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a meta-analysis of research

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Abstract: New technologies raise fears in public discourse. In terms of digital media use and youth, the advice has been to monitor and limit access to minimize the negative impacts. However, this advice would also limit the positive impacts of digital media. One such positive impact is increased engagement in civic and political life. This paper uses meta-analysis techniques to summarize the findings from 106 survey-based studies (965 coefficients) about youth, digital media use, and engagement in civic and political life. In this body of research, there is little evidence to suggest that digital media use is having dire impacts on youth's engagement. We find that the positive impacts depend on directly political uses of digital media, such as blogging, reading online news, and online political discussion. These online activities have offline consequences on participation, such as contacting officials, talking politics, volunteering, and protesting. We also find a very strong relationship between online political activities, such as joining political groups and signing petitions, with offline political activities, which undermine claims of slacktivism among youth. Finally, while research generally assumes a causal flow from digital media to participation, the evidence for the alternative causal flow is strong and has very different implications on interventions designed to address youth's levels of engagement in civic and political life.

Young people, digital media and engagement: A meta-analysis of research

All new technologies raise some sort of fear in public discourse. Headlines warn us about the detrimental effects of digital media on youth. Young people are characterized as technology addicts who have lost the ability to interact in face to face settings (Kahne et al., 2009; Twenge, 2017). They are also portrayed as vulnerable to online sexual exploitation, particularly girls, despite the greater risks of offline sexual exploitation in schools and within families (Jenkins et al., 2016). Their smartphone use is linked to depression and suicide (Twenge, 2017). This discourse concludes with a strong recommendation to parents and teachers that youth's access to technology should be monitored and limited (Jenkins et al., 2016; Twenge, 2017).

This discourse fails to acknowledge that the impacts of digital media depend on the *nature* of the use. Restricting access can limit detrimental effects, but it will also limit the positive impacts of digital media. One of the many ways young people use digital media is for civic purposes such as reading online news, joining online political groups, and discussing political issues on social media. Moreover, a variety of new forms of political participation have emerged creating new repertoires of engagement for young people (Cammaerts et al., 2014; Theocharis & van Deth, 2018). Furthermore, previously offline-only acts can be pursued online with dramatically lower costs, which can reinvigorate the repertoire of participation. In this study we provide an assessment of three questions:

(a) How do digital media affect youth engagement in civic and political life?

(b) What types of digital media use lead to civic and political participation?

(c) What are the mechanisms connecting digital media use and participation?

This study uses findings from 106 survey-based studies (965 coefficients) about youth, digital media use, and engagement in civic and political life. While several meta-analyses on the topic exist already (Boulianne, 2009, 2015; Chae et al., 2018; Skoric et al., 2016), this study is distinctive in three ways (see Online Supplement 1). *First*, it has an exclusive focus on youth participation. Young people are known to be early adopters and intensive users of digital media. Therefore, understanding how digital media affect their engagement, at a time in which civic and political attitudes and behaviors crystalize, is critical for understanding how their future participation habits are shaped.

Second, contrary to other meta-analyses which have a more specialized emphasis on the role of social media in particular (Boulianne, 2015; Skoric et al., 2016), this study adopts a broader scope looking at the effects of digital media more generally, similar to Boulianne (2009) and Chae, Lee and Kim (2018). While social media is extremely popular with young people, their digital habits are fluid and voluminous. They rapidly adopt new tools and abandon "old" or "uncool" digital tools, creating an ever-changing mix of communication technologies into their everyday repertoire. In response, we look at a broad range of digital media uses. Our definition of digital media is derived from existing research. As such, it refers to technologies that connect to the Internet. Research on youth's digital media use has largely focused on social networking sites, news and related websites, email, online gaming, chat rooms, blogs, downloading music from online sources, and mobile applications that connect to news websites or link to political candidates' websites. The terms engagement and participation are broadly defined within the scholarship, including such activities as contacting officials, talking politics, volunteering, marching in the street, boycotting products and services for political reasons and voting.

Finally, as with all meta-analyses studies, it allows us to provide an assessment about regularities and irregularities in theorizing and measurement that may help or impede future efforts to understand the impact of digital media on civic and political activities. We conclude by questioning the causal processes implied by existing research and raise concerns about policy interventions designed based on assumed, rather than tested, causal processes. Specifically, the assumption is that causality flows from digital media to offline participation, when the meta-data support the alternative – offline activity leads to online activity.

Young people, digital media and politics

Youth's digital media use is often seen as a partial remedy to the decline of youth participation in political and civic life -- a major issue of debate and concern for more than a decade. Youth's alienation from the political arena has manifested in low levels of electoral turnout, abysmally low levels of party membership, and a sharp decline in other forms of participation linked to institutionalized politics (Grasso, 2016; Martin, 2012; Sloam, 2016; Wattenberg, 2008). These concerns manifest in many places worldwide (The Economist, 2017). But if young people are turned off by electoral and party politics, they have not lost the willingness or desire to participate in civic life in general.

Digital media may be most important for those who lack access to formal political institutions (e.g., political parties) and institutionalized methods of participation (e.g., voting) (Jenkins et al., 2016). They have been shown to open new and alternative modes of participation in civic and political life, which are attractive to young people (Lee et al., 2013; Theocharis, 2011a,b). Early research comparing young and older adults demonstrates that the effects of digital media on civic participation differ by age group (Shah, Kwak, & Holbert, 2001; Shah,

McLeod & Yoon, 2001). However, this research was conducted in the early years of Internet use, prior to the development of social networking sites and the rise of platforms conducive to online political participation. Digital media have evolved tremendously since this early research was conducted, and so has the face of civic and political engagement.

Being frequently the first adopters of new technology and often its most intense users (Kahne et al., 2013), youth have also been at the forefront of participatory innovations. From a political socialization point of view, young people are at a critical life stage where their political identities and orientations are still in formation. As such, given the centrality of digital media to their day to day lives, we can expect that these tools could have a profound impact on them (Jenkins et al., 2016; Kahne et al., 2013; Kruikemeier and Shehata, 2016; Quintellier and Vissers, 2008; Twenge, 2017). There is a growing interest in how these tools shape young people's civic habits in ways that are beneficial (or harmful) to civic and political engagement. A thorough look at how digital media are impacting young people's civic and political engagement may thus "foreshadow" how technology could affect other age groups, as adoption spreads (Jenkins et al., 2016, p. 46).

How do digital media affect youth engagement?

Scholars present conflicting evidence about the positive versus negative effects of digital media on youth's engagement in civic and political life. Jenkins et al. (2016) highlight networked youth activism as part of the DREAMer movement (p. 158-161). Other studies highlight the use of digital media use in student protests against the rise of tuition fees in the UK (Theocharis, 2012) and in Canada (Raynauld, Lalancette, & Tourigny-Konéb, 2018). These stories of digital activism compete with narratives about digital media having dire consequences on youth's social

and psychological well-being (Jackson, 2017; Polianskaya, 2018; Twenge, 2017). In an experimental study with young Greeks, Theocharis and Lowe (2016) found negative effects of having a Facebook account on civic and political engagement. They offer a number of explanations for these findings, including that Facebook can "distract the users' attention from politics" (p. 148). In contrast, Xenos, Vromen, and Loader (2014) explore frequency of social platform use in three countries (USA, UK, and Australia), finding consistently positive outcomes on civic and political life. While all these studies are highly informative and compelling, an important limitation is that they rely on generic measures of digital or social media use, rather than explorations of the various types of digital media use. What is lacking is the big picture – a systematic review of disengagement and engagement, online and offline, as well as all types of digital media uses. This meta-analysis seeks to assess the broader positive or negative impact of digital media on youth's civic and political engagement examining a collective set of findings from 106 survey-based studies, asking:

> **RQ1)** To what extent does digital media use create a negative or positive impact on youth engagement? In particular, how does time online affect time spent on civic and political activities?

Digital media and mobilization mechanisms: The effect of political and non-political uses

One of the most frequently explored assumptions is that digital media has the capacity to allow citizens to engage with diverse others, spend time navigating a plethora of information, and get exposed to issues of very diverse nature, eventually leading them to take civic or political action. Social interactions with diverse people and different values can have a mobilizing effect by

introducing individuals to politics on a small scale (see van Deth, 1998). Further, digital media can play the role of online spaces in which citizens can obtain skills necessary for participating in civic life (Kahne & Bowyer, 2018). Kahne and Bowyer (2018) see the value of social media in building networks that could lead to incidental exposure. The digital environments can help citizens develop certain skills and psychological dispositions that are conducive for participation in the more resource-intense offline activities (Kim et al., 2016; Vissers & Stolle, 2014). Kahne, Middaugh, and Evans (2009) make a similar claim about youth's online gaming and their civic engagement – certain types of online gaming build skills that transfer to the civic sphere leading to increased engagement.

Yet, there are important nuances regarding this mechanism which are rarely considered in the relevant literature. In the offline realm, people tend to develop civic skills mainly in *civic* or *political* contexts (e.g. political groups/parties) and not in, say, leisure-oriented ones (e.g. discussion or reading groups and choirs) (Quintelier, 2008; van Der Meer & van Ingen, 2009). Similarly then, it can be hypothesized that in the online realm, purely social, entertainment- and leisure-oriented activities carried out on digital media do not necessarily mobilize individuals for civic or political action. Interactions have to be related to politics. The question of whether non-political digital media uses lead to offline engagement is critical, as theoretical work around the effects of social media tends to link activities that have little to do with politics, such as lifestyle-oriented social media use (related to e.g. fashion, food, music, games), to political outcomes (Bennett, 2012; Kahne & Bowyer, 2018). We gather a variety of studies to test the degree to which the positive impacts depend on explicitly political uses of digital media.

RQ2) What types of digital media use lead to offline civic and political participation? In particular, to what extent do non-political online activities relate to youth's offline civic and political activities?

Digital media and participation mechanisms: Gateway or Spillover?

There is much debate about the capacity of digital media to dramatically lower participation costs. A petition, for example, does not have to be physically signed on a paper distributed by a political activist. A few clicks online, possibly even on a dedicated petitions website, is sufficient. The minimal effort required to carry out such activities has rendered them devoid of democratic utility for some observers who assign greater value to activities carried out physically, in the offline world (Gladwell, 2010). The debates about slacktivism imply that online, low-effort political activities do not translate into more intense forms of offline political activities; further, these online activities are said to reduce the likelihood of engaging in offline activities by providing an illusion of having put enough effort. These claims merit further testing as they imply a demobilization mechanism according to which online activities substitute offline participation. Testing these claims has been a popular focus with recent scholarship (e.g., Chan, Chen, & Lee, 2016; Kahne & Bowyer, 2018; Kim, Russo, & Amna, 2016). However, what is missing is an aggregate perspective on the evidence (or lack thereof) in relation to slacktivist claims.

Moving past the slacktivist claims, we propose to examine two possible mechanisms connecting digital media use and participation: gateway and spillover. Scholars have hypothesized that digital media would serve as a *gateway*, whereby engagement with online activities would lead to offline participation (Kim et al., 2016; Vissers & Stolle, 2014). This

theoretical mechanism is based on the idea that online activities will build capacity to engage in politics, by building social networks which increase the chance of being asked to participate and by increasing exposure to political information which increases political knowledge (Boulianne, 2015). A less optimistic appraisal, which echoes early dismissals of the Internet's effects on participation as "politics as usual", however, sees merely a *spillover effect* in which offline activities lead to online engagement (Kim et al., 2016). The assumption of this mechanism is that it is mostly already politically involved individuals who will use digital media for information searching and new participatory opportunities – and not those previously uninvolved, thus replicating well-known participatory inequalities. This assumption aligns with the reinforcement theory of media effects (Norris, 2000), but the spillover effect is specific to a type of digital media use – online participation in civic and political life.

While the *gateway* and *spillover* mechanisms make for compelling theoretical explanations, they have proved difficult to test. Empirical investigations that would enable researchers to more comfortably infer causality, such as experiments or panel studies, have been in short supply. Those panel studies that are available tend to be student (e.g., Towner, 2013) or local samples of youth (e.g., Kim et al., 2016), raising questions about generalizability. Aggregating across the samples offers a robust picture of the causal process and consistencies in the findings. We thus ask:

RQ3) What are the mechanisms connecting digital media and participation? In particular, how do online political activities relate to offline political activities?

Methods

Study selection

Most meta-analyses focus exclusively on academic databases, but this approach may over-represent statistically significant findings (Ellis, 2010; Lipsey & Wilson, 2001). As such, this project supplements an academic database search with a search of Google Scholar. Google Scholar includes conference papers, dissertations, master's theses, and other works that may not appear in academic databases. The objective was to collect *all studies* using **survey**-based data to assess the relationship between youth's digital media use and their offline engagement. This search strategy addresses the publication bias (towards significant effects) that may exist when focusing exclusively on published works.

To verify full coverage of this research field, we employed two different research assistants, working separately, to conduct a search of the field. They were provided the same search queries as starting points. The search terms were: "political engagement" or "civic engagement" or "voting" or "political participation" or "civic participation" or "protest" or "volunteer" AND "online" or "web" or "social media" or "social networking" or "digital media" or "Internet". They were further instructed to refine their searches to studies focusing on "youth" or "adolescence" or "young". We did not specify, at the onset, the age range for the sample respondents. However, the existing literature used these concepts in relation to samples ranging from 12 years to 34 years. While standard definitions of youth tend to end at 24 years, we found many studies aggregated 18 to 29 years olds (Xenos, Vromen & Loader, 2014; Theocharis 2011 a,b) and 18 to 34 year olds together (e.g., Shah, Kwak, & Holbert, 2001; Shah, McLeod & Yoon, 2001; Vromen, 2007). We choose not to exclude this research for having a broader definition of youth. The search work was completed in March 2017 with updates in October 2017 and February 2018.

The studies were included if they focused on <u>behavioral</u> measures of digital media use and engagement in civic and political life. Studies assessing motivation for digital media use are excluded, as are studies focusing exclusively on the intent to participate or political interest (Kruikemeier and Shehata, 2016).

Prior meta-analyses illustrate the distinctive role of research design on findings. As such, the analysis examines whether the findings are different based on cross-sectional versus longitudinal design (Boulianne, 2009, 2015). While experimental designs offer stronger tests about causality (e.g., Theocharis & Lowe, 2016), the impact of experimental designs is dependent on the nature of the manipulation. As such, this design merits a separate analysis from the correlational focus of survey-based studies. A full listing of the studies is published as Online Supplement 2.

Effect sizes

The relationship estimates are based on ordinary least squares regression, Pearson or Spearman correlations. Sometimes, these estimates should be called coefficients, because they are merely measures of correlation, and other times these estimates can be called effects, as in the case of longitudinal analysis. If the authors report unstandardized OLS coefficients, the results were standardized using the standard deviations of the independent and dependent variables (if reported). Most studies use this type of analysis, but many studies use logistic regression, Tobit analysis or Poisson regression, which cannot be easily standardized. To address any concerns about omission bias in the effect size calculation, the analysis includes an analysis of both the direction of the effect (positive or negative) and whether the effect is statistically significant. If

there is no omission bias, the patterns of findings would be similar for effect sizes and the likelihood of statistical significance.

When bivariate correlations are reported alongside multivariate analysis, the multivariate results are included. However, when *only* bivariate correlational analysis is offered, these correlations are included in the analysis. In many instances, the coefficients for the multivariate findings and the bivariate findings are similar. For example, Burean and Badesco (2014) report a bivariate correlation of .275 for online activism and offline protest (Table 1). After controlling for gender, mother's education, father's education, and income, the size of the coefficient remains exactly the same (Burean & Badesco, 2014, Table 2). Vissers and Stolle (2014) offer similar findings for their bivariate wave 1 data on online and offline participation (.587 versus .56 in the multivariate model, controlling for socio-demographics, political attitudes, knowledge, and Internet use). Harp, Bachman, Rosas-Moreno, and Loke (2010) provide eight different tests between online and offline political activities. The bivariate estimates are similar to the multivariate analysis controlling for gender and household income (Harp et al., 2010). One of the reasons for the similarity in estimates is that the largest predictor of online and offline engagement tends to be education. This variable has less variance among youth than older adults and given the popularity of survey recruitment in schools, the variable is often left out of the analysis of youth's digital media use. The bivariate and multivariate results are not always similar; the value of evaluating multivariate results is that these coefficients are better at estimating the *unique effect* of digital media on engagement, once covariates such as gender and family income, are accounted for.

Sample characteristics

Across the 106 studies, university-based samples are the most popular sampling method for youth studies (Table 1). Few studies have more than 1500 respondents. As a collective, these 106 studies represent more than 85,000 survey respondents from across the globe. Data collection for these studies span the period of 1996 to 2016.

[insert Table 1 here]

The studies span the globe, but there is an abundance of studies conducted in the United States (394 coefficients across 47 studies). Other popular countries for analysis are Canada (69 coefficients across 6 studies), mainland China (91 coefficients across 10 studies), and Sweden (35 coefficients across 7 studies). There are more than 35 countries included in this body of research.

Digital media use variables are divided into time-based measures, political uses, and online political participation. Time-based measures of digital media do not reference any specific type of use. Rather the measures assess whether or not the respondent uses digital media or hours spent on digital media use. This measure relates to popular discourse about the dire consequences of digital media. Political uses of digital media include consuming news about politics or current affairs, election information, visiting candidates or social movement websites, emailing or chatting about politics, liking political posts, following political candidates or elected officials, online membership in *political* groups, the number of online political discussion partners, and other forms of online political engagement (e.g. signing petitions). This measure relates directly to claims about whether non-political uses can mobilize youth to participate. Within these political uses of digital media, we have further distinguished passive versus active forms of engagement by identifying a subcategory of digital media use for online political engagement. Digital media use for online political engagement includes measures of sharing

political views online, discussing politics on social media or other forums, donating to

campaigns online, signing e-petitions, and contacting officials online. The online political

engagement measures can address questions about the relationship between online and offline

political activities, and more specifically about whether the evidence aligns with a *gateway*

versus a *spillover* effect as well as the slacktivism debate.

Findings

Using all 965 coefficients across the 106 studies, there is a clear pattern of positive

coefficients between digital media use and engagement (Table 2). Approximately 80.89% of the

coefficients are positive and most of these positive coefficients are statistically significant at the

.05 level. Less than 20% of the coefficients are negative and it is relatively rare for a negative

coefficient to be statistically significant. Only 25 of the 942 coefficients are negative and

significant. There is a consistent omission bias in that some articles do not report the strength or

direction of coefficients, when the coefficient is not statistically significant. This impacts the

sample size/number of coefficients for analysis in Tables 2 to 6, as the number of coefficient

drops from 965 to 942 when exploring significance.

[Insert Table 2 here]

Figure 1 presents the effect or coefficients for those studies that report ordinary least

squares regression or Pearson, Spearman, or other type of correlation analysis. As mentioned, not

all studies report standardized coefficients limiting the calculation to a subset of studies (n=712,

instead of 942). This subset of studies also demonstrates the abundance of positive coefficients

(Figure 1). The average effect size for the 712 coefficients is .143 (standard deviation is .178).

Another way to assess the average effect size is to average the multiple estimates within a study, before using these estimates in calculating the grand average (Lipsey and Wilson, 2001). This approach addresses concerns about the non-independence of each estimate, since some estimates are derived from the same study. When the average is calculated at the study-level, the average at the study-level is .154 (standard deviation .122). In other words, the average is similar whether the unit of analysis is the effect or the study. For the study-level analysis, 87 of the 106 studies report at least one coefficient that was standardized or could be standardized.

[Insert Figure 1]

Figure 1 illustrates the range in the standardized coefficients from -.307 to .760. Ekström, Olsson, and Shehata (2014) report the lowest coefficient. They measured digital media use as talking to friends using a variety of instant messaging services, connecting with friends through Facebook and similar sites, and publishing information about oneself on Facebook and similar sites (p. 175). They measured engagement as public-oriented peer talk about news, environmental issues and politics or societal issues (p. 174). Their large sample (n=1677) is aged between 13 and 17 years and recruited from schools in a specific region of Sweden. They originally reported an OLS unstandardized regression coefficient of -.26 and a standard error .02 (p. 178). Using the reported standard deviations for the independent and dependent variables, the standardized coefficient was estimated at -.307. This particular result was based on their cross-sectional data; their analysis of panel data produces much smaller, but still significant negative effects in the range of -.06 and -.14 (also see Ekström & Östman, 2015). The study clearly illustrates the importance of research design (cross-sectional versus longitudinal data) in determining the magnitude of the relationship between digital media use and engagement. The

study also exemplifies the distinct effects when digital media is non-political versus political in nature.

The largest coefficient is from Kim et al. (2016), which is based on the same dataset as Ekström et al. (2014). They measured online political participation as signing an online petition, participating in an online protest, writing about political or societal issues on a blog or homepage, linking to a political video, connecting to a group on Facebook, and sharing political music (p. 9). Their measure of political engagement was collecting signatures for a petition, contacting a politician or public official, boycotting products for political reasons, taking part in a legal demonstration, attending a public meeting, taking part in a fundraising event for a political cause, and signing a petition (p. 9). This large effect (.760) is based on contemporaneous measures of online and offline engagement. When the effect is modeled across two waves of data, the effect sizes decrease to .32 to .47, depending on the age group (adolescents versus young adults). In terms of RQ1, digital media use, for the most part, has a positive impact on youth engagement. However, we further stipulated that the presence of positive versus negative effects may differ by type of digital media use, as noted when comparing Ekström's studies to Kim et al. (2016).

Measures focusing on time spent online (with no reference to purpose) are isolated from other measures, also addressing RQ1. There are 104 coefficients across 34 studies that measure generic time use on digital media. These coefficients are less likely to be positive, less likely to be statistically significant and are smaller in average size, compared to other ways of measuring digital media use (Table 3). These analyses, as well as that presented in the remaining tables, are based on t-tests of two sample means (unequal variance between groups). When measuring time

use on digital media and participation in civic and political life, there seems to be no relationship. The average effect is .038 (SD = .092) on a standardized scale of 0 to +1.

[insert Table 3]

As for RQ2, we examine what types of digital media use lead to offline civic and political participation, i.e., do non-political online activities relate to youth's offline civic and political activities? There are 554 coefficients across 79 studies that measure political uses of digital media. These coefficients are more likely to be positive, more likely to be statistically significant and are larger in average size, compared to other ways of measuring digital media use (Table 4). At an aggregate level, the findings suggest that political uses of digital media are positively correlated with measures of civic and political engagement. In contrast, non-political uses of digital media seem to have little impact on participation in civic and political life. The average coefficient is .058 (SD = .104) on a standardized scale of 0 to +1.

[insert Table 4]

Within the subset of political uses, there are 221 coefficients that measure online political participation, such as sharing political views online, discussing politics on social media, signing e-petitions, and contacting officials online. This analysis addresses RQ3. When this measurement approach is used, the coefficients are more likely to be positive, more likely to be statistically significant, and are larger in average size (Table 5). All of the tested coefficients (207 coefficients across 49 studies) between online and offline political participation are positive. The average effect size is .307 (SD=.185) on a standardized scale of 0 to +1. The exact effect size may vary across countries, but the sizes of the coefficients are remarkably large. For example, Chan, Chen and Lee (2016) examine the relationship between online and offline participation in

China, Hong Kong and Taiwan, using surveys of university students. The exact coefficient varies across these regions (.60, .43, and .56, respectively).

[insert Table 5]

As another example, Harp et al. (2010) focus on African American youth aged 12 to 17 years (n=108) gathered from Synovate's pool of respondents in the United States. They measure online participation as reading and posting comments posted by readers on a news website or political blog, exchanging political emails with friends and family, forwarding and receiving links to a political video or news article, sending or receiving text messages about politics, watching video news stories online, and watching political candidate videos online (p. 233). Their measure of offline participation was contributing money to a campaign, attending a political meeting or rally, working for a political party, displaying a political campaign button or sticker, or participating in a political protest (p. 233). They estimate the relationship as .746 after controlling for gender and household income. They also estimate the same relationship for white youth, but the coefficient is smaller (.622).

This dataset is also used in several other studies (e.g., Bode et al., 2014; Lee et al., 2013; Shah et al., 2009). The relatively large coefficient is replicated (.540 and .430, respectively) with a more exhaustive set of statistical controls including demographics, political characteristics, and other types of media uses (Bode et al., 2014, Table 3; Shah et al., 2009, Table 3). When the dataset is used for longitudinal analysis, the effect sizes are smaller (.340 in Bode et al., 2014 and .210 in Lee et al., 2013), but sizable in comparison to other coefficients (Figure 1). Once again, the studies demonstrate the importance of longitudinal versus cross-sectional designs in assessing the magnitude of the coefficient.

What are the mechanism connecting digital media use and offline political activities? As discussed with the above example, the effect sizes are different when longitudinal data are used to assess the relationship. Longitudinal research, in general, is less likely to produce positive coefficients, less likely to produce significant coefficients and the average effect size tends to be smaller (Table 6). The 167 longitudinal coefficients are based on only 15 studies. Towner (2013) examines 36 tests of the relationship between digital media use and engagement using longitudinal data and only four coefficients are significant. Indeed, the longitudinal results, as an aggregate, challenge the substantive impact of digital media use on participation in civic and political life. The average coefficient is .076 (SD = .108), which is approximately half the size of the estimate for cross-sectional designs, which is .157 (SD = .187).

[insert Table 6]

However, we examine whether the longitudinal findings could be partially explained by modelling choices. In particular, does digital media use cause participation or does participation cause digital media use? The common assumption is that digital media use leads to participation. However, a handful of studies (both longitudinal and cross-sectional) test the alternative. There are 89 coefficients across 30 studies. When the causal mechanism is tested as participation leading to digital media use, the coefficients are more likely to be positive, statistically significant, and larger in size, than the commonly assumed mechanism (Table 6). The findings are suggestive, rather than conclusive. Ideally, the directionality would be examined using longitudinal data that tests both directions (cross-sectional designs do not allow inferences about the direction of the relationship). However, longitudinal studies rarely test this directionality and follow the common practice of assuming directionality (e.g., Bode et al., 2014; Ekström et al., 2014; Kahne et al., 2013; Lee et al., 2013; Shah et al., 2009; Towner, 2013).

There are only eight studies that use a longitudinal approach and test the directionality of effects. The first study does not focus on online political participation and thus cannot speak directly to spillover versus gateway effects, which are specific to political participation (Theocharis & Quintellier, 2016). Within the remaining set of studies, the evidence for gateway versus spillover versus no effect is quite split (Boulianne, 2016, 2019; Ekström & Östman, 2015; Kahne & Bowyer, 2018; Shehata, Ekström, & Olsson, 2016; Vissers & Stolle, 2014). However, the findings repeat that the coefficient from longitudinal data modeling offline to online activities is more likely to be positive and slightly larger in size (there are no differences in relation to statistical significance). Most notable is Kim et al. (2016) who split their sample of youth into 15 years and 22 year olds. For 15 year olds, Kim et al. (2016) find that the effects align with a *gateway effect* (online political activities lead to offline political activities). They report a *spillover effect* for their older group of youth (22 year olds), meaning offline political activities lead to online political activities (Kim et al., 2016). However, the predominant assumption in this field of research is that the causal process runs from digital media to participation (gateway), but the few tests of the alternative pathway offer strong contrary evidence (spillover).

Discussion

The meta-data affirm the abundance of positive correlations between digital media use and engagement in civic and political life. While the positive correlations were established with other meta-analysis (Boulianne, 2009, 2015; Chae et al., 2018; Skoric et al. 2016), this project affirms the positive relationship for youth, examines research beyond social networking sites, and provides a contemporary account using 106 studies conducted across the globe from 1995 to 2016. Young people's lives are being shaped by their intensive use of new digital technologies in

ways that, some argue, have no precedent, and with dramatic changes in their attitudes and behaviors. Being at a critical life stage where their level of political interest and engagement is malleable, findings from youth studies may "foreshadow" how technology will shape their future engagement, as well as other ages (Jenkins et al., 2016).

This youth-focused meta-analysis provides a better estimate of the effects of digital media use on this specific group of people than broader meta-analyses. In an early meta-analysis on digital media use and engagement, which excluded studies of youth/students, Boulianne (2009) documented an average coefficient of .07, whereas this meta-analysis estimates an average coefficient of .143. The average effect is, indeed, larger for youth. Boulianne (2015) did not present an effect size, but did note that the findings were more likely to be significant for youth (but less likely to be significant for student samples), compared to adult samples. Chae et al. (2018) examined student (unweighted correlation .18) versus non-students (unweighted correlation .16). Student status introduces another set of questions about the role of education (as well as age effects) in the connection between digital media use and participation in civic and political life. The current meta-analysis study explores theories specific to age.

The new findings enable us to directly address three of the most important questions which are the focal points of current literature. *First*, despite concerns about digital media being a source of distraction or dire effects for young people when it comes to civic and political issues, the bulk of studies do not support this claim. While the claim is well-tested in the literature, only a handful of coefficients were negative and statistically significant. However, the time-use measures retain their popularity in the literature testing the effects of digital media on volunteering (Filsinger & Freitag, 2018; Vilhelmson, Ellder, & Thulin, 2017).

Second, the nature of digital media use matters, particularly the distinction between online non-political and political digital media uses. Available studies show that it is online political activities that are relevant mobilizers – the effects are larger (and significant) when compared to non-political uses. This is in line with previous findings about offline environments. Offline environments with civic or political properties tend to do so, while those with leisure- and self-expressive oriented properties do not (Quintelier, 2008; van Der Meer and van Ingen, 2016).

Third, the findings suggest a strong correlation between online and offline forms of participation in civic and political life. These findings address concerns that youth are engaging in online political activities, exclusively. These concerns have manifested around debates about clicktivism, slacktivism or flash activism. The findings offer a strong, conclusive statement that online and offline forms of engagement are highly correlated; youth engage in both environments.

Furthermore, existing research has largely assumed that online political participation will lead to offline participation with few tests of the reverse causal process. Research, for the most part, assumes this causal direction. Yet, directionality is important. Many solutions to engage youth in the political process, in social movements, and in their communities assume that online activities serve as a gateway, leading to the development of civic technology with the goal of boosting offline participation. However, if the causal process leads from offline participation to online participation, these technologies may have little impact. If the causal process runs from offline participation to online participation, then efforts to boost engagement should focus on offline activities. The relationship is likely reciprocal, but the critical issue is where this process starts, so that interventions, such as the development of civic technology, can be optimized. Civic

technology has a very different role to play in sustaining or recognizing participation, rather than mobilizing participation. Furthermore, these findings about offline leading to online (spillover) may have negative outcomes in terms of dividing the interested and engaged from those who are disinterested and disengaged. The divide would fuel concerns about participatory inequality and its implications on public policy.

These three conclusions highlight that digital media have a generally positive role to play in civic life, although much depends on how young people use digital tools. This should ease concerns of both scholars and policy makers. It should especially induce policy and civic specialists to strive towards devising ways that increase the chances of civic and political uses in the mix of young people's daily repertoire of digital media use. While playing games online may not detrimentally impact engagement in civic and political life, this type of activity will not increase engagement. Youth should be encouraged to read online news, comment on current events, and when they find a cause that interests them, they should connect with relevant groups online and participate in related activities, such as volunteering for these groups, signing petitions, contacting officials, or voting for candidates that support their causes. Schools can help encourage participation by helping students find organizations, as well as provide space to debate, organize, and express their political views (Maher & Earl, 2017). Families can support youth when they do find a cause that interests them (Maher & Earl, 2017). These institutions can support the bridging of the divide between those who are political interested and those who are not.

This meta-analysis allows us to make a number of observations about weaknesses in existing literature that impede scholars from a better understanding a phenomenon that is clearly of much interest and significance. The vast majority of available designs are cross-sectional.

Such designs are poorly suited for making causal claims about the relationships between variables of interest due to inevitable endogeneity problems. At the same time, they also produce much larger effects than studies deploying longitudinal designs, creating an overly optimistic assessment that may not have a solid grounding in reality. While longitudinal designs come with the practical problem of being expensive, this expense is justified in advancing our understanding of the causal mechanisms at work. More longitudinal and experimental studies are urgently needed for disentangling causal effects. However, we find, contrary to the predominant theories and causal process in the existing literature, that offline activities lead to online activities. This causal flow deserves more attention as the implications are very different from the mobilization process implied by a causal flow from online to offline. Finally, the expansion of online political participation into innumerable new forms has made its measurement a complex issue. Scholars should consider some standardization in measuring certain concepts (Theocharis and van Deth, 2018). The measurement of online political participation requires some attention to nuances (civic versus protest versus institutionalized) as well as re-visiting debates about whether this form of participation is distinct from its offline counterpart (e.g., contacting officials online vs. offline).

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Data Availability

The list of 106 studies is included as an online supplement and will be available at the following website: https://sites.google.com/site/shelleyboulianne/ . This listing can be used to replicate the analysis presented in this paper. In addition, copies of the data entry instructions can be accessed by contacting the primary author, Shelley Boulianne, at sjboulianne@gmail.com. We encourage researchers to build on our research by adding new studies and testing additional hypotheses.

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Table 1 Profile of Studies and Coefficients

Sample Characteristics	Number of coefficients	Number of studies
Type of sample		
University students	563	50
High school or middle school sample	113	15
Youth subset of a random sample from a random digit dialing or similar survey	163	22
Youth subset of an online panels matched to Census characteristics	89	14
Other types of samples, including surveys of young social media users, intercept street surveys, etc.	37	9
Sample size		
Less than 250 respondents	97	13
250 to 500 respondents	282	33
500 to 750 respondents	122	18
750 to 1000 respondents	270	24
1000 to 1250 respondents	61	6
1250 to 1500 respondents	41	8
1500 respondents	92	15
Total	**965**	

*Study counts do not add to 106 studies, because some studies included more than one type of sample (e.g., Kahne, Lee, & Feezell, 2013; Kim, Russo, & Amna, 2016) and longitudinal studies tend to present cross-sectional designs (with larger samples) as well as longitudinal results (with smaller sample sizes), such as Towner (2013) and Bode et al. (2014).

Table 2 Aggregate Findings

Direction		Number of coefficients	Percentage of total coefficients
Positive Coefficients	*Statistically significant**	469	49.79%
	Not statistically significant	293	31.10%
Negative Coefficients	*Statistically significant**	25	2.66%
	Not statistically significant	155	16.45%
	Total	**942**	**100%**

p < .05

Table 3 Generic (no reference to purpose) measures of digital media use

		number of coefficients	Percentage or Mean	Std. Deviation	t	p-value	Difference
Positive coefficients	*yes*	103	66.99%		3.24	.001	15.65%
	no	841	82.64%				
Significant coefficients	*yes*	104	36.54%		3.29	.001	16.61%
	no	858	53.15%				
Effect size	*yes*	67	.038	.092	8.63	<.001	.115
	no	645	.154	.181			

Table 4 Political uses of digital media use

		number of coefficients	Percentage or Mean	Std. Deviation	*t*	*p*-value	Difference
Positive coefficients	*yes*	536	87.31%		5.83	<.001	15.67%
	no	395	71.65%				
Significant coefficients	*yes*	554	58.84%		5.66	<.001	18.34%
	no	395	40.51%				
Effect size	*yes*	412	.197	.191	12.39	<.001	.139
	no	287	.058	.104			

Table 5 Online political participation measures

		number of coefficients	Percentage or Mean	Std. Deviation	*t*	*p*-value	Difference
Positive coefficients	yes	207	100.00%		15.42	<.001	24.42%
	no	737	75.58%				
Significant coefficients	yes	221	83.26%		13.35	<.001	41.42%
	no	741	41.84%				
Effect size	yes	184	.307	.185	14.94	<.001	.222
	no	528	.085	.135			

Table 6 Findings by Research Design

		number of coefficients	Percentage or Mean	Std. Deviation	t	p-value	Difference
Longitudinal Design							
Positive coefficients	yes	160	75.63%		1.74	.083	7.89%
	no	794	82.02%				
Significant coefficients	yes	167	28.74%		6.96	<.001	27.36%
	no	795	56.10%				
Effect size	yes	127	.076	.108	6.59	<.001	.081
	no	585	.157	.187			
Causal flow from offline participation to digital media use							
Positive coefficients	yes	86	93.02%		4.31	<.001	13.30%
	no	858	79.72%				
Significant coefficients	yes	89	62.92%		2.35	.020	12.75%
	no	873	50.17%				
Effect size	yes	72	0.175	0.144	1.93	.057	.036
	no	640	0.139	0.181			

Figure 1 Frequency Distribution of Coefficients
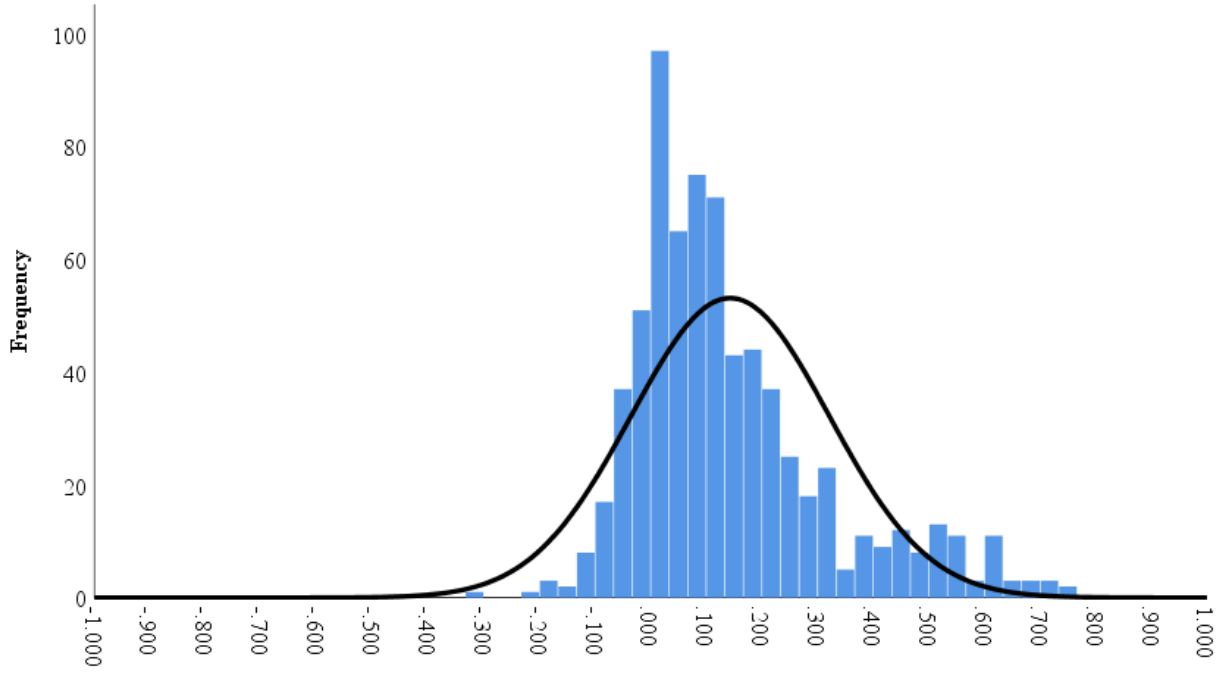
Young people, digital media and engagement: A meta-analysis of research

Online Supplement 1: Comparison of Meta-Analysis Articles

Shelley Boulianne and Yannis Theocharis

This online supplement compares key meta-analysis articles in this field of research. The coding scheme in this article is distinct from these other studies, because it focuses on theories and debates within youth scholarship. Within the youth scholarship, time-use measures and negative effects are given some prominence (Filsinger & Freitag, 2018; Theocharis & Lowe, 2016; Twenge, 2017); non-political uses are expected to have positive outcomes (Kahne & Bowyer, 2018; Kahne et al., 2009), as part of schools of democracy theories; claims of slacktivism are intensified (Twenge, 2017); and the causal flow is assessed within the gateway versus spillover debate (Kim et al., 2016; Vissers & Stolle, 2014). The current meta-analysis offers a nuanced analysis, which is enabled by the large sample of studies in the database. The size of this meta-analysis is exceptional, as evidenced by a recent meta-analysis of meta-analyses studies in communications (Rains, Levine, & Weber, 2018). These meta-analysis studies include, on average, 50 studies (Rains, Levine, & Weber, 2018), whereas this study includes 106 studies.

The table below outlines the coding scheme used in other key meta-analysis articles in this field of research. Each of these works offers a distinct contribution to the literature, but they pursue different research questions. Boulianne (2009) does not include any student or youth-focused studies. All the studies are of the adult population. The piece is focused exclusively on American studies. Given the explosion of studies on digital media and participation, the piece is also rather dated, as it only included studies published up to 2007 (with data collection up to 2005). While much of the research at the time of writing was focused in the United States, there has been a lot of research conducted and published since then, including a significant body of

international scholarship. Boulianne (2009) does not test causal direction given the lack of longitudinal studies at that time, but mentions in the Discussion that there are differences in modeling choices and assumptions about causal flow that merit further investigation. She writes, "further research should explore a two-way causal process, because the significance of the relationship seems to differ depending on whether the relationship is modeled as Internet use causing engagement or vice versa" (Boulianne, 2009: 203). The meta-analysis in this paper builds on this idea. This study includes 15 longitudinal studies in the database and a significant body of research questioning directionality (89 coefficients testing the reverse causal flow: participation to digital media use).

Boulianne (2015) includes student and youth-focused studies. There were seven youth samples studies and 13 student samples (see Table 1 on page 527). Boulianne (2015) did not address the distinctiveness of young adults compared to older adults, but pointed out differing patterns in the findings. Students samples are less likely to produce significant findings, whereas other youth samples are more likely to produce significant finding (Table 2, page 530). She writes "The findings about the youth samples require caution, because the findings are based on only 20 coefficients derived from 7 studies" (see page 531). Furthermore, the piece focused on social media only (36 studies).

Skoric et al. (2016) focuses on social media's impact on civic participation, political participation, online engagement, and social capital (22 studies). They do not isolate youth or student samples separately, nor do they report on theories related to youth's unique relationship to digital media or political participation. They offer insights about online political participation, but do not connect online and offline forms of participation.

Chae et al. (2018) do not address longitudinal research and causal flow. They offer

distinct findings not covered by this meta-analysis (online participation as a dependent variable).

Chae et al. (2018) examines student versus non-student, but did not find a difference. They find

"With regard to sample type, the results indicated no significant difference in the relationship

between Internet use and political participation relationship for non-students and students" (page

12). Student status explores education and age effects, whereas the current meta-analysis focuses

on theories related to age effects.

Supplementary Table 1: Review of Key Meta-analysis

	Boulianne, 2009	Boulianne, 2015	Skoric et al., 2016	Chae et al., 2018	This study
Size	38 studies	36 studies	22 studies	56 studies	106 studies
Geography	United States	Global	Global	Global	Global
Scope	Internet use	Social media	Social media	Internet use	Internet use
Sample	No student/ youth samples, only adult samples	20 studies of student/youth, rest are adult samples	Did not report on characteristics of the sample	23 student samples in the 56 studies	All youth/student samples
Dependent variables	*Civic and political engagement	*Campaign participation *Civic participation *Political participation	*Civic participation *Political participation *Online engagement *Social capital	*Online participation *Offline participation	*Civic and political engagement
Independent and moderator variables	*Online news *Year of data collection *Type of controls in model *RDD sample	*Sample type (student, youth, adult, etc.) *Democracy *Cross-sectional *Year of data collection *Sample size *Online news *Networking *Generic/hours	*Information *Expressive *Relational *Identity *Entertainment	*Internet vs. social media *Frequency (hours) vs. function *News *Student *Geography *Year *Sample size	*Generic/Hours *Political *Online political engagement *Gateway vs. spillover *Longitudinal design

In sum, this new meta-analysis builds on the above studies, but poses different questions related to youth. Do non-political uses offer an opportunity for youth to learn politics, as per the school of democracy literature (Table 4); to what extent is slacktivism occurring among youth (Table 5); and what is the causal flow for young people who are newly enfranchised and new to politics (Table 6)?

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