2010

Prediction of Cell Phone versus Landline Use in the General Social Survey

Erin Strauts

Prediction of Cell Phone versus Landline Use in the General Social Survey

Abstract

The rise of cell-only households (those in which a cell phone is the household's only telephone service) has decreased the coverage of the landline telephone and may have introduced bias into landline survey samples. This paper considers ways in which cell-only and cell-mostly households may differ from the landline-only and landline-mostly populations thereby identifying factors which, when added to the list of weighting factors, may increase the accuracy of landline samples and serve as a warning of where coverage bias may be a problem in the future. These factors were analyzed in an ordinal logistic regression, using data from the 2008 General Social Survey, in order to assess their ability to predict landline and cell phone use. In addition to age, other variables were found to predict phone use including income, homeownership, transitivity, and party identification.

PREDICTION OF CELL PHONE VERSUS LANDLINE USE IN THE GENERAL SOCIAL SURVEY

Erin Strauts

Abstract: *The rise of cell-only households (those in which a cell phone is the household's only telephone service) has decreased the coverage of the landline telephone and may have introduced bias into landline survey samples. This paper considers ways in which cell-only and cell-mostly households may differ from the landline-only and landline-mostly populations thereby identifying factors which, when added to the list of weighting factors, may increase the accuracy of landline samples and serve as a warning of where coverage bias may be a problem in the future. These factors were analyzed in an ordinal logistic regression, using data from the 2008 General Social Survey, in order to assess their ability to predict landline and cell phone use. In addition to age, other variables were found to predict phone use including income, homeownership, transitivity, and party identification.*

INTRODUCTION

Polling as we know it today, using random samples of respondents, did not begin until George Gallup famously bested the prediction of the *Literary Digest*'s straw poll in the 1936 Presidential election between Franklin Roosevelt and Alf Landon. The *Digest* used public records, including automobile registrations that were biased towards Republicans, and thought gathering as many responses as they could muster would make their poll the most accurate.[1] Gallup, on the other hand, studied the laws of probability and understood that "the size of the sample is far less important as a factor in achieving reliable results in modern polling than… the accuracy with which the persons chosen to be interviewed mirror the total group."[2] The methods of the *Literary Digest* and other organizations conducting straw polls at the time now seem laughable, but despite vast improvements in method, the key flaw still exists today albeit to a lesser extent. Survey researchers must still keep in mind that the goal of a sample is to be as similar to the population as possible, and if there are any subpopulations that have no probability of being sampled, then the sample may be biased. This type of bias is noncoverage bias and has been an issue throughout the history of polling.

The rise of cell-only households (those in which a cell phone is the household's only telephone service) has decreased the coverage of the landline telephone and may have introduced bias into landline survey samples. This paper will consider ways in which cell-only and cell-mostly households may differ from the landline-only and landline-mostly populations thereby identifying factors which, when added to the list of weighting factors, may increase the accuracy of landline

---

[1] Susan Herbst , *The Cambrindge History of Science: The Modern Social Sciences,* Ed. Theodore M Porter and Ross Dorothy (Cambridge: Cambridge University Press, 2003).

[2] George Gallup, *A Guide to Public Opinion Polls* (Princeton: Princeton University Press, 1948), 14.

samples and serve as a warning of where noncoverage bias may be a problem in the future. These factors will be included in a regression, using data from the 2008 General Social Survey, in order to assess their ability to predict phone use.

LITERATURE REVIEW

Survey research originally used the modes of mail and face-to-face interviewing, but telephone surveys have proven to be the best combination of fast turnaround and relatively low cost. As polling firms began the transition to the telephone, there was a large body of research carried out to assess the impact of the change in mode.[3] One concern was with the lack of complete penetration of telephones: there were still sizable groups without telephones in the home. Owen Thornberry and James Massey looked at the noncoverage bias by examining the results of a face-to-face survey, the National Health Interview Survey (NHIS), and comparing the subpopulation estimates of those who reported owning a phone and those who did not.[4] They concluded that there were significant differences in the population estimates, due partially to the young and poor being underrepresented in the telephone group, and stressed the need for poststratification to weight the data from phone surveys. There were still mode effects after weighting between face-to-face and telephone surveys, especially with sensitive questions; however, the difference decreased over time as people became more comfortable with telephones.[5] This decrease in bias suggests that the types of people reached through landlines were not significantly different than those reached in-person other than in characteristics controlled for with weighting procedures. Telephone coverage reached a point where the issue of user and non-user differences became insignificant, but survey researchers must revisit the issue as people are trading landline use for cell phone use.

The size of the cell only population has been estimated primarily through data collected by the nationally representative NHIS. Estimates can also be made by combining information from the American Community Survey (ACS) and Federal Communication Commission (FCC) reports. In this latter case, the estimate of cell-only households is the estimated percent of households with phone service (from the ACS) minus the estimated percent of households with primary landline connections (from the FCC). However, the figure is biased by carriers not being required to report from states in which they have less than 10,000 lines and overestimates due to including VoIP (Voice over Internet Protocol) phones in the number of households with phone service, but not in the number of landline connections.[6] The estimates from the two sources are similar, but the ACS/FCC estimate shows a greater rate of increase (See Table 1).

---

[3] Norman Bradburn, and Seymour Sudman, *Polls and Surveys* (San Francisco: Jossey-Bass Publishers, 1988).
[4] Owen T. Thornberry, and James T Massey, "Trends in the United States Telephone Coverage Across Time and Subgroups," In *Telephone Survey Methodology*, 25-49 (New York: Wiley-Interscience, 1988).
[5] Edith de Leeuw, and Johannes van der Zouwen, "Data Quality in Telephone and Face to Face Surveys: A Comparative Meta-Analysis," In *Telephone Survey Methodology* (New York: Wiley-Interscience, 1988): 283-99.
[6] Federal Communications Commission, "Trends in Telephone Service," 2008.

TABLE 1

Estimates of the Cell-Only Population in the United States	
NHIS	**ACS/FCC**
Jul-Dec 2004: 6.1%	Dec 2004: 6.3%
Jul-Dec 2005: 8.4%	Dec 2005: 11.3%
Jul-Dec 2006: 12.8%	Dec 2006: 19.3%
Jul-Dec 2007: 15.8%	N/A
Jan-Jun 2008: 17.5%	N/A
Source: Blumberg and Luke 2008	Source: Federal Communications Commission 2008

Previous work examining the differences between landline users and those without landline phones has typically shown little bias. Most recently, Stephen Blumberg and Julian Luke used a logistic regression to find questions in the NHIS that predict status as a landline or a non-landline household, and produce bias estimates.[7] The authors found that after weighting their data they found an estimated noncoverage bias of between 1 and 2.5 percent for binge drinking, having a usual place for care, and influenza vaccination. However, when the estimates were restricted to young adults, binge drinking increased bias by 6 percent and smoking, HIV testing, and financial barriers to medical care were also found to be biased. Unadjusted bias increased across all variables for the adult population since 2005. These results suggest that the noncoverage problem is not yet too severe when weighting is used; however, the bias is growing and it is useful to consider where to expect the greatest bias in the future.

Blumberg and Luke do not address the question of whether respondents with both a landline and a cell phone are likely to behave differently from those with either only a landline or only a cell phone. A difference is expected because, for instance, those reached on a cell phone who also have a landline differ demographically from those reached on a landline.[8] This suggests that the influence of cell phones may not be simply a noncoverage issue, but also a nonresponse issue since frequent use of a cell phone may result in a decreased likelihood of answering a landline. There are also respondents who will answer a landline but have a cell phone for out-going calls only and respondents who share a cell phone.[9] Because of these issues, an analysis of the impact of

---

[7] Stephen Blumberg, and Julian Luke, "Reevaluating the Need for Concern Regarding Noncoverage Bias in Landline Surveys," *American Journal of Public Health* 99, no. 10 (October 2009): 1806-10.

8 Thomas Guterbock, "Ask the Experts - Experiences with Cell Phone Samples," *Survey Practice* (October 30, 2008) http://surveypractice.org; and Pew Research Center, "Ways of Coping with a Growing Population Segment: The Impace of 'Cell-Onlys' on Public Opinion Polling" (2008).

9 AAPOR Cell Phone Task Force, "Guidelines and Considerations for Survey Researchers" (2008).

cell phones needs to take into consideration the respondents' relative use of their cell phone and landline.

Not only might the type of person that owns a cell phone be different than those who do not, but the use of the cell phone may also influence the attitudes and behaviors of the owner. Rich Ling discusses the impact of cell phones on society.[10] One of his conclusions is that having a cell phone increases communication with the intimate sphere of friends and family at the expense of speaking to strangers. Cell phones also allow instant communication with others through both talk and text, which may lead to a greater expectation of quick satisfaction of needs. These effects would theoretically be felt by all who use a cell phone for more than emergency purposes and should be greater in those who use their cell phone more often. This again stresses the importance of including the relative use of cell phones into the analysis.

Age

The most consistent finding in the examination of cell phone only individuals is that they tend to be young.[11] According to the July to December 2008 NHIS estimates, 33.1 percent of adults 18-24 and 41.5 percent of 25-29 year olds lived in cell-only households, while this figure goes down to 21.6 percent, 11.6 percent, and 3.3 percent for 30-44 year olds, 45-64 year olds, and 65 plus, respectively. Cell-mostly status was found to be more uniform across age groups ranging from 15.4 to 19.0 percent until the 65 years plus cohort drops down to 4.9 percent.[12] Using data from their Mobile Insights survey, The Nielsen Company seperated households into "wireless substitutor," "likely wireless substitutor," and "not likely wireless substitutor" categories.[13] They found that households with the head-of-household aged 18-34 were more likley than those older to be a "substitutor." This Nielsen finding suggests that the mean age of wireless substitutors will be higher in the future.

The impact of various life events accociated with age, such as moving away from parents, parenthood, and being comfortable with technology are likely drivers of the age difference and will be discussed below. The increased social life of the young may also be a cause. Cell phones

---

10 Ling, Rich, *New Tech, New Ties: How Mobile Communication is Reshaping Social Cohesion* (Cambridge: MIT Press, 2008).

11 Stephen Blumberg, and Julian Luke, "Coverage Bias in Traditional Telephone Surveys of Low-Income and Young Adults," *Public Opinon Quarterly* 77, no. 5 (Oxford University Press, 2007): 734-49; Stephen Blumberg, and Julian Luke, "Wireless Substitution: Early Release of Estimates from the National Health Interview Survey, January-June 2008." *National Center for Health Statistics, Centers for Disease Control and Prevention* (2008); Stephen Blumberg, and Julian Luke, "Reevaluating the Need for Concern Regarding Noncoverage Bias in Landline Surveys," *American Journal of Public Health* 99, no. 10 (October 2009): 1806-10; Pew Research Center, "Ways of Coping with a Growing Population Segment: The Impace of 'Cell-Onlys' on Public Opinion Polling" (2008); Michael Link, Michael Battaglia, Martin Frankel, Lawrence Osborn, and Ali Mokdad, "Reaching the Cell Phone only Generation: The Behavioral Risk Factor Surveillance System Experience." DC-AAPOR Meeting on Cell Phone Research (Washington, 2008).

12 Blumberg and Luke, 2008.

13 Nielsen.

provide a vehicle for satisfying the need to stay connected to one's social circle, which could partially explain why cell phones are more integrated into young people's lives. While cell phones are an essential tool of the 18-29 year-old cohort, some people in older cohorts with active social lives may also adopt the cell phone as their primary mode of communication thus creating attitude and behavior differences correlated to social activity above and beyond the correlation with age.[14]

There are also age differences due to differing levels of general technology adoption. This tendency to adopt technology is a more stable characteristic but currently varys by cohort; young people are typically more comfortable with cell phones and new technology. And due to the concentration of technological comfort they find among their peers, part of their cohort culture has become the assumption of cell phone possession.[15] This assumption serves as pressure on the reluctant adopters to rely on their cell phone. John Ehlen and Patrick Ehlen modeled both the tendencies to adopt a cell phone and to be cell-only.[16] They found that both tendencies are found in greater numbers in the young, but are stable charatericstics which will stay with this cohort as it ages.

However, there are some young people who are more influenced by the older generations and who continue landline use without considering other options. There are also some older people who keep more up to date with technological trends and will see the cell-only option as attractive. These people create variation not controlled for with an age weight.

Transitivity and Homeownership Status

The average cycle of homeownership through the lifespan is a likely driver of the age differences as well as an independent driver on those who deviate from the average. One reason young people who are reached in landline samples may be different from other young people is that they do not actually own the landline but use their parents' connection. When young respondents, aged 18-25, are reached over landline phones, they are more likely to be living with their parents than to have rented or bought their own house; conversely, when young respondents are reached via cell phone samples and report not having a landline, they are most likely to be renting their own house.[17] The type of person who either would rather live with their parents or is forced to is likely different than young people who live independent of their parents. In addition, the experience of living independently may impact responses.

Homeownership and transitivity are related influences on cell-only status, since owning a home creates more barriers to changing residences than renting. A person's predilection towards transitivity may also impact cell and landline use. Those with a history of transitivity or a desire to

---

[14] Ling.

[15] Paul Leonardi, Marianne Leonardi, and Elizabeth Hudson, "Culture, Organization, and Contradiction in the Social Construction of Technology: Adoption and Use of the Cell Phone across Three Cultures." In *The Cell Phone Reader* (New York: Peter Lan, 2006): 205-25.

[16] Ehlen, John, and Patrick Ehlen, "Cellular-Only Substitution in the U.S. as Lifestyle Adoption: Implications for Survey Research." DC-AAPOR Meeting on Cell Phone Research (Washington, 2008).

[17] Scott Ketter, Courtney Kennedy, April Clark, Trevor Tompson, and Mike Mokrzycki, "What's Missing From National Landline RDD Surveys?" *Public Opinion Quarterly* 71, no. 5 (2007): 772-92.

move may be more likely to use a cell phone that could be transferred to a new residence. Recently moving also changes the decision people face from disconnecting a landline or not, to connecting a landline in the first place or not. Transitivity is likely the driving force behind choosing a cell phone over a landline while homeownership is a mediating variable. Nielsen found evidence for this argument: renters were more likely than homeowners to be "wireless substitutors" and less likely to be "not likely wireless substitutors." Having recently changed residences was a commonality among cell-only households in Nielsen's data with 31 percent of wireless only households reporting having moved recently.[18] Having moved recently is likely to impact young people to a greater extent. They are more likely to have adopted a cell phone before moving out of their parent's house or dorm, and new residents who already possess cell phones are impacted by the status quo bias which will push them towards the disaction of not connecting a landline phone. However, over time all cohorts under 55 are adopting cell phones and show similar behavior. [19]

Marital Status and Parenthood

As discussed before, young people have a different decision to make when it comes to their choice of telephone service. The current cohort of young people likely adopted cell phones while living with their parents or at school and already have an established telephone service before they have the option of requesting landline service of their own.[20] Therefore, because of the status quo bias, the 18-29 year olds need a reason to adopt a landline. One of those reasons may be marriage and/or parenthood. The influence of marriage is likely similar to that of owning a house in general, because it serves as a stablizing force. The two are likely to be correlated, but marital status should account for varience not explained by transitivity. Even if the couple moves from an apartment to a house they can likely transfer their number to a new home without worrying about the number being associated with former roommates, so a person could keep their landline due to being married but at the same time be transient. The Nielsen study found a decreased likelihood of married respondents to be "wireless substitutors" compared to single and divorced respondents, but all marriage groups were about equally likely to be "likely wireless substitutors" or "not likely wireless substitutors."[21] Landline-only respondents were also more likely to be married than cell-only respondents (49.5 percent of landline-only; 32 percent of cell-only) according to the 2007 Behavioral Risk Factor Surveillance System Survey (BRFSS) conducted in Georgia, New Mexico, and Pennsylvania.[22]

Parenthood, while related to marriage, probably has an indepent effect on phone use. When young children are in the house the parents may want a landline to allow children to receive phone calls from friends but retain control over phone use, as well as start to give more weight to the reliability of 911 service on landlines.

---

[18] Nielsen.

[19] Nielsen.; Leonardi, Leonardi, and Hudson.

[20] Leonardi, Leonardi, and Hudson.

[21] Nielsen.

[22] Link et. al.

Income

A study done by The Pew Research Center reported that those with lower incomes are less likely to own a landline telephone and more likely to be cell-only.[23] They found that 29 percent of those reached on a landline reported an income above $75,000 compared to 16 percent of cell-only respondents, and 21 percent of landline users reporting an income less than $30,000 compared to 41 percent of those with only a cell phone.

The tendency of low-income households to be cell-only is partially due to the unpredictable nature of landline telephone bills where you pay for service after use. Users who end up with outstanding unpaid balances are disconnected from the telephone network, and because of a monopoly of service, this can serve as a barrier to reconnection for users.[24] Cell phones may be a more economical answer for low income households because of the pre-paid plan options and a great number of competitors. This is supported by an analysis done by Nielsen which estimated a savings of $33 per month for people substituting a cell phone for a landline (an average savings of $40 from discontinuing their landline, but an average $6.69 increase on their cell phone bill due to increased minute use).[25]

Income may be another explanation for the age differences in phone use since younger people tend to have a lower income due to being at the beginning of their careers. Low income households may also prefer cell phone use to landline use because the phone can be used during long commutes to work via public transportation. Poor areas are also more likely to have their landline service interrupted which makes a cell phone attractive since there are mulitple wireless services competing to provide reliable coverage.[26]

Regional Culture

Cell-only households also vary greatly by state: from 5.1 percent in Vermont to 26.2 percent in Oklahoma according to a model using NHIS data. The region with the highest percent is the south central states while the New England region has the lowest percent. [27] Variation between regions was also found by the BRFSS.[28] The variation may be due to the demographic factors already known to correlate with cell-only status, but it may also be caused by cultural differences.

---

[23] Pew.

[24] Milton Mueller and Jorge Schement, "Universal Service from the Bottom Up: A Profile of Telecommunications Access in Camden, New Jersey," *The Information Society* (1996): 273-291.

[25] Nielsen.

[26] Davin Heckman , "'Do You Know the Importance of a Skypager?': Telecommunications, African Americans, and Popular Culture." In *The Cell Phone Reader* (New York: Peter Lang, 2006): 173-86.

[27] SHADAC (State Health Access Data Assistance Center). "The Impact of Wireless-only Households on State Surveys of Healh Insurance Coverage" (2009).

[28] Link, et. al.

The public's opinion about political issues has been shown to be partially driven by political culture.[29] For example, Erikson, McIver, and Wright have shown state level public opinion to be influenced by both the demographic characteristics of the state and by the "political culture" of the state.[30] "Political culture" is left by Erikson et al. to be a fuzzy concept that seems to include media manipulation, geography, and regional culture. More recently, Chomsky and Barclay contributed to the understanding of this variable by showing that media opinions in op-eds have an effect on state-level opinion about marriage between two men or two women.[31] The aggregate media opinion in a state was found to be significantly different from public opinion and to draw public opinion towards it. Without taking cultural context factors into account when measuring opinion on political issues as well as other topics, regions with high cell-only populations will be underrepresented in the data. These cultural factors do not need to be explicitly known in order to control for them by weighting the data by state or region.

DATA AND METHODS

Data

The survey data used is from the nationally representative 2008 General Social Survey (GSS). 2008 was the first year the GSS asked questions about cell phone and landline status. These questions provide a valuable complement to research carried out on the NHIS and allow testing for bias on politically related questions such as party identification and religiosity.

Dependent Variable

The dependent variable is a five point scale that combines information about the type of phone(s) the respondent uses with the relative frequency of use. At the high end of the scale are land-line only respondents while the low end is populated by those with only a cell phone. In the middle of the scale respondents have both a landline and a cell phone, but vary by how often they use them. These respondents were asked, "Please think about all voice calls you and your family receive and exclude fax, modem, and other non-voice calls… (1) All or most calls received on cell phone, (2) Some received on cell phones and some on regular phones, (3) Very few or non received on cell phones." Those answering "all or most" on cell phones are categorized as "cell-mostly;" those answering "very few" on cell phones are "landline-mostly;" those answering in between are categorized as "neutral." [32]

---

[29] For a review of the major theories see Conway 1989

[30] Robert S. Erikson, John P McIver, and Gerald C Wright, "State Political Culture and Public Opinion," *American Political Science Review* 81, no. 3 (September 1987).

[31] Daniel Chomsky and Scott Barclay. "Shaping the Same Sex Marriage Discussion." American Political Science Association: Mass Media, Government Action, Social Demographic Factors, and Public Opinion in the States (2006).

[32] Martin Barron and Kirk Wolter, "A Social Profile of the 'Wireless-Only' and 'Wireless-Mostly' Population." AAPOR Annual Conference (Hollywood, Florida, 2009).

Independent Variables

Age is not collapsed but left as the age reported by the respondent. Family income is broken into five categories: less than $5000, $5000-$9999, $10000-$24999, and greater than $25000. Erikson, McIver, and Wright argue that political culture is more accurately represented by state rather than region, so weighting by state would be preferred; however, the GSS data only has a region variable available.[33] This region variable was collapsed into East, Central, West, and South, and four binary variables were created because the model assumes independents of at least ordinal level of measurement.

A homeownership variable was created with people in "other" residences (e.g. living with parents) coded in between those who rent and those who own or have a mortgage on their home. And to measure previous transitivity of the respondent, a variable denoting whether the respondent has moved cities or states since age 16 was used. A presence of children variable was created to assess the impact of at least one child living in the home. In the same vein as these concepts, a family type variable was also created as an ordinal measure to differentiate types of families based on theoretical number of ties the respondent has to his or her residence: single adult, non-married without children, married or related without children, and family with children.

Other variables of interest will be considered because of their association with a wide variety of other respondent characteristics. These variables do not have strong evidence for directly influencing the decision of which phone technologies to adopt but are important for diagnosing general noncoverage bias. Included are: sex, race, education level, political ideology, political party identification, and religiosity (how often church is attended).

Sex is coded with male as the high value. Race and ethnicity are captured by two variables: white/non-white and hispanic/non-hispanic. Hispanic status is given priority over white racial identification and multirace identifications are listed as non-white. Education level is catagorized by highest degree attained (<high school, high school, junior college, bachelor, graduate). Political ideology is categoried as liberal, moderate, and conservative with conservative ranked the highest number and liberal the lowest. Similarly, political party has categories of Democrat, independent, and Republican, with Republicans coded high. Religiosity runs from "never attend religious services" (0) to "attend religious services more than once a week" (8).

Model Creation

A nonparametric model must be used, because the dependent variable, phone use, is ordinal and thus normality and equal variance between independent and dependent cannot be assumed. The parallel lines assumption of ordinal logisitic regression (the relationship between the independent and each level of the dependents are the same, in other words the results are parallel lines) is violated by many variables of interest (age, child, homeown, and religiosity). Instead, a partial proportional odds regression, which is a subset of a general ordinal logistic regression, will be used, because it allows some variables to be unconstrained by the parallel lines assumption

---

[33] Erikson, McIver, and Wright.

while those that meet the assumption remain constrained. The model will be analyzed in Stata 9 using the program gologit2.[34]

The model assumes that there is a theoretical continuous variable behind the ordinal dependent and that the dependent is ordinal because it is a simplified measurement. The breaks between values in the dependent are called cutpoints, and the coefficients output by the model describe the amount of change needed for the respondent to cross the next cutpoint. The distribution of the theoretical variable behind the ordinal dependent is described by the link function used; in this case, the function resulted in non-uniform categories. The distribution of the phone scale has many extreme values (cell-only and landline-only) so a cauchit link will be used.

RESULTS

The gologit2 results are interpreted similarly to a series of binary logistic regressions.[35] For example, the result for the first iteration is the phone use scale value 1 versus values 2, 3, 4 and 5; the second iteration is value 2 versus values 1, 3, 4, and 5. The actual values of the coefficients cannot be interpreted, but as with most regressions, a positive coefficient means higher values of the independent make higher values of the dependent more likely. The coefficients of a variable in different iterations can be compared; the higher the absolute value, the greater the impact. The independents that are constrained, by definition, have equal coefficients across iterations. The unconstrained independents show unequal effects. These unconstrained variables can either push the dependent especially hard at the high extreme, or the low extreme, or have the greatest impact on the middle of the scale.

---

[34] Richard Williams, "Generalized Ordered Logit/ Partial Proportional Odds Models for Ordinal Dependent Variables," *The Stata Journal* 6, no. 1 (2006): 58-82.
[35] Ibid.

TABLE 2: *Generalized Ordinal Cauchit Regression*						
Dependent	**Independents**	**Coefficient**		**Dependent**	**Independents**	**Coefficient**
PhoneUse = 1 (Cell-Only)				**PhoneUse = 3 (Neutral)**		
	Age	.88***			Age	.04***
	Sex	.95***			Sex	.14
	Family Income	1.07***			Family Income	-.43***
	Family Type	.56**			Family Type	-.02
	Child	-1.12**			Child	-.15
	Homeown	.41**			Homeown	.12
	Moved	-.22***			Moved	-.22***
	West	.94**			West	-.21
	Ideology	.63***			Ideology	.20
	Party	-.31***			Party	-.31***
PhoneUse = 2 (Cell-Mostly)				**PhoneUse = 4 (Landline-Mostly)**		
	Age	.04***			Age	.03***
	Sex	.32*			Sex	-.11
	Family Income	-.45***			Family Income	-.59***
	Family Type	.07			Family Type	-.09
	Child	-.10			Child	-.32
	Homeown	.46***			Homeown	.03
	Moved	-.22***			Moved	-.22***
	West	-.13			West	-.62
	Ideology	.13			Ideology	-.05
	Party	-.31***			Party	-.31***
***=.01 level significance, **=.05 level significance, *=.1 level significance						

Younger people were more likely to be cell-only than landline-only, and being younger is an especially strong driver away from landline-only. The strongest effect of lower family income is to drive respondents towards cell-only status, which conforms to the theory. Lower income is also more strongly associated with using a landline more often than a cell phone if a landline is present. Family type is only significant in the first iteration and its direction is positive, which means that having greater ties to your family is assosiated with not being cell-only. Having a child in the home is also only significant for the first iteration, and contrary to the theory, it makes being cell only more likely. Owning one's own home instead of renting drives respondents towards landline-only. Having moved since age 16 is associated with being lower on the scale, and thus using a cell phone more often.

West was the only geographical region to be significant. Living in the western United States is most strongly associated with not being cell-only, but also associated with being lower (towards cell-only) than landline-mostly. Being politically conservative most strongly pushes respondents away from cell-only status and is not significant in other iterations. Being Republican, on the other hand, is associated with being more likely to be cell-mostly or cell-only. Sex is only significant for the first two iterations and is positive, so females are more likely to be cell-only or cell-mostly than use a landline and also more likely to be cell-only than cell-mostly. There were no effects on phone use found due to race, religiosity, or working outside the home rather than working inside or not working.

CONCLUSION

Overall, the results conform to expectations about which variables would predict phone use. The two points on which they do not conform consern the variables income and having children. Low income did make being cell-only more likely as predicted, but it also increased use of landlines. While typically using a cell phone instead of a landline is cheaper because minutes are bought in packages, if a respondent has a pre-paid phone (one without a minute plan) then it could be that landline minutes are cheaper. If finances are driving their decision to use landlines more often, then these households are likely to drop out of the landline sample when finances tighten further since being cell-only is cheaper than being landline-only. Contrary to prediction, instead of increasing probability of connecting a landline, having children increases the probability of being cell-only. This is a counter-intuitive finding, but may be due to the increasingly prevalent practice of giving adolescents' cell phones on family plans.

Weighting can be a very powerful tool, but we must not forget the potential problems due to noncoverage. This and previous research have been reliant on surveying itself to detect bias. There may be a population of people who are are very different, but are undetected because they tend not to respond to surveys at all. It will always be safer to ensure as much coverage as possible, but when that fails it is best to continually test the validity of the data. With the ever-increasing numbers of cell-only and cell-mostly households, any bias currently detectable is likely to be even larger in the future. Variables found to predict cell-only and cell-mostly status should be kept in mind when considering whether a cell sample is an economical investment. If answers are likely to covary with these factors, then gathering more information about the amount of bias with a cell sample may be worth it.