Self-Reported Versus Digitally Recorded: Measuring Political Activity on Facebook

Haenschen, Katherine

Veröffentlichungsversion / Published Version
Zeitschriftenartikel / journal article

Mitglied der
Leibniz-Gemeinschaft

gesis
Leibniz-Institut
für Sozialwissenschaften

Self-Reported Versus Digitally Recorded: Measuring Political Activity on Facebook

Katherine Haenschen[1]

Abstract
Facebook has been credited with expanding political activity by simultaneously lowering barriers to participation and creating new ways to engage. However, many of these findings rely on subjects' abilities to accurately report their Facebook use and political activity on the platform. This study combines survey responses and digital trace data from 828 American adults to determine whether subjects over- or underreport a range of political activities on Facebook, including whether they like political pages or share news links. The results show that individuals underestimate their frequency of status posting and overestimate their frequency of sharing news links on Facebook. Political interest is associated with a decrease in underreporting several political activities, while increasing the likelihood of overreporting the frequency of sharing news links. Furthermore, political interest serves a moderating effect, improving self-reports for high-volume users. The findings suggest that political interest not only predicts political activity but also shapes awareness of that activity and improves self-reports among heavy users.

Keywords
political participation, political interest, social media, Facebook, digital trace data

This article is part of the SSCR special issue on "*Integrating Survey Data and Digital Trace Data*", guest edited by Sebastian Stier, Johannes Breuer, Pascal Siegers (GESIS – Leibniz Institute for the Social Sciences) & Kjerstin Thorson (Michigan State University).

The Internet is credited with enabling new forms of political activity, often consisting of individual expressions within peer networks (Bennett, 2008; Bennett, Wells, & Freelon, 2011). Social science researchers have traditionally measured this activity with surveys, relying on subjects to accurately self-report behaviors (e.g., Gil de Zúñiga, Molyneux, & Zheng, 2014; Vitak et al., 2011). However, digital platforms offer an alternative source of information about online activity: digital trace data (DTD), which refers to data left behind by users of a platform or website

[1] Virginia Tech, Blacksburg, VA, USA

Corresponding Author:
Katherine Haenschen, Virginia Polytechnic Institute and State University, 181 Turner Street NW, Blacksburg, VA 24061, USA.
Email: katherine.haenschen@gmail.com

(Freelon, 2014; Howison, Wiggins, & Crowston, 2011; Jungherr, 2015). A growing body of research explores whether digital traces match up to subjects' own self-reported behavior online and finds a general trend toward overestimation of activity (e.g., Araujo, Wonneberger, Niejens, & de Vreese, 2017; Scharkow, 2016).

Errant self-reporting of political activity on Facebook, the dominant social networking platform in contemporary society, has implications for research that explores whether the platform expands participation. Research shows that individuals who are already politically engaged are more likely to report using Facebook for political activities and that Facebook offers its own unique forms of participation (Casteltrione, 2016; Gil de Zúñiga et al., 2014; Vissers & Stolle, 2014). However, if individuals overestimate their Facebook activity, as is the case with Internet use, mobile phone use, and news exposure (Araujo et al., 2017; Boase & Ling, 2013; Prior, 2009; Scharkow, 2016), this may inflate estimates of the platform's impact, particularly if errors are systematic and related to other political variables of interest.

This article analyzes self-reported and digitally recorded measures of political activity on Facebook from a sample of 828 American adults to determine whether subjects over- or underreport. Subjects provided informed consent before completing a survey and installing an app that collected their DTD. The app retrieved posts made by each subject over the previous 6 months, as well as all pages liked. Both instruments were used to measure whether subjects liked any political pages or shared political content or news links and estimated their frequency of posting status updates and sharing news. The volume of a given behavior, political interest, and demographics are explored to determine whether any predict under- or overreporting.

Results show that individuals tend to underestimate their frequency of status posting and overestimate their frequency of sharing news links on Facebook. Political interest reduces the probability of underreporting several political activities, while increasing the likelihood of overreporting the frequency of sharing news links. Furthermore, high political interest serves a moderating effect by reducing reporting error for high-volume users. Political interest therefore not only predicts political activity but also shapes the awareness of that activity and is capable of improving self-reports. Implications for the study of political activity are discussed.

Literature Review

The measurement of political activity online faces a number of challenges, many of which are endemic to communication research. The following sections review known issues with self-reported and digitally recorded measures, how combining the two obviates some of these issues, and how these challenges directly impact the study of whether digital media is impacting political participation.

Measuring Online Activity

The study of media use often relies on self-reports of behavior, even though those measures can be flawed. Self-reported measures put a tremendous burden on subjects' memory and may be unreliable due to the cognitive complexity of calculating and estimating answers to behavioral survey questions (Prior, 2009; Revilla, Ochoa, & Loewe, 2017; Schwarz & Oyserman, 2001). Random response or transient error may also emerge from subjects' momentary variation in attention, mood, or mental clarity (Schmidt & Hunter, 1999). As a result, subjects commonly overestimate variables such as Internet use or media exposure (Prior, 2009; Scharkow, 2016).

To surmount these problems when measuring online activity, some scholars have turned instead to DTD. DTD are defined as "records of activity . . . undertaken through an online information system" (Howison et al., 2011, p. 769). They are preexisting or found data usually collected through a platform's application programming interface (API) or with specially designed web-scraping tools rather than information generated specifically for research purposes (Jungherr, 2015). Because DTD

documents real human activity (Jungherr, 2015), they have the potential to address some challenges and limitations of self-reports. DTD also offers valuable information about the people who create them (Freelon, 2014), such as their interests and to what they are paying attention (Jungherr & Jürgens, 2013).

However, DTD are not free of bias or error simply because they obviates self-reporting. Jungherr (2018) cautions against assuming DTD and the samples they come from are representative. Digital traces are mediated communication subject to technological constraints and restrictions from platforms about what can be collected and from whom (Jungherr, 2018). Even those traces that can be collected do not have universally agreed-upon interpretations (Freelon, 2014), and in this era of digital misinformation, scholars cannot assume DTD are genuine, as any online metric or measure can be falsified (Karpf, 2012). Processes of collection, cleaning, and analysis may also introduce bias as humans choose which variables to measure and which observations to exclude (Boyd & Crawford, 2012).

One way to address the limitations of self-reported measures and digital traces is to combine them, creating what has been referred to as the "gold standard" of data (Araujo et al., 2017; Kobayashi & Boase, 2012). A number of studies use this approach to studying communication technologies, and across this literature, a trend of overreporting and inverse error has emerged. Subjects tend to overestimate Internet use, though self-reports vary indirectly with actual behavior: higher users underestimate, while lower users overestimate (Araujo et al., 2017; Scharkow, 2016). Mobile phone users overreport their frequency of specific activities such as sending and receiving calls, texts, and e-mails (Boase & Ling, 2013; Kobayashi & Boase, 2012). Users also overestimate their time on social networking sites (SNSs) including Facebook and Twitter (Junco, 2013; Zhou, Bird, Cox, & Brumby, 2013), as well as time spent on e-mail and online search (Junco, 2013). However, Scharkow (2016) found Internet users to be more accurate in reporting SNS activity than general Internet use, likely because most of his sample never used SNS.

Demographically, age and education level have been associated with errant reporting (Araujo et al., 2017; Boase & Ling, 2013; Kobayashi & Boase, 2012), and males may systematically over-report more than females (Boase & Ling, 2013; Scharkow, 2016). However, while demographics explain some error, technology use or social variables tend to be stronger predictors (Boase & Ling, 2013; Kobayashi & Boase, 2012). Asking subjects to self-report their most recent day rather than average behavior offers mixed results: While this improved estimates in Araujo, Wonneberger, Niejens, and de Vreese (2017), it did not in Boase and Ling (2013).

Measuring Political Activity Online

The measurement challenges detailed above are particularly relevant to the study of political activity online, since systematic errors in self-reports may inflate estimates of the impact of digital media on participation. This has direct implications for the debate regarding whether social and digital media are expanding political engagement or replicating structures that predict offline participation (Bennett, 2008; Schlozman, Verba, & Brady, 2010).

While many studies explore political activity on Facebook, this literature is characterized by a lack of consistent measures (Boulianne, 2015; Gibson & Cantijoch, 2013; Vissers & Stolle, 2014). Traditionally, political participation refers to actions intended to influence political outcomes such as electoral or issue campaigning, protesting, or contacting officials; recently, however, digital media has expanded the range of activities considered to be political (Dahlgren, 2005; van Deth, 2015; Verba, Schlozman, & Brady, 1995). In addition to traditional behaviors, measures of online political activity may include discussion (Casteltrione 2016; Vitak et al., 2011), expressing one's opinion or support (Casteltrione, 2016; Gibson & Cantijoch, 2013; Gil de Zúñiga et al., 2014; Gil de Zúñiga, Veenstra, Vraga, & Shah, 2010), and sharing news links (Gibson & Cantijoch, 2013; Kwon,

Moon, & Stefanone, 2015; Vitak et al., 2011). Many studies include measurements of general SNS use as well (Boulianne, 2015). Self-reports of behavioral frequency are often measured using ordinal scales (e.g., Gil de Zúñiga et al., 2010), though one noteworthy departure is found in Kwon et al. (2015, p. 1424), which asks subjects to count their number of "politics-related posts" made on Facebook in the last month. Political activities may also be measured as part of multiple-item scales (e.g., Gil de Zúñiga et al., 2010; Vitak et al., 2011).

The use of DTD can address some of these issues by measuring actual behavior, as can combining DTD with survey responses. Several studies use Facebook DTD to explore commenting behaviors on newspaper, campaign, and governmental Facebook pages (Bossetta, Segensten, & Trenz, 2018; Halpern & Gibbs, 2013). Facebook's internal data science team has used DTD to predict users' partisanship and related behavior (Bakshy, Messing, & Adamic, 2015; Bond & Messing, 2015). Other research has combined survey responses and DTD from Facebook users. One study of American college students found that self-reported news interest was positively associated with the number of political pages an individual liked and number of news words in friends' posts (Wells & Thorson, 2015). A study of Danish adults determined that likes on political page posts can predict partisanship in a multiparty system better than demographics and self-reported issue positions (Kristensen et al., 2017). Another analysis tracked browser activity of American adults and determined that Facebook was a major conduit to "fake news" during the 2016 election and that self-reported Trump supporters were statistically more likely to be exposed to fake news online (Guess, Nyhan, & Reifler, 2018).

Hypotheses and Research Questions

This article contributes to this research area by analyzing whether self-reports of political activity correspond to users' DTD. Based on prior studies comparing self-reports and DTD across a range of media and activities (Araujo et al., 2017; Junco, 2013; Kobayashi & Boase, 2012; Prior, 2009; Scharkow, 2016), two hypotheses are proposed:

Hypothesis 1: Self-reports of Facebook activity will be positively correlated with DTD measures.
Hypothesis 2: Self-reports of Facebook activity will overestimate actual behavior.

Furthermore, frequency of a behavior appears to impact the direction of error in self-reports: people overestimate the frequency of rare behaviors and underestimate those that are more frequent (Araujo et al., 2017; Scharkow, 2016; Schwarz & Oyserman, 2001). This forms the basis of a research question:

Research Question 1: Is there a relationship between the amount of Facebook activity and accuracy of self-reports?

The recency effect may also distort estimations of behaviors across a longer period of time: Subjects often assume that their current behaviors are representative of their behaviors in the past (Schwarz & Oyserman, 2001). Araujo et al. (2017) found that asking subjects about Internet use on a "typical" day improved accuracy over asking about "yesterday;" and Boase and Ling (2013) found that asking "how often" outperformed asking about "yesterday." In this study, it is possible to compare self-reports to only the most recent month of collected DTD, leading to another research question:

Research Question 2: Are self-reports more highly correlated with DTD from the most recent month of data collected or the overall 6-month period?

Political interest has been shown to predict political behavior generally (Prior, 2010) and on Facebook (Vitak et al., 2011), as well as exposure to political content online (Wells & Thorson, 2015). Furthermore, political interest has a moderating effect on the use of digital media for political outcomes that varies based on the measured activity (Bimber, Cunill, Copeland, & Gibson, 2015). Thus, political interest may also predict awareness or attention to one's own political activity and play a role in explaining discrepancies between self-reported and DTD measures. A research question is posed:

Research Question 3: Does political interest predict discrepancies between self-reported and digitally recorded measures of Facebook activity?

One benefit of combining survey and DTD measures is the ability to include demographic variables in analysis, potentially addressing Jungherr's (2018) "n=all" fallacy. Previous research has found age, education level, and sex to be inconsistently predictive of errant self-reporting (Araujo et al., 2017; Boase & Ling, 2013; Kobayashi & Boase, 2012; Scharkow, 2016). A final research question is posed:

Research Question 4: Do demographic variables predict discrepancies between self-reported and digitally recorded measures of Facebook activity?

Method

An English-language survey and Facebook app developed for research purposes were used to collect both self-reported and DTD measures of political activity from 828 American adults. The app was built by a developer to comply with institutional review board guidelines[1] and Mechanical Turk (MTurk) rules that forbid the collection of personally identifying information (PII). Subjects gave informed consent to the survey and app and completed a screener about Facebook usage, demographics, and willingness to install the app. Only subjects who self-reported using Facebook at minimum once a week and agreed to install the app advanced to the study.

The combined instrument was deployed on MTurk between December 29, 2016, and January 2, 2017. Once subjects finished the survey, they were directed to a page where they installed the app, which collected all pages already liked by the subject, all posts made by the subject from May 14, 2016, through November 15, 2016, and network size. This time frame was chosen to capture evidence of political activity during the run-up to an election period; due to rate limitations on the API, only a 6-month period of posts could be collected. Subjects who completed the survey and app install were compensated USD$2.01 for their time.

Participants

A convenience sample was recruited from MTurk from users who specified a location in the United States and had a prior HIT approval rate greater than or equal to 90%. While prior survey-DTD studies use convenience samples from students (Junco, 2013; Wells & Thorson, 2015; Zhou et al., 2013), this study extends that work by using a larger sample with a broader age range. A total of 828 subjects completed the survey and installed the app. Respondents were aged 20–69 ($M = 35.73$, $SD = 10.3$); 62.4% were female and 37.4% male. The higher share of female participants reflects both Facebook user statistics (Bond & Messing, 2015; Greenwood, Perrin, & Duggan, 2016) and

MTurk worker demographics (Difallah, Filatova, & Ipierotis, 2018). Respondents' race and ethnicity were 11.96% African American, 7.72% Hispanic or Latino, 6.76% Asian, 1.57% Native American, 67.15% Caucasian non-Hispanic, and 4.83% multiple races or "Other." In terms of education, 10.00% reported earning a high school diploma or less, 28.02% completed some college; 13.77% earned an associate's degree; 34.66% had a bachelor's degree; and 13.53% earned a graduate degree. The app reported that subjects had an average of 387.27 Facebook friends ($SD = 505.94$, range 0-4,969).

Measurement Approach

This study follows Vissers and Stolle (2014) in utilizing an intentionally expansive definition of political activity to encompass participatory and expressive behaviors. For this analysis, only activities that were both measured by the survey and captured by the app will be considered. The app collected data about user behavior that left a trace on the subject's own Facebook profile. Due to privacy concerns and the need to comply with MTurk's prohibition on collecting PII, the app did not collect measures such as whether subjects commented on posts from friends or pages, nor did it collect the contents of their newsfeed. Facebook activities measured in this study include the frequency of status posting and news sharing, and whether subjects liked any political pages, shared any news links, or shared any political page content.[2]

Survey Measurements

Self-reported measures were collected using a survey. Ordinal responses were used to measure subjects' self-reported frequency of posting on Facebook[3] (6 = *two or more times per day*, 5 = *once a day*, 4 = *2–3 times per week*, 3 = *1 time per week*, 2 = *2–3 times per month*, 1 = *1 time per month or less*) and self-reported frequency of posting news links on Facebook (6 = *2 or more times per day*, 5 = *once a day*, 4 = *2–3 times per week*, 3 = *1 time per week*, 2 = *2–3 times per month*, 1 = *1 time per month or less*). Following Scharkow (2016), for purposes of analysis, Categories 3 and 4 were collapsed into one measure, "weekly," and Category 2 into "monthly." The median self-reported value was "weekly" for status posting and "monthly" for news link sharing.

Binary measures were used for self-reports of whether subjects had, in the last year, (a) "like[d] the Facebook page for a candidate, elected official, or political organization" (referred to henceforth as a political page), (b) "share[d] a post" from a political page, or (c) "post[ed] a link to a news article on your own Facebook page." Distributions of responses are reported in Table 1. Political interest was measured on a 5-point ordinal scale asking "how often do you follow what's going on in politics and government" with responses ranging from *hardly at all* (1) to *all of the time* (5) ($M = 3.51, SD = 1.06$).

Digital Trace Measures

Total status updates. Each individual's total number of status updates made during the 6 months and last month of data collected were calculated using the time stamp of the post.

Posting frequency. Overall posting rate was calculated by dividing the total number of posts by the number of days in the study (185). The most recent 1-month rate was calculated by dividing total posts made in the last month by 31.

Total news links shared. The app returned URLs of shared web content, thus links were coded as news based on key terms in the web address rather than page content, based on prior work (Bakshy et al., 2015; Guess, 2018). Coding was designed to capture the presence of hard news. First, links were

Table 1. Descriptive Percentages of Survey and DTD Measures and Accuracy Rates.

Frequency Measures

Status posting	Self-Report	DTD	Difference
> Daily	21.0	27.9	−6.9
Daily	10.0	14.7	−4.6
Weekly	36.3	27.3	9.0
Monthly	15.4	18.9	−3.5
Once a month or less	17.2	11.2	6.0
News link posting	Self-Report	DTD	Difference
>Daily	9.8	0.0	9.8
Daily	6.7	0.3	6.4
Weekly	29.1	4.1	25.0
Monthly	16.3	12.5	3.8
Once a month or less	38.1	83.1	−45.0
Binary measures	Self-Report	DTD	Difference
Like any political pages	53.2	63.0	−9.8
Share any news links	68.3	60.0	8.3
Share pol. page posts	39.0	40.5	−1.5
Overall accuracy	Under	Correct	Over
Status posting	40.7	40.0	19.3
News link posting	0.6	41.1	58.3
Like any political pages	20.4	69.1	10.6
Share any news links	9.9	71.9	18.2
Share pol. page posts	16.1	69.3	14.6

coded based on (a) whether the domain was a media organization or not, and (b) the URL's first path or section heading, with those containing words such as news, politics, or election categorized as news (i.e., washingtonpost.com/news/). As Guess (2018) explains, this coding reflects the judgment of news editors about where content fits in a paper. Additionally, URLs were searched for strings related to hard news (i.e., "Trump," "Clinton," "Congress") and non-hard news (e.g., "recipe," "sports," "coupon," "celebrity") and coded accordingly. URLs from media outlets containing hard news words were coded as news; the number of news links shared by each subject was then calculated. Note that a similar key word–based approach was used by Wells and Thorson (2015) who searched for 22 news related terms in Facebook newsfeed content.

News sharing frequency. News sharing rate was calculated by dividing each subject's total number of news links shared by the number of days in the study (185). The most recent 1-month rate was calculated by dividing that number of links shared by 31.

Sharing news links. Subjects who shared any news links were coded as 1, otherwise 0.

Total pages liked. Subjects liked 141,693 distinct Facebook pages; the number of pages liked by each subject was calculated. Mean likes per liked page was 1.63 (*SD* = 3.00).

Total pages coded. Due to capacity, only the 25,080 Facebook pages liked by two or more subjects were coded; pages that were about a political candidate, group, topic, or elected official were coded as political.[4] Pages for news entities were not included in this measure.

Like any political page. Subjects who liked any page deemed political were coded as 1, otherwise 0.

Sharing political page posts. Shared page posts on Facebook were coded as political or not based on the source page. A total of 29,014 page posts were shared by subjects; 9% came from pages coded as political. Subjects who shared any political page post were coded as 1, otherwise 0.

Comparison Measures

Survey responses and digital trace measures were combined to create measures of over- or under-reporting. For frequency variables, the average rate of status posting and news link posting was mapped onto ordinal categories from self-reports, following the approach in Scharkow (2016). A daily rate below 1/30 (i.e., one or fewer days in a 30-day period) mapped to "once a month or less." A daily rate between 1/30 and less than 4/30 (fewer than 4 days per month) corresponded to "monthly." A daily rate between 4/30 and less than 4/7 (i.e., less than 4 times per week) mapped to "weekly." A daily rate of 4/7 to 1 corresponded to "daily," and any average rate greater than 1 corresponded to "more than daily."

Next, subjects' self-reported ordinal measures were compared to those calculated from their DTD; subjects whose DTD showed a lower frequency of activity were categorized as overreporting (e.g., subject self-report is daily but DTD measure is monthly), those whose DTD showed a higher frequency of activity as underreporting, and those whose estimates matched as correctly self-reporting.

For each of the binary behavioral variables—liking any political pages, sharing any news, and sharing any political page posts—if a subject self-reported a behavior that was not found in their DTD they were categorized as overreporting for that activity, subjects who did not self-report a behavior reflected in their DTD as underreporting, and the remainder—both DTD and self-report showed the subject as either doing or not doing the activity—as correct.

Demographic Measures

Subjects' age, sex, and education level were taken from survey responses. Education was recoded into an ordinal variable: 1 = *high school diploma or some high school*, 2 = *some college but no degree*, 3 = *associate's degree*, 4 = *bachelor's degree*, 5 = *master's degree*, 6 = *doctoral or professional degree*.

Results

First, descriptive statistics for all measures are calculated to detect trends in over- and underreporting, as well as accuracy. Next, correlations are used to compare self-reported and digitally recorded measures (Junco, 2013; Scharkow, 2016), and multinomial regression to model patterns of under- and overreporting (Boase & Ling, 2013; Scharkow, 2016). To compare strength of correlations, the cocor package version 1.1-3 in R (Diedenhofen & Musch, 2015) is utilized.

Comparison of Self-Reported and Digitally Recorded Measures

Descriptive statistics were calculated for survey and DTD measures, as well as error rate and percentage over- and underreporting, presented in Table 1. While the tendency in the frequency of status posting is to underreport, for news sharing the trend is to overreport (Hypothesis 2). Accuracy of self-reported binary measures was generally higher than that of frequency measures.

Self-Reported Versus Digitally Recorded Posting Frequency

A series of Spearman correlations were performed that show positive and significant correlations between survey and DTD measures supporting Hypothesis 1; a correlation table is reported in Appendix A of the Online Supplement. A significant and positive correlation was found between self-reported and digitally recorded frequency of status posting for the entire 6-month period, $r(775) = .62, p < .001$, as well as for the most recent 1 month, $r(775) = .59, p < .001$; supporting Hypothesis 1. Coefficients in the .60 range suggest a moderate to strong relationship between self-reported and digitally recorded frequency of posting. A significant and positive correlation was also found between self-reported and digitally recorded frequency of news link posting overall, $r(775) = .51$, $p < .001$, and in the most recent month of data, $r(775) = .43, p < .001$; supporting Hypothesis 1. A comparison of correlations (Diedenhofen & Musch, 2015) found the relationship between self-report frequency and overall DTD to be significantly stronger than that from the most recent month for both status posting ($p < .05$) and news link sharing ($p < .001$), addressing Research Question 2.

A series of multinomial regressions were performed to determine whether activity volume, political interest, or demographics predicted over- and underreporting of frequency, reported in Table 2. Results show an inverse relationship: As an individual's number of posts increases, they are more likely to underreport their frequency of posting status updates and less likely to overreport, addressing Research Question 1. Individuals high in political interest were marginally less likely to underreport, addressing Research Question 3; older individuals and those with higher levels of education were more likely to overreport, addressing Research Question 4. For news sharing frequency, only five subjects underreported, thus only overreporting is reported in Table 2. Here, the number of news links shared and status updates posted both predicted overreporting, addressing Research Question 1, as did political interest, addressing Research Question 3. However, an interaction between political interest and news links shared finds that individuals who are higher in political interest are less likely to overreport than high-volume link sharers who are low in political interest.

Self-Reported Versus Digitally Recorded Political Activity

Pearson correlations were performed to ascertain direction and strength of any correlation between self- and digitally recorded political activities; results are in Appendix A of the Online Supplement.[5] All were positive and significant (supporting Hypothesis 1): liking any political pages, $r(725) = .38$, $p < .001$, sharing any news links, $r(695) = .40, p < .001$, and sharing any political page posts, $r(695) = .36, p < .001$. While self-reports were also correlated with DTD from the most recent month (sharing any news, $r(695) = .32, p < .001$, sharing any political page post, $r(695) = .30, p < .001$), correlations between self-reports and the overall 6-month period were stronger.[6]

Multinomial logistic regressions explored whether variables predict under- or overreporting of liking political pages. Both total pages coded and total pages liked were used as independent variables; results are reported in Table 3. A higher number of pages liked decreased the probability of overreporting; a lower number increased the probability of overreporting, (addressing Research Question 1). Political interest predicted lower probabilities of underreporting and moderated the relationship between the number of pages liked and underreporting, improving self-reports for people who liked more pages, addressing Research Question 3. Education marginally improved self-reporting in several models, addressing Research Question 4.

In terms of sharing any news links, a higher number of Facebook posts was associated with lower rates of overreporting. Political interest reduced the probability of underreporting and moderated the effect of posting on under- and overreporting, addressing Research Question 1 and 3; results are reported in Table 4. For sharing any political page posts, overall status posting increased the

Table 2. Predictors of Over- and Underreporting of Facebook Frequency Variables, Multinomial Logistic Regression.[a]

	Self-Report: Frequency of Status Posting		Self-Report: Frequency of News Sharing		
	Under	Over	Over (A)	Over (B)	Over (C)
Count of status updates	1.002** (1.001–1.004)	0.99*** (0.99–0.99)			1.01*** (1.01–1.01)
Count of news links shared			1.02* (1.00–1.04)	1.15* (1.03–1.28)	1.27** (1.09–1.48)
Pol. interest	0.87† (0.74–1.02)	1.06 (0.87–1.30)	1.32*** (1.14–1.53)	1.40*** (1.20–1.63)	
News links × pol. interest				0.98* (0.95–1.00)	
Age	1.00 (0.99–1.02)	1.03** (1.01–1.05)	1.00 (0.99–1.02)	1.00 (0.99–1.01)	1.00 (0.98–1.01)
Sex (M)	0.94 (0.67–1.33)	1.25 (0.81–1.91)	0.82 (0.60–1.11)	0.83 (0.61–1.13)	1.20 (0.85–1.68)
Education	0.97 (0.86–1.10)	0.82* (0.70–0.98)	0.92 (0.82–1.03)	0.90 (0.82–1.03)	1.03 (0.91–1.17)
(Intercept)	1.24 (0.55–2.79)	0.42 (0.15–1.20)	0.69 (0.33–1.47)	0.55 (0.25–1.20)	0.26*** (0.11–0.58)
Nagelkerke R^2	.159		.062	.075	.222

Note. $n = 777$.

[a]Tables present odds ratios and their 95% confidence intervals. Odds ratios represent the relative risk for under- or overreporting compared to reporting correctly; coefficients above 1 indicate that the independent variable increases the probability of that outcome; coefficients under 1 indicate that the IV decreases that probability. Here, for instance, every additional status posted increases the probability that subjects will underreport their status posting frequency by 0.2% rather than correctly self-report. Underreporting of news sharing is not reported since only five subjects underreported, thus the sample is too small for analysis.

†$p < .1$. *$p < .05$. **$p < .01$. ***$p < .001$.

Table 3. Predictors of Over- and Underreporting of Liking Political Pages, Multinomial Logistic Regression.[a]

	Self-Report: Liking Any Political Pages, Coded Pages Liked Only				Self-Report: Liking Any Political Pages, Total Pages Liked			
	Under (A)	Over (A)	Under (B)	Over (B)	Under (A)	Over (A)	Under (B)	Over (B)
Count of coded pages liked	1.00† (1.00–1.00)	0.99** (0.99–0.99)	1.01*** (1.01–1.02)	1.00 (0.99–1.01)				
Count of total pages liked					1.00 (1.00–1.00)	0.996*** (0.99–0.10)	1.005*** (1.00–1.01)	1.00 (1.00–1.01)
Pol. interest	0.72*** (0.60–0.87)	0.97 (0.75–1.24)	1.08 (0.82–1.42)	1.19 (0.84–1.68)	0.73*** (0.61–0.87)	0.97 (0.75–1.23)	1.07 (0.87–1.30)	1.24† (0.97–1.60)
Coded pages liked × pol int.			0.997*** (0.99–0.99)	1.00 (0.99–1.00)				
Total pages liked × pol int.							0.999*** (0.998–0.999)	0.999* (0.997–1.00)
Age	1.004 (0.99–1.02)	0.99 (0.96–1.01)	1.00 (0.99–1.02)	0.99 (0.97–1.01)	1.00 (0.99–1.02)	0.99 (0.97–1.02)	1.00 (0.99–1.02)	0.99 (0.97–1.02)
Sex (M)	1.12 (0.74–1.68)	1.47 (0.88–2.45)	1.09 (0.72–1.64)	1.47 (0.88–2.46)	1.09 (0.72–1.63)	1.47 (0.88–2.46)	1.08 (0.72–1.62)	1.48 (0.89–1.46)
Education	0.99† (0.86–1.15)	0.83 (0.68–1.01)	0.99 (0.85–1.15)	0.82† (0.67–1.01)	0.99 (0.85–1.14)	0.84† (0.69–1.03)	0.98 (0.86–1.13)	0.84† (0.69–1.02)
(Intercept)	0.64 (0.24–1.70)	0.92 (0.25–3.36)	0.17** (0.05–0.57)	0.45 (0.10–2.09)	0.73 (0.28–1.90)	0.77 (0.21–2.78)	0.20** (0.19–0.20)	0.31*** (0.31–0.33)
Nagelkerke R²	.128		.154		.118		.143	

Note. n = 727.

[a]Tables present odds ratios and 95% confidence intervals; odds ratios represent the relative risk for under- or over reporting, with coefficients above 1 indicating an increase in probability, and under 1 indicating a decrease.

†p < .1. *p < .05. **p < .01. ***p < .001.

Table 4. Predictors of Over- and Underreporting of Binary Activity Variables, Multinomial Logistic Regression.[a]

	Self-Report: Share Any News Links				Self-Report: Share Political Page Posts			
	Under (A)	Over (A)	Under (B)	Over (B)	Under (A)	Over (A)	Under (B)	Over (B)
Count of status updates	1.00 (1.00–1.00)	0.99*** (0.99–1.00)	1.01† (1.00–1.02)	1.00 (0.99–1.01)	1.01*** (1.00–1.01)	1.00 (1.00–1.00)	1.01*** (1.01–1.02)	1.01** (1.00–1.02)
Pol. interest	0.73* (0.57–1.04)	0.90 (0.74–1.10)	0.97 (0.0.67–1.40)	1.05 (0.81–1.37)	0.80* (0.65–0.99)	1.21† (0.97–1.51)	1.00 (0.70–1.42)	1.66** (1.21–2.28)
Status updates × pol. interest			0.998† (0.996–1.00)	0.998† (0.996–1.00)			0.998† (0.99–1.00)	0.997*** (0.99–0.999)
Age	1.01 (0.99–1.04)	1.00 (0.98–1.02)	1.01 (0.99–1.04)	1.00 (0.98–1.02)	1.01 (0.99–1.03)	0.99 (0.97–1.01)	1.01 (0.99–1.03)	0.99 (0.97–1.01)
Sex (M)	1.18 (0.68–2.05)	0.80 (0.52–1.23)	1.20 (0.69–2.09)	0.80 (0.52–1.24)	1.00 (0.62–1.62)	1.43 (0.91–2.4)	1.03 (0.63–1.66)	1.48† (0.94–2.33)
Education	0.91 (0.74–1.12)	0.81* (0.69–0.96)	0.91 (0.74–1.12)	0.81* (0.69–0.95)	1.03 (0.87–1.22)	1.02 (0.86–1.21)	1.03 (0.87–1.22)	1.02 (0.86–1.22)
Intercept	0.33† (0.09–1.18)	1.55 (0.56–4.32)	0.13* (0.03–0.63)	0.89 (0.27–2.92)	0.15*** (0.05–0.45)	0.13*** (0.04–0.40)	0.07*** (0.02–0.31)	0.04*** (0.01–0.16)
Nagelkerke R²	.097		.107		.094		.110	

Note. n = 697.

[a]Tables present odds ratios and 95% confidence intervals; odds ratios represent the relative risk for under- or overreporting, with coefficients above 1 indicating an increase in probability, and under 1 indicating a decrease.

†p < .1. *p < .05. **p < .01. ***p < .001.

probability of under- and overreporting, addressing Research Question 1; however, political interest reduced underreporting and moderated the effect of posting on under- and overreporting, addressing Research Question 3. Education decreased the probability of overreporting sharing news links, addressing Research Question 4, and males were marginally more likely to overreport sharing political page posts, addressing Research Question 3.

Discussion

While research subjects are moderately successful at self-reporting political activity on Facebook, the frequency of a given activity and political interest both play a role in inflating self-reports of behavior. This study expands our knowledge of how well individuals self-report digital behavior, building on previous work exploring Internet use, mobile phone use, and general SNS use (Araujo et al., 2017; Boase & Ling, 2013; Junco, 2013; Kobayashi & Boase, 2012; Scharkow, 2016) by considering the specific case of political activity on Facebook. The results have consequences for communication research, since the same variable that predicts increased self-reported and digitally recorded behavior—political interest—also predicts and moderates the propensity to errantly self-report. These topics are discussed in turn below.

While each pair of survey and DTD measures is significantly and positively correlated, providing support for Hypothesis 1, all of the coefficients are below the .70 threshold, indicating moderate relationships. These findings echo results found across the comparison of survey and DTD measures (Boase & Ling, 2013; Junco, 2013). Correlations for the overall time period were higher than those for the most recent month of data, offering no evidence of recency bias in self-reporting and thus addressing Research Question 2. No clear demographic pattern emerged in reducing reporting error, though people with higher levels of education often had lower probabilities of under- and over-reporting, echoing Araujo et al. (2017).

Frequency of status posting, measured by calculating the average daily rate of each subject's posts, follows the same pattern as Internet use (Araujo et al., 2017; Scharkow, 2016): More frequent users were prone to underreport, whereas less frequent users tended to overreport. Political interest played a marginal role here, likely because the act of posting a Facebook status is not inherently political. Frequency of sharing news links follows a similar pattern: The behavior itself is relatively infrequent, yet subjects overestimate the rate at which they do it. This echoes Schwarz and Oyserman (2001), who find that people overreport rare behaviors. Furthermore, as subjects' actual news link sharing or general status posting increased, so did their probability of overreporting sharing news, suggesting that overreporting is worse among the most active Facebook status posters and link sharers. However, in terms of sharing any news links, increased number of total status posts reduced the probability of overreporting, likely because more active users were likely to have posted at least one link that was coded as news. Conversely, for sharing any political page posts, a higher number of status updates predicted both over- and underreporting, though this effect was moderated by political interest, which the following section explores.

Political interest played a key role in predicting whether subjects were likely to over- or under-report political activities, likely because it makes subjects more aware of political content. Across all activities measured, high political interest reduced the probability of underreporting. However, high political interest significantly increased the probability that subjects would overreport their frequency of news link sharing, such that an increase in one ordinal level of interest predicted a 27–40% increase in the probability of overreporting news link frequency, as well as marginally increased the probability of overreporting sharing any political page posts. An interaction model further illuminates the role played by political interest: It moderates downward the error in self-reporting associated with high levels of actual activity to improve estimates. For frequency of news sharing, sharing any news links, sharing any political page posts, or liking any political pages, high

political interest reduces the probability of errant reporting that results from high levels of posting. These results suggest that individuals high in political interest are simply more aware of either their own political activity or what counts as "political," such that it reduces underreporting, and reduces error in self-reports that arises from high levels of activity.

Theoretical Contribution

Political interest is understood as a major predictor of individuals' likelihood of engaging in political activity (Prior, 2010). These findings expand our theoretical understanding of how political interest functions: it predicts not only political activity, but also subjects' ability to correctly self-report it. In this study, higher political interest generally reduced the probability of underreporting, suggesting that it makes individuals more aware of ever engaging in political activity. Conversely, individuals high in political interest were more likely to overestimate sharing political page posts and the frequency with which they share news. Such individuals may pay more attention to the news they see in their feeds or have similar friends who share more news (Wells & Thorson, 2015), leading them to overreport. They may also simply view themselves as individuals who share news at a high rate.

Results suggest that the politically interested not only behave differently, they are differentially self-aware. Generally, those higher in political interest were better able to self-report ever doing specific political activities and were more accurate than other high-volume users with lower levels of interest. Scholars of political communication need to further consider the degree to which political interest predicts not only subjects' political behaviors but also their ability to recall them or perhaps even recognize them as political.

Methodological Contributions

Most scholars have neither the budget nor ability to collect DTD from research subjects, thus suggestions are offered for reducing error in self-reported measures. Subjects were more accurate in self-reporting binary activities than frequency estimates, suggesting that researchers should ask subjects if they have ever done an activity instead of how often. That said, political interest reduces underreporting of these activities, so item scales of these measures likely underestimate the activity of the less interested. If frequency must be measured, note that individuals overreport news sharing and underreport status posting. A measure adapted from Kwon et al. (2015), which asks subjects to count their political posts on Facebook over a given time period, may provide a more objective measure—though in this study, self-reports were more weakly correlated with the most recent month than the overall time period. At minimum, scholars should control for political interest and explore its moderating effects, given its ability to reduce reporting error that comes from high interest and high-posting frequency.

Limitations and Next Steps

This study is not without limitations. The app collected users' DTD created in the period of May 14–November 15, 2016, but did not collect DTD created after November 16 through December 29 when the survey commenced. Subjects' behaviors may have changed in the month prior to the survey in the aftermath of the 2016 election. Replicating this study outside of an election season would show whether campaign contexts impact behaviors and self-report activity. Furthermore, while this study relies on a hard/soft news categorization used in prior studies (Bakshy et al., 2015; Guess, 2018), other conceptualizations of "news" exist (Vraga, Bode, Smithson, & Troller-Renfree, 2016) that

may categorize more posts as news and reduce overreporting. The rich data generated for this study offer potential to investigate such measurement challenges further.

Conclusion

Researchers investigating the impact of Facebook use on political participation often rely on subjects' abilities to correctly self-report behavior. The importance of this research agenda to modern democracy cannot be overstated, thus it is imperative to understand how well self-reports align with actual activity. This study demonstrates that individuals routinely underestimate frequent activities and overestimate rare ones, following a pattern found in prior research. While political interest generally improves self-reporting and moderates the effect of high activity, it also increases the probability of overreporting frequency of news sharing. Finally, political interest not only predicts whether individuals will engage in political activity but also whether they are aware of such behaviors and can report them correctly.

Authors' Note

Declaration of Conflicting Interests

Funding

Supplemental Material

Supplemental material for this article is available online.

Notes

1. This study was reviewed and approved by the Institutional Review Board of Princeton University.
2. While posting a status is not inherently political, general Facebook use is often used in studies that predict political participation (Boulianne, 2015).
3. "On average, how often do you post content on your own Facebook page, by doing things like writing a status update or sharing a photo or video?"
4. Coding over 25,000 Facebook pages presented logistical challenges. The most-liked pages in the data set were used to create a qualification task to recruit MTurk workers to code the data. Political pages were those for "political candidates, elected officials, political or advocacy groups, [or] political ideas." MTurk workers (excluding anyone who completed the underlying study) who correctly coded at least 97% of the task qualified to code pages in the full data set. Budget-wise, it was not feasible to pay two workers to code every piece of data; thus data sets were seeded with previously coded pages to track ongoing accuracy, and every code was reviewed before approval. Incorrect codes were rejected, and MTurk workers who fell below 97% accuracy lost their qualification. Overall, only 2.21% of codes were rejected, suggesting a reliable coding scheme. Note that pages for media and news organizations are not included in this measure, as the

corresponding survey question asked subjects if they liked any pages for a "candidate, elected official, or political organization," not a news or media organization.
5. Analysis is conducted on subjects who completed a survey battery on political activities and provided DTD. The survey battery measuring activities on Facebook included an attention check; subjects who did not pass the attention check gave contradictory answers (for instance, selecting one or more behaviors and "none") or only selected the attention check, or neither any listed activities nor "none" were dropped from analysis.
6. Calculated using Diedenhofen and Musch (2015): sharing any news ($p < .001$), sharing political page posts ($p < .10$).

References

Araujo, T., Wonneberger, A., Neijens, P., & de Vreese, C. (2017). How much time do you spend online? Understanding and improving the accuracy of self-reported measures of internet use. *Communication Methods and Measures*, *11*, 173–190.

Bakshy, E., Messing, S., & Adamic, L. A. (2015). Exposure to ideologically diverse news and opinion on Facebook. *Science*, *348*, 1130–1132.

Bennett, W. L. (2008). Changing citizenship in the digital age. In W. L. Bennett (Ed.), *Civic life online: Learning how digital media can engage youth* (pp. 1–24). Cambridge, MA: MIT Press.

Bennett, W. L., Wells, C., & Freelon, D. (2011). Communicating civic engagement: Contrasting models of citizenship in the youth web sphere. *Journal of Communication*, *61*, 835–856.

Bimber, B., Cunill, M. C., Copeland, L., & Gibson, R. (2015). Digital media and political participation: The moderating role of political interest across acts and over time. *Social Science Computer Review*, *33*, 21–42.

Boase, J., & Ling, R. (2013). Measuring mobile phone use: Self-report versus log data. *Journal of Computer-Mediated Communication*, *18*, 508–519.

Bond, R., & Messing, S. (2015). Quantifying social media's political space: Estimating ideology from publicly revealed preferences on Facebook. *American Political Science Review*, *109*, 62–78.

Bossetta, M., Segesten, A. D., & Trenz, H. J. (2018). Political participation on Facebook during Brexit. *Journal of Language and Politics*, *17*, 173–194.

Boulianne, S. (2015). Social media use and participation: A meta-analysis of current research. *Information, Communication & Society*, *18*, 524–538.

boyd, D., & Crawford, K. (2012). Critical questions for big data: Provocations for a cultural, technological, and scholarly phenomenon. *Information, Communication & Society*, *15*, 662–679.

Casteltrione, I. (2016). Facebook and political participation: Virtuous circle and participation intermediaries. *Interactions: Studies in Communication & Culture*, *7*, 177–196.

Dahlgren, P. (2005). The Internet, public spheres, and political communication: Dispersion and deliberation. *Political Communication*, *22*, 147–162.

Diedenhofen, B., & Musch, J. (2015). cocor: A comprehensive solution for the statistical comparison of correlations. *PLoS One*, *10*, e0121945.

Difallah, D., Filatova, E., & Ipeirotis, P. (2018, February). Demographics and dynamics of Mechanical Turk workers. In *Proceedings of the Eleventh ACM International Conference on Web Search and Data Mining*, Marina Del Rey, CA, USA, 5–9 February 2018, pp. 135–143. ACM.

Freelon, D. (2014). On the interpretation of digital trace data in communication and social computing research. *Journal of Broadcasting & Electronic Media*, *58*, 59–75.

Gibson, R., & Cantijoch, M. (2013). Conceptualizing and measuring participation in the age of the internet: Is online political engagement really different to offline? *The Journal of Politics*, *75*, 701–716.

Gil de Zúñiga, H., Molyneux, L., & Zheng, P. (2014). Social media, political expression, and political participation: Panel analysis of lagged and concurrent relationships. *Journal of Communication*, *64*, 612–634.

Gil de Zúñiga, H., Veenstra, A., Vraga, E., & Shah, D. (2010). Digital democracy: Reimagining pathways to political participation. *Journal of Information Technology & Politics*, *7*, 36–51.

Greenwood, S., Perrin, A., & Duggan, M. (2016). Social media update 2016. *Pew Research Center*. Retrieved from http://www.pewinternet.org/2016/11/11/social-media-update-2016/

Guess, A. (2018). (Almost) everything in moderation: New evidence in Americans' online media diets (Working Paper) Retrieved from https://webspace.princeton.edu/users/aguess/Guess_OnlineMediaDiets.pdf

Guess, A., Nyhan, B., & Reifler, J. (2018). Selective exposure to misinformation: Evidence from the consumption of fake news during the 2016 US presidential campaign. Retrieved from https://www.dartmouth.edu/∼nyhan/fake-news-2016.pdf

Halpern, D., & Gibbs, J. (2013). Social media as a catalyst for online deliberation? Exploring the affordances of Facebook and YouTube for political expression. *Computers in Human Behavior*, *29*, 1159–1168.

Howison, J., Wiggins, A., & Crowston, K. (2011). Validity issues in the use of social network analysis with digital trace data. *Journal of the Association for Information Systems*, *12*, 767.

Junco, R. (2013). Comparing actual and self-reported measures of Facebook use. *Computers in Human Behavior*, *29*, 626–631.

Jungherr, A. (2015). *Analyzing political communication with digital trace data*. Cham, Switzerland: Springer.

Jungherr, A. (2018). Normalizing digital trace data. In N. J. Stroud & S. McGregor (Eds.), *Digital discussions: How big data informs political communication*. New York, NY: Routledge.

Jungherr, A., & Jürgens, P. (2013). Forecasting the pulse: how deviations from regular patterns in online data can identify offline phenomena. *Internet Research*, *23*, 589–607.

Karpf, D. (2012). Social science research methods in Internet time. *Information, Communication & Society*, *15*, 639–661.

Kobayashi, T., & Boase, J. (2012). No such effect? The implications of measurement error in self-report measures of mobile communication use. *Communication Methods and Measures*, *6*, 126–143.

Kristensen, J. B., Albrechtsen, T., Dahl-Nielsen, E., Jensen, M., Skovrind, M., & Bornakke, T. (2017) Parsimonious data: How a single Facebook like predicts voting behavior in multiparty systems. *PLoS One*, *12*, e0184562.

Kwon, K. H, Moon, S., & Stefanone, M. A. (2015). Unspeaking on Facebook? Testing network effects on self-censorship of political expressions in social network sites. *Quality & Quantity*, *49*, 1417–1435.

Prior, M. (2009). Improving media effects research through better measurement of news exposure. *The Journal of Politics*, *71*, 893–908.

Prior, M. (2010). You've either got it or you don't? The stability of political interest over the life cycle. *The Journal of Politics*, *72*, 747–766.

Revilla, M., Ochoa, C., & Loewe, G. (2017). Using passive data from a meter to complement survey data in order to study online behavior. *Social Science Computer Review*, *35*, 521–536.

Scharkow, M. (2016). The accuracy of self-reported Internet use—A validation study using client log data. *Communication Methods and Measures*, *10*, 13–27.

Schlozman, K. L., Verba, S., & Brady, H. E. (2010). Weapon of the strong? Participatory inequality and the Internet. *Perspectives on Politics*, *8*, 487–509.

Schmidt, F. L., & Hunter, J. E. (1999). Theory testing and measurement error. *Intelligence*, *27*, 183–198.

Schwarz, N., & Oyserman, D. (2001). Asking questions about behavior: Cognition, communication, and questionnaire construction. *The American Journal of Evaluation*, *22*, 127–160.

Van Deth, J. W. (2015). Political participation. In G. Mazzoleni (Ed.), *The international encyclopedia of political communication* (pp. 1–12). Hoboken, NJ: John Wiley.

Verba, S., Schlozman, K. L., & Brady, H. E. (1995). *Voice and equality: Civic voluntarism in American politics*. Cambridge, MA: Harvard University Press.

Vissers, S., & Stolle, D. (2014). The Internet and new modes of political participation: Online versus offline participation. *Information, Communication & Society*, *17*, 937–955.

Vitak, J., Zube, P., Smock, A., Carr, C. T., Ellison, N., & Lampe, C. (2011). It's complicated: Facebook users' political participation in the 2008 election. *CyberPsychology, Behavior, and Social Networking*, *14*, 107–114.

Vraga, E. K., Bode, L., Smithson, A. B., & Troller-Renfree, S. (2016). Blurred lines: Defining social, news, and political posts on Facebook. *Journal of Information Technology & Politics*, *13*, 272–294.

Wells, C., & Thorson, K. (2015). Combining big data and survey techniques to model effects of political content flows in Facebook. *Social Science Computer Review*, *35*, 33–52.

Zhou, Y., Bird, J., Cox, A. L., & Brumby, D. (2013). Estimating usage can reduce the stress of social networking. Personal Informatics in the Wild Workshop, CHI'13, April 27–May 2, 2013, Paris, France. Retrieved from http://discovery.ucl.ac.uk/1412160/

Author Biography

Katherine Haenschen is an assistant professor in the Department of Communication at Virginia Tech. Her research focuses on the intersection of digital media and political participation.