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## Social network sites and acquiring current affairs knowledge: The impact of Twitter and Facebook usage on learning about the news

Mark Boukes 

### ABSTRACT

This study investigates how the use of Twitter and Facebook affects citizens' knowledge acquisition, and whether this effect is conditional upon people's political interest. Using a panel survey design with repeated measures of knowledge acquisition, this study is able to disentangle causality and to demonstrate that more frequent usage of Twitter *positively* affects the acquisition of current affairs knowledge. The opposite is found for Facebook: More frequent Facebook usage causes a *decline* in knowledge acquisition. This negative effect of Facebook usage occurred particularly for citizens with *less* political interest, thereby, amplifying the existing knowledge gap between politically interested and uninterested citizens.

### KEYWORDS

Social network sites; learning effects; current affairs knowledge; Facebook; Twitter; social media; knowledge gap

With its increasing availability, dynamic nature and easy use, the Internet has become a popular source of information that has inevitably changed citizens' media repertoires. Currently, "the Internet" is citizens' second most important source of news, and among the youngest age cohorts already the number one source of information (Mitchell, Gottfried, Barthel, & Shearer, 2016; Newman, Fletcher, Kalogeropoulos, Levy, & Kleis Nielsen, 2017). Simultaneously, traditional news media are witnessing decreasing readership and declining viewer ratings (Mindich, 2005; Newman et al., 2017). Many citizens have instead turned to social network sites as Facebook and Twitter rather than to television, radio or newspapers to acquire their news (Bergström & Jervelycke Belfrage, 2018). Which impact this development has for public knowledge levels is still uncertain. The question, hence, is whether online platforms – and social network sites (SNS) in particular – can effectively replace the traditional news media as an information provider or instead function as a public distractor?

Pivotal in most theoretical models of democracy, people are expected to learn about politics and current affairs to fulfill their role as informed citizens (Althaus, 2012). The most common manner to do so

has for a long time been via the mass media (Strömbäck, 2005): Exposure to traditional news media has repeatedly been shown to positively affect knowledge of current affairs (e.g., Eveland, Hayes, Shah, & Kwak, 2005; Shehata, Hopmann, Nord, & Höijer, 2015). With the increasing centrality of social media in citizens' media diet, however, it is important to know whether these online platforms also contribute to current affairs knowledge. This is of great societal relevance, because knowledge acquisition is a crucial driver of citizens' participation in the political process (Andersen, Bjarnøe, Albæk, & De Vreese, 2016; Schudson, 1998). Hence, acquiring knowledge could be one of the mediating mechanisms explaining the already established relationship between social network usage and civic engagement (Gil de Zúñiga, Jung, & Valenzuela, 2012). However, not much is known about the knowledge effects of using social networks sites. In the absence of existing research, many concerns have been expressed, though: Speculations about filter bubbles, echo chambers or fake news have raised discouraging expectations about the democratic impact of SNS (Bakshy, Messing, & Adamic, 2015).

To date, no research has been able to convincingly unveil a causal relationship between the usage of specific social networks sites and the acquisition of current affairs knowledge. This is

partly due to the reliance on cross-sectional datasets. Survey research cannot determine the directionality of causal relationships: Associations between SNS usage and knowledge may identify a selection mechanism (i.e., knowledge causing SNS use) rather than a media effect. Using a panel survey design (three-waves;  $n = 3,240$ ) with a repeated measure of (new) current affairs knowledge, the current study has a unique ability to analyze whether the two social networks most often used for news consumption (respectively Facebook and Twitter, see Newman et al., 2017) affect the current affairs information that citizens acquire.

Several studies demonstrate that as the outcome of cleavages in social status, the citizenry is divided in groups that are well-informed about current affairs, on the one hand, and citizens with little knowledge about societal matters, on the other hand (e.g., Eveland & Scheufele, 2000; Tichenor, Donohue, & Olien, 1970). Contributing to this rich literature, the current study investigates the following research question: Do *social network sites* amplify or narrow the knowledge gap between citizens of low and high political interest? In other words, do SNS generate a “second-level digital divide” (Wei & Hindman, 2011)?

I investigate the uptake of current affairs knowledge as the outcome of social network usage in the context of The Netherlands, a country particularly well-suited to address this question, because of its high Internet penetration (96% of population) and the relative popularity of the social networks Facebook (62%) and Twitter (15%) (Newman et al., 2017). 81% of the Dutch population reports to get their news partly from online sources, and 47% report using social media for this purpose (Swart & Broersma, 2016). The gain of *new* current affairs knowledge about recent events (i.e., surveillance-general facts, see Barabas, Jerit, Pollock, & Rainey, 2014; Delli Carpini & Keeter, 1996) was examined rather than one’s subjective perceptions of knowledge gain (Müller, Schneiders, & Schäfer, 2016) or specific knowledge about issues prominent on social media (see Gleason, 2013) to yield findings that are important to evaluate the democratic consequences of social network sites in general.

## Facebook versus Twitter: distinguishing SNS platforms

Before hypothesizing about their effects, it is important to first analyze the characteristics of Facebook and Twitter as online platforms. In order to do so, social network sites can be distinguished on two grounds: their *platform architecture* as well as the actual *type of usage* by the audience.

### Platform architecture

Twitter has been mentioned – along with news apps, push messages and live blogs – as one of digitalization’s features that make news monitoring “extremely easy” (Costera Meijer & Groot Kormelink, 2015, p. 672). Concretely, previous research has shown that microblogs as Twitter are effective for information sharing (Lee & Oh, 2013): The short messages ease learning and understanding of societal issues (Gleason, 2013). Facebook posts, by contrast, are unrestricted in length; yet, only the first few lines of a text (about 400 characters) are displayed on a user’s timeline, the rest being truncated. Arguably, longer texts of which only the first few sentences are shown do not enhance knowledge acquisition, but they may however evoke a feeling of being informed (Müller et al., 2016).

Moreover, Twitter prominently displays its “trending topics” section immediately when users log in to the website and it has its own tab in the Twitter-app. Although this is not necessarily always the case, trending topics on Twitter often reflect the content of mainstream news organizations’ headlines (Kwak, Lee, Park, & Moon, 2010), which may thus point its users to the news-of-the-day. In the period 2014–2018, Facebook also featured a “Trending” news box, but only did so in five countries (i.e., not in the Netherlands). Users did not perceive this tool useful and neither did they use it frequently (Facebook Newsroom, 2018), which was the reason for Facebook to remove the Trending feature.

Well known among scholars but also citizens, Facebook has a strong algorithm that automatically determines which updates will be shown on top of one’s news feed, which lower on the webpage, and which updates remain completely

invisible (Bucher, 2012). Generally, the algorithm seems to have a strong inclination to prioritize personal messages of friends and family, while only giving marginal space to news content (Wang, 2017). Until 2015, Twitter instead displayed the tweets of followed accounts in the reverse-chronological order (i.e., newest first). From 2016, people could decide themselves whether they wanted to keep the reverse-chronological order or preferred an algorithm to decide which posts were most interesting to them. As the period under investigation is the first half year of 2015, Twitter users would have been exposed to all the messages. Thus, they would also see (shared) news content even when the individual user lacked interest, because no algorithm was involved.

The possibility of Twitter being a modern day news platform is also reflected in the type of relationships that prevail on this social network site. Whereas most social networks require reciprocal relationships (i.e., friending) and do not permit anonymous accounts (Ju, Jeong, & Chyi, 2014; Yoo & Gil de Zúñiga, 2014), a large majority of the user-pairs on Twitter is one-directional (78%, see Kwak et al., 2010, and also; Davenport, Bergman, Bergman, & Ferrington, 2014): This means that most users are not followed back by the accounts they follow themselves. The act of following on Twitter, thereby, becomes equal to “subscribing” to receive one’s (news) messages. And Twitter, by that respect, reflects the mass media, which also have a limited number of senders that disseminate news to a large audience (Yoo & Gil de Zúñiga, 2014). Facebook instead was originally created as a college student directory (Ju et al., 2014). Accordingly, the platform is mostly about two-way personal communication (Yoo & Gil de Zúñiga, 2014) in relatively closed circuits (Lee & Oh, 2013) about topics different than current affairs.

### **Platform usage**

Facebook is mainly used out of social motivations and for entertainment purposes (Ju et al., 2014). This social network is primarily employed as a social platform to, for example, mitigate loneliness (Hughes, Rowe, Batey, & Lee, 2012), relax

(Smock, Ellison, Lampe, & Wohn, 2011), maintain social relationships and interact with friends (Costera Meijer & Groot Kormelink, 2015). As such, almost half of its users prefer to *not see* any news on this social network (49%), most users hardly share any news on Facebook, and if they do so it mostly concerns non-serious “soft” news items (Costera Meijer & Groot Kormelink, 2015). A large majority of Twitter users, by contrast, do *not mind* seeing news content on this social network (83%, see Costera Meijer & Groot Kormelink, 2015). In contrast, Twitter is used by many citizens to keep up with the news (Barthel, Shearer, Gottfried, & Mitchell, 2015) and for information purposes rather than for socializing (Hughes et al., 2012).

Accordingly, journalistic outlets have four times *more* followers on Twitter than on Facebook, while the overall user-base on Facebook is much larger (Ju et al., 2014). News media, such as CNN, *NY Times* or NPR, as well as certain politicians are among the most followed accounts on Twitter. Whereas news outlets today are present on a wide array of social media to drive traffic to their websites, these news media have the most followers on Twitter compared to other platforms (including Facebook): Twitter, thereby, drives relatively the most *direct* traffic to news websites (i.e., taking into account the number of users, see Ju et al., 2014). Nevertheless, Facebook is still a major source of traffic to news websites (Nelson & Webster, 2017). Although, this arguably can be explained by its unprecedented popularity rather than its nature of providing news: Even a marginal proportion of news of Facebook would lead to many clicks in absolute terms due to its scale.

Finally, many Facebook users consider this social network not the right platform to read or share news (Costera Meijer & Groot Kormelink, 2015; Vitak et al., 2011). Other than what researchers or journalists may experience themselves, ordinary citizens see very few news items in their “regular” Facebook feeds (Wang, 2017); messages of family and friends are much more common. To avoid offending others and maintain harmony (Bright, 2016), most users do not share news on this platform or only in networks of likeminded friends (Newman et al., 2017), which makes any knowledge effects unlikely. Twitter, instead, could

provide a platform to learn about the news, even passively. This could even happen for citizens not necessarily following many journalistic or political accounts, because messages of these accounts will often be received indirectly (e.g., via weak ties, see Ahmadi & Wohn, 2018): The list of tweets that are most frequently *retweeted* is dominated by news messages (Kwak et al., 2010), which allows for passive learning (in the absence of motivation).

### Learning online

Several studies investigated the impact of Internet use *generally* as well as the consumption of *online news media*. Kenski and Stroud (2006), for example, demonstrate that Internet access on itself positively affects the political knowledge of citizens. More specifically, they show that visiting websites with political campaign information improves one's political knowledge (see also Bimber & Davis, 2003; Kim, 2008). Similar to the effects of offline *news*, several studies have shown that exposure to online journalistic content functions as a pathway to learning about the news (e.g., Dalrymple & Scheufele, 2007; Dimitrova, Shehata, Strömbäck, & Nord, 2014; Groshek & Dimitrova, 2011).

These insights into the positive effects of Internet use generally or the consumption of online news more specifically, do not inform about the consequences that *social networks sites* (SNS) have for citizens' knowledge about current affairs. Just as research on the effects of viewing television has become increasingly sophisticated – moving from *television* consumption generally, via *television news* exposure specifically, to distinctions between for example the effects of *hard and soft news* exposure (Baum, 2003; Prior, 2003) – it is crucial to do the same in the study of the effects that specific online behaviors have. Instead of assessing the effects of time spent online, scholars should assess the effects of particular online contexts (i.e., social network usage, see Shehata & Strömbäck, 2018) and split this out into the usage of specific online platforms (i.e., Facebook and Twitter) when this is theoretically justifiable. The latter is the case, because different social network sites are of a different political nature (Hughes et al., 2012; Ju et al., 2014), and may therefore cause different effects (Bode, 2016).

Hence, prior claims that social network sites, in general, would either be beneficial or harmful for democracy lack nuance: Effects will most likely vary per platform.

The existing literature both presents positive and negative outcomes of SNS use (Dimitrova et al., 2014). Positive consequences are expected of these platforms' *ability* to inform citizens. Never before has so much information, mostly without extra financial costs, been so close at hand for citizens. Almost literally, the online sphere provides citizens with unlimited sources, types, and a diversity of political information (Yoo & Gil de Zúñiga, 2014). Twitter and Facebook, concretely, provide a range of accounts, groups and networks that continuously spread information about political events, current affairs and breaking news. Potentially, these platforms *could* thus be a rich source of information for citizens to keep up with the news (Gil de Zúñiga et al., 2012) and to be confronted with a variety of (news) media brands (Newman et al., 2017).

So, whereas the possibilities for online learning about current affairs are endless, there are various reasons why this not necessarily happens. This relates to the unlimited choice of online media content (Yoo & Gil de Zúñiga, 2014). With the abundance of options, the likelihood shrinks that citizens opt for political content (Prior, 2007). The inherent "pull-media nature of the Internet" (Ancu & Cozma, 2009, p. 569) makes it less likely than in the traditional media that citizens are confronted with content that is *not* of their primary interest (Bonfadelli, 2002). As many citizens use social networking sites mainly to stay up-to-date about social relationships (Hughes et al., 2012), the amount of news one sees will be limited and the time spend on these platforms could even replace the time that is spent on following the news (Lee, Lindsey, & Kim, 2017).

Because of the social nature of SNS, though, users are likely to still get in touch with some news updates even if they personally do not follow journalistic accounts and refrain from joining political groups (see Ahmadi & Wohn, 2018). Posts about the news can be shared by friends or be retweeted by the people one follows and, therefore, also appear in the timeline of uninterested users, which opens up possibilities for passive learning

(Zukin & Snyder, 1984): Learning without the intention of acquiring current affairs information simply because it was presented to (i.e., not selected by) the media consumer. Accordingly, previous research found that as news coverage becomes more prevalent in the media environment and thus harder to avoid, citizens with low interest or motivation increasingly acquire knowledge (Elenbaas, de Vreese, Schuck, & Boomgaarden, 2014).

In today's fragmented media environment, this prevalence of news in one's media diet depends on the (social) media one uses and how saturated these platforms are with current affairs information: People can potentially learn from social networks but *only if* citizens are actually exposed to news on these platforms (Bode, 2016) and pay the necessary attention to it (Cacciatore, Scheufele, & Corley, 2014). As Druckman (2005) writes, "Learning information from a given medium requires that the medium include that information" (p. 466). We, therefore, separately investigate the effects of Twitter and Facebook usage on the knowledge that citizens acquire, because these platforms arguably differ considerably on the prevalence of news content and the motivations of citizens to pay attention to it.

In sum, the expectations about SNS in general are mixed and this is also reflected in the literature. Whereas some studies found positive effects of social network use (Beam, Hutchens, & Hmielowski, 2016; Lee & Oh, 2013; Yoo & Gil de Zúñiga, 2014), others found negative or null effects (Dimitrova et al., 2014; Gil de Zúñiga, Weeks, & Ardèvol-Abreu, 2017; Lee et al., 2017; Shehata & Strömbäck, 2018). Besides differences in research design (i.e., ability to disentangle causality) or operationalizations of knowledge, the contradictions in findings may partly relate to the measurement of independent variables (Ohme, 2018): Logically, general time measurements yield less positive findings than those measurements that tap the *intention* to acquire information online. Accordingly, general SNS activity was found to negatively influence political engagement, whereas *political* Facebook activity had a positive effect (Oeldorf-Hirsch, 2018; Vitak et al., 2011). The current study is primarily interested in the *overall* effects of using specific social network sites and,

thus, employs general measurements of SNS use to investigate how Facebook and Twitter affect the knowledge gap.

### The effects of Facebook and Twitter on knowledge acquisition

After having specified the platform differences between Facebook and Twitter as well as the effects such online platforms may have, hypotheses are now formulated about the consequences that these SNS may have for the acquisition of current affairs knowledge. Precondition to learning, media need to (a) contain the relevant information (Bode, 2016; Druckman, 2005) and (b) citizens have to pay attention to this (Cacciatore et al., 2014). Both conditions seem to be met for Twitter's platform. Its architecture is sending-oriented (i.e., one-directional, Davenport et al., 2014; Kwak et al., 2010) with a heavy emphasis on news, specifically in the content of retweets that will also be received by people not following many journalistic accounts (Ahmadi & Wohn, 2018). And, many Twitter users primarily employ the network for information purposes (Barthel et al., 2015; Costera Meijer & Groot Kormelink, 2015). All in all, Twitter is "an information-sharing community" (Gleason, 2013, p. 979), which likely contributes to the acquisition of current affairs knowledge (Bode, 2016; Lee & Oh, 2013). Hence, the following is expected:

H<sub>1</sub>: *Twitter usage positively affects the acquisition of current affairs knowledge.*

Facebook usage, by contrast, does not necessarily increase current affairs knowledge (Bode, 2016; Oeldorf-Hirsch, 2018) as it does not meet both the conditions required for learning. Regarding content, Facebook's architecture is oriented towards bi-directional relationships (Lee & Oh, 2013; Yoo & Gil de Zúñiga, 2014) and its algorithm seemingly prefers interaction about personal matters of friends and family over news content (Wang, 2017). The audience, additionally, uses the platform for social purposes (Hughes et al., 2012; Smock et al., 2011) and many even dislike seeing news on Facebook (Costera Meijer & Groot Kormelink, 2015). Rather than informing about current affairs and political news, Facebook may therefore distract and do the

opposite (Cacciatore et al., 2018); i.e., reduce citizens' information about the news as Müller et al. (2016) demonstrate.

Their study demonstrates that citizens obtain a heuristic of *feeling informed* by scrolling through their Facebook timelines. In the (rare) event of seeing (i.e., not necessarily reading) news headlines posted by a news organization or shared by a friend, a cognitive scheme is activated that is associated with the *impression* that someone has learned something about the news (Müller et al., 2016). Irrespective of whether these articles are actually read or not (for most users, it is not their primary motivation, and they thus do not read it), citizens *feel* being informed by Facebook, which subsequently evokes the perception that it is unnecessary to further inform themselves about the news via other platforms. Usage of Facebook, accordingly, is likely to boost “a false heuristic inference” (Müller et al., 2016, p. 439) of being informed, which may eventually *decrease* the likelihood to acquire new current affairs information (see also Cacciatore et al., 2018). After all, the time spent on Facebook and the subsequent feeling of already being informed may discourage following other sources of news that actually provide the necessary content to inform oneself (Müller et al., 2016):

*H<sub>2</sub>: Facebook usage negatively affects the acquisition of current affairs knowledge.*

### **Social networks sites and the a differential growth of knowledge**

Concern has frequently been expressed that the media would cause a “knowledge gap” between segments of society. Already in the 1970s, Tichenor et al. (1970) observed that people of higher social status acquired current affairs knowledge at a faster rate than citizens of lower status. Many scholars afterwards examined the learning influence of media exposure for different groups of citizens (e.g., Chaffee & Kanihan, 1997; Eveland & Scheufele, 2000; Shehata et al., 2015), but rarely beyond the impact of traditional news media. With the increasing choice in the current media landscape, this topic has however only become more relevant and it is of

utmost importance to also analyze how social network sites differentially affect the acquisition of knowledge (Cacciatore et al., 2014; Yoo & Gil de Zúñiga, 2014).

The so-called OMA framework (Dimitrova et al., 2014) specifies that knowledge acquisition is conditional on the *Opportunities* provided in a medium to learn (i.e., presence of substantive content) as well as the *Motivations* and *Ability* of citizens to actually do so. Thus, whether citizens learn from exposure to a medium depends on the availability of information but also whether citizens pay attention to it (i.e., motivation) and have the resources to understand it (i.e., ability). Although the early studies on the knowledge gap hypothesis used education to explain why different groups learned at a different rate from the media, political sophistication demonstrated to be a more influential determinant of how motivated and capable citizens are to learn from the media (Ettema & Kline, 1977; Luskin, 1990; Zaller, 1992). Concretely, political interest reflects citizens' motivation to acquire knowledge (Hopmann, Wonneberger, Shehata, & Höijer, 2015) as well as their ability to do so (Norris & Sanders, 2003).

Particularly in the online context, political interest of citizens will determine whether and how much current affairs information they acquire. Whereas the first digital divide seems to be overcome in most Western societies – by now, almost everyone has *access* to the Internet – a second-level digital divide may have emerged (Wei & Hindman, 2011): Inequality between citizens in their ability to effectively use the Internet for information purposes rather than for mere entertainment. As people self-select the accounts that they follow, their timelines and page visits will strongly mirror their personal interests. Therefore, learning about current affairs from SNS seems most likely to occur among citizens who are interested in societal affairs (Lee & Oh, 2013; Wei & Hindman, 2011).

The increased choice of content offered by social media, by contrast, forms a potential *distraction* (see Yoo & Gil de Zúñiga, 2014) for citizens without much interest in the news (Bonfadelli, 2002): These people will choose not to follow many journalistic or political accounts. By still accidentally being confronted with news items in

their timelines that friends share or retweet, they are likely to develop a “news-finds-me perception” (Gil de Zúñiga et al., 2017) together with a feeling of already being sufficiently informed (Müller et al., 2016). Hence, social media usage may further discourage uninterested citizens to expose themselves to news coverage (Lee et al., 2017), which probably results in negative consequences for the amount of current affairs knowledge that these citizens eventually will acquire (Gil de Zúñiga et al., 2017). Moreover, with regards to the news to which people are (accidentally) exposed on social network sites, the interested citizens will be better able to understand, store and memorize this.

On the one hand, highly interested citizens on Twitter, thus, are more likely to follow accounts that provide news about current affairs and to be exposed to relevant retweets. The distracting effect of Facebook, on the other hand, will be less strong for them because they may still follow alternative sources of information. Disinterested citizens, by contrast, will find the very limited amount of information enough and benefit less from the richness of information that is available on Twitter. Altogether, it is thus expected that knowledge acquisition via social network sites will most strongly occur for citizens that have the motivation to learn about current affairs, whereas SNS may particularly be a source of distraction for citizens who lack interest. Altogether, this leads to the following hypotheses:

H<sub>3a</sub>: *Twitter usage positively affects the acquisition of current affairs knowledge more strongly for citizens with more political interest.*

H<sub>3b</sub>: *Facebook usage negatively affects the acquisition of current affairs knowledge more strongly for citizens with less political interest.*

## Method

The most valid way of studying knowledge acquisition through social networks is a panel survey approach (see Tichenor et al., 1970). This approach has been applied in few studies on this topic thus far (Beam et al., 2016; Dimitrova et al.,

2014; Yoo & Gil de Zúñiga, 2014); yet, not with the intention to investigate the effects of *general* usage of *specific* social network sites (i.e., not social media in general or usage with specific motivations). The current study is unique in its ability to disentangle causality, because it combines a variety of strengths: (a) using separate measurements for Twitter and Facebook usage instead of general social media use variable, (b) tapping knowledge acquisition with items that ask about *recent events* unlikely to be known before the survey was launched, and (c) controlling for the existing level of current affairs knowledge in analyses to exclude alternative explanations (i.e., confounding variable bias).

## Data collection

Data for this study have been collected using a three-wave panel survey. Respondents were recruited from a sample of Dutch citizens of polling agency *I&O Research*, which was created using random sampling strategies from representative (municipal) population registers. 9,112 people started the questionnaire of the first wave of whom 6,386 completed this (completion rate: 70.1%). Only respondents that completed this wave were invited for the subsequent one. For Wave 2, 4,301 respondents completed the questionnaire (completion rate: 69.0%). In Wave 3, there were 3,270 completed surveys (completion rate: 77.0%). Response rates are similar to or higher than those reported in previous studies (Beam et al., 2016; Dimitrova et al., 2014; Yoo & Gil de Zúñiga, 2014). The different waves were fielded with an interval of eight weeks and launched, respectively, on February 23 (Wave 1), April 20 (Wave 2), and June 15, 2015 (Wave 3). Respondents had 24 days to complete each survey, but the majority did so in first two days.

## Measurements

### Independent variable

The usage of social networks was tapped in the first survey wave (i.e., Wave 1). Respondents were asked “How often do you make use of the following social media” and could respond on a scale from *0 days per week* to *7 days per week*. There was



a moderately strong relationship between the usage of Twitter and Facebook (*Pearson*  $r = .24$ ). Reflecting the overall Dutch population (Newman et al., 2017), Twitter ( $M = 0.46$ ,  $SD = 1.54$ ) was much less popular than Facebook ( $M = 2.38$ ,  $SD = 3.01$ ),  $t(3269) = 36.18$ ,  $p < .001$ . Further reflection on this operationalization of the independent variable is offered in the Discussion.

### Moderator

The effects of social networks site usage were expected to be conditional on citizens' political interest. Political interest is measured on an eleven-point scale from a  $-5$  (*not interest at all*) to  $5$  (*very interested*) ( $M = 1.79$ ;  $SD = 1.99$ ). Just as the independent and control variables, this variable was measured in Wave 1.

### Dependent variable

The acquisition of current affairs knowledge was measured with factual knowledge questions about recent events that caught significant (social) media attention. Barabas et al. (2014) coins these "surveillance-general facts," which are most likely to be learned through media attention. Questions focused on political-economic issues, because these form a dimension of and strongly relate to political knowledge generally (Delli Carpini & Keeter, 1996), and have important democratic consequences: Economic perceptions are a strong determinant of the approval for politicians (Nadeau, Niemi, Fan, & Amato, 1999) and influence party preferences (Sanders, 2000).

Measurements are specifically created to analyze which information was acquired in the period between Wave 1 and Wave 2 as well as between Wave 2 and Wave 3. The first wave contained five items to measure citizens' *initial level of knowledge* of current affairs: Questions asked about the current interest rate; the Dutch minister of Finance; the Managing Director of the IMF; most important trading partners of the Netherlands; and the credit rating of the Netherlands.

In the next waves, two times two extra knowledge questions were posed to measure the knowledge that respondents acquired *over time*.<sup>1</sup> These questions varied in difficulty and focused on current affairs that received media attention in the two weeks preceding a survey wave and arguably

**Table 1.** Questions used to assess current affairs knowledge.

Survey wave	Question	Answer	% correct
2	Which government-owned bank came into disrepute due to the bonuses of their directors?	ABN Amro	92.5%
2	Which law was approved by Parliament that directly influences Dutch employees?	Allowing flexible working times	59.9%
3	Which semi-public corporation did Timo Huges work for before he resigned after problems with public procurements?	NS Dutch Railways	78.6%
3	What is the percentage of economic growth predicted by the Dutch National Bank?	2 percent	56.9%

have been prominent on social network sites as well. Important to notice is that these facts were very *unlikely* or *impossible* to be known beforehand, because they had not taken place yet: Content analysis of regular news outlets indeed confirmed that these facts rarely received public attention *before* the panel survey commenced.<sup>2</sup>

Effects that are found on the dependent variable (i.e., knowledge acquisition) are, consequently, very likely the outcome of the independent variables rather than the reverse. The exact multiple choice questions (and answers) can be found in Table 1. Respondents were provided with a "don't know"-option to avoid false-positives. In total, respondents could thus maximally answer five questions correctly in Wave 1, seven in Wave 2, and nine questions in Wave 3. The analysis takes this dynamic measurement of knowledge acquisition into account by applying a multilevel growth curve model.

### Control variables

The analyses control for a range of variables to exclude the possibility of alternative explanations. Most importantly, analyses control for respondents' existing level of current affairs knowledge. Additionally, analyses control for the exposure to several types of news media that may also cause knowledge acquisition. Covariates were included for the number of television news programs that respondents watch per week ( $M = 10.37$ ,  $SD = 4.93$ ), the number of newspaper editions they read per week ( $M = 6.79$ ,  $SD = 5.03$ ), as well as the frequency of visiting news websites per week ( $M = 6.83$ ,  $SD = 7.59$ ). In addition, analyses include controls for age ( $M = 61.20$ ,  $SD = 11.08$ ), gender (66% female),

education (on a scale from 0 to 6;  $M = 4.02$ ,  $SD = 1.56$ ), and political trust ( $M = 8.35$ ,  $SD = 4.86$ ). All scales are available upon request.

### Analysis and robustness checks

To account for the dynamic nature of the dependent variable – repeated knowledge measures that cumulate with every wave – the analysis follows a multilevel growth curve modelling approach. As described by Hox (2010) and later applied by Shehata et al. (2015) as well as by Andersen and Hopmann (2018), such a two-level linear model nests observations *within* individuals, and predicts individuals knowledge acquisition between the survey waves. Nesting observations within individuals, implies that the intercept varies between units (i.e., every respondent has its own intercept). A major advantage of this approach is that it does not require balanced data; accordingly, the effects of panel drop out are minimized (e.g., respondents that dropped out in Wave 3 are still used for the estimation of knowledge acquisition in Waves 1 and 2). The independent variable “time” (i.e., values of respectively 0, 1, and 2) accounts for the trend over time (i.e., average increase of knowledge with every subsequent wave).

To assess the robustness of findings, additional analyses have been conducted: Similar results are found using (a) poisson regression on a composite measurement of knowledge gain in Waves 2 and 3 while controlling for the initial knowledge level in Wave 1, (b) negative binomial regression as a check for overdispersion, and (c) ordinary least squares regression predicting the overall knowledge gained between waves.

With an independent variable (i.e., SNS use) that clearly precedes the dependent variable (temporal order) and controlling for the initial level of current affairs knowledge in the intercept (alternative explanations unlikely), this study provides a strong test to analyze the *causal* relationship between social network sites usage and knowledge acquisition.

To test Hypotheses 1 and 2, the acquired knowledge is predicted by the interaction between time and the frequency with which respondents, respectively, used Twitter and Facebook (independent variables). The coefficient of this interaction effect

indicates whether the average trend in knowledge gain over time (i.e., with subsequent waves) is strengthened or weakened by the use of these SNS. Hypothesis 3 is examined by the interaction between time, SNS use, and political interest; these effects indicate whether the moderating influence of Twitter and/or Facebook is stronger or weaker for respondents who are more or less politically interested.

## Results

The multilevel growth curve model has been built step-by-step and begins with an assessment of how much knowledge has been acquired over time (Model 1). Table 2 presents the statistical findings. The intercept of 3.63 indicates the average knowledge level in the first panel wave ( $t_0$ ). The significant effect of time shows that with every subsequent wave, respondents on average answered an additional 1.45 ( $p < .001$ ) questions more correctly. This development in knowledge acquisition is visualized in Figure 1.

Model 2 adds control variables and the usage of social network sites to the model. It shows that Twitter use positively correlates with current affairs knowledge ( $B = 0.02$ ,  $p = .018$ ), whereas Facebook has a negative relationship with the knowledge of current affairs ( $B = 0.02$ ,  $p < .001$ ). However, this model is merely cross-sectional in the sense that it does not yet take the dynamic nature of the knowledge measurement into account.

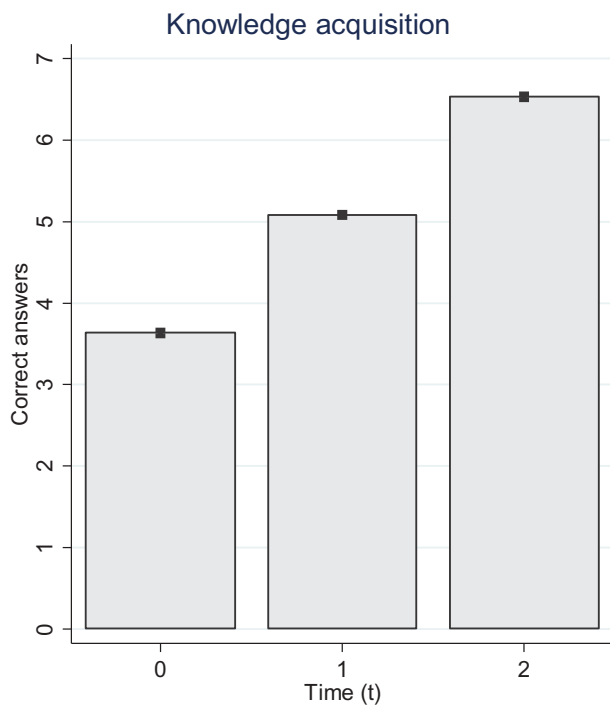
To test Hypotheses 1 and 2, the next model examines whether the acquisition of knowledge over time is stronger or weaker for people who use social network sites more or less frequently (Model 3). The positive interaction between time and Twitter ( $B = 0.03$ ,  $p < .001$ ) demonstrates that the overtime increase in knowledge is strengthened by more frequent Twitter usage. Figure 2 (left side) shows how the growth of knowledge is stronger for daily users of Twitter than for those who do not use this medium. This is in line with Hypothesis 1.

The opposite pattern is found for Facebook. A negative interaction effect ( $B = -0.02$ ,  $p < .001$ ) implies that the acquisition of current affairs knowledge slows down as people use Facebook more

**Table 2.** Multilevel growth curve model predicting the current affairs knowledge acquisition over time.

Independent variable	Model 1			Model 2			Model 3			Model 4		
	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>
Intercept	3.63	0.02	.000***	1.52	0.11	.000***	1.49	0.11	.000***	1.58	0.11	.000***
Time	1.45	0.01	.000***	1.44	0.01	.000***	1.49	0.01	.000***	1.39	0.01	.000***
Age				0.01	0.00	.000***	0.01	0.00	.000***	0.01	0.00	.000***
Gender (0 = Male; 1 = Female)				−0.38	0.03	.000***	−0.38	0.03	.000***	−0.38	0.03	.000***
Education				0.15	0.01	.000***	0.15	0.01	.000***	0.15	0.01	.000***
Internal political efficacy				0.06	0.00	.000***	0.06	0.00	.000***	0.06	0.00	.000***
Political trust				0.00	0.00	.901	0.00	0.00	.862	0.00	0.00	.825
Left-right political preference				0.01	0.01	.242	0.01	0.01	.259	0.01	0.01	.254
Television news consumption				0.01	0.00	.003*	0.01	0.00	.003*	0.01	0.00	.004***
Newspaper consumption				0.00	0.00	.291	0.00	0.00	.311	0.00	0.00	.314
News website consumption				0.02	0.00	.000***	0.02	0.00	.000***	0.02	0.00	.000***
Political interest				0.10	0.01	.000***	0.10	0.01	.000***	0.06	0.01	.000***
Twitter use				0.02	0.01	.018*	0.01	0.01	.485	0.01	0.01	.427
Facebook use				−0.03	0.01	.000***	−0.02	0.01	.001**	−0.03	0.01	.000***
Time × Twitter							0.03	0.00	.000***	0.03	0.01	.000***
Time × Facebook							−0.02	0.00	.000***	−0.03	0.00	.000***
Time × Political interest										0.05	0.00	.000***
Twitter × Political interest										0.00	0.00	.913
Facebook × Political interest										0.00	0.00	.083
Time × Twitter × Political interest										0.00	0.00	.236
Time × Facebook × Political interest										0.01	0.00	.000***
<i>BIC</i> (Goodness-of-fit)	37,842.45			36,184.40			36,077.30			35,712.55		

Note. Cells contain unstandardized regression coefficients (*B*) with standard errors (*SE*) in parentheses, and probabilities (*p*). \**p* < .05; \*\**p* < .01; \*\*\**p* < .001 (two-tailed).



**Figure 1.** The average growth in current affairs knowledge over time.

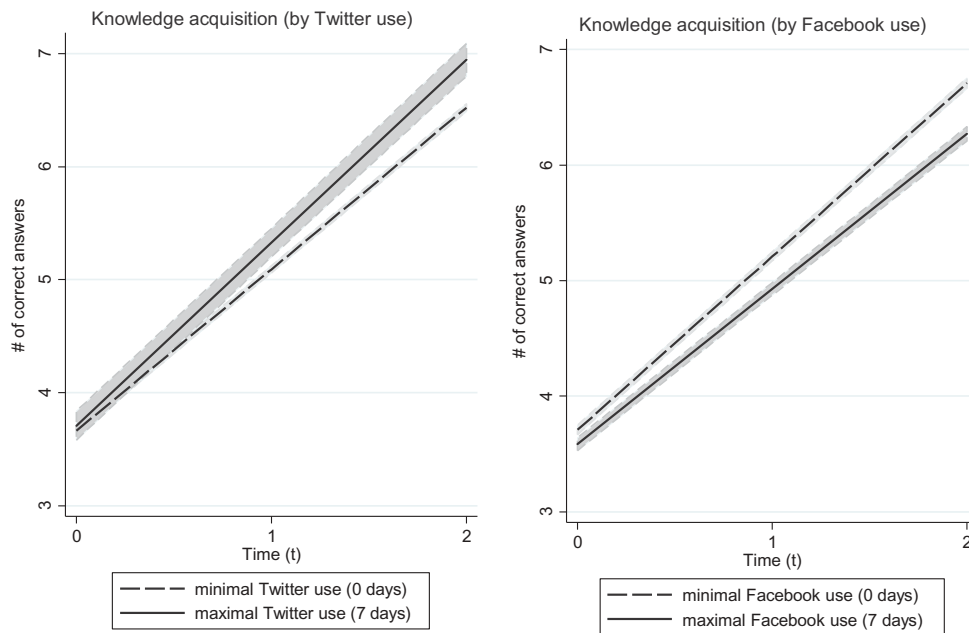
frequently. Figure 2 (right side) visualizes this interpretation. This finding, thus, provides evidence that is in line with Hypothesis 2.

**Political interest, social network sites and the differential acquisition of knowledge**

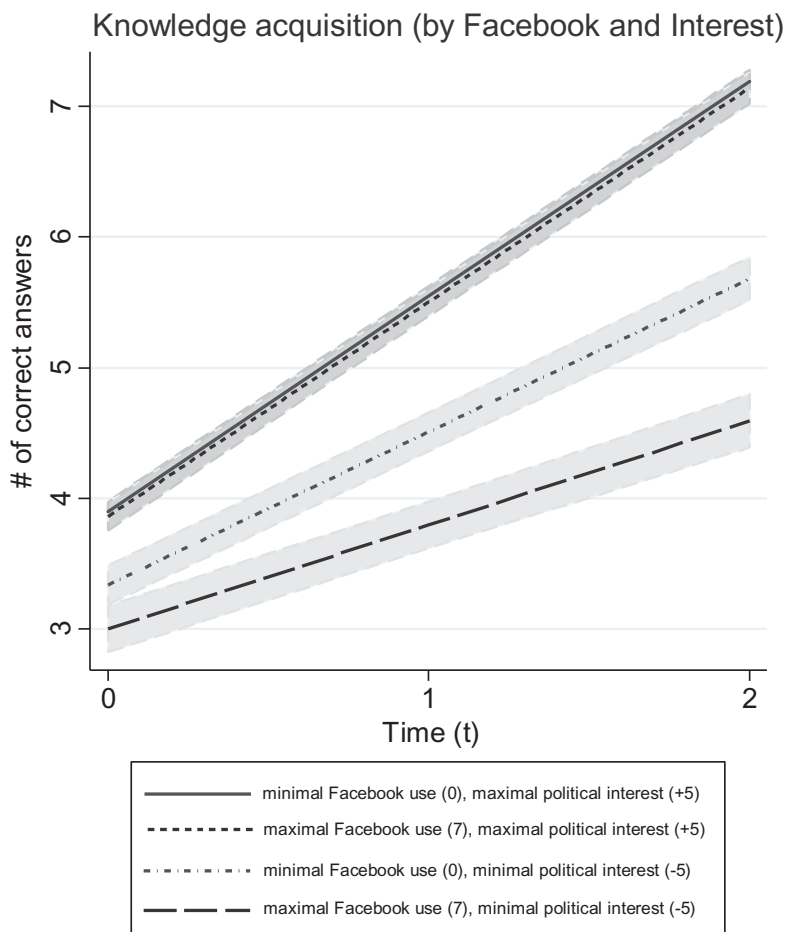
Model 2 already demonstrated a relatively strong effect of political interest on citizen’s level of current affairs knowledge, *b* = 0.10, *p* < .001. Extending the multilevel growth curve model with interaction terms between time, usage of social network sites, and political interest (Model 4), the analysis assessed whether this gap in knowledge has increased over time among people who use Twitter or Facebook more versus less frequently.

Model 4 finds that the interaction effect between time, Twitter usage and political interest is insignificant (*p* = .236). This means that the amount of knowledge that is acquired from Twitter is not significantly different for politically interested and uninterested citizens: In other words, Twitter’s positive effect on knowledge acquisition is equally strong for interested and uninterested citizens. Thus, Hypothesis 3<sub>a</sub> is rejected.

In contrast, the three-way interaction effect between time, Facebook usage, and political interest is significant, *b* = 0.01, *p* < .001. Figure 3 shows how knowledge acquisition over time is impacted by Facebook usage for individuals of high and low political interest. The figure shows that citizens



**Figure 2.** The average growth in current affairs knowledge over time for different levels of SNS use (on the left: Twitter; on the right: Facebook). The effect of time is shown together with its 95% confidence interval (at the mean values of other independent and control variables).



**Figure 3.** The average growth in current affairs knowledge over time for different levels of Facebook use and political interest. The effect of time is shown together with its 95% confidence interval (at the mean values of other independent and control variables).

with high political interest (upper two lines) acquire equally much knowledge about the current affairs irrespective of how frequently they use Facebook. For those with less political interest, Facebook usage has a significantly different impact on their knowledge acquisition: Citizens with little political interest learn significantly more about current affairs if they use Facebook less frequently compared to using it more often. Thus, the knowledge gap between citizens of high versus low interest grows with more frequent Facebook usage, because this social network site distracts citizens with low interest from acquiring current affairs knowledge. Altogether, this provides evidence in line with Hypothesis 3<sub>b</sub>.

## Discussion

This study investigated the effects of using social network sites on the current affairs knowledge that citizens acquire. Employing data from a panel survey with multiple waves, I could shed light on the causal relationships between the frequencies with which people used Twitter and Facebook and how much they have learned about recent socio-political events. Whereas Twitter usage positively influenced knowledge acquisition, the frequency with which people used Facebook had a negative effect, especially on the uninterested citizens. One could therefore conclude that social network sites, as such, do *not have* one uniform effect (overall, this could result in null effects, see Shehata & Strömbäck, 2018). Instead, it depends on the identity and content that is provided on the specific social network site but also the characteristic of the individual user.

Explaining its positive effect, the content to which people are exposed on Twitter will often be of political or current affairs news nature (Kwak et al., 2010). This also relates to citizens' motivation to use Twitter; many do this for information purposes (Costera Meijer & Groot Kormelink, 2015; Hughes et al., 2012). More research is needed, though, to examine the exact (news) content to which citizens are exposed on social network sites. Facebook, by contrast, is dominated by personal communication (Yoo & Gil de Zúñiga, 2014), mostly used for social purposes (Costera Meijer & Groot Kormelink, 2015; Hughes et al., 2012), and exposes its users to

limited amounts of news content (Wang, 2017), which explains why Facebook does *not* enhance knowledge acquisition (in line with the cross-sectional results of Cacciatore et al., 2018). By contrast and following Putnam's rationale (2000), the current study suggests that the more time is spent on Facebook, the less time citizens have to inform themselves about current affairs via other (more substantive) platforms (see also Gil de Zúñiga et al., 2012).

The current study, thus, demonstrates the importance of distinguishing between the general usage of social network sites and the usage with specific information purposes in mind. Previous research found that when citizens use Facebook *to seek information* or *follow the news* this may have positive consequences (Beam et al., 2016; Yoo & Gil de Zúñiga, 2014); however, such findings probably relate more to the *potential* impact of Facebook as a source of news rather than its *actual* impact in the real world (Bode, 2016; Cacciatore et al., 2018). After all, most Facebook users do *not* employ this social network for information purposes but rather out of social motivations (Hughes et al., 2012). This also explains why the current study finds that Facebook generally functions as a distracter of current affairs knowledge acquisition rather than that it contributes to knowledge.

More into detail, political interest has been found to be an important factor predicting how SNS usage affects knowledge acquisition on the individual level: The distracting effect of Facebook is conditional on how politically interested citizens are. Whereas the highly interested people are unaffected by the (negative) effect of Facebook, detrimental consequences occur particularly for citizens with lower levels of political interest. Consequently, this finding provides evidence that Facebook may amplify the knowledge gap: This social network site reinforces the social stratification in society between the *haves* and *haves-not* (Wei & Hindman, 2011). Twitter did not have such a divisive impact. Citizens of low and high interest both benefited from Twitter usage. Arguably, the reason is that current affairs information on this platform is abundantly present on Twitter timelines due to the (many journalistic/political) accounts that citizens follow, the absence

of a filtering algorithm, and popular retweets about news events (Ju et al., 2014; Kwak et al., 2010). Altogether, these findings expand knowledge gap theory to the online domain.

The question remains whether these platform specific effects are context-dependent. It could be that Dutch citizens use Facebook less for purposes of following the news than people in other countries (and for Twitter vice versa). For example, Facebook was a much more popular source of information in countries as Turkey and Portugal at the time of this study than in the Netherlands (Fletcher, Radcliffe, Levy, Nielsen, & Newman, 2015). Moreover, the Dutch population almost has a universal internet access. The impact of SNS usage will, arguably, be less strong in many countries where access to the online public sphere is less commonplace or more restricted. Accordingly, cross-national research is needed to replicate the current findings. In such future research, ideally, the independent variable of this study will be measured in greater detail. For example, by tapping the frequency of SNS use with more fine-grained answer options (e.g., number of times per day, instead of days only), by distinguishing the motivations and gratifications sought while using SNS, and by asking whether “usage” only includes passive or also active behaviors. Regarding the latter, it is relevant to know whether just scrolling through timelines and reading posts (i.e., passive behavior) already encourages learning, or whether posting, sharing, and commenting (i.e., active behavior) on these posts is perhaps precondition for any effects to take place (or may further enhance knowledge effects).

The current study, nevertheless, provides a solid investigation of Facebook and Twitter’s effect on knowledge acquisition and is a valuable starting point for future research that can build on my findings and dig deeper into the specific characteristics of SNS usage that drive the revealed effects. The effects found in the panel survey admittedly seem relatively small, but are meaningful when one understands these as part of a larger process. Small effects on a dynamic nine-point scale may develop into wider knowledge cleavages on the long term. Future research would benefit from knowledge scales with more items on a larger diversity of topics and of a varying difficulty to

more precisely examine the impact that social network sites have on knowledge acquisition (for inspiration, see Curran, Iyengar, Brink Lund, & Salovaara-Moring, 2009; Jerit, Barabas, & Bolsen, 2006; Soroka et al., 2013).

Empirical findings of previous research on the democratic consequences of social network sites have been very mixed. Whereas some find that it does not lead to much more than feel-good participation (i.e., “slacktivism”) without much impact (Vitak et al., 2011), others demonstrate that these platforms may fulfil an important democratic purpose (Gil de Zúñiga et al., 2012). The current study contributes to this ambiguity in the literature. Whereas the democratic contribution of Twitter had already been documented in times of crises and protests (Gleason, 2013), this paper shows that Twitter also has positive consequences for the current affairs knowledge that citizens acquire under everyday circumstances. Contributing to the rich literature on the knowledge gap hypothesis, Facebook by contrast has a negative effect on the knowledge acquisition of politically uninterested citizens, which may thus result in negative democratic outcomes. Theory about social network sites, thus, should avoid general claims about their consequences and instead carefully analyze the architectures and audience usage of specific platforms. Practically, users of Facebook and Twitter should be aware that one social network may serve information purposes better than another as not to leave them behind with just the *feeling* of being informed. Altogether, this study provides the necessary nuance to fuel debates about the democratic impact of social network sites: Effects of social network usage cannot be generalized but depend on the specific platforms (i.e., Twitter vs. Facebook) as well as the political interest of the individual citizen.

## Notes

1. The survey also asked factual knowledge questions about the meaning of TTIP (i.e., a trans-Atlantic trade agreement) and the name of the Greek Minister of Finance (i.e., Yanis Varoufakis). Because these facts could be known *before* Wave 1, these were excluded from the measurement of *acquired* current affairs knowledge. Findings are similar when these items are included in the measurement of knowledge.

2. ABN bonuses (before panel survey:  $n = 0$ ; during panel survey:  $n = 85$ ); law on flexible working times (before:  $n = 1$ ; during:  $n = 8$ ), Timo Huges (before:  $n = 6$ ; during:  $n = 117$ ), economic growth (before:  $n = 0$ ; during:  $n = 13$ ). The coverage in these news outlets clearly shows the strongly increased availability of factual information as was measured in the dependent variable.

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## Disclosure statement

No potential conflict of interest is reported by the author.

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