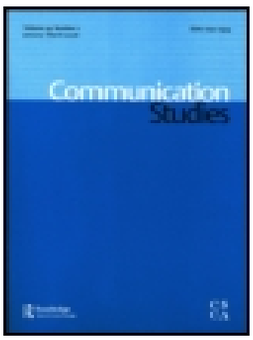

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Communication Infrastructure, Social Media, and Civic Participation across Geographically Diverse Communities in the United States

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ABSTRACT

Despite a growing body of scholarship on Communication Infrastructure Theory (CIT), the applicability of CIT as an ecological approach in rural and suburban areas remains largely unexplored in comparison with its urban counterpart. The current study advances CIT across the geographically dispersed communities (i.e., urban, suburban, and rural) and explores how community storytelling networks, through social media and interpersonal discussion, interact with the diverse communities on civic participation. A nationwide online panel survey reveals that community-oriented social media (CSM) use was positively associated with civic participation. The results also indicate that the relationship between CSM and civic participation was stronger for those who reside in rural communities. Interpersonal discussion in this study played a similar role for residents living in suburban communities. This study's theoretical contribution, policy implications, and practical applications are further discussed in the contexts of communication infrastructure, social media, and civic participation.

KEYWORDS

Communication infrastructure; local media; interpersonal discussion; community organizations; community social media; civic participation

A sheer volume of scholarship over the last two decades has examined how newly emerging digital media, including Internet, social, and mobile media, influences civic participation. Of most notable are three approaches: the communication mediation model (e.g., McLeod et al., 1999; Shah et al., 2007; Shah et al., 2009), communicative social capital (e.g., Shah et al., 2005, 2001), and communication infrastructure theory (e.g., Kim & Ball-Rokeach, 2006a), all of which center communication as a driving force engaging citizens into the political and civic action (Nah & Yamamoto, 2019). These three perspectives are distinct but closely tied to each other concerning communication and citizenship in various contexts, placing communication, interpersonal, and mediated, at the core of theoretical components alongside diverse community settings and action contexts.

Of particular focus in this study is the extent to which communication infrastructure or resources available in local communities may enhance civic participation to build a vibrant civic community in the civil society. Relying on Communication Infrastructure Theory (CIT), an increasing body of scholarship (Chen et al., 2013; Kim & Ball-Rokeach, 2006a; Nah & Yamamoto, 2017; Ognyanova et al., 2013;) has shed light on the community

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storytelling network, which is connected through interpersonal discussion, media use, and organizational involvement in community organizations, and its impact on civic and community outcomes. Recent scholarship in particular applies communication infrastructure theory to not only urban communities, but also rural communities and reaffirms the validity of the theory across geographically diverse communities (e.g., Nah et al., 2015) and pays particular attention to the roles that digital media in conjunction with the community storytelling network can play on civic participation (e.g., Kim et al., 2019; Nah & Yamamoto, 2017).

In sum, CIT scholarship has integrated community storytelling networks at the individual, organizational, and community levels embedded in the civic communication ecology. In addition, scholarship has consistently found that communication infrastructure is a catalyst for enhancing civic engagement. What remains relatively unexplored, however, is whether and the degree to which networked community storytelling operates in tandem with new types of communication networks across social media platforms as well as across geographically dispersed communities (Nah, 2010b). The present study conceptualizes social media as community-oriented communication platforms situated as newly emerging storytelling agents that moderate community storytelling networks for enhancing citizenship (Kwon et al., 2020). Community-based social media (CSM) use is thought to advance communication infrastructure theory highly rooted in urban, suburban, and rural communities. In a nutshell, the current study unveils the main and interactive effects of community storytelling networks, alongside social media as a newly emerging ecological storyteller in local communities.

Communication Infrastructure Theory: Causes, Components, and Consequences

Viewing various communication processes as an interconnected web of resources, communication infrastructure theory emphasizes a community's communication infrastructure in generating civic outcomes (Ball-Rokeach et al., 2001; Kim & Ball-Rokeach, 2006a). Communication infrastructure is defined as a community storytelling network embedded in local community contexts serving as vital resources for civic activities (Kim & Ball-Rokeach, 2006a, 2006b).

Central to this theory are the concepts of neighborhood storytelling network (STN) and communication action context (CAC). STN is defined as a communication system embedded in the neighborhood environment and sustained by the stories indigenous to the neighborhood. By "storytelling," the theory maintains that communities are actively constructed by discourse, such as interpersonal conversations, news stories, or organizational narratives (Ball-Rokeach et al., 2001, p. 394). And it is through storytelling that residents are integrated into the civic life of local community (Ball-Rokeach et al., 2001). Meanwhile, communication action context is the neighborhood environment where communication activities take place (Kim & Ball-Rokeach, 2006a, 2006b). Such an environment can be characterized by features such as the stability of a neighborhood, the level of ethnic heterogeneity, or a community's economic status (Wilkin et al., 2010). CAC can interact with STN by either enhancing or constraining the function of STN. For example, a neighborhood storytelling network may be better able to promote local engagement if the community is demographically stable. In contrast, STN may function less well in

a community that suffers economic distress, where the specific communication context limits the full potential of STN.

An individual's integration into STN may help generate various outcomes. These outcomes, as suggested in various literature, may be manifested cognitively through a sense of neighborhood belonging (McLeod et al., 1996), psychologically through collective efficacy (Sampson, 2006), or behaviorally through the level of civic participation (Shah et al., 2005), and conceptually all three dimensions constitute civic engagement from the theoretical lens of CIT. Specifically, neighborhood belonging is defined as both subjective and objective attachment to one's neighborhood community, indicated by how individuals interact with their neighbors, how they feel about their neighbors, and how they perceive the larger neighborhood community (Ball-Rokeach et al., 2001; Kim & Ball-Rokeach, 2006b). CIT considers individuals' participation in community-based organizations (Galaskiewicz, 1985), their engagement in neighborhood conversations (McLeod et al., 1999) and their connections to local media (Jeffres et al., 1988) as means of cultivating neighborly feeling and pro-engagement behaviors. As such, this neighborhood belonging dimension is not the precedent of civic engagement, but an integrated component of civic engagement. Meanwhile, collective efficacy is defined as "individuals' perception of their neighbors' willingness to participate in neighborhood problem solving" (Kim & Ball-Rokeach, 2006b, p. 416). Different from individuals' self-efficacy (Bandura, 1997), collective efficacy is indicative of the capacity of the overall community and a sense of "we" rather than "I" at the collective level. Finally, civic participation – the actual behaviors of individuals in attending city council meetings, contacting elected officials, or participating in boycott and protest – as the third and objective dimension of civic engagement. In sum, communication infrastructure theory conceptualizes civic engagement as a multi-dimensional, multi-faceted, and multi-level concept. This is a sharp distinction from the other two approaches of communication mediation model and social capital.

Three major components constitute the infrastructure of neighborhood storytelling network (STN): interpersonal discussion, geo-ethnic media, and community-based organizations. At the micro level, community residents are part of the storytelling network while engaging in daily conversations with their neighbors. At the meso and macro level, local media and community-based organizations are major organizational actors that produce and circulate neighborhood-bound stories (Kim & Ball-Rokeach, 2006a, 2006b). As the media environment is rapidly evolving, it is important to note that the spectrum of local media also evolves from the traditional, offline media – such as newspapers, TVs, and radios – to include those that exist online. On the one hand, offline local media may expand by establishing their respective online presence, a practice widely adopted among traditional news media (Lin & Jeffres, 2001). On the other hand, there are emergent forms of local media, such as citizen participatory media websites that exist solely online (e.g., Chen et al., 2018). It is therefore important to include internet as a vital component of the local media storytellers in the CIT framework.

CIT states that when individuals, local media, and community-based organizations are interconnected and producing coherent narratives, the community is more likely to have civically engaged residents and enjoy a high level of integration (Ball-Rokeach et al., 2001). The empirical linkage between residents' connection to a community's communication infrastructure and the subsequent civic outcomes has been well established in the prior scholarship. For example, Kim and Ball-Rokeach (2006b) found that individuals' *Integrated*

Connectedness to the Storytelling Network (ICSN) – a composite scale combining measures of the one's intensity and scope of interpersonal discussion, local media access, and organizational connection – was significantly associated with residents' civic engagement levels. Using a diverse community sample, Ognyanova et al. (2013) similarly found that residents who had higher levels of neighborhood discussion, more closely connected to local media and community organizations tended to participate more in community life both online and offline. Even for migrant community, storytelling network has been found to facilitate the integrative adaptation of migrants and thereby enhance their engagement in local civic life (E. Kim & Kim, 2018). Relying on a nationwide survey, Nah and Yamamoto (2017) found that, while ICSN had a positive impact on civic participation, it was also moderated by newly emerging storytellers via Internet in general and mobile media in particular. Based on the well-documented impact of communication infrastructure on residents' civic participation, we propose the following hypotheses:

H1: The level of connection to local media (a), the level of interpersonal discussion (b), and the level of connection to community organizations (c) are positively associated with individuals' civic participation.

Newly Emerging Storytelling Networks: Social Media

Thus far, while a CIT approach to civic engagement has received solid empirical support and guided multiple community interventions (e.g., Liu et al., 2018a), the conception of neighborhood storytelling network, particularly the component of news media, does not include various forms of emerging social media. According to a recent survey from the Pew Research Center (2016), social media became one of the top sources to receive election-related information, particularly among the youth aged between 18 and 29. As digital media are increasingly changing the landscape of today's information environment and altering the mode of civic participation (Yamamoto & Nah, 2018; Yamamoto et al., 2019), it is imperative to re-consider how social media may become an integral part of a community's communication infrastructure.

In developing an integrated approach of media effects, Nah and Yamamoto (2018) examined how individuals' integrated information seeking from diverse media forms – including traditional media and new media platforms such as Internet, mobile devices, and social media – impacted one's civic participation. The results confirmed the positive relationship between the level of integrated media use and civic activity, suggesting that while traditional media are still important sources of political information, the role of new media, particularly social media, should not be neglected.

In a similar vein, Kim et al. (2019) noted about both the "push" and "pull effect" (p. 9) of social media use on community engagement. They argue that social media users may turn residents' interest away from the local community, as social media afford the building of nonlocal relationships. Meanwhile, social media can also foster localism as they increase neighborhood conversation opportunities and lower the cost of communication within a community. By empirically testing the interrelationships among individuals' dependency on social media (SNS dependency) – defined as the extent to which individuals rely on social media to fulfill needs such as entertainment or orientation (DeFleur & Ball-Rokeach,

1989), connection to community storytelling network (ICSN) and the level of community engagement, they found that SNS dependency and ICSN were both positively associated with various forms of local engagement, further supporting the civic potential of social media on the community level.

The current study extends the CIT framework by proposing a social media component in community's communication infrastructure. Specifically, we focus on community-oriented social media, such as those dedicated for providing community-related news, updates, or serve as the platform for resident communication and event organization. We argue that such social media could become an important storytelling agent just like traditional media or community organizations in the digitally mediated civic communication environment, as they help circulate community-bound news information, promote interaction and dialogue among fellow residents, and serve as the getaway connecting residents and local community organizations.

Prior research has offered suggestions about the influence social media may have under a CIT framework. In his study examining the relationship between daily communication practices and the intention to engage in sustainable development behaviors, Kang (2018), for example, found that Facebook was used beyond personal connections and entertainment for community issues. Specifically, the study found that Facebook was an agent for participating in sustainable urban development behaviors – civic participation. In contrast, use of social media sites like YouTube and Twitter did not predict sustainable urban development behaviors, suggesting the nature of social media is an important factor to consider. Lane et al. (2018) found that the affordances of the now defunct mobile app Yik Yak provided online communication infrastructure for youth political expression. In particular, the qualitative study found that Yik Yak met three needs for young people: it allowed identity-focused political expression; removed the cost of social expression through the affordance of anonymity; and allowed a space for those who felt marginalized to speak on political issues. In this way the researchers called the app a civic laboratory – a platform that allowed young people the "flexibility and freedom to experiment with political expression (p. 13)." Civic laboratories, like Yik Yak, differed from traditional social media, also called online communication infrastructure, in three ways: 1) they created locally relevant, easily evaluable, and accessible communications flows; 2) they allowed expression without compromising identity; 3) they allowed youth to voice their political views to their peers (Lane et al., 2018).

Scholars have also investigated non-Western social media using CIT as a theoretical framework. Using a survey of 297 users of the Chinese social media site WeChat, Chen (2017) found that users who were active in online civic engagement had greater intention to be involved in offline civic activities. Further, WeChat users with more interactions engaged more with civic issues. Online interactions influenced offline civic engagement intentions. Similarly, Zhang and Lin (2018) investigated whether social media use could influence unaffiliated individuals to be more civically engaged. Their study of individuals in Hong Kong and Taipei found that social sharing and online political engagement influenced users to participate in collective political action through organizational membership. We thus propose the following hypothesis:

H2: The level of connection to community-based social media is positively associated with individuals' civic participation.

Communication Infrastructure across Communities

The rural versus urban comparison is important in scholarly literature related to social capital/social networks, civic engagement, and communication infrastructure. In their study of two nonmetropolitan communities in southwestern Louisiana, Beggs et al. (1996) found that social networks for rural individuals were smaller and denser than those for individuals living in metropolitan areas. Both rural and urban areas were characterized, too, by aspatial or unbounded communities, with evidence for rural distinctiveness. In that study, the geographic location was populated by individuals identifying as ethnically and culturally Cajun. Although this 1995 study focused on interpersonal communication, other scholars have compared the effects of traditional media on pro-social behaviors like voting and volunteering. Beaudoin and Thorson (2004) found, for example, that media effects differ by medium and community type – local TV news use had positive effects in an urban context, while network news use had positive effects in the rural context. Beaudoin and Thorson (2004) findings speak to a more fundamental difference between rural and urban communities' media infrastructure. For example, due to resource constraints, there are generally fewer local media outlets serving rural than urban communities. Individuals from rural communities are therefore more likely to depend on other information sources, such as national network media or in today's media environment, community-based social media, to stay informed and civically engaged.

Prior research has also investigated the impact of new communication infrastructure on rural, urban, and suburban communities. A seminal study by Hampton and Wellman (2003) found that the introduction of high-speed Internet to a Toronto suburb led to the founding of a local discussion group and the creation of weak ties among users dispersed across the suburb. This fomented increased local mobilization. Similarly, the introduction of broadband to rural communities was found to be associated with higher levels of participation and information-gathering (Stern et al., 2011). But user social networks mattered for communicating participation.

Social networks, trust, intergroup communication, and media infrastructure are all features that can make up different communication action contexts, which as CIT argues, may powerfully influence the degree to which community storytellers can contribute to civic outcomes. Since the original conceptualization of CIT (Ball-Rokeach et al., 2001; Kim & Ball-Rokeach, 2006a), the investigation of community storytelling networks has focused predominantly on urban environments. Ball-Rokeach et al.'s (2001) seminal work, of course, focused on community storytelling in Los Angeles neighborhoods. Since then, CIT research has examined community storytelling in various sized urban environs including mid-sized cities (Kim & Kang, 2010). Within these studies of urban areas researchers have examined the interactions among different communities. Liu et al. (2018a), for example, analyzed the interaction dynamics among diverse community members sharing the same residential neighborhood. The researchers' test of relationships between place-based communication, neighborhood belonging, out-group contact frequency, and perceived interaction quality found that place-based communication differentially impacts multiethnic intergroup interaction, depending on which inter-ethnic dyads come into contact. Further, the studies of Los Angeles County urban environs have included the city's suburbs. Wenzel (2016), for instance, explored the relationship between increased

neighborhood diversity and food practices, finding that different ethnic groups within a suburban community can share comfort zones without sharing storytelling networks.

Researchers have examined CIT in different geographic areas, including the southern United States. Wilkin et al. (2011), for example, created a CIT-based strategy for locating residents of a low-income Atlanta neighborhood who were likely to use 911 for their health needs. Further, Kim and Kang (2010) investigated the impact of communication resources on the likelihood of preparedness for severe weather events in Tuscaloosa, Alabama. This study found that neighborhood belonging increased hurricane preparation. While both of these studies consider nontraditional locales, both are still considered urban areas. Less has been written investigating CIT in rural geographic areas.

This does not mean, however, that CIT in rural environs has been ignored completely; CIT has been used as a framework for exploring the success of health communication interventions. Kim (2009), for instance, examined the use of CIT to develop strategies to help local rural residents enhance their health literacy by connecting poor, rural areas in Alabama to community-level communication resources. The emphasis on CIT in the health communication context points to the significance of the need for strong infrastructure for communicating health-related messages, particularly in rural areas. Estrada et al. (2018) found, for example, that approaches to studying CIT in rural areas, though similar in some respects to those in urban areas, had to be adapted to fit the rural context. In addition, geographic location, when integrated with other demographic variables like race, may illuminate the "complex interdependencies among [story-telling network] and [communicative action context] factors" (Matsaganis & Golden, 2015, p. 177). Relying on a community survey in a southeastern state, Nah and associates (2015) also found that CIT can be applicable to rural areas, noting that communication infrastructure, including Internet connection, can play a vital role in further reinvigorating democratic processes and outcomes. This study reaffirmed the validity of CIT across diverse communities and extended CIT into rural communities.

Wenzel (2019a) further examined the possibilities for reinvigorating the democratic process and outcomes in her case study of CIT and political polarization in rural areas. In examination of how a partisan political context affected the relationship of the community to media and CSNs, the researcher found that shared understanding of local issues was best formed through the distribution of information through local communication resources. The findings suggest that placed-based identity influenced trust in media even within a politically divided context, when residents share similar cultural backgrounds. This may be because individuals across ideological lines often use the same local news sources – whether traditional or social media (Wenzel, 2019b). Further, Wenzel (2019a) found that a move toward more participatory journalism – allowing local residents to share in the process of making news – evidenced an increase in trust and the strengthening of ties between a local news outlet and members of a rural community. At the same time, the perceived trustworthiness of the press was influenced by place and power dynamics (Wenzel et al., 2019b).

Other investigations of whether the model of CIT varies across urban and nonurban communities found no differences between residents of urban and rural communities (Nah & Yamamoto, 2018). Although Nah and Yamamoto (2018) study demonstrated the initial stages of considering the possible differences in models of CIT in different geographic communities, particularly urban vs. rural, the current study explores community

storytelling networks, geographic location, and civic participation, leading to the following research question:

RQ: To what extent does the different type of residential community (urban, suburban, and rural) moderate the relationship between community storytelling networks (connections to local media, residents, community organizations, and community social media) and civic participation?

Methods

Data Collection

Data were collected through a web-based survey to test our theorized model with interactions between community-based social media, interpersonal discussions, and diverse communities on civic participation. A national sample was recruited from the online panels registered with Nielsen. To represent the U.S. population, the sample was drawn to match the distribution of demographic characteristics such as gender, age, education, and income. The sample also considered the proportion of race and ethnicity. Based on the selected online panel representative of the U.S. population, Nielsen sent out invitations to a total of 9,215 panels. Between late-April and mid-May, 2016, 1,046 respondents completed the survey questionnaire. The survey yielded a response rate of 11.4%, which is consistent with the average response rate of web-based surveys (e.g., Baruch & Holtom, 2008). However, the low response rate may lead to potential nonresponse bias and limitations of the data will be discussed accordingly. The demographic and racial distribution of the completed respondents indicates 43% female and 57% male, the mean age of 57.87 with the range between 18 and 92, the median educational level with Associate Degree, the median income with 50,000 USD – 74,999, USD and 83% White, 5.5% African American, 5% Hispanic, and 2.6% Asian.

Measurement

Endogenous Variable

Civic participation in this study was measured based on the 12 items created by Nah and Yamamoto (2017). The items covered a wide range of civic and political activities in a local or community context, including attending a local forum or meeting; contacting local media; signing a petition for a local candidate or issue; contacting a local public official; attending local rallies or protests; voting in a local election; working for a local social cause or organization; contributing money to local social cause or organization; donating blood, food, or clothing to local organization; doing volunteer work; working on a community project; working for a local political campaign. We asked whether a respondent engaged in each of activities in the past two years. The responses were summed up into a single variable (M = 4.037, Min = 0, Max = 12, SD = 2.851).

Exogenous Variables

Three traditional community storytelling agents were operationalized based on prior studies (Ball-Rokeach et al., 2001; Kim & Ball-Rokeach, 2006b). Specifically, *connection to*

local media was measured based on eight items (seven-point scale, Cronbach's α = .87) that asked a respondent' use and attention to local news from TV, newspaper, radio, and Internet (M = 4.129, SD = 1.491); *interpersonal discussion* was measured by two items (seven-point scale, Cronbach's α = .78) by asking respondents how often they engage with conversions with other about local politics or community issues, and things happening in their neighborhoods (M = 3.905, SD = 1.610); *connection to community organizations* was measured by summing up a respondent's belonging to different types of community organizations, including sport/recreational, cultural/ethnic/religious, neighborhood-based, political/educational, and other (M = 1.325, Min =0, Max = 5, SD = 1.293).

As an emergent storytelling agent, *community-based social media (CSM)* was measured based on four items (seven-point scale, Cronbach's α = .93), including both a generic question (i.e., "how often do you use social media for community information?"), and three specific use questions (i.e., "how often do you use social media to search for information; to pass along information encountered online; and to express an opinion about local politics or community issues?") (M = 1.162, SD = .440).

Moderator

Types of residential communities were considered as a moderator. We defined three types or areas–urban, suburban, and rural – and asked each respondent which type characterized their neighborhood the best (suburban = 54%, rural = 24%, urban =21%).

Controls

Cognitive and psychological dimensions of civic engagement could possibly have confounding effects on behavioral civic participation (Kim & Ball-Rokeach, 2006a). Accordingly, two variables were added to the modeling. First, *neighborhood belonging* was measured based on eight items (seven-point scale, Cronbach's α = .91). By adopting Kim and Ball-Rokeach (2006b), both subjective (e.g., "I'm interested in knowing what my neighbors in my community are like") and objective measures (e.g., "my neighbors provide me with assistance in making a repair") were used (M = 4.102, SD = 1.323). Both subjective and objective belonging taps into the action with and feeling about neighbors (Ball-Rokeach et al., 2001).

Second, *collective efficacy* was measured using six items (seven-point scale, Cronbach's α = .92) that asked how many of neighbors a respondent would be able to count on to fix various types of community problems such as dangerous potholes on streets, organizing a holiday block, or unsafe sport fields (M = 4.045, SD = 1.578).

Demographic variables were also controlled, including income (10-point scale, 14,999 USD or under ="1", 200,000 USD or more = "10"), gender (female/male), race (nonwhite/white), home ownership (rent/home owner), age (six-point scale, 25 or under = "1", 75 or older = "6"), education (seven-point scale, 8th grade or less = "1", graduate or professional degree = "7"), and residential tenure (by years), political partisan (republican/democrat/independent).

Analytical Strategy

The hypotheses and research questions were examined based on a series of linear modeling. We adjusted our survey data to account for non-coverage bias by using weights. To be

consistent with the U.S. census parameters including gender, race, age, income, home-ownership and residential areas, we applied the raking method, using the package "*anesrake*" in R. To minimize errors due to heteroskidasticity, we ran the regression models using heteroskidasticity-corrected standard errors. For this, the package "estimatr" in R was used. To respond to the research question (RQ), interaction terms between each storytelling agent and types of residential communities were added. All variables were mean-centered for better interpretation of moderation effects.

Results

Overall, the main regression model accounted for 42% variance of civic participation (see Table 1 summaries of the correlations and descriptive statistics). When the interaction effects were added, the model explained 43.4% of the variance. Among control variables, age was positively associated with civic participation, $\beta = .084$, $p < .05$ (from the main model result); and independent political party affiliation was positively associated with civic participation, $\beta = .107$, $p < .05$ (from the main model result). Table 2 presents the results of the main effect model (Model 1) and interaction effect model (Model 2).

The first set of hypotheses addressed the relationships between traditional community storytelling agents and civic participation. The results indicated that the connection to local media (H1a) was positively associated with civic participation, $\beta = .150$, $p <. 01$. The connection to community organizations (H1c) was positively associated with civic participation, $\beta = .414$, $p <. 001$. However, the interpersonal discussion was not significant. Therefore, H1a and H1c were supported.

The second hypothesis (H2) posited that CSM influences civic participation. The result supported H2, revealing that CSM was positively associated with civic participation, $\beta = .166$, $p <. 001$.

To address the research question, a regression modeling with interaction terms was performed. The results indicated that the residential community types moderated the effects of CSM and interpersonal connection on civic participation. First, the effect of CSM was moderated by the types of residential communities. Compared to rural communities, $\beta = .187$, $p = .001$, CSM had less effect in urban communities, $\beta = -.121$, $p < .05$, and suburban communities, $\beta = -.177$, $p =. 01$. As the visualization shows (Figure 1a), the positive effect of CSM on civic participation was prominent in rural communities. That is, the positive relationship of CSM with civic participation was stronger for those who reside in rural communities than their counterparts.

Second, although there was no significant main effect in the previous model, interpersonal discussion had a significant interaction effect, significantly increasing civic participation in suburban communities in comparison to rural communities. The visualization of interaction effect (Figure 1b) indicates a clear interaction effect, such that the slope of interpersonal discussion is positive for suburban communities, $\beta = .141$, $p < .05$, whereas the slope for the rural communities is negative. (The slope of the rural communities was not significant.) The moderation tests suggest that CSM plays a more prominent role in increasing civic participation in rural communities than urban or suburban, while the interpersonal connection influences civic participation in suburban communities more than urban or rural communities.

Table 1. Correlations, means, and standard deviations ($N = 1046$).

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Education		.01	.39***	.15***	.14***	.14***	.00	.05	−.01	.14***	.02	.05	.00	−.01	.15***	.26***	.24***
2	Age			.01	−.05	.00	.20***	.32***	.20***	−.09**	.14***	.11***	.07*	−.20***	.06*	.15***	.03	.13***
3	Income				.12***	.19***	.30***	−.02	.08**	−.11***	.39***	.10***	.15***	.00	.03	.17***	.22***	.16***
4	Gender					.03	.05	.06	−.06	.08**	.12***	−.05	−.01	−.04	−.04	.07*	.05	.03
5	Residential areas						.01	−.06	−.02	.02	.05	.00	.10***	−.02	−.04	.07*	.09***	.05
6	Homeownership							.27***	.14***	−.05	.23***	.12***	.09***	−.08**	.05	.11***	.12***	.10***
7	Residential tenure								.09***	−.03	.01	.06	.03	−.09***	.08**	.10***	.01	.07*
8	Race									−.10***	.07*	.03	−.02	−.02	−.01	.03	.02	.06*
9	Partisanship										−.06*	−.06	−.06	.01	−.03	−.09***	−.07*	−.04
10	Marital											.14***	.12***	.03	.09**	.19***	.16***	.14***
11	Belonging												.61***	.25***	.51***	.39***	.28***	.34***
12	Collective efficacy													.19***	.35***	.34***	.27***	.30***
13	Community social media														.43***	.41***	.23***	.32***
14	Interpersonal communication															.58***	.33***	.43***
15	Local media																.29***	.42***
16	Community organization																	.54***
17	Civic participation																	
Mean		5.04	3.87	5.61	.57	1.30	.82	19.31	.84	2.03	.65	4.10	4.04	1.16	3.90	4.13	1.33	4.04
Std.Dev		1.47	1.37	2.33	.50	.83	.39	15.88	.37	.82	.48	1.32	1.58	.44	1.61	1.49	1.29	2.85

Table 2. Heteroskidasticity-corrected regression models of civic participation (N = 1046).

	Model 1				Model 2			
	B	Se	T		*B*	se	t	
(Intercept)	− .002	.035	− .047		− .002	.034	− .055	
Community social media (CSM)	.166	.046	3.594	***	.187	.045	4.150	***
Local media (LM)	.150	.052	2.879	**	.159	.048	3.284	**
Interpersonal connection (IC)	.065	.054	1.202		.063	.052	1.217	
Community organization (CO)	.414	.057	7.268	***	.407	.051	7.902	***
Belonging	.037	.054	.674		.039	.055	.714	
Collective efficacy	.076	.041	1.863		.060	.040	1.489	
Residential area: Urban	− .034	.059	− .569		− .013	.052	− .243	
Residential area: Suburban	− .087	.056	− 1.553		− .053	.049	− 1.087	
Gender (Male)	.017	.044	.395		.017	.043	.391	
Age	.084	.038	2.200	*	.083	.037	2.249	*
Education	.071	.049	1.462		.086	.046	1.851	
Income	.024	.042	.583		.025	.042	.604	
Race	.042	.035	1.189		.036	.034	1.057	
Partisanship (Democrat)	− .001	.046	− .017		− .008	.046	− .169	
Partisanship (Independent)	.107	.049	2.183	*	.105	.046	2.274	*
Homeownership	− .014	.041	− .336		− .017	.039	− .430	
Residential tenure	.058	.050	1.150		.054	.047	1.165	
CSMxUrban					− .121	.061	− 1.995	*
CSMxSuburban					− .177	.060	− 2.929	**
LMxUrban					− .025	.064	− .390	
LMxSuburban					.008	.054	.142	
ICxUrban					.037	.069	.532	
ICxSuburban					.141	.056	2.513	*
COxUrban					.051	.065	.785	
COxSuburban					− .018	.059	− .307	

***p < .001, ** p < .01, * p < .05; Model 1: Adjusted R^2 = .420, F(17, 1026) = 20.17, p < .001; Model 2: Adjusted R^2 = .434, F(25, 1018) = 20.07, p < .001; Rural area was set as a baseline.

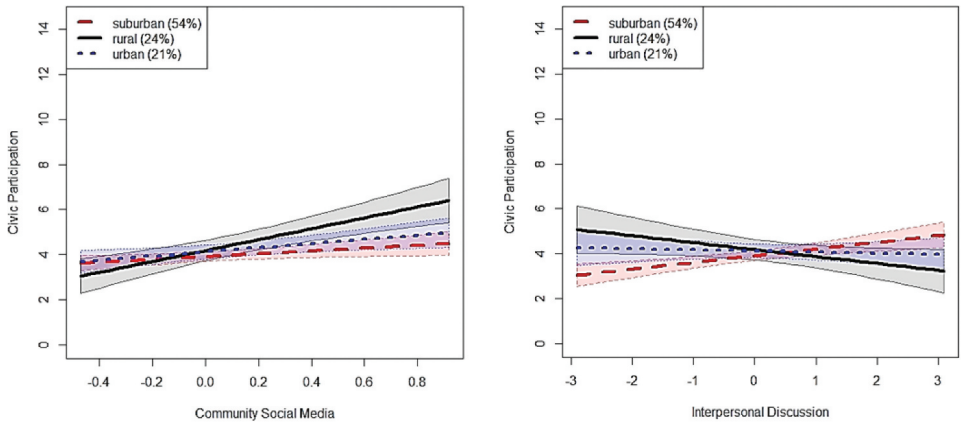

Figure 1. Interaction effects between community social media and residential areas (a), and between interpersonal discussion and residential areas (b).

Discussion

The study tested the effects of community storytelling network on civic participation with special emphasis on the roles that community-based social media (CSM) can play across geographically diverse communities. First, community storytelling networks, such as

connection to local media and interpersonal discussion, yielded positive associations with civic participation regardless of the type of communities. As with previous studies, the present study also confirms the theoretical validity with a nationwide survey across different communities in the United States (Kim et al., 2019; Nah et al., 2015; Nah & Yamamoto, 2017).

Second, the results indicate that community-based social media use was positively related to civic participation along with the preexisting storytelling networks. As a newly emerging storytelling agent, social media can play a vital role in enhancing citizenship. These findings add new insights into communication infrastructure perspective and suggest an integrated communicative approach to civic participation is necessary in the civic communication ecology (Friedland, 2001; Nah & Yamamoto, 2017; Shah et al., 2001).

Third, although community-based social media use (CSM) was positively related to civic participation, the positive relationship between CSM and civic participation was even stronger for those who reside in rural communities. These findings offer the following implications. On one hand, social media use in communities with relatively underdeveloped technological infrastructure with lack of access to high-speed internet can empower community residents to engage in civic and political activities. While digital inequalities or divide has been a persistent issue in terms of access, quality of access, and social inclusion (e.g., Ginossar & Nelson, 2010), social media can offer potentials of making civic life more inclusive and meaningful for those who reside in rural communities. On the other, social media platforms can serve as a mobilizing force especially those who reside in communities lacking in communication infrastructure, such as connection to local media, community organizations, and interpersonal dialogs among community residents. As Beaudoin and Thorson (2004) findings imply, those who reside in rural communities with lack of local media outlets may depend more on community-based social media as information sources to become more informed and civically engaged community members. Compared to rural communities, the effect of CSM on civic participation in urban and suburban communities was less prominent: As seen in the graphical visualization in Figure 1, the level of civic participation increased by the CSM use only slightly. This result could suggest that the penetration of CSM is so high in these areas that the use of CSM has already become a new norm of urban and suburban community life, regardless of the level of participatory activities.

Fourth, while interpersonal discussion yielded a positive association with civic participation, the relationship between interpersonal discussion and civic participation is even stronger for those who reside in suburban communities. Unlike urban and rural communities, suburban communities in this study may offer more cohesive residential areas where community residents discuss common interests and issues, which, in turn, leads to an enhanced level of civic participation.

These results carry policy implications and practical applications. First, given the moderating role of community-based social media use on civic participation, civic capacity, and utility of social media platforms especially in rural communities should be revisited and revitalized in a way to enhance civic communication infrastructure and civic participation. Therefore, policymakers, public officials, community activists, and media professionals alike should strive to build more communication and technological infrastructure across social media platforms as a new communicative space and conduit to building a vibrant civic community.

Second, policymakers, community practitioners, and scholars alike should strive to facilitate community discussion networks among residents. Given the lack of news coverage of nonprofit community organizations (Nah, 2010a), one possible solution is to reinvigorate and support community-based storytelling networks through hyperlocal news sites. For instance, Madison Commons (Robinson et al., 2009), a university-initiated community news site focusing on community issues in a mid-size community, has revitalized community storytelling networks connecting community organizations, residents, and local media organizations in Madison, Wisconsin. Another example is Alhambra Source (Liu et al., 2018a), a nonprofit community news outlet in an ethnically diverse community of Los Angeles County, which has offered a community news and information platform, thereby integrating the diverse community through interethnic conversation and collaboration in the local community (see also Liu et al., 2018b). These nonprofit news outlets have been beneficial to revitalizing community storytelling networks in the local communication ecology. Therefore, governments (local, state, and federal), community foundations, corporations, nonprofit and voluntary organizations, and social movements should be able to build collaborative networks to revitalize community storytelling networks.

Notwithstanding the meaningful contributions, the limitations still remain for suggestions in future studies. First, while the study focused on the main and interactive effects of storytelling networks, including social media, across diverse communities, it did not fully test communication infrastructure theory with civic engagement. Civic engagement, by definition, is a multifaceted and multidimensional concept comprising three civic consequences such as neighborhood belonging (cognitive dimension), collective efficacy (psychological dimension), and civic participation (behavioral dimension). Future research should test both mediating and moderating paths between social media and civic outcomes. Second, while a nationwide online survey recruited demographically matched respondents in the U.S., future studies should maximize to approximate the respondents who can match with the distribution of U.S. demographic features. Given the majority of respondents are White for instance, the results should be cautiously interpreted for generalizability. If possible, future studies should conduct a probability-based survey with mobile users and landline users to increase external validity across diverse communities and ethnic groups. At the same time, as this study focuses on geographic differences, the 54% of survey participants identifying as living in suburban communities is reflective of a 2017 American Housing Survey (United States Census Bureau, 2017): 52% of people living in the United States describe their neighborhoods as suburban. This may indicate a need for more formalized definitions of rural, urban, and suburban as well as qualitative investigation of the characteristics that separate these communities.

Third, embedded in communication infrastructure theory, future studies should conduct field research with a series of case studies across the communities in terms of the varying degree of communication and technological infrastructure and should examine the necessary conditions in community action contexts leading to the civic outcomes in longitudinal studies. Fourth, given the inherent limitations of cross-sectional surveys, scholarship on communication infrastructure should consider conducing a multi-wave panel survey to address the causality of the theoretical components.

In conclusion, this study advances CIT with social media as a newly emerging community storytelling agent as well as interpersonal discussion networks by testing the validity of CIT

across the geographically diverse communities (urban, suburban, and rural). Future CIT scholarship should strive to conduct longitudinal studies through panel surveys and ethnography in different community contexts. In doing so, future scholarship should consider community-based case studies and field work to address disparities and inequalities of communication infrastructure across geographically dispersed, ethnically diversified, and underrepresented communities. An accumulated case studies in different community contexts across diverse communities should enrich CIT scholarship and beyond. In particular, community-comparison case studies across different countries and cultures should conduct multi-method approaches at the multiple levels. Community-wide surveys should be coupled with in-depth interviews of core community storytelling networks such as community residents, community organizations, and community media, including local mainstream news media and geo-ethnic media in urban communities. Social network analysis of community storytelling networks also should examine central storytelling actors and resources available that may enhance a more vibrant civic community.

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No potential conflict of interest was reported by the authors.

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