

# Do We Need to Go Cellular? Assessing Political Media Consumption Using a Single-Frame Landline/Cellular Survey Design

Megan R. Hill, John M. Tchernev, and R. Lance Holbert

*School of Communication  
The Ohio State University*

Much research has been published on cellular phone only households and the challenges posed by cellular phones to traditional survey methodologies that attempt to generate representative samples using only landline telecommunications. This study reports analyses comparing two separate survey strata ( $N_{\text{landline}} = 152$ ,  $N_{\text{cellular}} = 153$ ) collected simultaneously and nested within a single-frame survey of a state in the American Midwest for differences in demographics, political orientations, individual differences, and a variety of political media consumption variables. Focus is also given to differences among audience variables that predict various forms of political media use across the two survey strata.

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**Megan R. Hill** (B.A., Oakland University, 2008) is a graduate student in the School of Communication at The Ohio State University. Her research interests include political communication and media effects.

**John M. Tchernev** (B.S., Northwestern University, 2001) is a doctoral student in the School of Communication at The Ohio State University. His research interests include political entertainment, satire, and narrative persuasion.

**R. Lance Holbert** (Ph.D., University of Wisconsin-Madison, 2000) is Associate Professor in the School of Communication at The Ohio State University. His research interests include political communication, persuasion, and media effects.

Correspondence should be addressed to Megan R. Hill, School of Communication, The Ohio State University, 3016 Derby Hall, 154 N. Oval Mall, Columbus, OH 43210. E-mail: meghill2@gmail.com

Age serves as a consistent positive predictor of traditional political news consumption, including daily newspapers and broadcast television news (e.g., Holbert & Benoit, 2009). Citizens who are older tend to consume these media outlets with greater frequency. In addition, the only consistent predictor of various forms of entertainment-oriented political media (e.g., *The Daily Show with Jon Stewart*, *The Colbert Report*) is age, but it is those who are younger who are turning to this content more often (e.g., Hmielowski, Holbert, & Lee, 2011; Young & Tisinger, 2006). Methodologically, the field of political communication, as well as every other field that employs the use of survey methodology to address various research questions and hypotheses, is becoming all the more aware of the inherent weaknesses of using traditional landlines as the only telecommunications mode by which to generate representative samples of a population (Link, Battaglia, Frankel, Osborn, & Mokdad, 2007). It is clear that citizens, particularly younger citizens, are “going cellular” (see Blumberg & Luke, 2010) and potentially falling outside the bounds of traditional survey research procedures that continue to use landline phone exchanges as the sole means for generating random samples (Carley-Baxter, Peytchev, & Black, 2010; Lavrakas, Shuttles, Steeh, & Fienberg, 2007). The radical changes occurring within the telecommunications environment could have profound effects for political communication research that employs traditional survey research methodologies, especially given the important role age has played in relation to patterns of political media consumption.

The current research effort examines whether there are differences in patterns of political media consumption (as well as in those variables that have been shown in extant research to predict political media consumption) between two sampling strata collected at the same point in time and of the same population, one stratum generated from landline phone prefixes and the other generated from cellular phone prefixes. In addition, we want to know if any of these differences can be explained away by the third variable of age.

The issue of how best to measure news media exposure has become a hotly debated topic of late (see Althaus & Tewksbury, 2007; Eveland, Hutchens, & Shen, 2009), with one argument lodged against traditional measures of news exposure being the production of inflated estimates (Prior, 2009). If the samples we are using of a given population are based solely on landline phone prefixes and these prefixes represent a more aged population, then our sampling procedures may be making a bad situation (i.e., inflated estimates of news media exposure) all the worse given that age serves as a positive predictor of traditional political news use. Likewise, if age is a negative predictor of various forms of political entertainment consumption, then the exposure estimates for these types of media use will also be inaccurate (i.e., potentially deflated) based on surveys collected through landline phones. Even more important, there has been no formal discussion of

whether there are potential differences in the ability of various demographic, political orientation, and individual difference variables to serve as meaningful predictors of various forms of political media use for samples collected from landline versus cellular phone prefixes.

Although there is much discussion of the need to assess whether it has become necessary to incorporate the use of cellular phone exchanges (Brick, Dipko, Presser, Tucker, & Yuan, 2007; Kennedy, 2007; Steeh, 2004), there has been little formal empirical research seeking to address the landline versus cellular issue in relation to assessing levels of political media consumption (cf. Keeter, Kennedy, Clark, Tompson, & Mokrzycki, 2007). In addition, there has been no formal research published on whether there are differences in what predicts various forms of political media use (often more important to political communication scholars than the actual levels of media use) between survey data collected through cellular versus landline telecommunications.

Two statewide survey strata of a state in the American Midwest ( $N_{\text{landline}} = 152$ ,  $N_{\text{cellular}} = 153$ ) were collected from December 2009 to January 2010. Analyses offered in this study compare the two sampling strata on a broad range of demographic (including age), political orientation, and individual difference variables. Formal assessments of differences in traditional and nontraditional forms of political media use across the landline and cellular sampling strata are also undertaken, and any differences found are readdressed with an accounting of age and sex as additional control variables. Finally, a series of forward stepwise regressions are offered to identify which audience variables retain substantive predictive value for various forms of political media use between the landline and cellular groups. Judgments are then offered regarding the potential importance of incorporating cellular phone exchanges into the field's telecommunication survey sampling techniques. It is essential that the field of mass communication gain a solid understanding of what survey sampling methodologies are most appropriate when determining how to gain more accurate assessments of media use patterns and how the use of one type of sample versus another (e.g., landline vs. cellular) can impact what serves as a meaningful predictor of various types of media use. The current study provides a window into the all-important issue of using landline versus cellular exchanges as the field continues to wrestle with these contentious questions.

#### THE CHANGING TELECOMMUNICATIONS ENVIRONMENT AND SURVEY RESEARCH METHODOLOGY

The latest National Center for Health Statistics report (released April 20, 2011) indicates that more than one fourth of American households

(26.6%) are cellular only (Blumberg et al., 2011). This staggering figure is the latest in what has been a steady increase in the movement to cellular phone only (CPO) households within the American population (see Ehlen & Ehlen, 2007). In fact, “the prevalence of such ‘wireless-only’ households markedly exceeds the prevalence of households with only landline telephones (12.9%), and this difference is expected to grow” (Blumberg et al., 2011, p. 1). To provide further context regarding the changing nature of how the American public is utilizing its telecommunication services, the same report offers an insight that between 24.9% and 52.8% of American households with a landline phone report receiving virtually all desired calls through cellular phone devices. This figure casts even greater doubt on the effective reach of U.S. landline phone service for the purposes of survey research.

Survey methodologists in the area of public opinion research have been tracking the changing nature of the telecommunications industry and have speculated for some time how this brave new world could impact their efforts (see Steeh, 2004). Over the past several decades, public opinion survey research methodology has become highly reliant on the landline telephone as the dominant means by which to reach populations of interest (see Groves et al., 1988). The relatively stable telecommunications environment that offered near-complete saturation of landlines into American households allowed for the refinement of a specific set of methodologies that worked well for a particular moment in time. However, this stable environment is collapsing as a result of the rise of cellular phone technology (as evidenced in the latest National Center for Health Statistics report), and with it has come a reduction in the utility of the sampling methodologies employed in relation to that environment. As argued by Lavrakas et al. (2007), “the ability of researchers to reach representative samples of the U.S. public via wired/landline telephone surveys and gather reliable data is being seriously challenged” (p. 841).

The key issue, as identified by Lavrakas and colleagues, centers on the concept of representativeness. The overarching goal of all advances in survey methodology is to generate samples that are the best representations (i.e., with minimal biases) of the populations that will ultimately be generalized about by a given researcher (see Babbie, 2009). Researchers have detailed several potential biases derived from a failure to sample CPO individuals. The most obvious demographic bias concerns the demographic variable of age (Kennedy, 2007). Ehlen and Ehlen (2007) noted that a natural outcome of the increase in cellular phones, especially among the younger cohorts, “will be a ‘graying’ of the landline population” (p. 720). In addition to a potential age bias, Blumberg and Luke (2007) noted that there is also the distinct possibility for an income bias in surveys where CPO households are not properly sampled, with those households with lower incomes tending

to adopt a CPO lifestyle at a quicker pace than households with greater financial means to retain both landline and cellular telecommunication devices. Once more, there is a high likelihood of extreme biases produced from an Age  $\times$  Income interaction. Few young adults of modest means will be found among today's landline population. Most recently, Ansolabehere and Schaffner (2010) noted that CPO households also vary from the landline population in terms of residential mobility and family structure. All of these biases can compound to create nonrepresentative samples of the populations we are seeking to generalize about in our research.

### THE STUDY OF CPO SAMPLES

The range of differences found between traditional landline samples and CPO samples is quite extensive. In terms of demographics, Kennedy (2007) identified a clear age differential and reported that individuals in a CPO sample were less likely to be married. Tucker, Brick, and Meekins (2007) found that a much lower percentage of individuals in a CPO sample had completed a graduate degree, and Ansolobehere and Schaffner (2010) reported income to be a statistically significant, negative predictor of being CPO. In terms of race, Tucker et al. (2007) indicate that Hispanic households are more likely to be cellular only (see also Link et al., 2007). Link et al. (2007) also revealed a gender bias, with CPO households reflecting a near even split of male and female members but landline-only households being heavily female (i.e., women live longer).

For contextual variables, Tucker et al. (2007) noted that the Northeastern United States retains the highest percentage of landline-only and the lowest percentage of cellular-only households. There are also indications in the Tucker et al. study that more CPO households are found in urban centers. As for political characteristics, the largest difference between landline and cellular-only samples found by Keeter et al. (2007) concerns voter registration, with a higher percentage of respondents in the landline sample being registered voters. The landline sample also possessed greater levels of political knowledge and increased interest in political elections.

The result of this research on the CPO population, as well as lingering concerns about how to address survey methodology issues raised by the pervasiveness of cellular phone use, have generated a call to discard dual-frame designs and incorporate single-frame designs (Link et al., 2007). A dual-frame design is the approach taken in a majority of the studies outlined in this section of the article. Researchers utilizing a dual-frame design conduct a traditional landline survey using traditional methods and conduct a second survey where the frame is limited to just CPO households (i.e.,

distinct landline and cellular frames—no overlap in the populations). By contrast, a single-frame design is summarized by Link et al. (2007): “Many telephone researchers will have to *consider the telephone frame as a single frame with landlines and cell phones being separate strata and sample from each, without screening for cell phone only households*” (p. 835). The reasoning behind the call for a single-frame design is that the most problematic subpopulation to address through the use of a dual-frame survey methodology are those individuals who can be accessed by survey researchers through *both* landline and cellular telecommunications. There is much variation within this group regarding their level of reliance on one mode of telecommunications versus the other, and there is no appropriate means by which to deal with this variation using a dual-frame survey methodology. Individuals in dual-use households who are contacted for a survey via their cellular phone report using that particular telecommunications device a majority of the time. Conversely, the respondents in dual-use households who are contacted by survey researchers for the same study via landline phones report *that* particular device being their dominant mode of telecommunications (Kennedy, 2007). These reports are problematic because a dual-frame design can exclude dual-use households where the cellular phone is the dominant telecommunication device. Such households will be much more difficult to contact via their landline phones because a vast majority of their desired calls come via their cellular phones, and these dual-use households will not be sampled in a CPO frame because they still have a landline.

A single-frame design with strata of cellular and landline samples is an appealing alternative in that the cellular and landline strata are not forced to be mutually exclusive. The stratum of respondents reached by cellular phone is not restricted a priori to those in CPO households. Thus, a single-frame design should be less prone to errors of accidental exclusion, particularly with regard to potential respondents who have both landline and cellular phones.

#### CELLULAR AND LANDLINE: IMPLICATIONS FOR THE STUDY OF POLITICAL MEDIA USE

Keeter et al. (2007) offered a number of comparisons of potential differences in political media use for landline versus cellular-only samples using the PEW Media Consumption Survey collected in April and May 2006. Among the most pronounced and statistically significant differences in political media use found between the two samples were the following: reading newspapers (landline greater), watching local TV news (landline greater),

watching national broadcast TV news (landline greater), getting news from multiple devices (cellular greater), and watching *The Daily Show with Jon Stewart* (cellular greater). A number of other types of political media activities did not prove to vary widely between the two samples. These political media activities included watching cable TV news, listening to radio news, visiting national newspaper websites, and visiting news blogs. Keeter et al. concluded that the differences in patterns of political media consumption, along with several other audience characteristics, were not overwhelming, but they also concluded that “the rapid growth in the size of the cell-only population and its continued concentration among younger people means that its potential impact warrants continued study” (p. 789).

We concur fully with the Keeter et al. assessment concerning the need for additional research on this topic and, in particular, for devoting much attention to the variable of age when looking at potential differences in cellular versus landlines samples. This is especially true for the study of political media use and what predicts political media use. The field of political communication is far from mastering the art of accounting for large amounts of variance in patterns of political media consumption, whether the political media content is news oriented (e.g., Coe et al., 2008; Han, 2008) or entertainment oriented (e.g., Young & Tisinger, 2006). However, one variable has proven itself tried and true in the study of political media use: age (e.g., Holbert, 2005; Holbert & Benoit, 2009; Young & Tisinger, 2006). Thus, any potential age sampling bias derived from the exclusion of those who use cellular phone technology—either exclusively (i.e., CPO lifestyle) or even primarily (defined as a “wireless-mostly” lifestyle by Blumberg & Luke, 2010)—can have a major influence on the reliability and validity of the generalizations we make about the political media use habits of a given population (and what predicts political media use patterns). As previously mentioned, such potential bias in measurement and sampling techniques has engendered fierce debate within the field, and understandably so. At best, the conclusions we have drawn from potentially flawed measurement and sampling strategies have led to only minor differences in estimates of, for example, news media exposure. At worst, however, the conclusions we have drawn are entirely misleading, producing inaccurate assessments of theory and practice.

Therefore, recommendations have been made for taking a single-frame approach to the incorporation of cellular phone technology into public opinion survey sampling procedures (Brick, Edwards, et al., 2007; Link et al., 2007). Such an approach was taken for the current study. The single-frame approach (i.e., treatment of landline and cellular as separate strata within a single population and sampling from each) better addresses the issue of reaching cellular phone users than does the use of any existing weighting techniques (see Link et al., 2007). But will a single-frame survey methodology



allow for a reduction in potential differences across strata (landline and cellular) concerning a wide range of demographics, political orientations, and other individual difference variables of interest to political media scholarship? In addition, are there any differences in patterns of political media use between the landline and cellular strata? Questions similar to these were addressed by Keeter et al. (2007) in a dual-frame design (i.e., a comparison of a landline and a cellular-only sample). However, the current research effort heeds the call for further research by addressing these basic research questions within a single-frame survey methodology:

- RQ1: Are there differences in the cellular versus landline sampling strata in terms of demographics, political orientations, or individual differences?  
 RQ2: Are there differences in the cellular versus landline sampling strata in terms of political media use (news, political talk, or entertainment)?

In addition, the current research effort extends the political media use questions addressed to date in the study of cellular-only samples in two important ways. One, we want to offer a direct empirical assessment of whether any differences in political media use and those audience variables commonly employed in the study of political media use can be explained away by age. As emphasized by Keeter et al. (2007), it is important to remain focused on the demographic of age as we study ways in which to address the cellular phone issue in survey research methodology. If there are differences between the landline and cellular strata in our study, it is important for political communication scholars who are thinking of incorporating such a design to know whether these differences can be explained away by the third variable of age. Thus, we offer the following research question:

- RQ3: Can any of the differences identified as a result of the first two research questions be explained away by age as third variable?

We further extend our analysis by offering a direct assessment of whether any differences across strata in political media use and those audience variables commonly employed in the study of political media use can be explained away by gender. Past research has consistently indicated that men consume more political media than women (Knobloch-Westerwick & Alter, 2007; Pew Research Center for the People and the Press, 2008; Verba, Burns, & Schlozman, 1997). However, Link et al. (2007) observed a considerable gender bias between their landline and cellular samples; their findings indicated that CPO households reflected a near-even split of male and female members, whereas landline-only households were predominantly



female. Link et al.'s findings may be attributed to the fact that women, on average, live longer than men. Regardless, it is important to consider whether differences between the landline and cellular strata can be explained away by gender. Given Link et al.'s findings, we offer the following research question:

RQ4: Can any of the differences identified as a result of the first two research questions be explained away by gender as an additional control variable?

Finally, the study of communication is about the study of process (Holbert & Stephenson, 2003), and it is important that research begin to look at the processes that are leading citizens to consume a variety of political media and whether these processes differ across the landline and cellular strata in a single-frame survey design. To that end, we offer our final research question:

RQ5: Are there differences in what serve as statistically significant predictors of various forms of political media use between the cellular versus landline sampling strata?

## METHOD

A private research firm was hired by the authors to conduct a phone survey of a large state in the American Midwest. The survey was conducted during December 2009 and January 2010 ( $N_{\text{landline}} = 153$ ,  $N_{\text{cellular}} = 152$ ), with the firm using a computer-generated random sample of phone numbers for the appropriate area codes and landline/cellular exchanges. All phone calls (landline and cellular) were then made manually by the research firm to adhere to federal law stating that all calls made to cellular phones need to be done so in that manner (Lavrakas et al., 2007). Given the difficulty associated with contacting cellular phone respondents, all calls were made between 9 a.m. and 9 p.m., and the survey firm adopted a rigorous callback policy. In short, the firm made as many callbacks as necessary to maintain the quality of the survey's response rate.<sup>1</sup> All survey respondents (age 18 and

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<sup>1</sup>Callbacks continued to be made throughout the duration of the survey. No limitations were placed on the number of callbacks made, with the only stipulation being that the final response rates for the respective strata (landline and cellular) remain relatively equal. This requirement resulted in a much larger number of callbacks for those in the cellular sample compared to the landline sample (i.e., people are much less willing to accept a call from an unknown number when being contacted through a cellular telecommunications device).

older) were given \$10 for completing the survey, regardless of doing so via traditional landline or cellular phone (we did not want to introduce a potential confound across strata). Using guidelines established by the American Association for Public Opinion Research (AAPOR), the response rates for the cellular and landline strata were 31.4% and 32.4%,<sup>2</sup> respectively.

### Measures<sup>3</sup>

*Predictor variables.* The study includes four basic demographic variables: age (measured in years as of last birthday), biological sex (female coded high), income, and education. Income was measured on an 11-point scale ranging from (*less than \$10,000*) to (*over \$150,000*). Education was measured on a 10-point scale ranging from *middle school* to *doctorate*. The combined sample retained a near equal distribution of male and female participants (female = 49.3%). Also included in the study was political ideology, measured on a 5-point scale from *extremely liberal* to *extremely conservative*.

In relation to the study of traditional news, we included a five-item Need for Cognition index used in extant research (Cacioppo, Petty, Feinstein, Blair, & Jarvis, 1996). Level of agreement, ranging from *strongly disagree* to *strongly agree*, was measured along 5-point scales, and each item reflects high need for cognition coded high (Cronbach's  $\alpha = .76$ ).

In addition, Trust in News, a refined four-item index drawn from the more expansive 16-item measure detailed in Kohring and Matthes (2007), is utilized in this study. A single item from each of the four dimensions of trust in news media (selectivity of topics, selectivity of facts, accuracy of depictions, and journalistic assessment) was included in the present study (all scored with trust coded high). The four-item index retains a decent reliability for the combined sample (Cronbach's  $\alpha = .68$ ).

For the study of political entertainment media, we included Need for Humor. The most recently refined Need for Humor scale consists of 12 items. As with past research (Cline, Altsech, & Kellaris, 2003), the index proved to be reliable (Cronbach's  $\alpha = .85$ ).

We also included the newly explicated measure of Affinity for Political Humor. The Affinity for Political Humor measure is an 11-item index (see Hmielowski et al., 2011). Personal agreement for each of the 11 items was assessed using 5-point scales ranging from 1 (*strongly disagree*) to 5 (*strongly*

<sup>2</sup>AAPOR Response Rate 1 (Completed Interviews)/[(Completed Interviews + Partial Interviews) + (Refusals + Non-Contacts + Other) + (Unknown Household + Unknown Other)].

<sup>3</sup>Single reliability estimates (landline + cellular strata) are reported for the multiple-item indices as a matter of efficiency.

agree), with the higher end of the scale indicating a greater affinity for political humor. The index retains strong reliability (Cronbach's  $\alpha = .90$ ).

*Political media consumption variables.* Seven political media consumption measures are employed in the current study. All media measures were ascertained using 5-point scales ranging from 1 (*never*) to 5 (*all the time*).

Daily newspaper and national broadcast TV news consumption were measured using single items, as was web news use. The three individual forms of news consumption were kept distinct given the low average inter-item correlation between the three, average interitem  $r = .09$ , *ns*. Two cable TV political talk indices were constructed: cable TV political talk liberal (i.e., MSNBC) and cable TV political talk conservative (i.e., FOX News). Cable TV political talk liberal is a three-item additive index consisting of exposure measures to *Countdown with Keith Olbermann*, *Hardball with Chris Matthews*, and *The Rachel Maddow Show* (Cronbach's  $\alpha = .71$ ). Cable TV political talk conservative is also a three-item additive index and consists of frequency of exposure to three FOX News programs (*Hannity*, *The O'Reilly Factor*, and *Glenn Beck*; Cronbach's  $\alpha = .81$ ).

Political TV satire exposure consists of items measuring frequency of viewing *The Daily Show with Jon Stewart* and *The Colbert Report*. These two items retained a strong relationship with one another (zero-order  $r = .74$ ,  $p < .001$ ). Satirical TV situation comedy exposure is operationalized as a two-item additive index consisting of exposure to *The Simpsons* and *Family Guy* (zero-order  $r = .68$ ,  $p < .001$ ).

## Analyses

First, a series of one-way analyses of variance (ANOVAs) were run with the independent variable of landline versus cellular sampling strata. The respective dependent variables were the demographic, political orientation, individual difference, and political media consumption variables.

The second analysis stage involved a series of one-way analyses of covariance (ANCOVAs). All one-way ANOVAs that provided statistically significant results in the first stage were included in the second stage, with the only addition to these analyses being the inclusion of age as covariate. Assessments were made as to whether the landline versus cellular independent variable retained a statistically significant main effect on the respective dependent variables after accounting for the influence of the age covariate. The process was then repeated with gender being added as a second covariate to determine whether the previous main effects remained after controlling for both age and gender.

Finally, a series of forward stepwise regression equation analyses were run to address RQ4. The first three research questions addressed whether there are formal differences for the variables of interest between the landline and cellular strata, whereas our final research question addressed whether there are novel features regarding what predicts various types of media use from one sampling stratum to the other. It is important to gain a sense of whether different regression equations emerge when predicting patterns of media use employing the use of landline versus cellular samples. The eight political media consumption measures served as respective dependent measures in the regression equations, and two regression equations were run for each dependent variable (one equation for the cellular strata and the other for the landline strata). This process allowed for determinations to be made regarding what predictor variables retained sufficient utility in the landline versus cellular strata. All regression equations included the following demographics as possible predictor variables: age, biological sex, education, income, and political ideology. The equations involving any of the six news dependent variables retained need for cognition and trust in news as additional predictors. The two additional predictors for the entertainment-oriented media dependent variables were need for humor and affinity for political humor.

### Post Hoc Power Analysis

A post hoc power analysis was run for the ANOVA, ANCOVAs, and multiple regression analyses. The alpha level used for all power analysis assessments was .05. The total sample size used for the ANOVA and ANCOVA assessments was 305, and the sample size used for the regression assessment was 152 (the smaller of the two sample sizes for the respective survey strata given that separate equations were run for cellular and landline groups). The power calculations for the regression analysis indicated seven possible predictor variables. The effect sizes for the ANOVA and ANCOVA assessments were as follows:  $f = .10$  (small),  $f = .25$  (moderate), and  $f = .40$  (large). The effect sizes used for the regression assessments were as follows:  $f^2 = .02$  (small),  $f^2 = .15$  (moderate),  $f^2 = .35$  (large; Cohen, 1988). The GPOWER 3.1.2 software package was used to perform these analyses (see Erdfelder, Faul, & Buchner, 1996).

The power analyses results are as follows for the one-way ANOVA (two groups) tests: small effect = .41; moderate effect = in excess of .99; large effect = in excess of .99. The regression power estimates are as follows: small effect = .19; moderate effect = .95; large effect = in excess of .99. With the threshold for adequate power commonly established at .80 (Cohen, 1988), these results show that there is enough power to detect moderate to large

effect sizes, but there is inadequate power for the detection of small effect sizes for the full range of analytical techniques employed in this study.

## RESULTS

### Audience Characteristics (RQ1)

As suspected, there was a dramatic difference in mean age of more than 16 years between the two strata, landline ( $M_{\text{age}} = 57.29$  years) and cellular ( $M_{\text{age}} = 41.03$ ). The one-way ANOVA results revealed a statistically significant difference,  $F(1, 303) = 82.23$ ,  $p < .001$  (see Table 1). The use of the single-frame survey methodology demonstrated the severe shift in age that occurs when cellular phones are tapped to bring cellular respondents into the fold of the sample.

There were no differences in the mean education,  $F(1, 303) = 0.545$ ,  $p > .45$ , and income levels,  $F(1, 303) = 0.081$ ,  $p > .75$ . The mean education level for both samples fell squarely between the (some college) and (college graduate) options. In addition, the mean income level for both samples hovered around the \$40,000 to \$49,999 range on the scale. However, there was a slight difference in biological sex between the two samples,  $\chi^2(1) = 4.26$ ,

TABLE 1  
Cellular/Landline Comparison in Demographics and Political Exposure

	<i>Landline</i> <i>M (SD)</i>	<i>Cellular</i> <i>M (SD)</i>	<i>F</i>	<i>p</i>
Predictor Variables				
Age	57.29 (17.1)	41.03 (14.1)	$F(1, 303) = 82.23$	<.001
Political ideology	3.11 (.93)	3.29 (.94)	$F(1, 295) = 2.91$	>.05
Need for cognition	3.42 (.78)	3.62 (.71)	$F(1, 294) = 5.06$	<.05
Trust in news	3.00 (.77)	3.09 (.68)	$F(1, 281) = 2.53$	>.10
Need for humor	3.47 (.61)	3.70 (.56)	$F(1, 294) = 11.23$	<.001
Affinity for political humor	3.12 (.79)	3.38 (.65)	$F(1, 282) = 8.99$	<.001
News consumption				
Daily newspaper	3.14 (1.68)	2.92 (1.57)	$F(1, 303) = 1.43$	>.20
National TV broadcast	3.28 (1.61)	3.14 (1.52)	$F(1, 303) = 0.60$	>.40
Web news	2.38 (1.57)	2.98 (1.52)	$F(1, 303) = 11.72$	<.001
MSNBC	1.41 (.75)	1.60 (.77)	$F(1, 293) = 4.23$	<.05
FOX News	1.92 (1.16)	1.97 (1.02)	$F(1, 299) = 0.10$	>.75
Satire consumption				
Political TV	1.48 (.93)	2.00 (1.27)	$F(1, 303) = 15.70$	<.001
Sitcoms	1.39 (.85)	2.14 (1.38)	$F(1, 303) = 32.60$	<.001

Note. Values reported are without using age or gender as covariates.

$p < .05$ . There was a slight undersampling of female participants in the cellular sample (43.4% female), along with a corresponding oversampling of male participants, whereas the landline sample had a majority of female participants (55.3%). There was no difference between strata in terms of political ideology,  $F(1, 295) = 2.91, p > .05$  ( $M_{\text{landline}} = 3.11, M_{\text{cellular}} = 3.29$ ).

There was no difference in trust in news across the landline and cellular strata,  $F(1, 281) = 2.53, p > .10$ . Both samples were firmly rooted in the middle of the 5-point scale. However, there were statistically significant differences in need for cognition,  $F(1, 294) = 5.06, p < .05$ ; need for humor,  $F(1, 294) = 11.23, p < .001$ ; and affinity for political humor,  $F(1, 282) = 8.99, p < .001$ . The most pronounced differences can be found in the more entertainment-oriented individual differences, need for humor ( $M_{\text{landline}} = 3.47, M_{\text{cellular}} = 3.70$ ) and affinity for political humor ( $M_{\text{landline}} = 3.12, M_{\text{cellular}} = 3.38$ ). The cellular sample exhibited a greater need for cognition, need for humor, and a stronger affinity for political humor.

### Political Media Use (RQ2)

There were no statistically significant differences found for the following variants of political media consumption: daily newspaper,  $F(1, 303) = 1.43, p > .20, M_{\text{landline}} = 3.14, M_{\text{cellular}} = 2.92$ ; national broadcast TV news,  $F(1, 303) = 0.60, p > .40, M_{\text{landline}} = 3.28, M_{\text{cellular}} = 3.14$ ; and FOX News,  $F(1, 299) = 0.10, p > .75, M_{\text{landline}} = 1.92, M_{\text{cellular}} = 1.97$ .

However, statistically significant differences in political media consumption could be found for the following four outlets: political TV satire,  $F(1, 303) = 15.70, p < .001, M_{\text{landline}} = 1.48, M_{\text{cellular}} = 2.00$ ; satirical situation comedies,  $F(1, 303) = 32.60, p < .001, M_{\text{landline}} = 1.39, M_{\text{cellular}} = 2.14$ ; web news use,  $F(1, 303) = 11.72, p < .001, M_{\text{landline}} = 2.38, M_{\text{cellular}} = 2.98$ ; and MSNBC,  $F(1, 293) = 4.23, p < .05, M_{\text{landline}} = 1.41, M_{\text{cellular}} = 1.60$ . The cellular stratum consumes much more political TV satire, satirical situation comedy, and news via the web than the landline group, and there is also a slight difference in MSNBC viewing (with the cellular stratum having the higher mean use rate). As with the individual-difference results, it appears that the true differentials across the sampling strata can be found more with the political entertainment-oriented variables than the traditional news/political talk consumption items.

### Age as Third Variable (RQ3)

Besides age, seven of the variables just analyzed were revealed to retain mean differences across the landline and cellular strata: need for cognition, need for humor, affinity for political humor, political TV satire use, satirical

situation comedy use, web news use, and MSNBC viewing. In five of the seven instances, once age was added as a covariate, the landline/cellular independent variable no longer produced a statistically significant main effect on the various dependent variables. The differences found earlier became nonsignificant when one-way ANCOVAs were run for need for cognition,  $F(1, 293) = 2.65, p > .10$ ; need for humor,  $F(1, 293) = 1.88, p > .15$ ; political TV satire,  $F(1, 300) = 1.31, p > .25$ ; web news,  $F(1, 294) = 2.15, p > .10$ ; and MSNBC viewing,  $F(1, 292) = 3.16, p = .08$ . Only two statistically significant differences between strata from the one-way ANOVA analyses remained intact for the one-way ANCOVA analyses, after controlling for age: affinity for political humor,  $F(1, 281) = 4.17, p < .05$ , and satirical situation comedy viewing,  $F(1, 302) = 4.08, p < .05$ . However, it should be noted that both of these results reflect outcomes that fell just barely below the  $p < .05$  alpha level established for this study. In short, the differences between the landline and cellular phone strata can be explained away almost in their entirety by the third variable of age. Once the age differential between samples is introduced, almost all differences for the landline and cellular groups fade away.

#### Sex as Additional Predictor (RQ4)

To answer the question of whether sex explains some of the differences between the cellular and landline samples, for the seven variables for which significant differences were initially found, an additional analysis was run with both sex and age as covariates. The results directly parallel the results for RQ3. The same five variables were again nonsignificant: need for cognition,  $F(1, 292) = 1.63, p > .20$ ; need for humor,  $F(1, 287) = 1.77, p > .10$ ; political TV satire,  $F(1, 299) = 1.21, p > .20$ ; web news,  $F(1, 301) = 2.22, p > .10$ ; and MSNBC viewing,  $F(1, 291) = 3.01, p = .08$ . The same two variables still retained significant differences between the landline and cellular strata, after differences in age and sex were controlled for: affinity for political humor,  $F(1, 280) = 4.03, p < .05$ , and satirical sitcom viewing,  $F(1, 301) = 4.02, p < .05$ . Thus, age was found to have a significant role in the differences between strata, but sex did not explain further differences.

#### Predicting Political Media Consumption (RQ5)

*Daily newspapers.* As shown in Table 2, the landline equation for predicting daily newspaper reading produced two statistically significant predictors, age ( $\beta = .32, p < .001$ ) and income ( $\beta = .21, p < .05$ ). Age remained a statistically significant predictor of newspaper consumption in



TABLE 2  
Largest Predictors of Political Media Consumption by Survey Method

	<i>Landline</i>		<i>Cellular</i>	
	<i>Predictor</i>	$\beta$	<i>Predictor</i>	$\beta$
News consumption				
Daily newspaper	Age	.32***	Age	.25**
	Income	.21*	Education	.21*
National TV broadcast	Age	.19*	Gender	.17*
Web news	Age	-.35***	NFC	.24**
	Education	.21*	Income	.20*
MSNBC	Ideology	-.38***		
FOX News	Ideology	.39***	Ideology	.38***
	Education	.20*		
Satire consumption				
Political TV	AFPH	-.29***	AFPH	.33***
	Age	.31***	Age	-.29***
	Ideology	-.26***		
Sitcoms	Age	-.36***	Age	-.42***
	AFPH	.22**	Income	-.23**
	Income	-.21*	AFPH	.16*

Note. NFC = need for cognition; AFPH = affinity for political humor.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

the cellular sampling stratum ( $\beta = .25, p < .01$ ) as well, but the additional variable in this equation was education ( $\beta = .21, p < .05$ ), not income.

**Broadcast TV news.** Like the newspaper equations, age was a positive predictor of national broadcast TV news consumption for the landline sample ( $\beta = .19, p < .05$ ). No other potential predictor variables accounted for a sufficient level of unique variance in this dependent variable. In stark contrast to the landline equation, only sex ( $\beta = .17, p < .05$ ) served as a statistically significant predictor for broadcast TV news in the cellular sample. Even more intriguing, the beta weight points in the direction of female participants consuming more of this political media content than men.

**Web news.** For the landline stratum, age was a strong negative predictor of web news consumption ( $\beta = -.35, p < .001$ ), whereas education was a positive predictor ( $\beta = .21, p < .05$ ). The cellular equation identified need for cognition as the single strongest predictor of web news use ( $\beta = .24, p < .01$ ), followed by income ( $\beta = .20, p < .05$ ). The finding of need for cognition as a strong positive predictor of web news use speaks well of what may be

driving people to proactively seek out news content in a pull media environment (see Holbert, Garrett, & Gleason, 2010).

**MSNBC.** Political ideology served as the lone predictor of MSNBC consumption ( $\beta = -.38, p < .001$ ) in the landline stratum. The more liberal the respondent, the greater the MSNBC use. However, such was not the case for individuals reached via their cellular phone. In fact, none of the potential predictor variables were shown to serve as statistically significant predictors of MSNBC use for this group.

**FOX News.** For FOX News, ideology served as a statistically significant predictor of consumption in both the landline ( $\beta = .39, p < .001$ ) and cellular ( $\beta = .38, p < .001$ ) strata. In addition, education ( $\beta = .20, p < .05$ ) served as a positive predictor of this type of media use for the landline group.

**Political TV satire.** There were three strong predictors of political TV satire consumption in the landline group: age ( $\beta = -.29, p < .001$ ), affinity for political humor ( $\beta = .31, p < .001$ ), and political ideology ( $\beta = -.26, p < .001$ ). Those who are younger, retain a greater affinity for political humor, and are more liberal in political orientation are consuming more political TV satire. As for the cellular equation, affinity for political humor was the strongest predictor ( $\beta = .33, p < .001$ ), followed by age ( $\beta = -.29, p < .001$ ). There was no statistically significant influence for political ideology in the cellular sample.

**Satirical situation comedies.** The landline sample produced three significant predictors of satirical situation comedies: age ( $\beta = -.36, p < .001$ ), affinity for political humor ( $\beta = .22, p < .01$ ), and income ( $\beta = -.21, p < .05$ ). In addition, these same three predictors were found to be included in the forward stepwise equation for the cellular stratum: age ( $\beta = -.42, p < .001$ ), income ( $\beta = -.23, p < .01$ ), and affinity for political humor ( $\beta = .16, p < .05$ ). This is the only case where predictor variables were identical across strata for the paired forward stepwise regression equations.

## DISCUSSION

The single-frame survey design employed for this study found sizeable age differentials in line with those reported in previous analyses of dual-frame surveys (i.e., distinct landline and cellular-only samples). The mean age differential between the two sampling strata in this study was more than 16 years. In short, this study confirms the “graying” of samples obtained via

the use of landline telecommunications. The size of the age differential revealed in this study has the potential to impact the study of political communication given that age has been shown to play a very important role in predicting who will consume various types of political media outlets. It is especially important for political communication researchers who are focusing on one or more of the subpopulations that are moving more rapidly to a cellular-only or wireless-mostly lifestyle (e.g., youth, lower income, Hispanic) to give extra-careful consideration to the incorporation of cellular phones into their survey designs. In particular, we are recommending the use of a single-frame design (i.e., single sample with distinct landline and cellular strata) as the most parsimonious means by which to generate a representative sample that would allow for generalizations to be made about a given population.

The primary content area driving the current study was entertainment media and politics, and there were several clear mean differences in the entertainment-related variables analyzed for this project. The main audience for much political entertainment television content is the younger demographic. The mean age for this study's landline survey stratum was older than 57 years, and a sample of this kind alone would have been woefully ill-suited for the study of any aspect of political entertainment media.

The implications of this finding extend beyond the current study, raising important and intriguing opportunities for the reevaluation of previous investigations of entertainment media, politics, and age. For example, using Pew Research Center data from 2000 and 2004, Cao (2008) examined the relationship between exposure to political comedy shows (i.e., *The Daily Show*) and political knowledge during the primary season. Cao concluded that exposure was positively associated with campaign knowledge among the highly educated and young yet negatively associated with older and less educated individuals. If we review Cao's results through the lens of the current study, however, we may question the extent to which Pew's standard sampling method (random digit dialing landline; median age for each sample was 44 and 47, respectively) influenced the study's final results. That is, given the negative correlation between age and political entertainment viewership, Cao's results might reflect a partially deflated estimate of exposure to political comedy shows, thereby leading to inaccurate estimates of the interactive effects of such exposure and age, education, and political participation. Reassessing Cao's research, along with more traditionally oriented political communication studies (i.e., Cheng & Riffe, 2008), with a single-frame survey methodology may ameliorate these potential limitations and provide a more accurate and representative analysis of the moderating effects of age on political media consumption.

In terms of the major differences found when comparing the landline and cellular strata, the strongest and most persistent differentials could be found for the items related to the study of political entertainment media. The two strongest mean differences in political media consumption were for political TV satire and satirical situation comedies. Conversely, four of the five types of news media consumption reflected no mean differences between the two survey strata. The only difference in news/political talk consumption that could be detected between the survey strata was for web news use, with the cellular group reading web news more than the landline group. In addition, of the individual difference variables analyzed for this study, those most clearly associated with entertainment media (e.g., need for humor, affinity for political humor) exhibited the largest cellular versus landline differences.

Of note, our analyses were constrained by an inability to control for respondents' level of political interest, a variable known to account for a significant amount of variance in research on media use, political attitudes, and political behavior. This limitation was due to the length of the survey questionnaire, and future research should consider how potential differences in political interest between landline and cellular strata might affect media consumption patterns. In a similar vein, the scale responses used to assess media consumption may have introduced additional noise into our findings. Specifically, the high end of our scale (5 on a scale ranging from 1 to 5) was anchored by the phrase "all of the time," which, if taken literally, would suggest that an individual never stops consuming media. Although we doubt the likelihood of such an interpretation, the phrase does introduce a level of ambiguity that may exceed more traditional response options (e.g., "regularly").

Nevertheless, most of the differences between the survey strata could be directly attributed to the massive age differential. Only two mean differences between the strata (i.e., affinity for political humor, satirical situation comedy consumption) remained statistically significant once age was introduced as a covariate. These two more persistent differences are most likely representative of some broader lifestyle distinctions that exist among those who have chosen to become cellular only or wireless mostly. Additional research should be conducted to further explore the potential existence of clear differences in habits of media consumption for individuals who are contacted via landline versus cellular telecommunications. It is our opinion that this study is only scratching the surface of what may be a much broader set of lifestyle differences that can impact media use habits, as well as a much broader set of political behaviors (e.g., likelihood to vote). Although the potential differences extend beyond the scope of the current study, further investigations are warranted, particularly in light of the ubiquity

and influence of preelection polling. Future research should attend to these limitations and, in doing so, should take special care in collecting enough data to detect what may be small yet extremely important effects. As noted, our study was able to detect moderate to large effect sizes, but there was inadequate power for the detection of small effect sizes for the full range of analytical techniques we employed. To make even greater progress in our understanding of the differences driving media use habits and political behaviors among individuals contacted via landline versus cellular telecommunications, it is imperative that we conduct studies with sufficient power to utilize the full range of analytical tools at our disposal.

Two of our most interesting and noteworthy findings emerged as we analyzed variables that best predict political media use across the two sampling strata. Our first finding indicated that gender was the best predictor of broadcast TV news use in the cellular group and that the direction of the influence pointed to women consuming this outlet more, which is surprising. The predominant sex difference finding observed in past research consistently indicates men consume more political media than women (Knobloch-Westerwick & Alter, 2007; Pew Research Center for the People and the Press, 2008; Verba et al., 1997). We believe the difference in our findings is due, in part, to the changing face of broadcast TV news. More specifically, the anchor position at each of the three broadcast networks (ABC, CBS, and NBC) has undergone considerable change over the past decade. The retirement of Tom Brokaw (NBC), the departure of Dan Rather (CBS), and the passing of Peter Jennings (ABC) created a period of instability at the anchor position. One way to cope with this uncertainty is to “alter the characteristics of the person chosen for the anchor job” (Meltzer, 2010, p. 45) a tactic the networks appeared to have embraced by having hired Katie Couric (CBS) and Diane Sawyer (ABC), respectively. The networks’ transition to the female anchor dovetailed precisely with the selection of morning news hosts for the evening anchor job (Meltzer, 2010). Given the gender disparity of morning news viewership (i.e., 65% female, 35% male; Pew Research Center for the People and the Press, 2008), it is possible our finding reflects female anchors’ ability to attract more female viewers to the evening news.

A second interesting finding concerns need for cognition serving as the strongest predictor of web news consumption within the cellular stratum. It remains a normative ideal that news media attract an audience that seeks to be engaged. Need for cognition measures the degree to which someone finds pleasure in taking part in cognitive activities. The cellular group was found to rate higher in its need for cognition than the landline group, and age was found to be the driving force behind this difference (i.e., lack of landline vs. cellular differential once age was added as a control).

Individuals high in need for cognition represent an ideal group for news organizations to attract, and it is especially important to stress that need for cognition revealed its strongest predictive value for Web news use. The use of new media outlets requires audience members to be proactive in seeking out and pulling down the content they wish to consume, whereas older media messages (e.g., broadcast TV news) are pushed at this same audience. Audience characteristics associated with the consumption of new media may allow for a new range of political messages (e.g., more central processing-oriented messages within an elaboration-likelihood model framework) to be presented on a more consistent basis and may produce longer-lasting democratic outcomes (Holbert et al., 2010).

The summary judgment offered in this work is that political communication scholarship interested in the study of media needs to begin to incorporate the use of cellular phone technology into the methodologies used to generate samples of a given population. The continued movement toward cellular-only and wireless-mostly lifestyles within the American public has created new circumstances to which the field needs to adapt. The central issue is the age differential between the landline and cellular groups; we need to recognize that media use, being driven so heavily by age, is an area of research that is like a canary in the coal mine. The study of media use is an area of social scientific inquiry that could be among the most immediately impacted by the shifting telecommunications landscape. It is important that we get ahead of the curve and be a leader in the production and refinement of cellular phone sampling techniques. Our area of study requires us to be at the forefront of this issue, and we might as well seize the opportunity while it is at hand.

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