Understanding the Political Distinctiveness of the Cell Phone Only Public: Results from the 2006 and 2008 CCES

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Introduction

Innovations in communications technology present new opportunities and new challenges for survey research. As people adopt new technologies, new ways to contact people and elicit their opinions emerge. Cheap printing costs facilitated the rise of mail surveys; the spread of telephones and the use of computerized dialing precipitated the emergence of random digit dialing phone surveys and computer assisted telephone interviews; the development of the Internet led naturally to web-based surveys. New technologies also cause problems for survey methods as they alter the nature of sampling frames and may create systematic skews in the samples drawn using established procedures. That problem is of particular interest today, as a growing number of people have abandoned landlines and rely exclusively on their cell phones, making it difficult to reach these people through random digit dialing (Lavrakas et al. 2007). In short, technological innovations are creating greater heterogeneity in the modes of communications that people rely on and making it difficult to sample from the population using a single approach.

Changes in communications technology will matter in the short-run for survey research if they create systematic biases in questions of interest to researchers. This paper compares the characteristics, beliefs, and behaviors of cell-phone only adults in Internet surveys to gauge the potential effects of this class of people on traditional phone polls. There are significant differences between cell-only respondents and others in demographic characteristics, especially age and residential mobility. There are also differences across types of phone service in political beliefs, especially on new-politics issues such as gay marriage. But, we find that differences in political beliefs between cell-phone only respondents and others vanish upon controlling for various demographics. Moreover, the cell-only respondents in 2006 were much less likely to

vote, owing perhaps to their greater mobility, than others, muting the effects of potential biases on electoral choice.

Data and Methods

This paper examines differences between cell-only adults and others using the 2006 and 2008 Cooperative Congressional Election Surveys (CCES). These surveys each contain large samples (36,500 in 2006 and 32,700 in 2008), which facilitates study of a relatively small segment of the population, namely those with cell-phones only (CPOs). These surveys were conducted through the Internet, making it possible to reach those who lack landline phone service through the same sampling frame as others in the sample (those with only a landline and those with both cell phone and landline service).

Both surveys were conducted by YouGov/Polimetrix, of Palo Alto, California, and consist of matched random sample surveys. The sampling proceeded along two tracks. First, a very large number of people were recruited to participate in online surveys. Second, a random sample was drawn from the consumer files available to YouGov/Polimetrix, and the characteristics of these people were recorded. A subset of respondents to the online surveys was then selected by matching them on a set of demographic characteristics to the randomly selected set of individuals from the population (i.e., the consumer files) using indicators of age, race, gender, income, education, and media usage. Propensity score weights for the samples were developed so as to ensure that the sample represents the demographic characteristics of the adult population as reflected in the 2004 and 2008 Current Population Survey. Additional information about the sampling methodology and the total survey error for vote and other objective indicators

is presented in the guides to each of the two surveys, posted at http://web.mit.edu/polisci/portl/cces/index.html.

The 2006 and 2008 CCES each asked respondents what phone service they had – landline only, cell phone only, both, or no phone service. In 2006, this question was only asked of half of the sample (16,171 cases); in 2008, it was asked of all 32,700 respondents. The data reveal that a significant and growing fraction of the population now relies exclusively on cell phones for the telephone service. In 2006, one in eight respondents said their household was cell phone only; in 2008, nearly one in five said so. This group is significant because it represents respondents difficult (and more costly) to reach through traditional random digit dialing methodologies (Keeter et al. 2008).

	Landline Only	Cell Only	Both
2006	11%	12%	76%
2008	9%	19%	70%

The estimates of the size of the CPO population may be influenced by CCES's survey methodology. As a check on the quality of the sampling frame we compare these figures with two other surveys, constructed with other methodologies. In 2008, the American National Election Study (ANES) conducted a stratified national random sample of households in the United States and performed in-person interviews. That study estimates that 17 percent of the population is CPO. The National Health Interview Survey (NHIS) uses a similar sampling and interview approach. That study found that 18 percent of American adults lived in a household that only had cell phone access (Blumberg and Luke 2009). Thus, the estimates provided by each

study are quite close and the 95 percent confidence intervals for each study's estimate overlaps with the others (see Appendix for a more detailed comparison of the CCES and ANES data). Importantly, none of these surveys used indicators of phone service in their sampling frame.

Who Is "Cell Phone Only"?

The size of the CPO population raises a challenge for survey researchers. A substantial portion of the population is now outside the frame commonly used for Random Digit Dialing surveys. This may create problems using traditional phone methods to the extent that those who rely exclusively on cell phones differ from those who have landlines as part of their phone service. If this is a problem, many solutions are possible, including using mixed mode samples or adjusting for the bias in the sampling frame analytically. Such corrections require that we know much more about the segment of the population that is CPO.

Table 1 presents some of the basic demographic features of the segment of the population that has decided to rely exclusively on cell phones. Panel A corresponds to the 2006 CCES and Panel B, the 2008 CCES. The patterns are very similar, so we focus on the 2008 study here.

[TABLE 1 ABOUT HERE]

On the whole the cell phone only population is younger, poorer, and more likely to rent than those who have landlines. Age has the most dramatic effect. Forty percent of those under 30 report being cell phone only, compared with 5 percent of those over 65. Twenty-eight percent of those with income less than $25,000 report that they rely entirely on cell-phones compared with 12 percent of those with incomes above $100,000. Over one-third of renters report having only a cell phone compared with just 11 percent of home owners. Half of those who moved in the past six months rely solely on cell phones, compared with 11 percent of those who have lived

in their homes at least 5 years. Finally, one-third of single and separated people are cell only, compared with 13 percent of those who are married. Overall these characteristics suggest that the cell phone only users are, on the whole, the less rooted and more mobile segment of the population.

Many of these variables are correlated with each other. To tease out their independent effects on cell-phone only households we estimate a logit model in which we predict indicator of cell-phone only households using a host of demographic variables commonly factored into sampling frames, namely: region, age, race, gender, income, education, marital status, children, residency, and home ownership. The results are presented in Table 2 for both the 2006 and 2008 CCES studies. The variables Gender (Female), Married, Single, Kids Under 18, Own Home, Rent Home, Northeast, Midwest, South, White, Black, and Hispanic are 1-0 indicators. Age is a continuous measure with a mean of 45.8 and standard deviation of 16.1. Income takes 14 categories, with median category of 8 ($50,000-59,999) a mean of 7.6 and standard deviation of 3.5. Education is an ordinal variable, which takes a value of 1 if the respondent did not complete high school up to 6 for someone who has done post-graduate work. The average value is 3.1, which corresponds to someone who has taken some college but not completed a college degree, and has a standard deviation of 1.4. Finally, Residency takes 6 values corresponding to the categories in Table 1; 1 means less than 1 month and 6 means 5 or more years. The mean is 5.1 (3 to 4 years) with a standard deviation of 1.2. As a rule of thumb, the marginal effect of a unit change in a variable in a logit equals the coefficient divided by 4. Using this rule of thumb many of the coefficients, although statistically significant, translate into trivially small effects.

[TABLE 2 ABOUT HERE]

The logit analysis reveals that Age, Residency, Renting, Marriage, and Children Under 18 are among the strongest determinants of whether one is cell phone only. Renting and Age have the largest marginal effects. A decade and a half difference in age (approximately 1 standard deviation) translates into a 26 point difference in the fraction who are cell phone only. In other words, other things equal, the difference in the likelihood that a 25 year old is CPO and a 55 year old is CPO is fully 40 points. Cell phone only households are more common among renters than others by 17 percentage points. The estimates also imply that, other things equal, those who have moved within the past year are 24 percentage points more likely to be cell-phone only than those who have been in their homes at least 5 years. Married people are less likely than single people to be cell-only by 6 points and less likely than divorced, separated, and those in domestic partnerships by 13 points. Those with kids under 18 are less likely to be cell-only by 10 percentage points. The CPO gap between men and women is approximately 7 points, and African Americans are approximately 10 points less likely than those of other racial identities to live in a cell-phone only household. In addition, the 2008 model indicates that those living in the Northeast U.S. are about 10 percent less likely to be CPO. Northeasterners move less than citizens in any other party of the country (U.S. Census Bureau 2009), but this effect is above and beyond mobility. We wish to stress that these are substantively large effects. Age is the most substantial predictor of CPO households, but so too are renting, length of residency, marital status, and children, and these factors dwarf differences in cell-phone only status across levels of education and income.

Overall, these parameters reflect the general pattern that the more rootless in American society are more likely to be CPOs. There are several reasons that highly mobile Americans may be more likely to go without landlines. First, whenever someone moves from one residence to

another, they have an opportunity to reassess their phone needs. Thus, the act of moving provides an opportunity for individuals to shed their landlines. Second, mobile Americans may choose a CPO lifestyle because cell phone numbers tend to be more portable than landlines. When moving from one metropolitan area to another, individuals must change their landline phone number, but do not need to change their cell number. This may provide an incentive for choosing not to maintain a landline in a new residence. Third, those with fewer family and community ties may feel less of a need to have multiple phone lines on which they can be reached by members of their social networks.

Overall, these estimates suggest that traditional phone surveys will face substantial difficulties reaching younger segments of the population and those who have recently moved or rent. For some purposes, such as predicting the election outcomes, these segments of the population may not be important to reach, but for a general population survey it is important to represent these people in survey samples. In the following section, we examine the amount of bias introduced by excluding CPOs from political surveys.

Examining the Cell-only Bias in Political Preferences

Survey organizations tend to weight their data according to several of the factors that we showed above to have a significant influence on the likelihood of owning a cell phone, including age, race, ethnicity, gender and education (e.g., ABC News, CBS News/New York Times, Pew). During the 2004 presidential campaign, it appeared that such weighting successfully removed any bias that might have arisen from the exclusion of CPOs (Keeter 2006). However, in 2008, the Pew Center for the People & the Press reported that even after weighting, their landline samples consistently showed less support for Obama than their samples that included CPOs

(Keeter, Dimock, and Christian 2008). Thus, it now appears to be an open question whether weighted landline surveys produce substantively equivalent results compared to polls that contact CPOs.

While analysis conducted by Keeter and his colleagues at Pew demonstrates that including CPOs in the sampling frame produced consistently higher support for Obama in their pre-election polling, this does not necessarily constitute evidence of bias. In fact, it is possible that the landline sample produced results that were consistently *closer* to the population parameter of actual Obama support. To determine whether the exclusion of CPOs caused bias in these estimates, it is necessary to know what the actual support for Obama was. Fortunately, election outcomes provide a useful census of candidate support against which we can judge survey estimates. Figure 1 presents the percentage of respondents to the post-election wave of the CCES who indicated that they voted for Obama in the presidential contest. The marker on the left indicates the estimate of the Obama support based on the CCES post-election survey question asking respondents who they voted for, while the marker on the right indicates the estimate once CPOs are excluded from the CCES sample. The vertical lines represent 95% confidence intervals surrounding the estimates. The horizontal line is the actual percentage of the vote captured by Obama.

[FIGURE 1 ABOUT HERE]

Two patterns in this figure are particularly notable. First, the confidence intervals for the two estimates do not overlap. This indicates that removing CPOs from the sample produces an estimate that is statistically different from the estimate produced by the full sample. In fact, just as Pew found during the pre-election period, removing CPOs from the sample produces estimates that are a few percentage points less favorable for Obama. Second, and more

importantly, the sample that includes CPOs produces a more accurate estimate of the population parameter (Obama's actual vote share). Obama's actual percentage of the vote (52.9%) falls within the 95% confidence interval surrounding the full sample estimate, but it falls outside of the 95% confidence interval for the estimate produced without CPOs included. Thus, comparing the CCES survey estimates to the actual vote provides support for the claim that excluding CPOs biased horse race estimates.

While Figure 1 provides evidence of bias in the aggregate, we examine individual-level vote preferences to gain a better understanding of the nature and extent of this bias. In particular, we are interested in determining whether CPOs have vote preferences that are distinct from landline respondents even after controlling for the regiment of demographic factors that pollsters might weight for. We estimate two logit models. In the first model, the dependent variable equals 1 if the respondent voted for Obama and 0 if he/she reported voting for McCain (respondents voting for other candidates are excluded). The second model uses the vote for House of Representatives as its dependent variable; this variable equals 1 if the respondent voted for the Democrat and 0 if he/she cast a vote for the Republican. Both models include controls for age, gender, race, ethnicity, education, and income. We also control for party identification since some survey organizations weight by party, especially during the latter stages of presidential campaigns (e.g. Rasumussen). The second model also includes dummy variables controlling for whether there was a Democratic or Republican incumbent running in the respondent's House election in order to control for incumbency advantage.

Finally, both models include a dummy variable indicating whether the respondent was cell-only or if he/she also (or only) had a landline. If the coefficient for this variable is small and lacks statistical significance in both models, then that would indicate that accounting for other

factors can largely eliminate any bias that may result from excluding CPOs. However, if the variable has a significant effect on vote choice even after controlling for the other variables in the model, then that would provide evidence that the bias cannot be fully accounted for with standard demographic (or even partisan) variables.

The results from these models are presented in Table 3. Most of the control variables in the models have coefficients that are statistically significant and in the expected direction. Not surprisingly, partisanship had a strong effect on the vote, as did the presence of a Democratic or Republican incumbent in the House race in which respondents voted. Respondents who were older and had higher incomes were less likely to vote Democratic, while those who were African American or had more formal education were more likely to do so. Males voted less Democratic in the election for president, but the coefficient for gender was not statistically significant in the House vote model.

[TABLE 3 ABOUT HERE]

The coefficient for the variable indicating whether a respondent was CPO or not is statistically significant and positive in both models, indicating that even after controlling for the other variables in the model, CPOs were more likely to vote Democratic than those with landlines. Figure 2 demonstrates the strength of this effect by plotting the predicted probability of voting for Obama and the House Democratic candidate depending on whether one was a CPO or not. The figure indicates that the difference between landline users and CPOs was substantial. When holding the other independent variables constant at their means, CPOs had a predicted probability of voting for Obama that was .097 higher than those with landlines. The effect was somewhat smaller, but still significant and notable in the House election model. The predicted probability of voting for the Democratic House candidates was .067 higher for CPOs.

[FIGURE 2 ABOUT HERE]

Thus, CPOs were more likely to vote for Obama and for the Democratic House candidate in 2008 even after controlling for demographic factors and partisanship. But do polls that exclude CPOs risk biasing their estimates on other political measures of interest as well? To answer this question, we produce one final set of comparisons to examine differences in political preferences between CPOs and landline respondents. In particular, we examine whether CPOs hold distinct issue opinions from landline respondents and, if so, whether those differences persist after demographic controls are taken into account.

The 2008 CCES asked respondents to place themselves on a 0 to 100 sliding scale with 0 indicating that the individual was very liberal and 100 representing very conservative. Figure 3 shows the average placement for both CPOs and landline respondents on this measure (along with 95% confidence intervals for those averages). When no statistical controls were included, CPOs placed themselves an average of 5.5 points to the left of those who had landlines in their homes. However, once we controlled for age, education, income, gender, race, and ethnicity, this difference became considerably smaller. CPOs were less than 2 points to the left of landline respondents under this condition. The 95 percent confidence intervals did not overlap, indicating that this difference was statistically significant, albeit small.

[FIGURE 3 ABOUT HERE]

In addition to asking for respondents' ideological self-placement, the 2008 CCES also solicited opinions on a variety of policy proposals. Table 4 compares support for these proposals among both CPOs and landline respondents. Absent demographic controls, CPOs held statistically distinct positions on seven out of the ten policy proposals. In some cases, these differences were quite large. CPOs were 10 percent less supportive of banning gay marriage and

9 percent less supportive of allowing overseas eavesdropping without a court order. As with placement on the ideological scale, once demographic controls were accounted for, the differences in opinions shrank. In fact, only on gay marriage and overseas eavesdropping did statistically significant differences persist when accounting for demographic factors. Interestingly, these two issues are the ones that most clearly involve civil liberties and rights.

[TABLE 4 ABOUT HERE]

Overall, our analysis indicates that CPOs are politically distinct on a variety of measures. However, this distinctiveness is somewhat muted when demographic controls are taken into account. Interestingly, the largest differences between CPOs and landline respondents are not on issues or ideological self-placement, but on reported vote choices. However, in the following section we examine the extent to which CPO vote choices are actually registered as actual votes on election day.

Political Participation and Phone Status

The results from our vote choice models indicate that CPOs were more likely to have reported voting for Obama than those with landlines. However, the amount of bias this pattern would create in the aggregate depends at least partly on the extent to which CPOs actually turn out to vote. The research on CPOs has generally focused on the large age differences between those who do and do not have landlines in their homes (Keeter et al. 2007). The fact that CPOs tend to be younger means that they may also be less likely to vote, since age is positively associated with political participation (Wolfinger and Rosenstone 1980). However, as we demonstrated above, residential mobility is also a significant factor influencing whether an individual adopts a cell-only lifestyle. Citizens who have moved more recently are much more

likely to be without a landline than those who have lived in the same place for a longer period of time. Previous work has demonstrated that recent movers are also significantly less likely to vote, even when controlling for other characteristics like age (Squire, Wolfinger, and Glass 1987; Highton 2000). The most important reason for this depressed turnout is due to registration requirements in the U.S. When an individual moves to a new location, he or she must register to vote in that new area and many fail to do so before the next election. Thus, higher levels of residential mobility may result in lower rates of turnout among CPOs.

In the 2008 CCES post-election study, 72.7% of landline respondents said that they had voted in the election while just 62.8% of CPOs reported voting (the difference was significant at $p<.01$). Of course, reported turnout rates tend to be susceptible to social desirability bias, with many respondents claiming to have voted when they actually did not do so (Neuman 1986; Silver et al. 1986; Ansolabehere and Hersh 2008). Thus, for a more reliable measure of turnout, we turn to the 2006 CCES, which included vote validation data for respondents in 26 states and the District of Columbia (see Ansolabehere and Hersh 2008 for more information on the validation study).[1]

Table 5 compares the reported and actual registration and turnout rates for landline and CPO respondents. The difference in the percentage of landline and CPO respondents who reported being registered was fairly small—over 95% in both groups. However, there was a much larger gap in actual registration rates (66.8% versus 53.9%). Despite the fact that over 95% of CPO respondents reported being registered, the voter files indicated that little over one-half actually were. A similar pattern is evident for turnout. As with 2008, CPOs were about 10% less

[1] The validation study was attempted in each state. However, we include only the 26 states where the validation data was considered to be of the highest quality.

likely to report that they voted as those with landlines. But the validation data indicate that the actual turnout gap between those with landlines and CPOs was 16%.

[TABLE 5 ABOUT HERE]

Thus, the validation data not only confirm that CPOs were less likely to vote than citizens with landlines, but they also indicate that CPOs were more likely to over-report their registration and turnout status.[2] But why would CPOs be more likely to misreport their registration and turnout compared to those with landlines? Given that over 50% of CPOs reported having lived in their current residence for 2 years or less, it would not be surprising to find that a non-trivial portion of CPOs may have thought that they had properly changed their registration when they had not actually done so. Furthermore, even if CPOs had properly registered in their new homes, mistakes by local election officials in processing those registrations would likely only become known to CPOs when they first attempted to cast a ballot.

Individuals who believe they are registered when they are not will face issues when they attempt to cast a ballot at their polling place. Because they are highly mobile, we expect that CPOs will be more likely to encounter such problems. Both the 2006 and 2008 CCES asked respondents whether they encountered any problems with their registration status when they attempted to vote. Figure 3 shows the percentage of CPO and landline respondents who reported such problems. In both years, CPOs were significantly more likely to have problems with their registration when attempting to vote. In 2008, over 7% of CPO respondents indicated that there was a problem with their registration when they attempted to vote, compared to fewer than 4% of respondents with landlines. These differences remain statistically significant even when we control for the other demographic factors. While, overall, the share of CPOs encountering

[2] The tendency of CPOs to misreport at higher rates persisted even after controlling for other demographic, socioeconomic, and partisan factors.

registration problems is relatively small, the pattern is suggestive of the role that residential mobility plays in leading CPOs to be registered (and ultimately vote) at lower rates than those with landlines.

[FIGURE 3 ABOUT HERE]

CPOs and Campaign Mobilization

The evidence presented thus far suggests that part of the reason that CPOs are less likely to vote may be because they are less likely to be registered at their current address. However, the fact that CPOs are highly mobile may have other consequences related to turnout. For example, citizens who move around more frequently and do not have landlines may be more challenging targets for campaign mobilization efforts. Citizens are more likely to participate politically when they are asked to do so (Verba, Schlozman, and Brady 1995). Parties and campaign organizations spend significant resources on mobilizing voters and such contact can have a positive (though limited) influence on the likelihood that an individual turns out to vote (Green and Gerber 2004). In fact, some research has even indicated that text messages can be used to mobilize voters with cell phones (Dale and Strauss 2007). Yet, if parties and campaigns find it as costly and difficult to reach CPOs as pollsters do, then CPOs may be less likely to receive these solicitations.

Table 6 presents the extent to which landline and CPO respondents reported being contacted by the campaigns. The first row shows the most significant difference between these groups--CPO respondents were more than twice as likely as those with landlines to report that neither campaign contacted them. Nearly two-thirds of CPOs went unreached by either of the campaign organizations. These differences held up even when controlling for demographic,

socioeconomic, and political variables. Among CPOs who were contacted by one of the campaigns, most were reached only by the Democratic Party, with the remainder split roughly evenly between being contacted by both parties or just the Republican Party.[3] Furthermore, it does appear that the lack of a landline was a significant hurdle for campaigns seeking to contact CPOs. Even among those who were contacted by the campaigns, CPOs were much less likely to be contacted by phone than landline respondents. When CPOs were contacted by the campaigns, it was mostly by e-mail or postal mail whereas the most frequent mode of contact reported for landline respondents was over the phone.

[TABLE 6 ABOUT HERE]

Thus, the reduced levels of contact from campaigns and increased chances of registration problems meant that CPOs comprised a smaller share of the electorate than their percentage of the adult population. In the 26 states for which we have validation data for the 2006 election, CPOs accounted for 11.4% of adult respondents but just 8.8% of validated voters. While the inclusion of CPOs provides for a better representation of the adult population as well as the electorate, it appears to be more crucial for the former.

Conclusion

In this paper, we have provided a detailed examination of which individuals are more likely to be cell-only and how CPOs differ from landline respondents with regard to their political preferences and their participation in politics. Consistent with previous research, our profile of CPOs underscores the central role of age--younger Americans are far more likely to be cell-only. However, this is only part of the story. Even after accounting for age, residential

[3] These same patterns were also revealed in our analysis of NES data.

mobility has a strong effect on whether an individual has adopted a cell-only lifestyle. The rootless population is more likely to have shed its landlines compared to those who are less mobile. One important consequence of this finding is that it helps us to consider how (and whether) the CPO population may increase over the next several years. Indeed, it appears that when an individual moves, he/she takes the opportunity to re-evaluate their phone service and many who make this re-evaluation choose to go without a landline at their new residence. Thus, we should expect cell-only rates to increase not only among younger adults in the U.S., but also among groups and in areas where residential mobility is higher.

Our findings have immediate value for those conducting random digit dialing surveys. The analyses in Table 2 reveal the demographic groups more likely to be missed in RDD surveys of the general population and the likely extent of selection biases. Specifically, we have shown which factors are of most importance in explaining who is cell-phone only: age, gender, marital status, residency, renting, and race (black). Some of these factors may be adjusted for with conventional weights, especially age, gender, and race. However, most surveys do not adjust for marital status, residency, or renting. These variables continue to factor into the cell-phone only population, even after controlling for age, gender, race, education, income, and region. The results in Table 2 indicate that these variables ought to be incorporated into any effort to correct for potential biases in general population phone surveys that cannot reach cell phone only households.

In addition, the higher mobility rates of CPOs have important political consequences. CPOs are more likely to encounter problems with their registration when they attempt to vote, likely due to the fact that they are more likely to have moved to a new area recently. CPOs are less likely to be contacted by the campaigns, a factor that could also serve to depress their

propensity to turn out. Indeed, CPOs appear to vote at much lower rates than their landline counterparts. Perhaps of more concern to pollsters is that they also tend to misreport their turnout at higher rates, a fact that could complicate horse race polling. One of the most challenging issues for pollsters is distinguishing "likely voters" from those who are not likely to vote. A significant share of CPOs may appear to be likely voters in a pre-election survey; yet, many of these individuals may ultimately fail to cast ballots due to factors that have little to do with their intent to vote or their political engagement.

Finally, our analysis confirms that CPOs had distinct candidate preferences in 2008 and that these differences persisted even after controlling for demographic factors. However, the extent to which these differences will persist over future elections remains to be seen. Indeed, we found much smaller differences when it came to CPOs' ideological self-placement and issue positions. This finding leaves open the possibility that CPOs were more distinct in their voting preferences in 2008 than they may be in future elections.

Nevertheless, our analysis emphasizes the importance of continuing to survey this segment of the population. After all, without CPOs, the CCES's vote estimate for Obama was biased and as the size of the CPO population continues to increase, such bias may only grow larger in future elections. Furthermore, our analysis indicates that landline-only surveys would produce biased measures of other political measures such as campaign contact and vote intentions. Both of these measures were far more modest once CPOs were taken into account. Thus, in this rapidly evolving communications environment, pollsters will need to continue to re-assess their approaches to capturing public opinion.

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Table 1A. Demographics of Phone Service, 2006 CCES

	Only Landline	Only Cell Pone	Both	No Phone
All [n=16,171]	11.2%	12.1%	76.3%	0.4%
Age				
Under 30 [2,144]	10.0%	36.7%	52.7%	0.5%
30 to 50 [7,420]	9.1%	11.2%	79.3%	0.4%
50 to 65 [4,956]	12.3%	5.9%	81.4%	0.5%
Over 65 [1,652]	19.3%	2.8%	77.7%	0.3%
Race				
White [12,716]	12.0%	11.9%	75.9%	0.3%
Black [1,027]	7.8%	9.8%	81.6%	0.9%
Hispanic [1,613]	7.0%	14.1%	78.2%	0.7%
Other [718]	13.1%	14.3%	71.8%	0.9%
Gender				
Male [9,390]	11.1%	12.9%	75.5%	0.5%
Female [6,781]	11.4%	11.0%	77.3%	0.3%
Education				
No HS [500]	20.8%	8.8%	70.1%	0.3%
HS Grad [5,180]	15.5%	9.1%	74.9%	0.6%
Some Coll. [4,053]	10.1%	15.1%	74.4%	0.5%
2-Yr Coll. [1,462]	10.3%	14.3%	75.2%	0.1%
4-Yr Coll. [3,153]	7.1%	14.8%	77.8%	0.4%
Post-Grad [1,811]	7.0%	8.7%	84.2%	0.1%
Home Ownership				
Own [11,853]	9.8%	6.2%	83.7%	0.3%
Rent [3,544]	15.4%	30.4%	53.7%	0.5%
Other [657]	14.8%	19.0%	64.3%	1.9%
Length of Residence				
< 1 Month [193]	6.3%	50.1%	42.4%	1.3%
1-6 Months [806]	5.1%	39.6%	54.8%	0.5%
7-11 Months [376]	11.3%	28.9%	59.3%	0.6%
1-2 Years [2,857]	10.3%	21.1%	68.1%	0.5%
3-4 Years [2,157]	10.3%	11.7%	77.8%	0.2%
5+ Years [9,521]	12.3%	5.6%	81.8%	0.4%
Marital Status				
Married [9,870]	8.9%	5.9%	85.0%	0.6%

Separated [324]	9.9%	12.4%	77.3%	1.0%
Divorced [1,425]	17.7%	15.4%	65.8%	1.4%
Widowed [433]	24.5%	5.9%	68.9%	0.8%
Single [3,184]	14.0%	29.4%	56.0%	1.3%
Dom. Partner [905]	11.2%	16.3%	72.3%	0.7%
Children Under 18				
Yes [5,541]	7.5%	7.3%	85.0%	0.3%
No [10,560]	13.2%	14.6%	71.7%	0.5%
Income				
<$25,000 [1,523]	30.9%	19.6%	48.7%	0.8%
$25,000 - $50,000 [3,434]	16.1%	16.0%	67.4%	0.5%
$50,000 - $100,000 [5,427]	7.3%	11.1%	81.3%	0.3%
$100,000> [3,266]	2.9%	7.4%	89.5%	0.2%
Region				
Northeast [6,249]	10.8%	14.3%	73.9%	1.0%
Midwest [7,617]	10.8%	20.1%	68.6%	0.6%
South [12,017]	8.3%	20.9%	69.7%	1.1%
West [6,839]	8.6%	22.2%	68.6%	0.6%

Table 1B. Demographics of Phone Service, 2008 CCES

	Only Landline	Only Cell Pone	Both	No Phone
All [n=32,723]	9.4%	19.7%	70.0%	0.9%
Age				
Under 30 [6,982]	6.4%	40.3%	51.9%	1.4%
30 to 50 [11,418]	8.4%	21.1%	69.5%	1.0%
50 to 65 [9,595]	11.3%	10.3%	77.9%	0.5%
Over 65 [4,728]	12.6%	5.1%	81.8%	0.5%
Race				
White [23,794]	10.0%	18.6%	70.8%	0.7%
Black [3,845]	9.6%	18.9%	70.2%	1.3%
Hispanic [3,200]	6.8%	26.5%	65.1%	1.6%
Asian [564]	3.4%	25.8%	68.2%	2.6%
Other [1,367]	8.1%	22.6%	68.5%	0.8%
Gender				
Male [15,270]	9.2%	21.5%	68.3%	1.0%
Female [17,003]	9.6%	18.1%	71.6%	0.8%
Education				
No HS [1,698]	17.4%	20.8%	59.0%	2.9%
HS Grad [13,079]	12.8%	16.8%	69.3%	1.1%
Some Coll. [7,516]	7.4%	25.1%	66.7%	0.8%
2-Yr Coll. [2,255]	6.9%	17.9%	74.6%	0.7%
4-Yr Coll. [5,945]	4.8%	21.8%	73.2%	0.2%
Post-Grad [2,230]	5.3%	13.9%	80.7%	0.2%
Home Ownership				
Own [9,749]	8.0%	11.1%	80.5%	0.4%
Rent [19,464]	12.8%	34.0%	51.7%	1.5%
Live with Others [2,942]	8.9%	24.2%	65.7%	1.1%
Live in Institution [453]	2.0%	52.9%	41.2%	3.9%
Length of Residence				
< 1 Month [417]	8.1%	50.8%	38.4%	2.8%
1-6 Months [3,077]	6.4%	48.4%	44.2%	1.0%
7-11 Months [1,633]	8.0%	36.5%	53.2%	2.4%
1-2 Years [4,897]	8.9%	29.1%	60.8%	1.1%
3-4 Years [5,086]	9.9%	20.4%	69.2%	0.6%

5+ Years [17,558]	10.2%	9.5%	79.7%	0.7%
Marital Status				
Married [18,273]	7.4%	13.3%	78.7%	0.6%
Separated [581]	11.5%	31.3%	56.3%	1.0%
Divorced [3,381]	14.9%	20.6%	63.1%	1.4%
Widowed [1,332]	18.0%	8.4%	72.9%	0.8%
Single [7,604]	9.9%	34.2%	54.6%	1.3%
Dom. Partner [1,551]	10.9%	27.4%	61.0%	0.7%
Children Under 18				
Yes [10,398]	7.5%	18.9%	72.9%	0.7%
No [22,227]	10.3%	20.1%	68.7%	0.9%
Income				
<$25,000 [6,147]	20.9%	27.2%	49.8%	2.0%
$25,000 - $50,000 [9,219]	11.1%	21.2%	66.9%	0.8%
$50,000 - $100,000 [10,171]	4.8%	18.0%	77.0%	0.3%
$100,000> [4,913]	1.6%	12.5%	85.7%	0.3%
News Interest – Follow Public Affairs				
Most of Time [17,997]	7.6%	16.2%	75.7%	0.5%
Some of Time [7,997]	9.7%	22.2%	67.5%	0.7%
Now and Then [3,796]	12.8%	26.1%	59.8%	1.2%
Hardly at All [1,997]	14.4%	26.4%	57.1%	2.2%
Region				
Northeast [6,249]	10.8%	14.3%	73.9%	1.0%
Midwest [7,617]	10.8%	20.1%	68.6%	0.6%
South [12,017]	8.3%	20.9%	69.7%	1.1%
West [6,839]	8.6%	22.2%	68.6%	0.6%
Military Status				
R in Military [311]	5.8%	37.5%	56.1%	0.7%
Military HH [3,883]	8.0%	20.1%	71.3%	0.6%
R is Vet [4,778]	10.9%	14.6%	73.8%	0.7%
Vet in HH [14,597]	9.6%	16.8%	73.1%	0.6%
Non-Military [12,309]	9.4%	24.1%	65.3%	1.3%

Table 2. Demographics of Phone Service in 2006 and 2008 CCES, Logistic regression

	2006			2008		
Indep. Var.	Coef.	Std. Err.	Z-stat	Coef.	Std. Err.	Z-stat
Age in Yrs	-.042	.003	-15.02	-.050	.002	-31.37
Income	-.028	.010	-2.67	-.027	.006	-4.55
Education	.041	.026	1.59	.045	.013	3.41
Gender (F)	-.344	.066	-5.25	-.288	0.36	-8.11
Married	-.683	.085	-8.00	-.539	.045	-11.87
Single	.033	.097	0.35	-.294	.056	-5.25
Kids Under 18	-.410	.084	-4.87	-.411	.042	-9.88
Residency	-.354	.024	-15.04	-.295	.013	-22.96
Own Home	-.128	.144	-0.89	.143	.070	2.05
Rent Home	.653	.140	4.67	.697	.066	10.54
Northeast	-.089	.106	-0.84	-.390	.058	-6.74
Midwest	.162	.090	1.80	.045	.052	0.87
South	.160	.082	2.05	.083	.047	1.79
White	-.003	.140	-0.02	.053	.074	0.71
Black	-.499	.194	-2.57	-.387	.089	-4.35
Hispanic	.024	.174	0.14	.088	.087	1.01
Intercept	2.322	.291	7.97	2.438	.139	17.59
Number of observations =		13,502			30,468	
Log likelihood =		-3518.3841			-11157.631	
Pseudo R^2 =		0.226			0.173	

Note: Dependent Variable = 1 if Cell Phone Only, 0 otherwise

Table 3: Logit Models Vote for President and House (2008 CCES)

	Democratic Presidential Vote		Democratic House Vote	
Variables	Coefficient	(Std. Error)	Coefficient	(Std. Error)
CPO	.399*	(.067)	.260*	(.071)
Age	-.017*	(.002)	-.007*	(.002)
Female	.104*	(.044)	.080	(.046)
African American	2.318*	(.132)	1.115*	(.117)
Hispanic	.151	(.089)	.067	(.094)
Education	.299*	(.023)	.227*	(.024)
Income	-.032*	(.007)	-.038*	(.008)
Democrat	2.137*	(.050)	2.127*	(.055)
Republican	-2.771*	(.064)	-2.323*	(.059)
Democratic Incumbent			.569*	(.078)
Republican Incumbent			-.530*	(.078)
Intercept	.790*	(.117)	.422*	(.140)
N	21,285		18,154	
Adjusted Count R	.633		.617	
Log-Likelihood	-7988.878		-7286.387	

*p<.05. Analysis limited to those who voted for one of two major party candidates. Sample weights applied.

Table 4: Differences Between CPOs and Landline Respondents on Issue Opinions (2008 CCES)

Probability of	Without Statistical Controls			With Statistical Controls		
expressing support for…	CPOs	Landline	Difference	CPOs	Landline	Difference
Banning gay marriage	.320	.420	-.100*	.376	.420	-.044*
Eavesdropping overseas	.481	.573	-.092*	.566	.594	-.028*
SCHIP	.694	.627	.067*	.660	.641	.019
Carbon tax	.213	.160	.053*	.178	.157	.021
Withdrawing troops	.561	.513	.048*	.521	.524	-.003
Extending NAFTA	.319	.293	.026*	.314	.305	.009
Increasing min. wage	.797	.772	.025*	.793	.788	.005
Stem cell research	.550	.533	.017	.585	.562	.023
Housing crisis assistance	.448	.433	.015	.427	.434	.007
Bank bailout	.203	.209	-.006	.219	.215	.004

*Indicates that difference between CPOs and landline are statistically significant at $p<.05$. Statistical controls include age, gender, race, ethnicity, education, and income. All estimates generated using sampling weights.

Table 5: Validated Registration and Vote Among CPOs and Landline Respondents, 2006 (95% Confidence Intervals in Parentheses)

	Landline Respondents	CPO Respondents
Reported being Registered	97.8%	95.8%
	(97.3%, 98.1%)	(93.9%, 97.1%)
Registration Validated	66.8%	53.9%
	(65.6%, 67.8%)	(50.5%, 57.1%)
Number of Respondents	9,410	1,014
Reported having Voted	94.2%	84.2%
	(93.5%, 94.8%)	(81.2%, 86.7%)
Vote Validated	61.9%	45.9%
	(60.6%, 63.1%)	(42.3%, 49.6%)
Number of Respondents	8,043	841

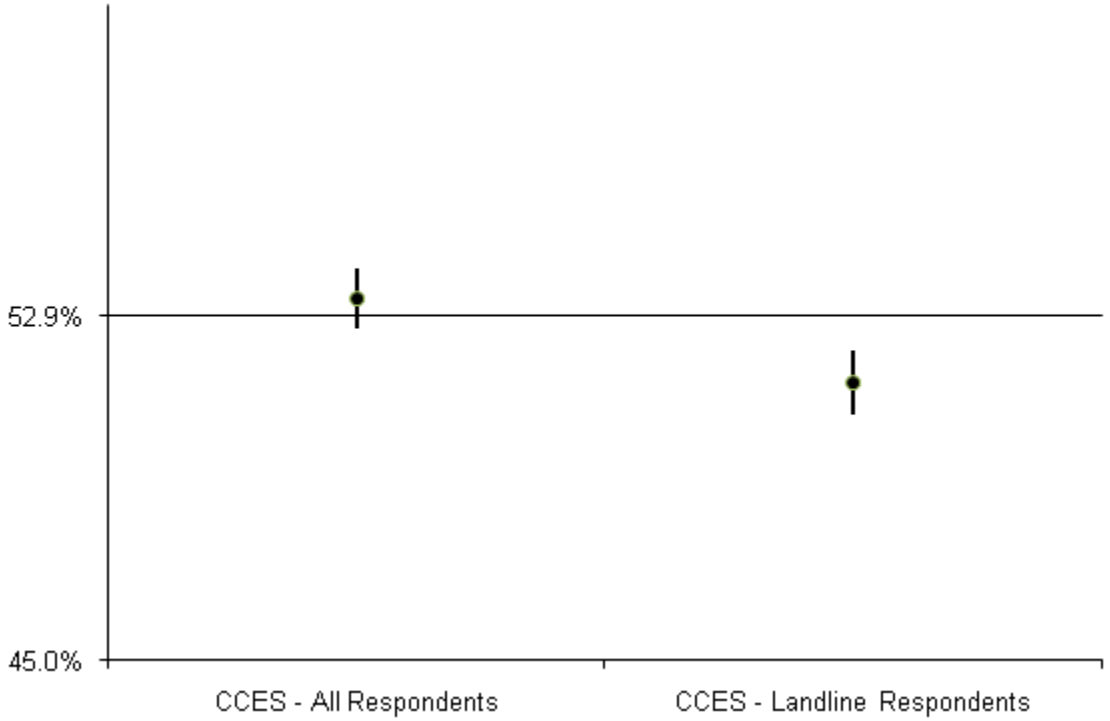
Note: Analysis limited to 26 states (and the District of Columbia) where complete 2006 vote records were available.

Table 6: Reported Contact from Campaigns, 2008 (95% Confidence intervals in parentheses)

Contacted by	Landline Respondents	CPO Respondents
No Contact	29.5%	64.9%
	(25.2%, 34.3%)	(54.3%, 74.2%)
Contacted by Democrats	21.6%	19.5%
	(17.8%, 26.0%)	(12.3%, 29.4%)
Contacted by Republicans	13.0%	8.1%
	(10.6%, 15.9%)	(4.7%, 13.6%)
Contacted by Both Parties	35.9%	7.6%
	(31.5%, 40.4%)	(4.6%, 12.3%)
Number of Respondents	654	139

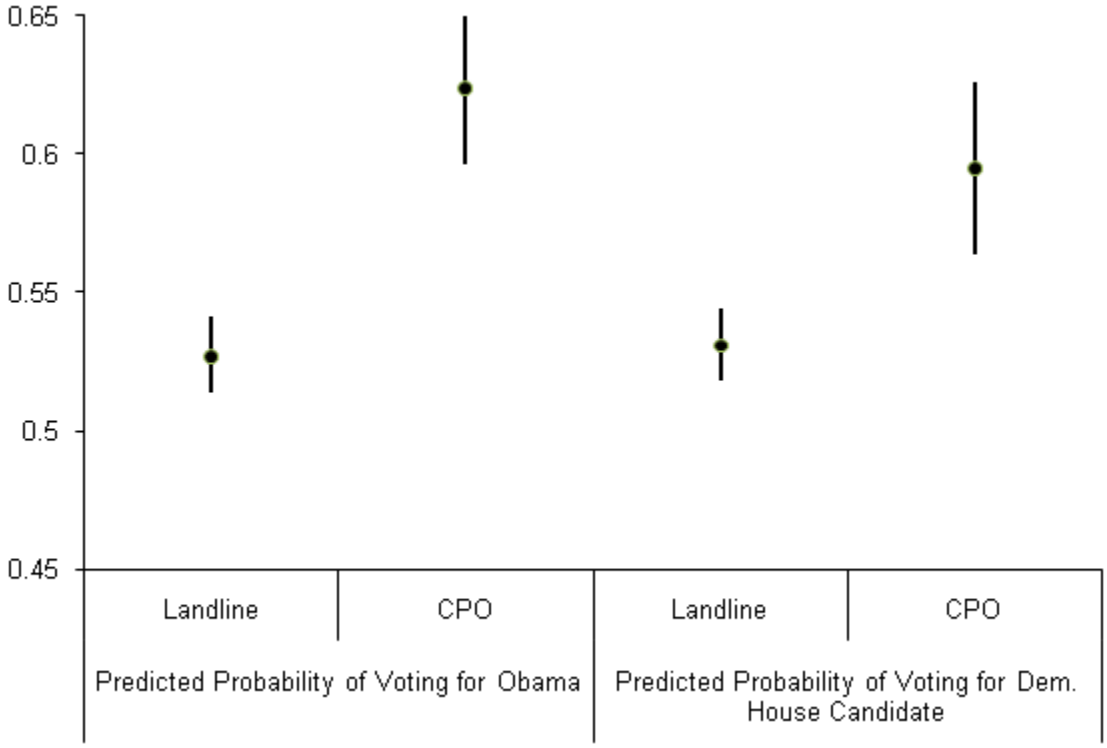
Weighted estimates from a subsample of the 2008 CCES.

Figure 1: Reported Vote Choice among CCES Respondents Including and Excluding CPOs



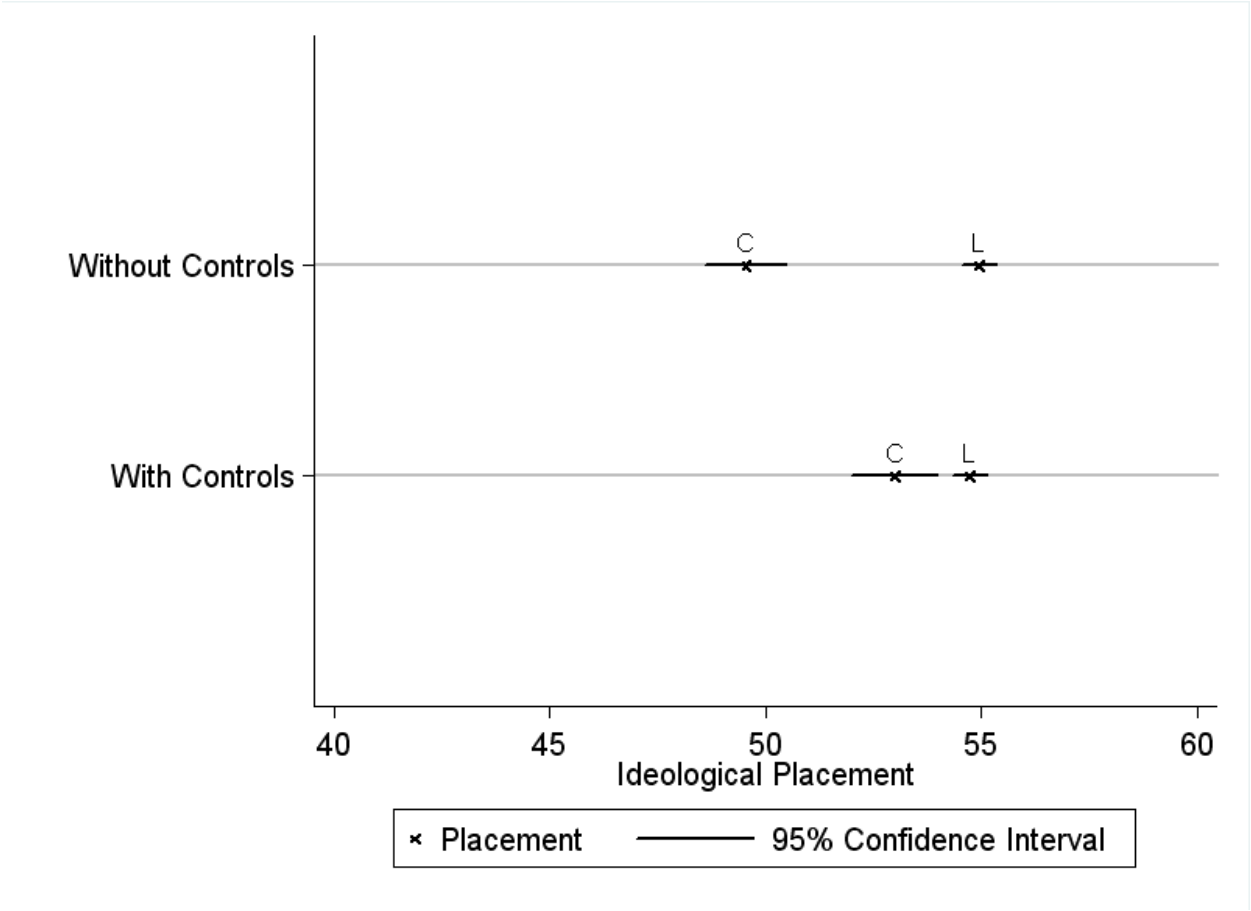
Estimates are produced using sampling weights. Bars represent 95% confidence intervals and horizontal line represents actual national vote for Obama.

Figure 2: Predicted Probability of Voting Democratic Based on CPO Status



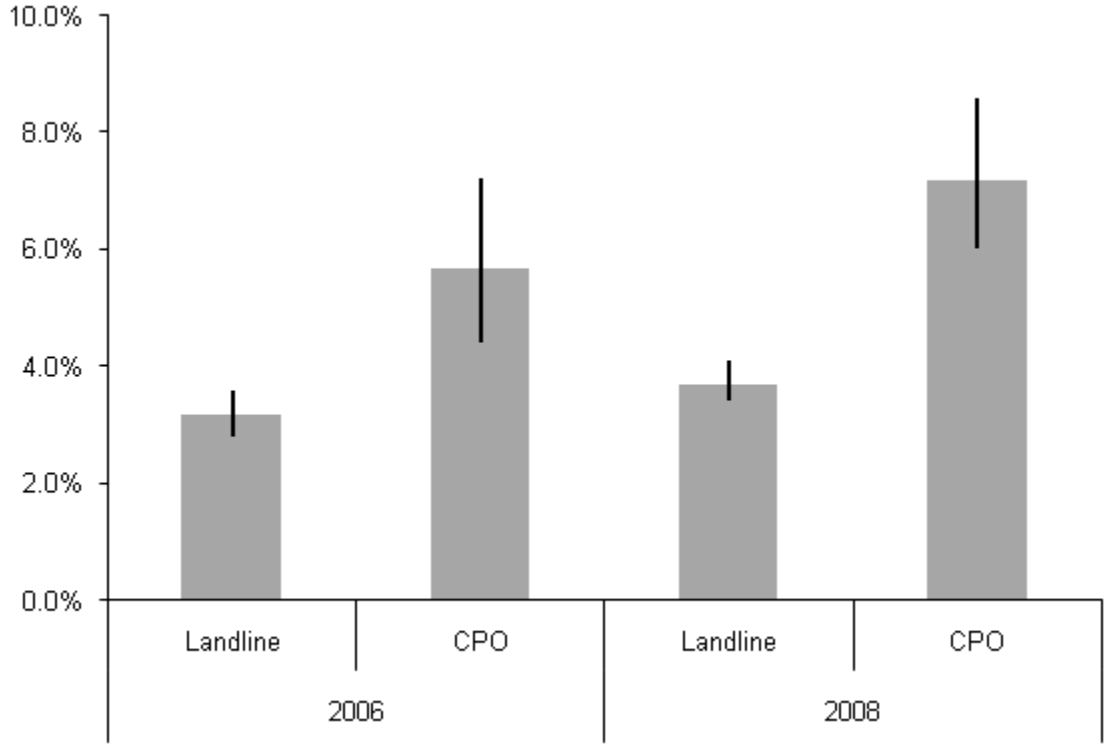
Predictions generated from the models in Table 2, holding all other variables at their means. Bars represent 95% confidence intervals.

Figure 3: Ideological Self Placement of CPOs and Landline Respondents to CCES (2008)



C = Cell-only, L = Landline
Statistical controls include age, gender, race, ethnicity, education, and income. All estimates generated using sampling weights.

Figure 4: Percentage Reporting Problems with their Registration at the Polls, 2006 and 2008



Based on weighted sample data. Bars represent 95% confidence intervals.

Appendix: Comparing Profiles of CPOs from CCES and ANES (2008)

	CCES		NES	
	Landline	CPO	Landline	CPO
Average Age	48.3	35.7	50.4	34.4
Gender				
Male	47.0%	52.4%	44.1%	46.4%
Female	53.0%	47.6%	55.9%	53.6%
Race				
White/other	79.1%	75.5%	81.2%	81.0%
Black	11.9%	11.3%	11.7%	9.3%
Hispanic	9.0%	13.2%	7.1%	9.7%
Education				
High School	46.5%	39.6%	48.5%	43.7%
Some College	28.5%	35.6%	19.2%	29.5%
College Degree	17.7%	20.1%	20.5%	18.9%
Post-Graduate	7.3%	4.8%	11.8%	7.9%
Income				
Less than $50,000	48.1%	59.8%	47.2%	55.9%
$50,000 - $99,999	34.2%	30.1%	32.6%	29.6%
$100,000 or more	17.6%	10.1%	20.2%	14.6%
Marital Status				
Married	60.3%	37.7%	54.2%	48.3%
Not Married	39.7%	62.4%	45.8%	51.7%
Home Ownership				
Own	66.1%	33.6%	75.1%	40.5%
Rent/Other	33.9%	66.5%	24.9%	56.5%
Have Children	31.2%	29.6%	37.7%	39.2%
No Children	68.8%	70.4%	62.3%	60.8%
Years in Residence				
Less than 1	10.8%	35.7%	8.5%	32.9%
1 to 2	13.2%	22.2%	14.8%	28.9%
3 to 4	15.4%	16.1%	11.5%	11.3%
More than 5	60.6%	26.0%	65.2%	26.9%

Note: Figures are calculated using weights provided with survey data.