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The Growing Gap between Landline and Dual Frame Election Polls

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The number of Americans who rely solely or mostly on a cell phone has been growing for several years, posing an increasing likelihood that public opinion polls conducted only by landline telephone will be biased. A new analysis of Pew Research Center pre-election surveys conducted this year finds that support for Republican candidates was significantly higher in samples based only on landlines than in dual frame samples that combined landline and cell phone interviews. The difference in the margin among likely voters this year is about twice as large as in 2008.

Across three Pew Research polls conducted in fall 2010 –conducted among 5,216 likely voters, including 1,712 interviewed on cell phones -- the GOP held a lead that was on average 5.1 percentage points larger in the landline sample than in the combined landline and cell phone sample. In six polls conducted in the fall of 2008, Barack Obama’s lead over John McCain was on average 2.4 percentage points smaller in the landline samples than in the combined samples.

In Pew Research’s final pre-election poll in 2010, the landline sample of likely voters found Republican candidates ahead 51%-39%, a 12-point lead. In the sample that combined landline and cell phone interviews, the Republican lead was 48%-42%, a six-point advantage. The national vote for House candidates is not yet final; currently, Republicans lead by approximately a seven-point margin.

A Growing Difference Between Landline and Dual Frame Samples

	Landline and cell sample	Landline sample	Diff
2010 Congressional vote			
	%	%	
Republican	49.6	52.1	2.5
Democrat	42.0	39.4	2.6
Other/Don't know	<u>8.4</u>	<u>8.5</u>	
	100	100	
Rep-Dem margin	+7.6	+12.7	5.1
2008 presidential vote			
McCain	41.6	42.7	1.1
Obama	49.8	48.5	1.3
Other/Don't know	<u>8.6</u>	<u>8.8</u>	
	100	100	
Rep-Dem margin	-8.2	-5.8	2.4

PEW RESEARCH CENTER. Based on combined data among likely voters from surveys conducted in the fall of each year. Figures are based on weighted data – the combined landline and cell sample and the landline sample are each weighted independently to the same demographic targets. Figures may not add to 100% because of rounding.

The key comparison in this analysis is between estimates based on the landline sample alone, weighted to a standard set of demographic characteristics, and the combined sample of landline and cell phone interviews, weighted to the same demographic characteristics plus telephone status and usage (see the methodology statement for more details).

A previous analysis in May found a growing potential bias in landline only surveys (See "[Assessing the Cell Phone Challenge, Commentary, "May 20, 2010](#)"). Previous Pew

Research studies on this subject had generally found only small and often non-significant differences between landline and dual frame samples ([May 2006](#), [June 2007](#), [Jan. 2008](#), [Dec. 2008](#)).

The new analysis also finds consistent differences between the landline and combined samples when comparing registered voters. In five of six Pew Research polls conducted during 2010, there was a three to six percentage point difference on the margin among registered voters. Only one poll showed no difference.

Landline Samples Inflated Republicans' Midterm Advantage

	Landline and cell sample			Landline sample			Diff in margin
	Vote Rep	Vote Dem	Adv	Vote Rep	Vote Dem	Adv	
Likely voters	%	%		%	%		
Aug-Oct average*	49.6	42.0	R+7.6	52.1	39.4	R+12.7	R+5.1
October 27-30	48	42	R+6	51	39	R+12	R+6
October 13-18	50	40	R+10	52	38	R+14	R+4
Aug 25-Sept 6	50	43	R+7	53	41	R+12	R+5
Registered voters							
Aug-Oct average*	44.3	45.0	D+0.7	46.1	42.6	R+3.5	R+4.2
October 27-30	43	44	D+1	45	41	R+4	R+5
October 13-18	46	42	R+4	48	41	R+7	R+3
Aug 25-Sept 6	44	47	D+3	46	45	R+1	R+4
July 21-Aug 5	44	45	D+1	44	45	D+1	0
June 16-20	45	45	Even	48	42	R+6	R+6
March 11-21	44	44	Even	47	41	R+6	R+6

PEW RESEARCH CENTER. 2010. Figures are based on weighted data – the combined landline and cell sample and the landline sample are each weighted independently to the same demographic targets. Likely voter estimates are based on a seven-question turnout scale. * Average based on combined data from three surveys conducted Aug 25-Sept 6, Oct 13-18 and Oct 27-30.

Cell Respondents Less Republican, More Democratic

The difference in estimates produced by landline and dual frame samples is a consequence not only of the inclusion of the cell phone-only voters who are missed by landline surveys, but also of those with both landline and cell phones – so called dual users – who are reached by cell phone. Dual users reached on their cell phone differ demographically and attitudinally from those reached on their landline phone. They are younger, more likely to be black or Hispanic, less likely to be college graduates, less conservative and more Democratic in their vote preference than dual users reached by landline.

Among dual users reached by landline, Republicans had a 12-point advantage among likely voters. But the GOP lead was only five points among dual users reached by cell phone. Among cell phone only voters, there was no Republican lead (a nominal 47%-44% Democratic edge). These patterns were, if anything, stronger among the broader sample of registered voters than among likely voters.

Duals reached by landline made up a smaller proportion of voters in the dual frame sample than the landline sample because of the addition of the cell only respondents and the duals reached by cell. The latter two groups comprised about a third of all voters in the dual frame sample.¹

Dual Users Reached by Cell Are Less Republican than Dual Users Reached on Landlines

	Landline and cell sample				Landline sample			
	Vote Rep	Vote Dem	Adv	% of sample	Vote Rep	Vote Dem	Adv	% of sample
	%	%		%	%	%		%
All likely voters	50	42	R+8		52	39	R+13	
Landline only	43	44	D+1	10	42	45	D+3	10
Duals from landline	52	40	R+12	58	53	39	R+14	89
Duals from cell	50	45	R+5	16	--	--	--	--
Cell only	44	47	D+3	14	--	--	--	--
All registered voters	44	45	D+1		46	42	R+4	
Landline only	38	47	D+9	11	37	48	D+11	11
Duals from landline	48	42	R+6	53	48	42	R+6	87
Duals from cell	45	48	D+3	16	--	--	--	--
Cell only	38	51	D+13	19	--	--	--	--

PEW RESEARCH CENTER. 2010. Based on combined data from three surveys conducted Aug 25-Sept 6, Oct 13-18 and Oct 27-30. Figures are based on weighted data – the combined landline and cell sample and the landline sample are each weighted independently to the same demographic targets. Likely voter estimates are based on a seven-question turnout scale.

¹ The ratio of dual users reached by landline vs. those reached by cell phone is dependent on the overall ratio of landline to cell interviews. In Pew Research Center surveys conducted this year, a third of the completed interviews were conducted by cell phone and two-thirds were completed by landline.

While dual users reached by landline were the majority of voters in both the dual frame sample and the landline sample, they were a far smaller proportion of voters in the dual frame sample because of the addition of the cell only respondents and the duals reached by cell. The latter two groups comprised about a third of all voters in the dual frame sample.²

Those who only have a landline also were somewhat more Democratic in their vote preference than respondents reached on their landline who also have a cell phone. However, in both the landline sample and the combined sample, landline only respondents made up only about 10% of the sample.

Further evidence of the impact of dual users reached by cell phone can be seen in a comparison of blended samples that include landline and cell phone interviews with those that include landline and just the cell-only respondents. Adding just the cell-only respondents to the landline samples reduced the GOP advantage, but not as much as including all of the interviews from the cell phone sample.

Comparing Landline and Cell-Only With Landline and All Cell Interviews

<i>Congressional vote</i>	<i>Likely voters</i>			<i>Registered voters</i>		
	Landline and cell sample	Landline and cell only	Landline sample	Landline and cell sample	Landline and cell only	Landline sample
	%	%	%	%	%	%
Republican	49.6	50.4	52.1	44.3	45.0	46.1
Democrat	42.0	40.9	39.4	45.0	43.8	42.6
Other/DK	<u>8.4</u>	<u>8.7</u>	<u>8.5</u>	<u>10.7</u>	<u>11.2</u>	<u>11.3</u>
	100	100	100	100	100	100
Adv	R+7.6	R+9.5	R+12.7	D+0.7	R+1.2	R+3.5
N	5216	4169	3504	6986	5703	4981

PEW RESEARCH CENTER. Based on combined data from three surveys conducted Aug 25-Sept 6, Oct 13-18 and Oct 27-30. Figures are based on weighted data – the combined landline and cell sample, the landline sample and cell only interviews, and the landline sample are each weighted independently to the same demographic targets. Figures may not add to 100% because of rounding.

Republicans led the Democrats by average margin of 9.5 percentage points among likely voters when cell-only respondents were included with the landline survey. The Republican advantage was 7.6 percentage points in the combined sample that includes all of the interviews completed by cell.

² The ratio of dual users reached by landline vs. those reached by cell phone is dependent on the overall ratio of landline to cell interviews. In Pew Research Center surveys conducted this year, a third of the completed interviews were conducted by cell phone and two-thirds were completed by landline.

Young Voters and Cell Phones

Cell phones pose a particular challenge for getting accurate estimates of young people's vote preferences and related political opinions and behavior. Young people are difficult to reach by landline phone, both because many have no landline and because of their lifestyles. In Pew Research Center surveys this year about twice as many interviews with people younger than 30 are conducted by cell phone than by landline, despite the fact that Pew Research samples include twice as many landlines as cell phones.

According to the [latest estimates](#) from the National Center for Health Statistics, in the second half of 2009, 38% of 18 to 24 year olds and 49% of 25 to 29 year olds lived in households that had no landline. And research has shown that people under age 30 who are cell phone only can have different behaviors and attitudes than those who are reachable by a landline phone.³

Estimates from the combined landline and cell sample based on the last three-pre-election Pew research surveys showed Democrats with a 53% to 38% lead over Republicans among registered voters under 30. But estimates based only on interviews from the landline sample, showed Democratic and Republican candidates running about even among young voters – 49% said that if the elections were held today they would vote for the Democratic candidate, while 45% backed the Republican candidate in their district. The difference in the margin

Age and the 2010 Congressional Vote

	Landline and cell sample				Landline sample				Diff in margin
	Vote Rep	Vote Dem	Adv	N	Vote Rep	Vote Dem	Adv	N	
	%	%			%	%			
All likely voters	50	42	R+8	5216	52	39	R+13	3504	R+5
18-29	45	49	D+4	283	52	44	R+8	107	R+12
30-39	43	50	D+7	443	46	48	D+2	213	R+5
40-49	54	38	R+16	837	56	35	R+21	510	R+5
50-64	49	42	R+7	1986	51	40	R+11	1342	R+4
65+	52	39	R+13	1569	54	37	R+17	1254	R+4
All registered voters	44	45	D+1	6986	46	43	R+3	4981	R+4
18-29	38	53	D+15	1279	45	49	D+4	430	R+11
30-39	37	53	D+16	1014	38	49	D+11	533	R+5
40-49	49	40	R+9	1434	52	38	R+14	941	R+5
50-64	45	44	R+1	2780	45	43	R+2	1992	R+1
65+	48	41	R+7	2092	48	40	R+8	1811	R+1

PEW RESEARCH CENTER. 2010. Based on combined data from three surveys conducted Aug 25-Sept 6, Oct 13-18 and Oct 27-30. Figures are based on weighted data – the combined landline and cell sample and the landline sample are each weighted independently to the same demographic targets. Likely voter estimates are based on a seven-question turnout scale.

³ Stephen J. Blumberg and Julian V. Luke. Coverage Bias in Traditional Telephone Surveys of Low-Income and Young Adults. 2007 Public Opinion Quarterly 2007 71: 734-749. Available at <http://poq.oxfordjournals.org/cgi/reprint/71/5/734>.

between the combined sample and the landline sample was 11 points.

These sample differences in voter preference were not limited just to voters under 30. Estimates based on the landline and cell interviews produced slightly less support for Republican candidates and greater support for Democratic candidates in voters ages 30-39 and 40-49. Among registered voters in both of these age groups, there was a difference in the margin of 5 percentage points. Among registered voters 50 and older, there was little difference in the margin between the combined sample and the landline samples.

Comparing the vote preference of likely voters across age groups produces a similar result, although the estimates are not quite as robust because of the smaller sample sizes. Because young people are significantly less likely than older adults to be classified as likely voters, the sample size of young likely voters is reduced considerably.

Characteristics of Dual Users Reached by Cell and Landline

Dual users reached by cell phone are much younger than those reached by landline – 22% of duals interviewed on their cell phone are under 30, compared with only 8% of duals reached on their landline. The cell phone only are younger than dual users and those with only a landline; 42% of people with only a cell phone are under 30. Half of those who have only a landline phone are 65 or older – far higher than in any other phone use category.

There also are differences by education. More of the duals reached by cell than by landline have only a high school education or less (33% vs. 29%) while more duals reached on their landline are college graduates (43% vs. 38%).

Seven-in-ten (70%) duals interviewed on their cell phone are non-Hispanic whites, compared with 79% of duals reached on their landline. Hispanics and African-Americans comprise a larger proportion of duals reached on their cell phone than on their landline phone.

Demographic Characteristics by Phone Status

	Land-line only	Dual reached on...		Cell only
		Landline	Cell	
	%	%	%	%
Men	38	41	55	57
Women	62	59	45	43
18-29	7	8	22	42
30-39	5	10	13	20
40-49	10	17	18	14
50-64	26	35	32	18
65+	50	28	14	5
Men 18-49	10	15	30	44
Women 18-49	12	20	24	32
Men 50+	27	25	25	13
Women 50+	49	38	21	10
College grad+	19	43	38	29
Some college	24	28	29	30
HS or less	56	29	33	41
N	2662	14737	5038	3561
White, non-Hisp	73	79	70	61
Black, non-Hisp	12	8	12	13
Hispanic	9	6	9	17
Other, non-Hisp	5	6	8	8
N*	1497	7624	2653	1895

PEW RESEARCH CENTER. Based on unweighted annual totals from Pew Research Center surveys conducted in 2010. Figures read down. Don't know responses not shown. *Based only on surveys in 2010 that included Spanish language interviewing.

As the voter preferences would suggest, duals reached on their cell phone are somewhat more Democratic in their party affiliation than those interviewed on their landline phones. By a 47% to 43% margin duals reached on their cell phone identify with the Democratic Party or lean Democratic. This balance is nearly reversed among duals reached on their landline – 46% are Republicans or lean Republican, while 43% are Democrats or lean Democratic. Both the cell onlys and those with only a landline phone are more Democratic than Republican in their party identification.

Duals interviewed on their landline phone are somewhat more conservative in their political views than those reached by cell (43% vs. 40%). Cell onlys, by contrast, are more liberal than duals reached by landline or cell phone.

Duals reached by cell also are less likely to be registered to vote than those interviewed on their landline phone (80% vs. 88%). Voter registration is lowest among those with only a cell phone – just 60% are registered voters.

Political Characteristics by Phone Status

	Land-line only	Dual reached on...		Cell only
		Landline	Cell	
<i>Party affiliation</i>	%	%	%	%
Republican	23	30	28	21
Democrat	38	31	33	33
Independent	31	33	34	39
Other/Don't know	9	5	5	7
<i>Party with leaners</i>				
Republican/Ln Rep	35	46	43	35
Democrat/Ln Dem	49	43	47	50
No lean	16	11	10	14
<i>Ideology</i>				
Conservative	41	43	40	33
Moderate	31	35	36	37
Liberal	18	18	20	24
Don't know	10	4	4	7
Registered voter	76	88	80	60
N	2662	14737	5038	3561
<i>Obama approval</i>				
Approve	47	43	48	51
Disapprove	40	49	44	37
Don't know	13	8	8	12
N	2093	11684	3970	2821
<i>View of national conditions</i>				
Satisfied	21	19	28	31
Dissatisfied	72	76	67	63
Don't know	7	5	5	6
N	1412	7391	2548	1732

PEW RESEARCH CENTER. Based on unweighted annual totals from Pew Research Center surveys conducted in 2010. Figures read down.

ABOUT THE DATA

Most results in this report are from six Pew Research Center surveys conducted in 2010. All six surveys were based on telephone interviews conducted among a nationwide samples of adults, 18 years of age or older, living in the continental United States. The table below shows the field dates and sample sizes for registered and likely voters for each survey.

Field dates	Registered voters				Likely voters			
	Landline + cell sample	Landline sample	Cell sample	Cell only	Landline + cell sample	Landline sample	Cell sample	Cell only
Aug-Oct combined	6,986	4,981	2,005	722	5,216	3,504	1,712	402
October 27-30, 2010	2,373	1,681	692	266	1,809	1,393	416	146
October 10-18, 2010	1,797	1,270	527	168	1,354	878	476	88
Aug 25-Sept 6, 2010	2,816	2,030	786	288	2,053	1,233	820	168
July 21-Aug 5, 2010	2,431	1,724	707	246	--	--	--	--
June 16-20, 2010	1,496	1,035	461	172	--	--	--	--
March 11-21, 2010	2,070	1,442	628	191	--	--	--	--

The late October survey was conducted under the direction of Princeton Survey Research Associates International with data collection by Princeton Data Source and Abt/SRBI Inc. The mid-October, September, August and March surveys were conducted under the direction of Princeton Survey Research Associates International with data collection by Princeton Data Source. The June survey was conducted by Abt SRBI, Inc. Interviews were conducted in English only for the mid-October and late October surveys. Interviews were conducted in English and Spanish for the other four surveys. The landline and cell phone samples for all six surveys were provided by Survey Sampling International.

The combined landline and cell phone sample are weighted using an iterative technique that matches gender, age, education, race/ethnicity, region, and population density to parameters from the March 2009 Census Bureau's Current Population Survey. The sample also is weighted to match current patterns of telephone status and relative usage of landline and cell phones (for those with both), based on extrapolations from the 2009 National Health Interview Survey.

Fall 2010 Weighting Parameter for Phone Status and Usage

	%
Cell only	25.4
Dual – both landline and cell	63.6
All or almost all calls on cell	17.4
All/almost all/some calls on landline	46.2
Landline only	<u>11.0</u>
	100

Based on Pew Research Center extrapolations from NHIS data for July-December 2009.

The weighting procedure also accounts for the fact that respondents with both landline and cell phones have a greater probability of being included in the sample and adjusts for household size within the landline sample. The landline sample is weighted using the same techniques as the combined sample, except that the telephone status and usage parameter is excluded, and there is no correction for respondents with both landline and cell phones, since they have only one chance of being included in the sample. The landline plus cell only sample is weighted using the same techniques as the combined sample, except that there is no correction for respondents with both landline and cell phones, since they have only one chance of being included in the sample.

The significance tests comparing the estimates based on the combined landline and cell sample with those from the landline sample account for the overlap in the two samples since the landline respondents are included in both samples. The tests were conducted using software that accommodates complex survey samples.

Sampling errors and statistical tests of significance take into account the effect of weighting. The following table shows the error attributable to sampling that would be expected at the 95% level of confidence for the combined landline and cell sample and the landline sample only for registered and likely voters:

Field dates	Margin of error plus or minus...				
	<i>Registered voters</i>		<i>Likely voters</i>		
	Landline + cell sample	Landline sample	Landline + cell sample	Landline sample	
Aug-Oct combined	1.5	2.0	2.0	2.0	percentage points
October 27-30, 2010	2.5	3.0	3.0	3.5	percentage points
October 10-18, 2010	3.0	3.5	3.5	4.0	percentage points
Aug 25-Sept 6, 2010	2.5	3.0	3.0	3.5	percentage points
July 21-Aug 5, 2010	2.5	3.0	--	--	percentage points
June 16-20, 2010	3.5	4.0	--	--	percentage points
March 11-21, 2010	3.0	3.5	--	--	percentage points

In addition to sampling error, one should bear in mind that question wording and practical difficulties in conducting surveys can introduce error or bias into the findings of opinion polls.

Likely voter estimates are based on a 7-item turnout scale that includes the following questions: thought given to the election, have ever voted in your precinct or election district, how often you follow government and public affairs, frequency of voting, whether you plan to vote in the election, chance of voting in the election on an 10-point scale, and whether you voted in the 2008 election. Those in the mid-October and late October surveys who said they already voted were

automatically counted as likely voters. More details about the Pew Research Center's methodology for estimating likelihood to vote are available at: <http://people-press.org/methodology/files/UnderstandingLikelyVoters.pdf>.