reports</td>
<td>10</td>
<td>90%</td>
<td>70%</td>
<td>0.40</td>
<td>+0.40</td>
<td>1.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Siena College</td>
<td>12</td>
<td>92%</td>
<td>0%</td>
<td>0.39</td>
<td>+0.39</td>
<td>4.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trafalgar Group</td>
<td>15</td>
<td>60%</td>
<td>93%</td>
<td>1.61</td>
<td>+1.61</td>
<td>0.61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YouGov</td>
<td>6</td>
<td>100%</td>
<td>33%</td>
<td>1.04</td>
<td>-1.04</td>
<td>1.09</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section Summary

The main purpose of this section was to . . .
- see how well the polls did ignoring the undecides

This resulted in the following conclusions:
- There was a slight difference between the online and the telephone polls
- University polls did not do significantly better than others
- Pollsters estimated Biden support much better than Trump support
  - “The undecideds broke for President Trump.”
Section Contents

1 Introduction: Why this is important

2 PLTH 101: Polling Theory

3 These Polling Results

4 How We Can Improve

5 End matter
The Problems

Four things have come to light during this talk.
- estimating the voting population
- handling the undecideds
- fundamental statistical issues:
  - multiple comparisons
  - single population
- communication issues
The Problems

The Polling Narrative is Wrong

Source:

The Problems

Source:
Some solutions

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- handling the undecideds
- fundamental statistical issues:
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- communication issues
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Summary and Conclusion

The main purpose of this talk was to better understand...  
- the basic issues of polling;  
- where we did (and did not) fail; and  
- what we can do to improve.

This resulted in the following conclusions:
- Estimating the voting population is important
  - (this includes how the undecideds will vote)
- There are some statistical issues with the estimates
- The communication of the results is certainly problematic
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  - (this includes how the undecideds will vote)
- There are some statistical issues with the estimates
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Additional Readings


Questions?