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How new media affords network diversity: Direct and mediated access to social capital through participation in local social settings

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Abstract

This study examines how information and communication technologies – mobile phone, social networking websites, blogging, instant messaging, and photo sharing – are related to the diversity of people's social networks. We find that a limited set of technologies directly afford diversity, but many indirectly contribute to diversity by supporting participation in traditional settings such as neighborhoods, voluntary groups, religious institutions, and public spaces. Only one internet activity, social networking websites, was related to lower levels of participation in a traditional setting: neighborhoods. However, when direct effects were included, the total influence of social networking services on diversity was positive. We argue that a focus on affordances of new media for networked individualism fails to recognize the continued importance of place for the organization of personal networks: networks, that as a result of the persistent and pervasive nature of some new technologies, may be more diverse than at any time in recent history.

Keywords

civic engagement, community, echo chamber, pervasive awareness, social isolation, social support

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Introduction

The relationship between information and communication technologies (ICTs), participation in local public life, and network diversity is heavily debated. Some fear that the internet is pulling people away from participation in traditional local settings that have been associated with exposure to diverse others. Such settings include neighborhoods, voluntary groups, religious institutions, and public and semipublic spaces (Gergen, 2008; McPherson et al., 2006). Others point to the potential for various internet activities to create new social settings and affordances that will supplement or replace the network benefits accrued through participation in traditional physical settings (Wellman et al., 2003). One perspective values the proven role of local engagement and fears that a rise in privatism – networks that are increasingly home-centered and homophilous – could result from a shift in the locus of communication from the physical to the virtual. Another perspective embraces recent technological innovations, and questions what are believed to be antiquated notions about the importance of place. Both perspectives value social capital and recognize that diverse networks contribute to positive social outcomes. However, these perspectives clash and fail in their polarity.

ICTs have enabled a shift from group-based to network-based societies (Castells, 1996). Just as urban technologies, such as the car and telephone, freed the individual from the social constraints of village life, digital technologies may afford supportive community structures that are even less bounded, more spatially dispersed, and less dependent on place. Arguments pertaining to how this transformation, toward what Barry Wellman 2001) termed 'networked individualism,' influences the diversity of people's networks assumes an 'online and global' or 'offline and local' dichotomy. As a result, existing conceptualizations of community fail to recognize the relationship between ICTs, participation in local settings, and network diversity. We argue that ICTs support diverse networks. However, our argument is not based on the assumption that community has become less bounded, more spatially dispersed, and less tied to place than in the past. We present evidence to support the conclusion that the use of social media primarily supports diverse networks through participation in traditional, local settings – glocalization.

The importance of social settings for network diversity

The importance of diversity within social networks has been extensively theorized and documented. Personal networks high in diversity are associated with a range of positive outcomes that include better physical and mental health (Cohen et al., 1997), deliberation (Delli Carpini et al., 2004), autonomy (Coser, 1975), cultural knowledge (Erickson, 1996), tolerance and trust (Putnam, 2000), and access to job information (Granovetter, 1974). The focus of this study is not on the link between diversity and the well-established literature about these positive outcomes. Instead, it examines the social settings where such benefits are likely to accrue.

Before focusing on the nexuses of diverse social ties, it is necessary to clarify the relationship between social networks, social settings, social capital, and the various positive social outcomes that we just identified. The diversity of social networks is a direct measure of the resources that people can access through their networks (Lin and Erickson, 2008). Diverse resources flow through diverse networks. The resources that

are embedded in networks are termed social capital (Lin and Erickson, 2008). Some foci, or the settings around which individuals organize their social relations, are more likely than others to provide access to diverse networks (Feld, 1981). The potential for higher social capital is maximized in social settings where the diversity of others is highest. Those with higher social capital can access more support and are exposed to more diverse information, which is associated with those outcomes we identified related to trust, health, autonomy, knowledge, and deliberation. Thus, the question of what settings provide access to more or less diverse social networks is particularly important.

The private home is least likely to be a setting where people encounter those who are different from themselves. It is the locus of people's strongest ties, ties that tend to be highly homophilous and densely connected (McPherson et al., 2001). Some have argued that the close-knit, embedded nature of strong ties is social capital (Coleman, 1988). Indeed, such relationships do provide many forms of support (Wellman and Wortley, 1990), but, because they are often kin and are highly similar, they provide little diversity. Weak ties – more diverse ties – belong to the domain of other social settings (Granovetter, 1973).

In contrast to the private home, settings that are more public, and less restrictive in terms of access to people from different social strata, are most likely to provide exposure to diversity (Lofland, 1998). These settings include urban public spaces (e.g., public parks), semipublic spaces (e.g., cafés), voluntary associations (e.g., clubs), religious institutions, and neighborhoods.

Voluntary organizational groups are perhaps the best-known settings for their relationship to social capital (Putnam, 2000). This is a broad category that includes community groups, sports leagues, youth groups, social clubs, and charitable organizations. Such activities are likely to become a setting for diverse networks because of their ability to unite people from different backgrounds – typically in face-to-face contact – around a common interest, cause, or activity. The literature recognizes variation in the types of voluntary organizations likely to contribute to network diversity (Glanville, 2004; Magee, 2008). The highest levels of diversity from voluntary organizations come from participation in a range of groups with different purposes (Erickson, 2004). Putnam (2000) documents the decline in participation in voluntary groups over the last quarter century. This decline is of particular concern, given that participation in these associations is such a strong predictor of the diversity of ties in people's networks (Erickson, 2004).

Religious institutions, such as churches, synagogues, and temples, provide a focus of activity that brings people into routine, face-to-face contact with others who share at least one common interest, but who may otherwise vary in many meaningful ways. Not only is church affiliation the most common type of organization joined by Americans (Putnam, 2000), but religious participation plays a particularly strong role in the formation of diverse networks (Ellison and George, 1994). Putnam and Campbell (2010) report that there has been a gradual generational decline in church attendance. Yet, these authors maintain that it is still the most important setting for social capital in America.

Neighborhoods are another focus for diverse contact. But, in terms of network diversity, knowing neighbors may be very different from exposure to people in other settings. Because of the homogeneity afforded by self-selection, socioeconomic factors, and segregation, neighborhood networks may not provide as much diversity as other voluntary associations (Glanville, 2004). There may also be important variation by neighborhood

context. An example is apartment buildings, which tend to have less local interaction than other neighborhood types (Michelson, 1977). There is evidence of a recent decline in neighboring and neighborhood tie formation (Guest and Wierzbicki, 1999). Nevertheless, familiarity with neighbors tends to be strongly and positively associated with network diversity (Granovetter, 1973; Magee, 2008; Putnam, 2000).

There are no social settings where people, regardless of race, background, and socioeconomic status, come in as close proximity as they do in public spaces, such as parks, plazas, and markets. It is the uncontrolled nature of access to these spaces that affords diversity. All other foci bring people together based on at least one level of social similarity. The only thing guaranteed to be shared by people in public is place. Often, public spaces are where existing social ties are maintained, but occasionally they are also a source of serendipity – chance encounters with acquaintances or potential new friends. The role of public space in the formation and maintenance of diverse networks has been extensively documented (Lofland, 1998), as has the role of similar spaces that can be more restrictive to access: semipublic spaces, such as cafés and restaurants (Oldenburg, 1989).

ICTs and network diversity

Social interactions that take place online are often framed in the language and literature used to describe traditional foci associated with network diversity. This includes analogies that equate the internet with public spaces (Papacharissi, 2002), 'third places' (Kendall, 2002), spiritual spaces (Campbell, 2005), and voluntary associations (Klein, 1999). Despite overt claims of parallels between ICTs and traditional settings associated with diversity, there is little evidence that internet use is equivalent to or functions like a setting that expands diversity.

In support of the argument that the internet provides a new setting for tie formation and maintenance, various studies have found that many people form new ties online (Tufekci, 2010). In addition, internet users have contact with a greater number of friends and relatives than nonusers, in particular those who use social as opposed to passive internet technologies (Wang and Wellman, 2010; Zhao, 2006). However, size does not necessarily equate with diversity. The internet may function more like the private home than a public space – building large homophilous networks at the expense of diverse ties. Ties formed or maintained online may even replace existing diversity.

'Internet use' may be too broad a category to describe the unique individual affordance of new technologies. It may be more meaningful to explore the affordances of specific technologies. Indeed, there is some indication that categories of internet technologies, in particular 'social media' – internet activities characterized by their intent to promote social interaction – may increase social network diversity. For example, Marlow (2005) found a relationship between blogging and higher levels of network diversity. In a longitudinal study of students who use Facebook, Steinfield et al. (2008), found that Facebook users scored higher on a scale of perceived 'bridging social capital.' However, in contrast, some social media support interaction with only a small set of relatively homogeneous strong ties. Those who use instant messaging typically use the technology to maintain an intimate network of three to five ties (Kim et al., 2007). Most people use a mobile phone to keep in regular contact with fewer than half a dozen densely knit ties (Ling, 2008). In addition,

mobile phone use within public spaces typically requires disengagement from both co-present strangers and existing acquaintances (Humphreys, 2005). The 'always on, always accessible' contact with a small number of intimates afforded by the mobile phone may reduce the need to maintain a larger and more diverse circle of confidants (Gergen, 2008).

An alternative perspective to the argument that the internet provides a new social setting is that a relationship between ICTs and network diversity results from a tendency for technology use to serve as a precursor to participation in traditional settings – glocalization. That is, internet use may be associated with higher levels of participation in traditional settings that support the formation of diverse networks. Wellman et al. (2001), using data on a large (but nonrandom) sample of internet users, found that internet use, in particular users of synchronous media, were involved in a larger number of voluntary organizations. Similarly, others have found a relationship between blogging, social networking services, mobile phone use and participation in civic organizations (Campbell and Kwak, 2010; Valenzuela et al., 2009). In a study of 1300 wireless internet users observed in public spaces, Hampton et al. (2010) found that internet users are more likely to visit public spaces and to visit them more often. They also found that nearly one-quarter of public space visits by wireless internet users resulted in serendipitous interaction with a stranger, and one in six reported that serendipitous encounters resulted in long-term social ties. Hampton and Wellman (2003) in their study of Netville, and Hampton (2007) in his study of four Boston neighborhoods, found that those who used a neighborhood email list formed a larger number of local, weak ties. Hampton (2007) found that the longer people had been using the internet, the more neighborhood weak ties they formed over time. There is also evidence that internet use overcomes contextual, neighborhood effects in areas of concentrated disadvantage that would otherwise limit opportunities for local tie formation (Hampton, 2010).

Other scholars argue that ICTs detract or do little to influence participation in traditional settings. Using time-use data from the 2006 General Social Survey, Robinson and Martin (2010) found that internet users spent as much time in church as nonusers. McPherson et al. (2006) speculate that the internet encourages the formation of distant over local ties and, as a result, there has been a decline in social ties formed through local voluntary groups and neighborhoods.

The debate surrounding the influence of ICTs on network diversity is polarized and divided. There are those who suggest that the internet creates new social settings, those who argue that it supports traditional settings, and those who argue that it neither creates new opportunities for the maintenance of diverse social ties nor aids existing opportunities and may even reduce diversity. The existing research suggests four possibilities:

1. ICTs provide a new social setting, and participation is directly associated with higher network diversity;
2. ICTs provide new settings, but participation is directly associated with lower levels of diversity;
3. There is a mediated relationship between the use of ICTs and network diversity, such that technology use increases participation in traditional settings;
4. The mediated relationship between the ICT use and diversity is negative, i.e., these technologies withdraw people from participation in traditional settings.

Although these perspectives are generally treated as exclusive, this study argues that they are, in fact, nonexclusive. That is, they all may be happening simultaneously. For example, the internet may provide a new social setting that replaces diversity lost as a result of lower levels of participation in specific traditional settings. Different ICTs, for example the use of instant messaging compared to the use of social networking websites, may have contradictory relationships (one may have a positive effect and the other may be negative). Different media may offer direct, mediated, or both types of relationships with network diversity.

We anticipate that that there is both 'glocalization,' affordances for network diversity that are related to the use of ICTs that results from participation in traditional local settings, as well as affordances that result directly from online activities. Those technologies that afford interaction with large numbers of unspecialized others are likely to have direct effects on network diversity. Technologies that fall into this category include general internet use (including web surfing and email) and social networking services (e.g., Facebook). This contrasts with technologies such as instant messaging, which are likely to have no relationship to diversity because they primarily afford interaction with a small number of close-knit ties. In contrast to these direct relationships, some specific uses of ICTs, such as sharing photos online (e.g., Flicker) are not likely to result directly in higher diversity. Rather, sharing photos implies participation in traditional settings such as public spaces that are in turn associated with diversity. Blogging is also not likely to increase diversity directly. The principle of homophily suggests that people drawn to a blog's content are likely to be very similar (Adamic and Glance, 2005), but bloggers may be more likely to participate in activities that provide source material for their blogs, such as voluntary associations. The mobile phone is used primarily to maintain close social ties, which suggests that it does not have a direct effect on diversity, but it may allow for better coordination of time to participate in traditional foci (e.g., meetings in restaurants or bars). While we have suggested some possible relationships, we have limited predictions about which specific foci are likely to benefit from the use of specific ICTs. However, because it is easier to enter and participate in some types of settings than others and participation in some spaces (particularly public and semipublic spaces) is already more common than others, it is expected that those settings will be the primary beneficiaries of technology use. The study does not expect to find the total network diversity of ICT users to be lower. There may be tradeoffs, in which a specific technology serves as an independent source of diversity and is simultaneously associated with reduced participation in a traditional setting for diversity. However, replacement or net gains are expected rather than a decline in diversity.

Methods

Survey

In partnership with the Pew Internet & American Life Project, a random-digit, dial survey of 2512 adults living in households in the continental United States was conducted in the summer of 2008. A combination of landline (2007 interviews) and mobile phone (505 interviews) samples was used to represent all adults with access to a telephone.

A separate cell phone sample was included to account for any potential bias that might result from the number of households that have only a mobile phone and no landline. A two-stage, weighting procedure was used to weight this dual-frame sample. A first-stage weight was assigned to account for the inclusion of dual-users (landline and mobile phone) in both sample frames. The second stage of weighting balanced sample demographics to population parameters. The sample was balanced to match national population parameters for sex, age, education, race, Hispanic origin, region, population density, and telephone usage. The response rate was 21 percent for the landline sample and 22 percent for the mobile phone sample.

Measures

Network diversity. The dependent variable, the diversity of a person's network, was measured using a social network position generator. This measure is based on the understanding that people in different social locations in society can provide different types of resources. Occupation is a good measure of difference. Occupations vary in prestige, and people in high prestige occupations tend to have special resources tied to income, education, and authority. However, even people in lower prestige occupations have special skills and can offer unique opportunities. The more people someone knows in different occupations, particularly a range of occupations, the more likely he or she is to have access to a range of information and resources – social capital. A number of studies show that the position generator is a valid and reliable measure of network diversity (Lin and Erickson, 2008).

Participants were asked if they knew anyone in twenty-two occupations that ranged in occupational prestige: nurse, farmer, lawyer, middle-school teacher, full-time babysitter, janitor, personnel manager, hairdresser, bookkeeper, production manager, operator in a factory, computer programmer, taxi driver, professor, policeman, Chief Executive Officer of a large company, writer, administrative assistant in a large company, security guard, receptionist, Congressman, and hotel bell boy.[1] Network diversity was operationalized as an additive index of these 22 items ($M = 9.25$, $SD = 5.30$). To ease the interpretation of the results, the scale was transformed into a standardized *z*-score.

Use of information and communication technologies. Central to our argument is that different technologies are likely to afford very different types of social relationships. We captured variation in ICT adoption, non-use, heavy internet use, and location of use. Although there is likely to be variation even within our categories, the focus of this study is on broad trends. An examination of more specific affordances for different technologies and specific websites, such as variation within and across social networking services, is left to future studies. Participants' internet use is classified based on the following variables, where participants can fall into multiple categories:

Internet user – dichotomous measure of participants who used the internet at least occasionally (76.5%);

Frequent internet use at home – use the internet from home at least several times a day (22.1%);

Frequent internet use at work – use the internet from work at least several times a day (24.5%);

Instant messaging – send instant messages to others who are online at the same time (30.9%);

Blogging – work on own online journal or blog (10.0%);

Share digital photos online – upload photos to be shared with others (34.8%);

Social networking services – use a social networking site such as MySpace, Facebook, or LinkedIn (25.9%).

For mobile phone users, there may be significant variation in how people maintain their social networks, based not only on cell phone ownership, but the decision to maintain or not maintain a landline telephone. Thus, participants were categorized into three groups: *use only landline phone* (18.4%), *use only cell phone* (14.5%), and *use both landline and cell phone* – the reference category (67.2%).

Participation in traditional social settings.   We have argued that different types of social settings are likely to contribute differently to network diversity.

Public spaces: an additive index that ranges from 0 to 18. Participants indicated on a 7-point scale (0 = never, 6 = more than six times), how many times in the past month they had stayed for more than 15 minutes in a public library, community center, public park or plaza ($M = 3.43$, $SD = 3.61$).

Semipublic spaces: an additive index that ranges from 0 to 24. On a 7-point scale (0 = never, 6 = more than six times), how many times in the past month participants had stayed for more than 15 minutes in a café or coffee shop, fast-food restaurant, any other type of restaurant, or a bar (M = 7.62, $SD = 5.59$).

Religious institutions: a 7-point scale (0 = never, 6 = more than six times), how many times in the past month they had gone to a church, synagogue, mosque, or temple ($M = 2.02$, $SD = 2.24$).

Voluntary groups: an additive index of five dichotomous items. Participants indicated if they belong to the following types of associations: community group or neighborhood association, local sports league, local youth group, local social club or charitable organization, some other local group ($M = .83$, $SD = 1.12$).

Neighborhood ties: a 4-point scale (0 = none, 1 = only some, 2 = most, 3 = all) whether they know the names of their neighbors who live close by ($M = 1.28$, $SD = 1.09$).

Control variables.   Previous studies identify several demographic factors that are associated with participation in traditional social settings and network diversity (Lin and Erickson, 2008). These include age ($M = 46.29$), sex (51.8% female), education ($M = 13.37$ years), race (77.7% White, 12.8% Black, 9.5% other), ethnicity (11.7% Hispanic), marital status (56.6% married or living with partner), employment status (49.1% full-time, 12.4% part-time, 15.4% not employed for pay, 23.2% other), type of housing (15.6% apartment),

length of residence (M = 11.08 years), and living with children under 18 years old (38.2%). Because of the nonlinear relationship among age, participation in traditional social settings, and network diversity, the square of age was also entered in the models in this study.

Analysis procedure

A series of ordinary least squares (OLS) regression analyses were conducted to specify a path model that incorporated the links between the use of ICTs, traditional social settings, and network diversity with the influence of the fourteen, relevant exogenous variables controlled. The path model estimates the magnitude and statistical significance of the links among the key variables.

In the discussion, unstandardized path coefficients are reported. This approach differs from the most common presentation of OLS path models, in which the focus is to compare the relative importance of variables based on standardized versions of the coefficients. We argue that a comparison of standardized coefficients is an inadequate method to determine the relative importance of the variables in our model – in large part because of variation in the ease and likelihood of participation in different foci of activity. For example, it is unreasonable to compare a standard deviation change in a setting such as church attendance, which may have a higher barrier to access as well as ascribed routines and expectations for participation, with hanging out at a local café. The focus on unstandardized coefficients eases interpretation. The standardized path coefficients are presented in Table 1 for readers who have an interest in reviewing them.

Findings

Traditional foci of activity

As expected and reported in Table 1 and Figure 1, a large and significant proportion of people's network diversity is attributed to their participation in traditional foci of activity.[2] People belonging to voluntary associations average 0.197 standard deviations (SD) more diversity in their networks for every organizational membership that they maintain. People who know none of their neighbors have networks that are .136 SD lower in diversity than those who know at least some neighbors, .272 SD lower than those who know most of their neighbors, and .408 SD lower than those who know all of their neighbors. This compares to .038 SD higher diversity for each visit/month to a public space, and .027 SD higher diversity for each visit to a semipublic space.

Participation in traditional settings has an additive relationship to diversity. That is, the more often one attends church, the more neighbors one knows, the more voluntary groups to which one belongs, and the more time one spends in parks and cafés, the higher one's network diversity. However, in practice, participation in some settings is easier and more likely than others. A large segment of the population does not attend church even once a month (45.3%), and few attend more than once per week (16%). Only a minority know more than just some of their neighbors (39.8%). Most people belong to no voluntary organizations (53.1%). Almost everyone patronizes cafés and restaurant (90.6%), and the majority of people visit such semipublic spaces more than six times per month

Table 1. OLS regressions (N = 2317)

	Neighborhood ties	Voluntary groups	Religious institutions	Semipublic spaces	Public spaces	Network diversity
OLS regression						
Constant	.197	−.730**	.325	4.392****	−.904	−2.256***
Female	.090* (.042)	.031 (.014)	.377*** (.084)	−1.003*** (−.091)	−.032 (−.004)	.020 (.010)
Age (years)	.007 (.106)	.001 (.015)	−.005 (−.040)	−.052 (−.163)	.010 (.050)	.035*** (.622)
Age squared	−.000 (−.124)	.000 (.062)	.000* (.258)	.000 (.079)	−.000 (−.129)	−.000*** (−.561)
Education (years)	.051*** (.137)	.090*** (.235)	.041 (.054)	.222*** (.117)	.226*** (.183)	.011 (.031)
Married or living with partner	.141** (.065)	.124* (.055)	.337** (.075)	−.014 (−.001)	.238 (.033)	.118** (.059)
Children under 18 at home	.090 (.040)	.137* (.060)	.448*** (.097)	−.448 (−.040)	.781*** (.106)	−.036 (−.017)
Black (compared to White)	−.280*** (−.086)	−.023 (−.007)	.598*** (.089)	−.446 (−.027)	.485 (.045)	.197*** (.066)
Other race (compared to White)	−.336*** (−.092)	−.147 (−.039)	.182 (.024)	−.815 (−.044)	.110 (.009)	−.129 (−.038)
Hispanic	−.101 (−.029)	−.201* (−.057)	−.178 (−.025)	−.019 (−.001)	−.081 (−.007)	.166* (.052)
Live in an apartment	−.442*** (−.146)	−.113 (−.036)	−.149 (−.024)	.675 (.044)	.374 (.037)	.022 (.008)
Length of residence (years)	.030*** (.256)	.003 (.025)	.003 (.013)	.029* (.049)	.003 (.007)	.005* (.050)
Full-time employment[1]	−.076 (−.035)	−.106 (−.048)	−.110 (−.024)	1.464*** (.133)	.029 (.004)	.264*** (.133)
Part-time employment[1]	−.020 (−.006)	.120 (.036)	.275 (.041)	.761 (.046)	.610 (.056)	.097 (.033)
Other employment[1]	.104 (.040)	.043 (.016)	−.246 (−.046)	.785 (.059)	.422 (.049)	−.010 (−.004)
Use only landline phone[2]	−.067 (−.024)	−.140** (−.048)	−.610*** (−.105)	−1.338*** (−.094)	.170 (.018)	−.065 (−.025)
Use only mobile phone[2]	−.127 (−.041)	−.148 (−.047)	−.191 (−.030)	.604 (.039)	.259 (.026)	.022 (.008)
Internet user	.001 (.000)	−.025 (−.009)	.225 (.042)	1.245*** (.095)	.354 (.041)	.124* (.053)
Frequent internet use at home[3]	.004 (.002)	.026 (.010)	−.116 (−.021)	.653* (.049)	−.051 (−.006)	−.044 (−.019)
Frequent internet use at work[4]	.090 (.036)	.217** (.083)	.225 (.043)	1.182*** (.092)	−.100 (−.012)	.201*** (.087)

Table 1. (Continued)

	Neighborhood ties	Voluntary groups	Religious institutions	Semipublic spaces	Public spaces	Network diversity
Social networking services	−.155* (−.063)	.055 (.022)	−.280 (−.055)	.719 (.057)	.458 (.056)	.116* (.052)
Blogging	.086 (.024)	.223* (.060)	.400* (.054)	.482 (.026)	.950** (.079)	.068 (.021)
Share digital photos online	−.006 (−.003)	.205*** (.088)	−.027 (−.006)	.095 (.008)	.564** (.075)	.015 (.007)
Instant messaging	.032 (.014)	.067 (.028)	−.012 (−.002)	−.150 (−.013)	−.016 (−.002)	.020 (.009)
Neighborhood ties						.136*** (.149)
Voluntary groups						.197*** (.222)
Religious institutions						.056*** (.127)
Semipublic spaces						.027*** (.152)
Public spaces						.038*** (.136)
R^2	.197	.138	.087	.159	.125	.380

Notes: Cell entries are unstandardized regression coefficients. Numbers in parentheses are standardized regression coefficients.
*p < .05; **p < .01; ***p < .001.
[1] Compared to not employed for pay. [2] Compared to using both. [3] Use internet at home at least several times per day. [4] Use internet at work at least several per day.
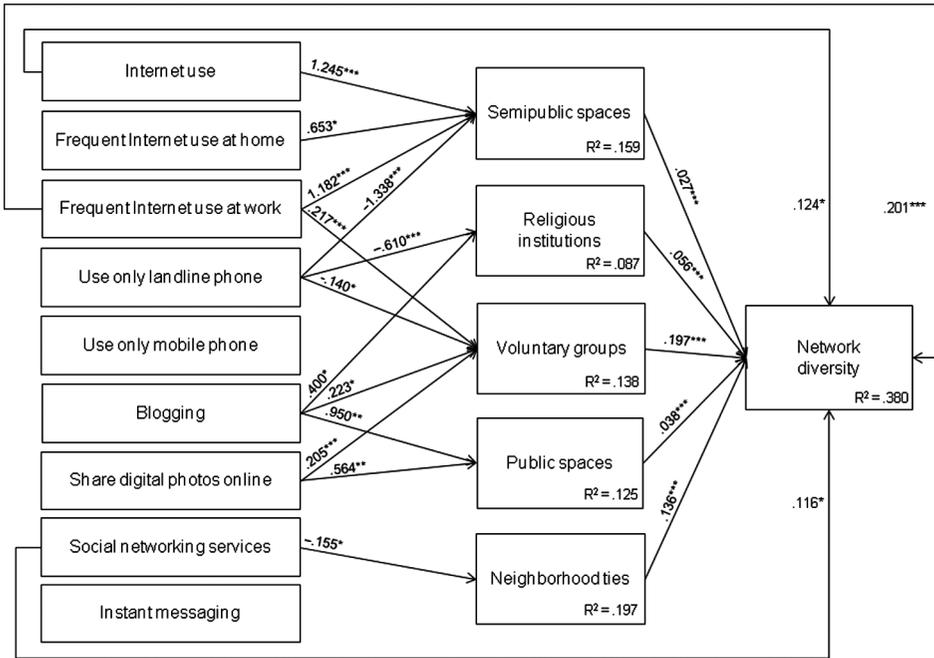
Figure 1. Path model
Notes: All coefficients on the arrows are unstandardized OLS regression coefficients. The coefficients of control variables are not shown. **p < .05; **p < .01; ***p < .001.*

(50.8%). Only 29% of people do not visit parks or other public space, and 40.7% visit public spaces at least weekly.

It is worth noting in Table 1, based on standardized coefficients, that only two of the control variables come close to the same level of importance as any traditional social setting. Age is strongly tied to network diversity, as is employment status. Each year of age contributes to network diversity at about the same rate as each monthly visit to a public space. Being employed full-time, compared to being unemployed, is equivalent to about seven visits to a public space/month. Foci of activity where people organize social relations are clearly strong and important contributors to network diversity.

The role of technology

Unlike the direct relationship between traditional settings and network diversity, as modeled in Figure 1, there are few direct relationships between the use of ICTs and diversity. However, such effects are in a positive direction. On average, internet users have networks that are .124 SD more diverse than those who do not use the internet. In addition, those who are heavy internet users at work have networks that average .201 SD more diversity than other internet users. People who use online social networking services have networks that average .116 SD more diversity. When combined, the direct effects of technology use are substantive when compared to non-internet users. Those who frequently

use the internet at work and also use social networking services have networks that are, on average, .441 SD more diverse.

Although there are few direct relationships between the diversity of people's networks and their use of ICTs, many ICTs have mediated relationships to diversity. That is, use is associated with higher levels of participation in traditional foci that contribute to diversity. However, the mediated relationship between the use of these technologies and diversity is very specific; particular technologies afford access to social capital through different social settings.

In addition to its direct relationship, basic internet use has an additional mediated relationship through visits to semipublic spaces. The average internet user makes 1.245 more visits/month to semipublic spaces than non-internet users. This translates into a modest 0.034 SD higher diversity as a result of higher rate of participation in semipublic spaces. Similarly, in addition to the direct relationship between frequent use of the internet at work and diversity, frequent internet users average 1.182 more visits to semipublic spaces each month (.032 SD higher diversity), and they belong to more voluntary groups (an average of .217 more) than less frequent internet users (0.043 SD higher diversity). In addition, there is a mediated relationship between frequent home internet use and semipublic spaces; frequent home users make .653 more monthly visits to semipublic spaces than those who use the internet less often (0.018 SD higher diversity).

Only one type of 'social media' is directly related to personal network diversity: social networking services (.116). However, many social media have mediated relationships to diversity. Bloggers are likely to attend church more often (.400 visits/month), participate in more voluntary groups (.223 more), and visit more public spaces (.950 visits/month). As a result, compared to internet users who do not blog, bloggers' networks are .102 SD higher in diversity.

People who share digital photos online tend to visit more public spaces (.564 visits/month) and belong to more voluntary groups (.205 memberships). Compared to internet users who do not use these media, those who share photos online have networks that are a modest .061 SD more diverse.

Besides the direct effect between the use of social network services and overall personal network diversity, there is an additional mediated relationship between social networking services and neighborhood involvement. The average user of a social networking service, controlling for demographic characteristics, knows fewer of their neighbors (−.155). However, because of the direct relationship between social networking services and diversity, those who use these technologies average .095 SD more diversity compared to internet users who do not.

No relationship between the use of instant messaging and diversity was found.

There is no direct relationship between mobile phone use and network diversity. However, there is a mediating effect from cell phone use to diversity through visits to semipublic spaces, religious institutions, and voluntary group memberships. People who own only a mobile phone or own both a mobile phone and a traditional landline have similar levels of network diversity. However, those who do not have a mobile phone tend to visit church less frequently (−.610 visits/month), visit fewer semipublic spaces (−1.338), and are members of fewer voluntary groups (−.140). As

a result, the average person who does not own a mobile phone has a network that is .098 SD less diverse.

When direct and mediated relationships are considered independently, the individual influence of ICTs on the diversity of people's networks is relatively modest. However, when direct and mediated relationships are totaled and the range and intensity of online activity are considered together, the combined relationships provide an entirely different finding. The following examples demonstrate that the net difference in diversity can be substantial. Controlling for demographic characteristics and allowing participation in traditional social settings to vary as they naturally would, on average:

- Compared to nonusers (no internet or mobile phone) an intensive internet user, one who is a frequent internet user at home and at work, owns a mobile phone, and uses a range of social media, including blogging, photo sharing, and social networking services, has a network that is nearly one full SD (.808) more diverse. Nearly half of the accessible social capital advantage (.367 SD) is attributable to the mediated influence of technology use on participation in traditional settings. The remainder is a result of ICTs that function as new foci of activity (.441).
- General internet users, who own a cell phone but are not frequently online and do not use any social media have one-half a SD (.552) less diversity in their personal networks than the most intensive technology users.

Discussion

Concerns have been raised about the influence of the internet and mobile phone on participation in traditional local social settings and the diversity of people's social networks. The result of this analysis is a clear picture of the positive and substantive total contribution that the use of ICTs has on network diversity and, thus, the social capital that is accessible through personal networks.

Despite concerns about the decline of traditional settings for the organization of diverse social relationships, such settings remain extremely important sources for the social capital that is accessible through personal networks. Optimism that 'social media' and other technologies would offer new settings that independently and directly contribute to the diversity of people's networks is largely misplaced. Only general internet use – which includes email and web surfing – frequent use of the internet at work, and the use of social networking services (e.g., Facebook) directly contribute to the diversity of personal networks. However, the direct contribution of even these limited relationships is substantial; an internet user who frequently goes online at work and uses a social networking service has a network that is nearly one-half a standard deviation more diverse than those who do none of these things. Such a network advantage is similar to the difference between those who know none and those who know all of their neighbors, those who do not attend church and those who attend twice weekly, those who make three additional weekly visits to public spaces, belonging to two additional types of voluntary association, or making four additional weekly visits to a semipublic space.

In addition to the direct relationship between some uses of ICTs and the diversity of people's networks, many technologies have mediated relationships to diversity through participation in traditional foci of activity. Frequent home internet use, mobile phones, blogging, and sharing photos online are associated with higher levels of participation in very specific settings. Only one internet activity – the use of social networking services – is related to lower levels of traditional social participation and only in one setting: neighborhoods. However, although those who use social networking services do tend to know fewer neighbors, the direct relationship of these services to the extensity of people's networks results in overall higher levels of diversity. The results show no general trend in which the diversity of people's networks is lower among those who use ICTs.

The finding that social networking services afford higher levels of network diversity overall, but less diversity in the neighborhood setting, is consistent with historical trends observed as a result of the adoption of 'old' communication technologies like the telephone (Fischer, 1992). Online social networking sites allow people to more easily access social support from outside the neighborhood setting, reducing reliance on local ties, but increasing opportunities for the formation and maintenance of more diverse ties overall. Hampton et al. (2009) find that users of social networking services are less likely to seek companionship from neighbors (although they are as likely to give such support to neighbors). Some resources previously obtained from the neighborhood setting may now come from interaction initiated through social networking services. Wellman (2001) argues that this shift from community that is based on place-to-place relationships and toward person-to-person networks is part of the rise of 'networked individualism.' Wellman defines this as a change in the structure of community whereby spatial proximity is increasingly less important, and personal networks are increasingly sparsely knit, distant, dispersed, and maintained in private rather than public spaces.

Although this study finds some support for the conclusion that people are becoming networked individuals, the findings are not fully supportive of networked individualism. People are using ICTs to reinforce participation in existing foci of activity; established institutions, public spaces, and other settings that are public, place-based, and primarily local. True, the data in this study are cross-sectional, and causality cannot be definitively demonstrated. However, it seems unlikely that the relationship is spurious. There may be bi-directionality; use of traditional social settings may drive some technology use (Sessions, 2010), which in turn drives more use of the settings. In the absence of longitudinal data, we cannot definitively conclude that participation in traditional settings is not declining among those who use technology in the ways identified (they may have used traditional settings at even higher rates before the technology). It is also likely that further delineation of our measures of ICT use would find more specialized relationships. And, we also believe that the inclusion of additional 'places,' such as school and work, would have highlighted additional mediated relationships (especially for social networking services). Nevertheless, despite these limitations and opportunities for additional work, we believe that it is clear that ICTs are intertwined with the uses of traditional foci. This is apparent not only in how ICTs are used in the maintenance of personal networks, but in the redesign of traditional social settings. New technology infrastructures are increasingly embedded in public and semipublic spaces, such as coffee shops, public parks, libraries, and even churches equipped with wireless internet access.

Our interpretation of the trend observed suggests a duality in how ICTs influence social relations: they support relationships globally and locally – 'glocalization.' That is, ICTs afford social participation that is both unbounded from shared time and geography ('global' and not dependent on place) and tied to participation in foci of activity that are very 'local' (contextual and tied to place). Different uses of new technologies afford one or both of these trends.

We are not witnessing a total shift in the structure of community from place-to-place toward person-to-person networks. The findings show only limited evidence that place-based relations have less resonance with internet users; this was in one setting (neighborhoods) for one type of technology (social networking sites) – and an alternative explanation, as has been found in other research (Hampton, 2007), is that those with few neighborhood ties are more likely to adopt social media. A claim that the structure of personal networks has shifted from place-to-place to person-to-person underplays the continued role and technological affordances that are associated with traditional social settings. Place is not lost as a result of the affordances of new technologies, but place-based networks are reinforced and made persistent.

In contrast to a belief that networks would be more easily abandoned in the electronic age (Bauman, 2000), social networks may be more persistent now than at any point in modern history. ICTs afford relationship maintenance in ways that reduce the likelihood that ties will ever become completely dormant. Unlike in the past, when networks of high school and neighborhood ties were abandoned with marriage (Kalmijn, 2003) or migration (Hagan et al., 1996), it is increasingly likely that both the relation and the content of the relation's messages remain persistent over time as 'friends' on social networking services and as data stored and engaged with online. As our finding about the use of social networking services suggests, this directly benefits network diversity and access to social capital.

Not only are networks persistent over time, but they are increasingly pervasive and visible across what were once clearly articulated and bounded cliques. New technologies, such as the 'status update' offered by many social networking services, afford opportunities for 'pervasive awareness,' whereby individuals are regularly broadcasting and receiving information from 'their networks.' But segmentation is difficult, and such broadcasts often lack control to delineate the presentation or flow of information by relationship or foci (e.g., kin, workmates, etc.). In addition, members of a person's network have increased visibility of other ties that were previously hidden. This enables flows from person-to-person and from tie-to-tie, which are likely to increases access to social capital.

The pervasive awareness afforded by many new technologies has more in common with a traditional village-like community than it does with individualized person-to-person contact. Pervasive awareness provides a shared history (Tönnies, 1887), familiarity of daily labor (Durkheim, 1893), shared context, density, and public life that is reminiscent of traditional village life. The fundamental difference between a village-like community and the *person-to-network* structure that characterizes contemporary networks is the possibility for personal networks that are larger and more diverse than at any time in human history.

Yet, the existence of network diversity does not guarantee that social capital will remain accessible. For now, the relationship between ICTs and the positive social outcomes we identified earlier – trust, health, autonomy, knowledge, and deliberation – are

likely positive. However, if the tie-to-tie visibility that is afforded by the pervasive awareness within contemporary networks also affords increased, network closure (Burt, 1992), unique access to information – and correspondingly social capital – will decline. In addition, new, developing technologies have the potential to flip the person-to-network structure of contemporary community. Networks may become as much *network-to-person* as they are person-to-network. Newer technologies, such as 'social search,' in which the use of the internet to search for information privileges or limit exposure to information collected or accredited by members of a person's social circle, may promote prevailing ideology and information while omitting important bridges, divergent views, and unique resources that exist between networks. Search processes may become mediated by technology to the point that they form new silos that ultimately reduce trust, tolerance, opinion quality, and the competitive advantage that results from access to social capital through diverse ties. In a world where information flows and is filtered from network-to-person and where network closure is high, the nature of community may not represent the promise of higher, accessible social capital that is presented here, but may again resemble the repressive, inward-looking structure of traditional village life (Durkheim, 1893).

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Notes

1. This list of occupations is based on the work of Nan Lin, Yang-chih Fu, and Chih-jou Jay Chen, at the Institute of Sociology, Academia Sinica.
2. With one exception, a correlation matrix of the variables in our model confirms the findings of our OLS regression; the relationship between participation in religious institutions and blogging is only significant after controlling for age. Readers who have an interest in reviewing the correlation matrix can view it as an online supplement available at http://www.mysocialnetwork.net/downloads/NMS/diversity.pdf

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