

Discussion Network Heterogeneity Matters: Examining a Moderated Mediation Model of Social Media Use and Civic Engagement

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Employing original two-wave national panel survey data, this study examines the mediating role of discussion network heterogeneity on social media in the relationship between social media use for news/information and civic engagement. This study also investigates whether such indirect effects of social media use on civic participation are contingent on individuals' extraversion personality. The results indicate that discussion network heterogeneity mediates the relationship between citizens' social media use for news/information and their civic engagement. In other words, social media use for information positively influences individuals' discussion network heterogeneity on social network sites, which consequently contributes to increased levels of civic engagement. In addition, this indirect effect of social media use on civic participation through network heterogeneity is stronger for introverted individuals. The implications of these findings are discussed.

Keywords: social media, discussion network heterogeneity, civic engagement, personality traits, extraversion, differential gains model

The increasing diffusion of social media platforms has raised questions about the role of social media in citizens' participatory behaviors. Many studies provide evidence that social media use has a positive relationship with engagement in civic and political activities, for example, by providing mobilizing information or news about current events and allowing users to exchange thoughts and opinions with other users (Gil de Zúñiga, Jung, & Valenzuela, 2012; Kim, Hsu, & Gil de Zúñiga, 2013; Macafee & Simone, 2012). Given these findings, an important inquiry is how and why these social media platforms relate to citizen participation and under what conditions these associations may differ (Choe, 2013; Valenzuela, Arriagada, & Scherman, 2012).

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Existing research has mainly demonstrated that social media use positively influences civic engagement, but little research has investigated the mechanisms by which social media can influence citizens' participation in civic activities. Research on political participation has suggested how and why social media use can increase individuals' participation in politics by demonstrating mediating mechanisms of social media effects. For example, specific types of social media activities—including social media use for news, expressing opinions, and social interaction with friends—mediate the relationship between overall social media use and political participation (e.g., Valenzuela et al., 2012). Although the literature on political participation suggests that the effect of social media on participatory behaviors is indirect rather than direct, little is known about how social media use can indirectly lead to civic engagement. This article adds to this literature by proposing a possible mechanism by which social media use leads to increased levels of citizen participation through expanding discussion network heterogeneity.

Previous studies have documented the positive influence of social media use on network heterogeneity (Kim, 2011; Lee, Choi, Kim, & Kim, 2014) and on participatory behaviors (Gil de Zúñiga et al., 2012; Kim, Chen, & Gil de Zúñiga, 2013). However, these relationships were documented separately, and researchers have called for further examination to better understand whether and how social media use and network heterogeneity together influence citizens' participatory behaviors. To fill this gap, this study proposes a mediating role of discussion network heterogeneity in the relationship between social media use for news/information and civic engagement. It is possible that using social media for news may increase the opportunities to discuss topics with more heterogeneous people on social media, and this can enhance individuals' participation in civic activities. Thus, we test a pathway to civic engagement by highlighting the mediating role of discussion network heterogeneity. The findings make a key contribution to the literature on the mediating mechanisms of social media use on citizens' participatory behaviors.

In addition, this study focuses on the moderating role of extraversion personality in examining the contingent conditions under which social media influence network heterogeneity, which in turn leads to civic engagement. Therefore, a moderated mediation model is proposed based on the differential gains model, which posits that media effects may be different depending on individuals' characteristics (Scheufele, 2002). Based on previous studies demonstrating that the positive influence of social media use can be greater for introverted and less open individuals (Kim et al., 2013), this research expects that the indirect mechanism of social media use on civic participation via discussion network heterogeneity is contingent on individuals' personality trait of extraversion. Therefore, this study aims to advance the scholarly debate on the use of social media for citizens' engagement in civic activities by examining the mechanisms by which social media use can contribute to civic participation and investigating whether and how these mechanisms may differ depending on individual characteristics.

In sum, the present study investigates associations among the constructs shown in Figure 1. We argue that social media use for news and information influences individuals' discussion network heterogeneity on social media, which in turn increases levels of civic engagement. The model shown in Figure 1 also illustrates that this indirect effect of social media use for news on civic engagement through network heterogeneity is contingent upon the individual's extraversion personality trait. A review of literature on the associations among the key constructs is presented below, along with the hypotheses.

We then explain the survey method and measurements and present the results. Last, we summarize and discuss the implications of the findings.

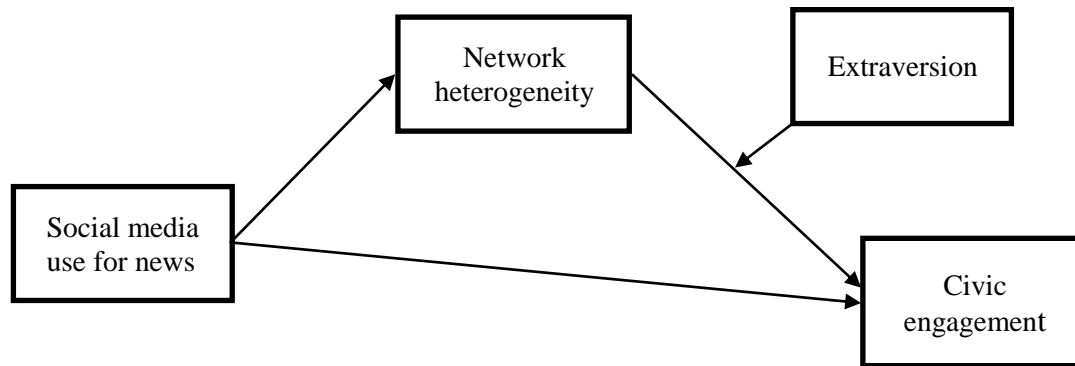


Figure 1. Proposed research model.

Note. The indirect (mediation) effect of social media use for news on civic engagement through discussion network heterogeneity is contingent upon extraversion.

Social Media and Civic Engagement

Civic participation plays a significant role in the functioning of a democratic society (Putnam, 2000; Verba, Scholzman, & Brady, 1995). It includes voluntary activities related to social, community, or nonpolitical issues, such as raising money for charity, attending neighborhood meetings, and working for nonpolitical groups (Verba et al., 1995). Scholars have debated whether the Internet encourages or discourages participation in civic activities. Some researchers argue that more time spent online leads to less time spent participating in civic causes (e.g., Kraut et al., 1998; Nie, 2001) and that those who use the Internet as another platform for engagement are those who are already interested in politics (Norris, 2001). However, others contend that the Internet can mobilize inactive people to engage in civic and political activities. For example, online communication can enhance community engagement (McLeod, Scheufele, & Moy, 1999). As a result, with the increasing popularity of social media, the relationship between social media use and citizens' participatory behaviors has received a great deal of attention.

A positive link between social media use (e.g., blogs, Facebook, and Twitter) and citizens' participatory behaviors has been consistently found in previous studies (e.g., Gil de Zúñiga et al., 2012; Kim et al., 2013; Macafee & Simone, 2012; Valenzuela et al., 2012). The literature has demonstrated that overall use of social media platforms has a positive influence on civic and political participation (Kim et al., 2013; Valenzuela et al., 2012). This is because social media provide people with news and mobilizing information and because users are able to exchange their opinions with many others, which may motivate them to engage in public activities.

Acknowledging possible explanations for that relationship (e.g., social media as an information source), another line of research has started to map out how and why overall social media use can be associated with citizen participation by focusing on specific types of social media usages and analyzing mediating mechanisms. Noting the important role of informational media use in informing and mobilizing citizens, recent literature has focused on the effects of social media use for news and information and provided evidence that informational social media use has a significant and positive impact on individuals' civic participation (Gil de Zúñiga et al., 2012). Because individuals' networks or connections on social media are based on interpersonal relationships, people may be more interested in news and information, including public affairs and community events, that their friends share and post through social media (Kim et al., 2013) and thus be motivated to attend community events or civic activities.

The Mediating Role of Network Heterogeneity in Civic Engagement

The extent to which citizens are exposed to diverse viewpoints determines the possibility of reasoned public opinion and deliberative democracy (Delli Carpini, Cook, & Jacobs, 2004; Gutmann & Thompson, 1996; Habermas, 1989). Exposure to diverse viewpoints has been found to enhance people's political tolerance, facilitate their awareness of rationales for their own political opinions, and foster a better understanding of issues (e.g., Mutz, 2002; Price, Cappella, & Nir, 2002).

Before discussing the impact of network heterogeneity on civic participation, it is important to understand the concept of heterogeneity to provide a conceptual foundation for whether and how network heterogeneity affects civic participation. As Nir (2011) suggested, heterogeneous discussion can be operationalized in two ways: (a) competition between points of view or (b) opposition to another's view. Competition, from the perspective of the heterogeneity of the network, indicates a mix of divergent viewpoints within a given network (Huckfeldt & Sprague, 1995; Nir, 2005), while opposition, from the perspective of ego position, is a divergence between the preference of the ego position and all other discussants in the network (Mutz, 2006). This distinction helps to explain the different results regarding whether network heterogeneity mobilizes or demobilizes participatory behaviors because scholars have not measured heterogeneity in the same way. Nir (2011) argued that opposition to a person's view is likely to discourage political participation because of the increase of attitudinal ambivalence and interpersonal cross-pressure. However, competition does not demobilize participation. Instead, competition prompts cognitive processing of information because the heterogeneity of networks helps people learn about complex issues (i.e., *learning function*) and motivates them to search for further information (i.e., *motivation-for-information function*; Nir, 2011; Scheufele, Nisbet, Brossard, & Nisbet, 2004). This can further encourage citizens' participation in public affairs (Leighley, 1990; Scheufele et al., 2004).

Our study adopts the competition state of heterogeneity and follows previous studies' operationalization of heterogeneous discussion networks as "how often individuals discuss and socially interact with other individuals from different ideological, political, gender, or racial backgrounds" (Scheufele, Hardy, Brossard, Waismel-Manor, & Nisbet, 2006, p. 735). Our measurement, therefore, includes not only those with oppositional viewpoints but those with different demographic and

socioeconomic backgrounds who could provide diverse viewpoints (see also Kim et al., 2013; Lee et al., 2014; Scheufele et al., 2006).

We argue that discussion network heterogeneity is positively related to civic engagement for three theoretical reasons. First, network heterogeneity can be positively associated with citizen engagement by triggering individuals' need for information or "post hoc information seeking" (Scheufele et al., 2006, p. 731). Exposure to contradictory information as a result of the diversity of viewpoints encountered in a heterogeneous network forces individuals to follow up on interaction with heterogeneous people to learn more about social issues and to bolster or rethink their perspectives (Scheufele et al., 2006). This *post hoc information seeking function* is important, because the literature has demonstrated that information seeking stimulates individuals' cognitive activity as well as their interest in and awareness of social issues and events (Eveland, 2001), which in turn leads to increased levels of citizen engagement. Second, discussion network heterogeneity can have positive effects on civic engagement by providing a variety of mobilizing information about social events. Individuals who build and maintain relationships with heterogeneous others on social media can receive many types of mobilizing information and news about various civic events when talking about public issues with others in their networks, thus increasing the opportunities to engage in civic activities. Third, although studies have demonstrated that network heterogeneity can discourage participation, such studies have mostly focused on political and electoral participation (e.g., McClurg, 2006; Mutz, 2006; Parsons, 2010), which involves activities in which people need to take up fixed positions. By contrast, studies that found a positive influence of network heterogeneity on participation focused more on civic activities (e.g., Scheufele et al., 2006; Wojcieszak, Baek, & Delli Carpini, 2010). As Lee (2012) suggested, the impact of heterogeneity is likely to depend on the type of participatory activities involved. Given that political participation is more likely to require people to choose their position, discussing politics with heterogeneous others is likely to induce ambivalence and make people feel uneasy about taking part in the activities. However, when it comes to civic engagement, which does not require people to express support for a fixed position, as Lee (2012) found in his study, discussing politics with heterogeneous others encourages participation in non-position-taking civic activities. Thus, network heterogeneity may play a positive role in affecting civic engagement.

Based on the literature reviewed above, this study proposes that network heterogeneity plays a role that mediates the relationship between social media use and engagement in civic activities beyond the direct effect of social media on civic participation. Researchers have suggested that social media use for news can prompt civic participation (Gil de Zúñiga et al., 2012). Network heterogeneity may also play a positive role in influencing civic participation (e.g., Leighley, 1990; Scheufele et al., 2004). However, researchers have not yet examined the role of network heterogeneity in the relationship between social media use for news and civic participation. This study fills this gap in the literature.

Before examining the mediating hypothesis, the relationship between social media use and network heterogeneity should be discussed given that whether the digital media environment contributes to network heterogeneity has been a scholarly debate. Some argue that because of the increased control users have over information selection, they will be more likely to filter out contrasting viewpoints so that digital media encourages viewing attitude-consistent or like-minded information (Johnson, Bichard, & Zhang, 2009; Sunstein, 2007). Others contend that individuals will have more chances to encounter

diverse information and viewpoints in the new media environment. Brundidge (2010) described a structural force in the online environment that can drive people to expose themselves to diverse perspectives and called this force "inadvertency." This inadvertency thesis indicates that a less-than-perfect selective exposure strategy, nonavoidance of exposure to political difference, and weakened social boundaries in the online world can lead people to expose themselves to more diverse political perspectives through their computer-mediated communication with heterogeneous others. Indeed, Brundidge (2010) found that Internet use for news and information (i.e., online political discussion and online news use) increased rather than reduced discussion network heterogeneity. In addition, Wojcieszak and Mutz (2009) found that people are likely to come across different viewpoints when they are in the online environment where both political and apolitical activities coexist. This is because political-oriented spaces such as political discussion boards could make it easier to accomplish selective exposure relative to nonpolitical-oriented chat rooms or message boards (Wojcieszak & Mutz, 2009). These studies suggest that exposure to various and heterogeneous networks may happen somewhat incidentally in places where weakened social boundaries exist and both political and apolitical information exists at the same time. Social media, therefore, provide an online environment similar to what Brundidge (2010) and Wojcieszak and Mutz (2009) suggested.

Kim, Chen, and Gil de Zúñiga (2013) also suggest that social media activities promote inadvertent information exposure, which may enhance network heterogeneity. In addition, Kim (2011) found that use of social network sites for campaign information had a significant influence on encountering diverse perspectives. Another study finds that general social media use such as Facebook and Twitter has a positive relationship with discussion with heterogeneous people (Kim et al., 2013). A recent study maps out how the use of social media is associated with network heterogeneity. Lee et al. (2014) show that three types of activities on social media (getting news, posting news, and talking about public issues) mediate the relationship between the frequency of social media use and the level of social media network heterogeneity. These findings suggest that not only the (general) frequency of social media use but specifically informational use may lead to greater levels of network heterogeneity on social media. Based on these studies, because posting/getting news and information and engaging in political discussion on social media may increase inadvertent contacts with diverse others (Brundidge, 2010; Kim, 2011; Lee et al., 2014), we expect a positive relationship between social media use for information and network heterogeneity.

Combined with this discussion about the positive role of social media use for news and network heterogeneity on civic participation, we argue a mediating role of discussion network heterogeneity in the relationship between social media use for news and civic participation. People are likely to talk with various people as they share news and information and interact with their family, friends, colleagues, and strangers on social media platforms. By doing so, individuals' higher levels of network heterogeneity within a broadened social network may consequently lead to increased levels of engagement in civic activities. Therefore, we propose the following hypothesis:

H1: Network heterogeneity on social media mediates the relationship between social media use for news and civic engagement.

Extraversion as a Moderator: Differential Gains for Social Media

In addition to investigating a mediation mechanism of social media use on civic engagement, this study examines a moderated mediation mechanism by proposing that a personality trait (i.e., extraversion) moderates the relationship between social media use, discussion network heterogeneity, and civic participation. Examining the moderating effect can illuminate the conditions under which the mediating relationship may differ. Specifically, assessing extraversion as a moderator allows us to know the important role of individual characteristics in amplifying or attenuating the effects of social media on engagement in civic activities.

Extraversion is one of the Big Five personality traits and includes characteristics such as adventurousness, sociability, and talkativeness. By contrast, introverts are shier and quiet, and do not crave excitement (Costa & McCrae, 1992a). Extraversion has been found to be positively linked to civic engagement. For example, Mondak and Halperin (2008) found that extraverts are more likely than introverts to participate in civic activities such as attending and speaking at political meetings and volunteer work. However, studies have yielded mixed findings in terms of how extraversion relates to social media use. Some research has found that people who are more extraverted will use social media more frequently (e.g., Correa, Hinsley, & Gil de Zúñiga, 2010), while others found a negative relationship between extraversion and social media use (e.g., Swickert, Hittner, Harris, & Herring, 2002). Researchers argue that introverts are likely to use social media to present themselves and interact with others (Amichai-Hamburger, Wainapel, & Fox, 2002). Although introverts are less talkative and sociable in daily life than extraverts, they could use social media to build trusted connections and develop deeper conversations (Cain, 2012). Therefore, social media could provide a bigger bonus for introverts than extraverts in terms of benefiting from social media use. Therefore, we propose extraversion as the moderator in influencing the mediating relationship between social media use and civic participation.

The literature on the differential gains model (Scheufele, 2002) provides insights to investigate the idea that the relationships between social media use, discussion network heterogeneity, and civic participation may vary depending on personality traits. The differential gains model posits that the impact of media use on citizens' understanding of public affairs and participatory behavior might be contingent on interpersonal discussion (Scheufele, 2002). In other words, although there is an overall positive influence of media use on citizens' engagement in social or political activities, this impact may differ depending on individuals' levels of talking about current issues with others. Scheufele (2002) found that the influence of news use on political participation was stronger for people with higher levels of discussion than for those with lower levels of discussion, supporting the differential gains model.

Furthermore, a body of literature on this model has suggested that outcome variables such as citizens' participatory behaviors may be contingent on individuals' characteristics. For example, the effect of Internet use on political engagement appeared to be enhanced for those with greater levels of interest in politics (Xenos & Moy, 2007). Eveland and Scheufele (2000) also demonstrated gaps in participation between less- versus more-educated people such that individuals with high levels of education were more likely to participate in political activities than those with low levels of education.

The differential gains model can be applied to the relationship between social media, network heterogeneity, and civic engagement. Kim et al. (2013) found that the positive role of social media consumption in increasing interpersonal network heterogeneity and civic engagement is greater for introverted and less open individuals. However, it has not yet been tested whether the indirect path from social media use to civic participation via network heterogeneity (social media → network heterogeneity → civic engagement) is contingent on individuals' personality traits. Based on the discussion above, it is plausible to expect that compared to extraverted people, introverted individuals benefit more from social media. When introverted people use social media more frequently for news and information, they may be able to take more advantage of expanding their network heterogeneity than extraverts, who may already have greater network heterogeneity on- and off-line, which will in turn increase the levels of civic engagement. Thus, this study expects that the indirect effect of social media use for news on civic engagement via network heterogeneity will be stronger for introverted individuals. The following hypothesis is proposed:

H2: The indirect effect of social media use for news on civic engagement through network heterogeneity is contingent on individuals' extraversion personality such that the effect is stronger for those who are introverted.

Method

Data and Sample

This article relies on original survey data collected in South Korea. A two-wave national panel survey was conducted by a professional research company. Participants were recruited from national online panels maintained by the research company. The first-wave survey was conducted in December 2012. To proportionally represent the Korean population, stratified quota sampling was employed based on gender (male and female), age (19–20, 30–39, 40–49, and 50 and older), and region (six regions) to reflect the South Korean census. The technique of matching a sample using census data to provide a more accurate representation of the population has been validated by previous research (e.g., Iyengar & Hahn, 2009). The quota sampling process continued until each subgroup (i.e., age, gender, and region) reached its quota. A total of 526 participants completed the first wave survey (258 men, 268 women; age $M = 43.9$, $SD = 13.2$).¹ The second wave ran in June 2014 with 304 returning participants, yielding a 57.8% retention rate. The analyses are based on participants who completed both waves of the survey.

Measures

Social media use for news. In the first-wave survey, respondents were asked to report to what extent they used social network sites for news and information. On a 7-point scale ranging from *never* to *very frequently*, they reported how frequently they use social media for "getting/posting news,"

¹ More information about the quota and a comparison between the sample and the census data are available upon request.

"information," and "engaging in current events and public issues." The three items were averaged to create an index of social media use for news and information (Cronbach's $\alpha = .89$, $M = 2.55$, $SD = 1.56$).

Social media network heterogeneity. As discussed in the literature and based on previous operationalization of the concept of network heterogeneity (Kim et al., 2013; Lee et al., 2014; Scheufele et al., 2006), social media discussion network heterogeneity was measured by asking how often respondents talked about social or public issues on social media with "people who do not share their age, socioeconomic status, or gender," "people who disagree with their views," and "people who agree with their views." Responses to "people who agree with their views" were reverse-coded. A seven-point scale (1 = *never* to 7 = *very frequently*) was used to indicate frequency of discussion network heterogeneity on social media. The items were measured in the second wave, and the scores of the three items were averaged to create an index (Cronbach's $\alpha = .92$, $M = 3.32$, $SD = 0.56$).

Extraversion. Individuals' extraversion was measured with a brief measure of the Big Five dimensions of personality, which has been successfully validated by numerous studies (Gosling, Rentfrow, & Swann, 2003; Grant, 2008; Rammstedt & John, 2007). Extraversion was measured with two items asking respondents to rate the extent to which they aligned to different personality characteristics on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), including "reserved and quiet" (reversed) and "extraverted and enthusiastic." The two items were averaged to create an index ($r = .41$, $p < .001$, $M = 4.12$, $SD = 1.10$).

Civic engagement. As the model's dependent variable, civic engagement was measured with six items from the second wave of the panel data asking the frequency of respondents' engagement in civic activities. Respondents were asked to rate on a 7-point scale (1 = *never* to 7 = *very frequently*) how often they engaged in the following activities: "participating in activities for charity," "participating in social activities, such as for environmental issues," "voluntary work for local groups," "discussing local issues or problems," "attending a meeting to resolve neighborhood problems," and "caring for local communities and neighbors." The scores of each item were averaged to form an index of civic engagement (Cronbach's $\alpha = .88$, $M = 3.18$, $SD = 1.32$).

To control for other variables that the literature has demonstrated to be related to civic engagement (Kim et al., 2013; Shah, Cho, Eveland, & Kwak, 2005; Shah, Kwak, & Holbert, 2001; Xenos & Moy, 2007), the multivariate analysis included demographic variables, political orientations, and news media use.

Demographics. Demographic variables were measured and controlled for in the analyses. Four demographic control variables were included in the models: gender (51% female), age ($M = 43.9$, $SD = 13.2$), level of education measured on a 4-point scale ranging from *less than high school or high school* to *graduate school or higher* ($Mdn =$ BA or currently a university student), and income measured by one of nine categories of monthly household income ($Mdn =$ 300–399 million Korean won, which is about US\$3,000–\$4,000).

News media use. Respondents were asked to rate on an 8-point scale (0 = *never* to 7 = *every day*) how often they used the following media to get news and information about current events: newspapers ($M = 2.88, SD = 2.79$), TV news ($M = 5.59, SD = 2.22$), radio ($M = 2.15, SD = 2.50$), and Internet ($M = 5.50, SD = 2.19$).

Political efficacy. To measure political efficacy, respondents were asked to rank their level of agreement with the following statements on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*): "I believe my actions influence the decisions made by government officials" and "Voting is an effective way to force government to do something." The responses were averaged ($r = .74, p < .001, M = 5.51, SD = 1.28$).

Political interest. Respondents were asked to report to what extent they are interested in politics on a scale ranging from 1 (*not at all*) to 7 (*very much*) ($M = 5.59, SD = 1.25$).

Political knowledge. Respondents were asked nine questions related to public affairs issues, including the Korea-U.S. Free Trade Agreement, political candidates' issue stances (e.g., health care and unemployment), and identifying the name of the Korean prime minister. Correct responses to each item were coded as 1, and incorrect or "don't know" responses were coded as 0. The items were added to create an index of political knowledge ($M = 4.34, SD = 2.12, \text{range} = 0-9, \text{Cronbach's } \alpha = .70$).

Statistical Analysis

To test the proposed hypotheses, we used Hayes' PROCESS macro (Hayes, 2013). PROCESS Model 4, which allows testing of the mediating relationship with bootstrap confidence intervals for an indirect effect, was used to test H1 (the mediating role of social media discussion network heterogeneity in the relationship between social media use for news and civic engagement). To test whether this indirect path (i.e., social media use \rightarrow network heterogeneity \rightarrow civic engagement) is contingent upon individuals' extraversion personality (H2), we tested PROCESS Model 14. This macro uses bootstrap confidence intervals to estimate conditional indirect relationships in which the indirect effect of the independent variable on the dependent variable through the mediating variable is contingent on the moderator variable.

Results

The first hypothesis predicted that discussion network heterogeneity on social media will mediate the relationship between social media use for news and civic engagement. To test this hypothesis, we used the PROCESS macro Model 4 (Hayes, 2013), which utilizes the bootstrapping method to calculate the indirect mediation effect. The results of the relationship between social media use for news/information, network heterogeneity, and civic engagement are presented in Figure 2, which shows that individuals who engage in social media use for news at some point in time (Wave 1) tend to discuss with heterogeneous networks and engage in civic activities more frequently at a later time (Wave 2). Results showed that social media use for news/information had a positive influence on social media network heterogeneity ($b = .80, SE = .02, p < .001$) as well as civic engagement ($b = .21, SE = .05, p < .001$), controlling for

respondents' demographic variables (i.e., age, gender, education, and income), political orientations (i.e., political interest, efficacy, and knowledge) and media use. Network heterogeneity also had a direct effect on participants' civic engagement ($b = .48$, $SE = .12$, $p < .001$), after controlling for demographic variables, political orientations, and news media use.

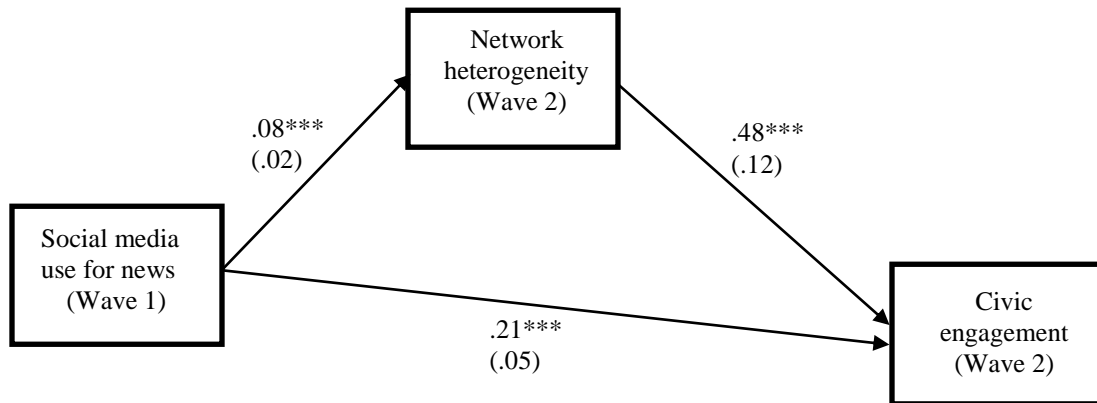


Figure 2. Results of the mediation model of social media use for news, discussion network heterogeneity, and civic engagement.

Note. Unstandardized regression coefficients are reported with standard errors in parentheses. Respondents' demographic variables (i.e., age, gender, education, and income), political orientations (i.e., political interest, efficacy, and knowledge), and media use (i.e., newspapers, TV, radio, and Internet) were controlled in the model. *** $p < .001$.

Further mediation analysis based on the bootstrapping method indicates that the effect of social media use for news on civic engagement is mediated by network heterogeneity on social media. As presented in Table 1, the 95% confidence interval of the indirect effect of social media use for news on civic engagement through network heterogeneity ranged from .10 to .08, with a coefficient of the indirect effect of .04, $b = .04$, $SE = .01$, bootstrapping $CI = [.01, .08]$. Thus, H1 was supported.

Table 1. Mediation Model: Indirect Effect of Social Media Use for News on Civic Engagement through Network Heterogeneity.

Mediator	Indirect effect of social media use on civic engagement		
	<i>b</i>	<i>SE</i>	Bootstrap 95% <i>CI</i>
Discussion network heterogeneity	.04	.01	[.01-.08]

Note. Entries are unstandardized regression coefficients. Bootstrap resample = 5,000. *SE* = standard error; *CI* = confidence interval. Estimates were calculated using the PROCESS macro.

H2 stated that the indirect effect of social media use for news on civic engagement through network heterogeneity will be contingent on individuals' extraversion personality such that the effect is stronger for those who are introverted. The bootstrapping method with the PROCESS macro (Hayes, 2013) was employed to investigate the moderated mediation effect. This study utilized the PROCESS Model 14 specified in Hayes (2013), in which the effect of social media use for news on civic engagement via network heterogeneity is moderated by extraversion. Figure 3 presents the results of the moderated mediation model, in which the independent variable, the mediating variable, the moderating variable (i.e., extraversion), and the interaction term (heterogeneity \times extraversion) were entered in predicting civic engagement. The results of the PROCESS Model 14, in which extraversion and the interaction term (heterogeneity \times extraversion) are added in addition to the control variables, also demonstrated that social media use for news had a positive influence on social media network heterogeneity ($b = .08$, $SE = .02$, $p < .001$). Both social media network heterogeneity ($b = 1.61$, $SE = .54$, $p < .01$) and social media use for news ($b = .20$, $SE = .05$, $p < .001$) also had a direct effect on participants' civic engagement. Furthermore, extraverted individuals were more likely to participate in civic activities ($b = 1.17$, $SE = .40$, $p < .01$). The interaction effect of network heterogeneity and extraversion on civic engagement was significant ($b = -.28$, $SE = .12$, $p < .05$).

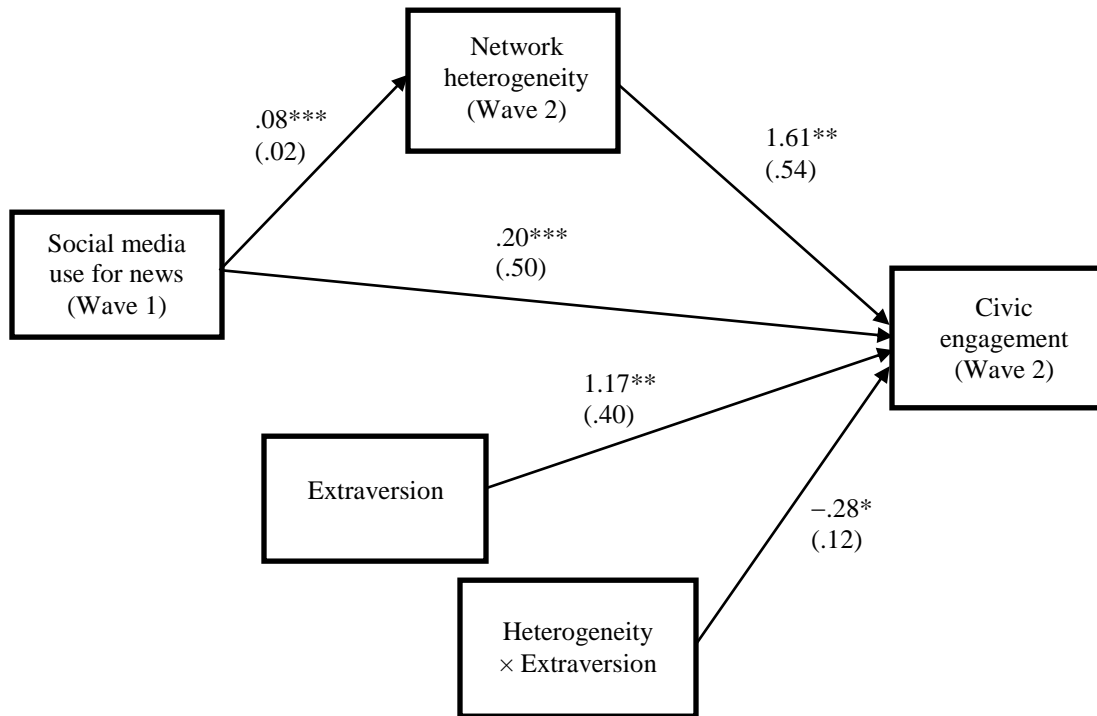


Figure 3. Results of the moderated mediation model of social media use for news on civic engagement through network heterogeneity.

Note. The indirect effect is contingent upon extraversion. Unstandardized regression coefficients are reported with standard errors in parentheses. The effects of demographic variables (age, gender, education, and income), political antecedents (political efficacy, political interest, and political knowledge), and media use (newspapers, TV, radio, and Internet) were controlled. Path entries are unstandardized coefficients. * $p < .05$. ** $p < .01$. *** $p < .001$.

The conditional indirect effects further demonstrated that the indirect effect of social media use for news on civic participation through network heterogeneity is contingent on individuals' extraversion personality. Table 2 reports the varying degrees of indirect effects according to levels of extraversion. The findings show that the indirect effect of social media use for news on civic engagement via network heterogeneity becomes stronger as the level of extraversion decreases. The indirect effect of social media use for news on civic engagement through network heterogeneity was significant for low ($b = .06$, $SE = .02$, $95\% CI = .02$ to $.12$) and middle levels of extraversion ($b = .04$, $SE = .01$, $95\% CI = .01$ to $.07$). However, the indirect effect was not significant for the high level of extraversion ($b = .01$, $SE = .01$, $95\% CI = -.01$ to $.05$). Therefore, the proposed moderated mediation hypothesis (H2) was supported. That is,

the moderated mediation analysis suggests that introverted individuals tend to derive greater civic participatory benefits from the use of social media for news and information via expanded heterogeneous social networks.

Table 2. Moderated Mediation Model: Indirect Effect of Social Media Use for News on Civic Engagement through Network Heterogeneity Moderated by Extraversion.

Mediator	Condition	Conditional indirect effects of extraversion		
		<i>b</i>	<i>SE</i>	Bootstrap 95% <i>CI</i>
Network heterogeneity	Low	.06	.02	[.02-.12]
Network heterogeneity	Middle	.04	.01	[.01-.07]
Network heterogeneity	High	.01	.01	[-.01-.05]

Note. Entries are unstandardized regression coefficients. Bootstrap resample = 5,000. Conditions for moderator (extraversion) are the mean and plus/minus one standard deviation from the mean. *SE* = standard error; *CI* = confidence interval. Estimates were calculated using the PROCESS macro.

Discussion

As social media are increasingly integrated into everyday life, researchers have examined the effects of social media on civic life. Some studies have demonstrated that social media use is associated with individuals' network heterogeneity and civic engagement (Gil de Zúñiga et al., 2012; Kim et al., 2013; Lee et al., 2014). This study seeks to expand this line of research by exploring the mediating mechanisms by which social media use may increase citizens' network heterogeneity on social media, which in turn leads to greater levels of engagement in civic activities. Furthermore, and perhaps more interestingly, we also theorized that this mediating relationship will be contingent upon the personality trait of extraversion, considering findings that introverted people tend to take more advantage of the positive consequences of using social media such as expanding their social networks.

The results of this study support the proposed indirect effect model, demonstrating that heterogeneity in one's social media network mediates the relationship between social media use for news or information and individual variations in civic engagement. This suggests that use of social media for news or information may expand individuals' discussion network heterogeneity, which in turn may lead to civic engagement. This is one of the theoretically noteworthy links presented in the current study, because the findings add to the growing literature on the mechanisms of social media effects on citizens' participatory behaviors, moving beyond examining direct relationships between social media use and civic participation by providing evidence of a mediating role of network heterogeneity on social media. The current literature on social media has demonstrated that social media use may have a positive influence

on citizens' participatory activities and network heterogeneity, but such studies have focused on the separate direct effects on civic engagement and network heterogeneity rather than incorporating them. In other words, little is known about the indirect paths of social media effects on civic participation through network heterogeneity. In this study, empirical evidence was found for the proposed mechanism by which social media use indirectly influences civic participation through network heterogeneity.

These findings are particularly important given concerns over the possibility that people experience too much exposure to likeminded people and ignore diverse perspectives in the digital media environment as well as concerns about decreasing interest regarding civic life (e.g., Sunstein, 2007). The use of social media is promising for the development of heterogeneous social networks that facilitate active citizenship. In particular, our results suggest that network heterogeneity may contribute to deliberative democracy (e.g., McLeod et al., 1999) as well as participatory democracy by providing a positive pathway toward civic participation.

Perhaps more importantly, we also theorized that these indirect paths to civic engagement may differ depending on personality traits based on previous work on the differential gains model, which states that the impact of media use on outcome variables such as citizen engagement may differ depending on individuals' characteristics (Eveland & Scheufele, 2000; Hardy & Scheufele, 2005; Kim et al., 2013; Scheufele, 2002). The analysis indicates that discussing with heterogeneous networks on social media is an important mediating mechanism, but these mediating paths to civic participation were contingent on individuals' extraversion personality trait. The results confirmed that the indirect effect of social media uses on civic participatory behaviors through network heterogeneity was contingent on personality traits such that the effect of social media use is stronger for those who are introverted. Compared to extraverted individuals, introverted individuals were more likely to have diverse and heterogeneous networks on social media platforms, and the expanded network heterogeneity in turn increased the levels of civic participation. This suggests that social media can be an especially useful tool for introverts in communicating with diverse people and motivating them to engage in civic activities.

In particular, it is interesting to note that individuals' personality trait of extraversion may display a similar effect across nations or cultures. While there is some research demonstrating the role extraversion plays in regard to the effect of social media and/or participatory behaviors (Costa & McCrae, 1992b; Elshaug & Metzger, 2001; Kim et al., 2013), little research has examined whether and how extraversion plays out in the relationship between social media use and individuals' civic engagement in South Korea. The findings of the current study showed a significant direct effect as well as a moderating effect of extraversion, suggesting that extraverts are more likely to participate in civic activities (i.e., a direct effect), but introverted individuals may reap more civic participatory benefits from social media use than do extraverted people in South Korea. These findings are generally consistent with previous research conducted in other countries such as the United States (e.g., Kim et al., 2013). Thus, as demonstrated by some research (e.g., Rammstedt & John, 2007), this study provides evidence that extraversion and introversion may have similar effects across nations or cultures in the relationship between (social) media use and citizens' participatory behaviors.

Taken together with previous studies (Jung, Kim, & Gil de Zúñiga, 2011; Valenzuela et al., 2012), the findings of this study demonstrate various pathways to citizen engagement, from social media use to civic participation, through network heterogeneity. This study, furthermore, contributes to our understanding of the differential gains models by demonstrating that the indirect effect of social media use for news and information on civic participatory behaviors may be contingent upon personality traits. In particular, the data employed in this study are based on two-wave panel data. Although the causal relationships proposed in this study were based on prior research showing that media use influences individuals' levels of exposure to diverse or like-minded points of view, which consequently may lead to behavioral outcomes (Brundidge, 2010; Scheufele et al., 2006; Shah et al., 2005), results from panel data may draw a better causal inference. Therefore, our findings can better confirm the causal relationship between social media use and civic engagement, which is critical when it comes to studies about the relationship between media use and participatory behaviors.

This research has some limitations. One limitation relates to the instrument used to measure extraversion, which showed a moderate level of measurement reliability. Although the brief Big Five Inventory used in this study has been validated and employed extensively in previous research, a more thorough measurement approach that has more items to measure extraversion would have been ideal. Therefore, future researchers should consider the inclusion of more items for the measurement of extraversion to ensure a greater measurement reliability (Costa & McCrae, 1992b, 1992c; John, Donahue, & Kentle, 1991). Another limitation is related to the self-reporting method of measuring participants' social media use and network heterogeneity, which might yield inaccurate measures because of imperfect recall and social desirability bias (Kim et al., 2013; Tewksbury, Weaver, & Maddex, 2001). However, the survey method is an appropriate approach to examine people's collective action such as civic engagement, and national survey data provide more generalizable findings.

Similarly, it is important to note that the mediating effect of network heterogeneity on the social media-civic participation link is weak. This could be a consequence of using panel data or perhaps of the fact that network heterogeneity was measured with somewhat less exhaustive items (e.g., a single item for discussion network heterogeneity in terms of age, socioeconomic status, or gender). In addition, although our study provides evidence of the positive impact of social media use for news/information on civic participation via network heterogeneity, the relationship may not be generalizable to other participatory behaviors, such as political participation. As mentioned in the literature, the impact of heterogeneity is likely to depend on the type of participatory activities involved (Lee, 2012). Future researchers, therefore, could examine participatory behaviors in a wider context to understand how different types of participation are influenced by network heterogeneity on social media in particular.

This study adopts the differential gains model and finds that the positive relationship between social media use for news/information, network heterogeneity, and civic participation was augmented by introversion. However, some social media activities, such as entertainment use, may be negatively related to civic participation, and this negative relationship might be exacerbated by individual characteristics. In this sense, differential losses may exist (Brundidge, Garrett, Rojas, & Gil de Zúñiga, 2014). Future researchers could consider examining different types of social media activities and exploring the two models at the same time. Another weakness of this article is the fact that we focused our analysis on

concurrent models (e.g., both discussion network heterogeneity on social media and civic engagement in Wave 2) rather than lagged models of social media use and network heterogeneity effects on civic engagement. Ideally, the model would use lagged measures of the three key variables—that is, predicting civic engagement in Time 3 with the Time 2 measure of discussion network heterogeneity (i.e., mediator) and the Time 1 measure of social media use (i.e., independent variable), controlling the Time 1 measures of civic engagement and network heterogeneity.² Future researchers could make use of multiwave panel data, allowing for a full estimation of lagged models involving three sets of variables: social media use, discussion network heterogeneity, and civic engagement (see, e.g., Shah et al., 2005, for lagged autoregressive models).

Despite such limitations, the findings of this study contribute to a better understanding of the mechanism by which social media use may lead to citizens' participatory activities through the heterogeneity of social networks. This study first investigated the mediating role of network heterogeneity in the association between social media use and civic engagement and then tested whether and how these indirect paths from social media to civic involvement via network heterogeneity are contingent upon individuals' extraversion personality. The findings of mediation and moderation mechanisms provide a more comprehensive picture of the relationships among social media use, network heterogeneity, civic participation, and personality traits. This research sheds light on the growing literature on the impact of social media on public life by investigating the process from the use of social media to exposure to heterogeneous networks and then to citizens' participatory behaviors. As the findings demonstrated, the positive role of social media in citizens' civic involvement can be enhanced by expanding individuals' network heterogeneity in the social media sphere. In particular, the results suggest that social media can be a more useful space for introverted individuals to engage in civic activities by providing diverse social interactions that would have been less frequent in their off-line daily life. Future researchers also can elaborate on the findings reported in this article by proposing and testing other mediating and moderating mechanisms. For instance, future researchers may wish to examine not only network heterogeneity but network homogeneity in the model, because people in general tend to seek pro-attitudinal information and avoid discussing politics with others who disagree with them (Festinger, 1957). Although this study highlights the important role of network heterogeneity in mediating the relationship between social media use for news/information and civic participation, it is worth investigating whether network homogeneity plays a similar mediating role in influencing civic participation or other types of participatory activities.

² Given that the same items of network heterogeneity were measured in both waves, it was possible to examine its lagged effect. Additional regression analysis showed that social media use for news (Time 1) was significantly associated with network heterogeneity (Time 2) at a marginal level ($\beta = .14, p < .10$), when accounting for the lagged effect of network heterogeneity in Time 1 ($\beta = .15, p < .05$). However, the same sets of lagged measures for civic engagement were not available.

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