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The Implications of Social Capital for the Digital Divides in America

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The existing literature is oriented toward examining how Internet access and use may affect social capital. The role of social capital in narrowing the digital divides has been frequently mentioned but few studies have empirically examined how various types of social capital may affect people's access and use of the Internet. Drawing on a two-wave national panel data set, this article aims to fill this gap. Results demonstrate that social capital facilitates Internet access and use. In particular resource-rich bonding social capital helps overcome the digital divides in access, general use, and online communication. Before the Internet can revitalize social capital, there must be the right social capital in place to close the digital divides. Highlighting the relationship between social connectivity and digital connectivity, the findings have important implications for policymakers and practitioners.

Keywords digital divides, embedded resources, social capital, strong ties, weak ties

The share of Internet users in America has increased from around 3 percent in 1995 to almost 80 percent in 2010 (DiMaggio et al. 2001; Smith 2010). The last 20 percent of Americans who still have no Internet access are sometimes called the "information want-nots": people who lack the motivation to adopt the Internet (van Dijk 2006). In fact, many of these so-called "information want-nots" are disconnected from the Internet both technically and socially. Smith (2010) reports that more than 80 percent of nonusers have no family members who use the Internet. The National Telecommunication and Information Administration (2010) reports that among American households without broadband Internet access, two-thirds of these households have no members who have ever used the Internet in any place.

The relation between the Internet and social capital has generated a heated debate (Kraut et al. 1998; Nie and Erbring 2000; Wellman et al. 2001; Chen and Wellman 2004; Zhao 2006; Vergeer and Pelzer 2009; Hampton, Sessions, and Her 2011). However, the attention has been overwhelmingly centered on what the Internet can do to social capital. Also, most studies have relied on cross-sectional data (see exceptions in Kraut et al. 1998; Miyata and Kobayashi 2008; Valkenburg and Peter 2009). The other direction of the relation—how social capital may affect digital divides—has received limited attention, especially in empirical research, although some scholars have highlighted the role of social capital in structuring the diffusion of new technologies (Rogers 1995; DiMaggio and Cohen 2003).

This study not only examines how social capital is related to Internet adoption and use but does so with a refinement by exploring the implications of different types of social capital for digital divides. Drawing on the Social Capital in the U.S. Survey in 2004 and 2007, a two-wave national panel data set, it addresses the following questions: How is social capital related to Internet access, general Internet use, and online communication? How does the relationship vary by different types of social capital in terms of tie strength and embedded resources?

UNDERSTANDING HOW SOCIAL CAPITAL MAY AFFECT DIGITAL DIVIDES

Digital divides are multidimensional and multilayered—whether and the extent to which individuals have Internet access, how they use it, what they use it for, and the

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returns they gain from use. Existing research, which has gone through two major waves with the earlier studies focusing on pattern of access and later ones on the pattern of usage (Selwyn 2004; Chen and Wellman 2004), shows that early adopters are disproportionately young, better educated, affluent, urban, and white (Chen, Boase, and Wellman 2002; Boase 2010), and the digital divides do not just disappear when access is available, as socioeconomic status affects Web skills and the kind of Internet activities people conduct online (Zillien and Hargittai 2010). Furthermore, demographic and status disparities at the individual level are only one part of the story. Racial segregation and concentrated poverty in inner-city neighborhoods hamper Internet access among racial and ethnic minorities (Fong and Cao 2008). In the case of rural populations, low population density, slow investment in infrastructure, and high Internet service cost are barriers that hinder access to and use of the Internet (LaRose et al. 2008). In general, income, education, race, and geographic location remain important predictors of broadband Internet access in America (NTIA 2010).

Social capital is also a complex concept. In fact, it is one of the most contested concepts in social sciences. Although different schools argue about its definition, causes, consequences, and the appropriate level of analysis, most scholars agree that what makes social capital unique is its relational nature (Bourdieu 1985; Coleman 1988; Lin 2001; Putnam 1995, 2000). Social capital is individuals' investment in social relations for instrumental or expressive return (Lin 2011). It depends on the social connections between and among people.

Although quite a few scholars have highlighted the role of social capital in structuring access and use of new communication technologies (Rogers 1995; DiMaggio and Cohen 2003), existing studies have paid limited attention to how social capital may affect digital divides, and empirical research in particular is lacking.

Social capital may affect the extent to which people get exposure to new technologies and the extent to which they receive assistance from family and friends to solve technical problems. Peer influence affects a range of behaviors from substance use to technology adoption via modeling, encouraging, and facilitating. People observe and mimic their peers, especially those who are highly visible or influential (Chen 2007). Peer influence is associated with Internet use among various population segments ranging from high school students (Zhao et al. 2011) to corporate employees (Monge and Contractor 2003). Correspondingly, socially isolated adolescents are less likely to use digital communication (Bryant, Sanders-Jackson, and Smallwood 2006). By contrast, the more people in one's network use a new technology to communicate, the greater are the benefits and pressure one would perceive in jumping on the bandwagon (DiMaggio and Cohen 2003).

Furthermore, even though it is widely understood that there are different types of social capital, there has been a striking lack of research exploring the implications of these different types of social capital for digital divides. According to Putnam (2000), the value generated through social networks among homogeneous people, that is, people who share similar ascribed or achieved traits, is bonding social capital and that from heterogeneous people is bridging social capital. Putnam's notion of bonding and bridging social capital builds on Granovetter's (1973) notion of strong and weak ties. People's social networks often contain a relatively small number of strong ties in the core and a larger number of weak ties on the periphery. Strong ties tend to be homogeneous and involve emotional bonds, closeness, trust, and reciprocity. People feel close to their strong ties and maintain frequent communication with them. Weak ties are more likely to be heterogeneous, and people do not feel close to their weak ties and only communicate occasionally with them. Weak ties are more likely than strong ties to increase the diversity of network contacts and thus help people to access novel information. While Burt (1992) and others, following Granovetter, have focused on tie strength, Lin (2001) directs attention to the resources embedded in people's networks: The overall quantity and quality of resources that people can access and mobilize through their network contacts affect the outcome of their social action.

Social capital can also generate cost and liabilities such as the exclusion of outsiders, excessive claims from group members, restriction on individual freedoms, and unproductive group norms (Portes and Sensenbrenner 1993; Hsung and Breiger 2009). Densely knit social groups preserve resources for insiders only and impose unproductive obligations and tight social control that may restrict individual autonomy (Coleman 1988). The pressure of conformity, especially in poor communities, can lead to a downward leveling of norms and expectations (Portes 1998).

In sum, the existing research suggests that social capital may both facilitate and constrain Internet access and use in complex ways. Therefore, the examination of social capital in the aggregate may gloss over these complexities. The current study then makes a move toward a more refined understanding of the role of social capital by examining how its implications for digital divides may vary by its two structural aspects: tie strength and embedded resources.

BONDING AND BRIDGING SOCIAL CAPITAL

While, as noted earlier, few studies have examined the impact of bonding or bridging social capital on Internet access and use, the rich literature on strong and weak ties provides some hints. Weak ties are strong in connecting individuals from otherwise separated networks.

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They thereby bring people fresh and diverse information, which enables them to access pools of resources beyond the ones they typically do (Granovetter 1973; Burt 1992). In general, exposure to diverse contacts helps people to develop cognitive flexibility and enhance their cultural capital, which assists technology diffusion within a community (Erickson 1996; Markus 1987). In effect, weak ties can accelerate technical or cultural diffusion from one group to the other.

Furthermore, according to the diffusion theory, the last 16 percent of the population that adopts an innovation is the "laggards" (Rogers 1995). Rogers describes laggards as "the most localite in their outlook of all adopter categories; many are near isolates in the social networks of their system" (1995, 265). In other words, laggards have few weak ties. Their limited contact with innovators and opinion leaders reduces their exposure to innovations and thereby their awareness of the benefits of adopting new technologies and practices. By contrast, people with more weak ties receive exposure to innovations earlier. In the diffusion theory's terminology, cosmopolites—individuals with boundary-expanding ties—are more likely to introduce innovations into a population (Rogers 1995). Although few studies have empirically examined how bridging social capital may affect online communication, existing studies argue for a positive relation between online communication and the number of weak ties due to the perceived accordance between the technological affordances offered by the Internet and the low-maintenance nature of weak ties (Donath and Boyd 2004). Accordingly, Internet users who have more weak ties are likely to use the Internet for communication. Thus:

> H1: Bridging social capital is positively related to Internet access, general Internet use, and online communication.

Existing studies also offer hints that bonding social capital based on strong ties may facilitate Internet access and use. Strong ties such as family and peers facilitate people's socialization into the technoculture (Selwyn 2004). How people perceive and use a new communication technology is affected by how their strong ties perceive and use it (Campbell and Russo 2003). Strong ties facilitate the transfer of fine-grained information and tacit knowledge and encourage collaboration. In general, strong ties are more reliable and willing in providing social support (Uzzi 1996). Thus, strong ties can serve as informal mentors, passing on hands-on expertise and solving technical problems for people who have no or limited Internet experience. For instance, compared to weak ties on Facebook, strong ties on Facebook are more likely to respond to request for modest help (Stefannone, Kwon, and Lackaff 2011). By contrast, without strong social support, it is difficult for people to gain advice on purchasing, troubleshooting, and upgrading hardware and software (van Dijk 2006). Existing studies also suggest that bonding social capital based on strong ties can encourage online communication. A longitudinal study in Japan shows that the size of supportive networks increases with e-mail use (Miyata and Kobayashi 2008). In a similar vein, other studies show that workers started to use e-mail when colleagues with whom they shared a strong tie did so (Monge and Contractor 2003), and adolescents who have strong social relationships are more likely to communicate online (Lee 2009). Thus:

> H2: Bonding social capital is positively related to Internet access, general Internet use, and online communication.

ACCESS TO RESOURCES VIA BONDING AND BRIDGING SOCIAL CAPITAL

One good measure of the social capital lodged in a person's social network is the occupations of its members, as occupations tend to be arrayed in a structural hierarchy with regards to wealth, status, and power (Lin and Dumin 1986). People with low socioeconomic status are disadvantaged not because they have no social ties but because they do not have social ties that provide access to job information and other means of advancement. Some of their social contacts in fact even add financial or emotional stress (Portes and Landolt 1996). Conversely, individuals from advantaged backgrounds benefit from their association with well-endowed people. At the same time, we need to be mindful that while ties with people with low-prestige occupations may constrain instrumental action such as labor-market performance, they can facilitate expressive action such as obtaining emotional support (Lin and Erickson 2008).

Individuals who have access to more resources via their social networks are more likely to access the Internet and use it more in general for the following two reasons. First, their resource-rich network contacts are more likely to use the Internet themselves and communicate online. Second, they are more likely to gain Internet awareness and receive informal training, technical support, and peer pressure from their resource-rich contacts. For instance, research shows that Internet access is positively associated with the number of ties in high-prestige occupations and negatively associated with that in low-prestige occupations (Boase 2010). Importantly, tie strength and embedded resources may mutually reinforce each other's impact on social action (Lin 2001).

Building on the limited empirical research, it is likely that access to resources via bonding social capital enhances Internet access and use. Obligations, reciprocity, and trust embedded in strong ties increase the likelihood of receiving technical and other help if needed. Conversely, people whose bonding social capital allows access to only limited resources will be less motivated to access and use the Internet and also will have less social support. For instance, urban poor chose not to have home telephones due to the concern that their resource-deprived strong ties such as family, neighbors, and friends might abuse it (Mueller and Schement 2006). In a similar vein, the fear that home Internet can be abused by resource-deprived strong ties may hinder nonusers' decision to adopt and use it. The concern may be further magnified with a greater number of strong ties with limited resources. Thus:

> H3: Access to more embedded resources via bonding social capital is positively related to Internet access, general Internet use, and the intensity of online communication.

People with more resource-rich bridging social capital are more likely to have more exposure to a larger number of potential Internet users. Conversely, bridging social capital would be a bridge to nowhere if there are no resources that can be accessed. If these ties are limited both in number and the quantum of resources, they are unlikely to enhance nonusers' awareness of the payoff of Internet access and use. They are also unlikely to generate social support or peer pressure to adopt and use the Internet. Thus:

> H4: Access to more embedded resources via bridging social capital is positively related to Internet access, general Internet use, and the intensity of online communication.

DATA AND ANALYSIS

This research draws data from the Social Capital in the U.S. Survey in 2004 and 2007 (hereafter the SC-USA survey). Random digit dialing (RDD) was used in both waves. The survey targeted adult respondents currently or previously employed and aged between 22 and 65 years during Wave 1, which was conducted from November 2004 to March 2005 (McDonald, Lin, and Ao 2009). In total, 6,915 of selected households were reached in Wave 1. Among these, 3,000 eligible persons whose birth dates were closest to July 1 responded to the interview requests, producing a response rate of 43.4 percent for Wave 1. Wave 2 was conducted in early 2007 and obtained data from 941 of the 3,000 respondents of Wave 1, which yielded a response rate of 31 percent. The response rate and the attrition rate are comparable with other national RDD surveys (Groves et al. 2004; Fitzgerald, Gottschalk, and Moffitt 1998; Sharot 1991).

The comparison of Wave 2 data with the Current Population Survey in March 2007 demonstrates that the respondents in Wave 2 were more likely than the general population to be women, white, older, better educated, and married or living in a partnership. One reason is that the SC-USA survey focused on respondents with current or previous work experience. Another reason is that panel attrition tends to be highest with respondents with lower socioeconomic status (Fitzgerald, Gottschalk, and Moffitt 1998). Therefore, sample weights are constructed using the rake procedure in Stata to match the gender, race, age, education, and marital status of SC-USA survey respondents to the Current Population Survey in March 2007 (limited to respondents aged between 25 and 68 years). In total, 14 cases among the 941 respondents who participated in Wave 2 do not have valid weights due to missing values on race (3), marital status (4), and education (9) and are excluded from the analyses. The weighting procedure adjusts the demographic distribution of the sample as close to the general population as possible so that the weighted data can yield more generalizable results (Deville et al. 1993). Table 1 reports the summary of sample characteristics. The analysis sample includes 926 respondents after the list-wise deletion of cases with missing values on the variables of interest. The analysis uses Wave 1 data on social capital and socioeconomic characteristics and Wave 2 data on Internet access, use, and online communication.

Dependent Variables

Internet use and online communication measured in Wave 2 serve as dependent variables. Respondents were asked how much time in a typical week they spent on the Internet and how much time in a typical week they spent on the Internet communicating with people they had daily contact. Both questions asked the respondents to provide the number of hours. Four variables on Internet access and use are constructed based on the two questions. Internet access is dichotomous. Respondents who spent any time on the Internet in a typical week are coded as 1 and those who did not as 0. The intensity of general Internet use is a continuous variable and measured by the number of hours a respondent spent on the Internet in a typical week. The likelihood of online communication with daily contact is dichotomous. Respondents who spent any time on the Internet communicating with people they had daily contact in a typical week are coded as 1 and those who did not as 0. The intensity of online communication with daily contact is a continuous variable and is measured by the number of hours a respondent spent in a typical week on the Internet communicating with his or her daily contact. As the distributions of the time respondents spent on the Internet are skewed, the squared root terms of the two intensity variables are used in the analysis. Table 1 reports the descriptive statistics.

Independent Variables

The survey uses the position generator, which has yielded reliable and valid empirical evidence on the instrumental or expressive return of social capital (Lin 2001). It maps the respondent's network via a list of high- and low-status occupations, which indicates access to resources

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TABLE 1
Descriptive statistics of dependent and independent variables

	Mean	SD	Minimum	Maximum	*n*
Internet use					
Likelihood	0.76	0.43	0	1	926
Intensity	2.26	2.02	0	11.96	926
Online communication					
Likelihood	.54	0.50	0	1	762
Intensity	1.13	1.41	0	7.07	762
Bonding social capital	3.76	2.54	0	17	926
Bridging social capital	3.84	2.93	0	15	926
Accessible resources					
Via bonding social capital	44.61	15.73	0	78	926
Via bridging social capital	43.90	17.34	0	78	926
Women	0.52	0.50	0	1	926
Foreign-born	0.11	0.32	0	1	926
Generation					
1945 or earlier	0.11	0.31	0	1	926
1946–1954 (Old Boomer)	0.23	0.42	0	1	926
1955–1964 (Young Boomer)	0.32	0.47	0	1	926
1965–1976 (Generation X)	0.28	0.45	0	1	926
1977 or later (Generation Y)	0.06	0.23	0	1	926
Partnered	0.65	0.48	0	1	926
Race					
White	0.66	0.47	0	1	926
Black	0.12	0.33	0	1	926
Latino	0.15	0.36	0	1	926
Other	0.07	0.25	0	1	926
Education					
High school	0.42	0.49	0	1	926
College	0.45	0.50	0	1	926
Graduate	0.13	0.33	0	1	926
Family income					
Less than $14,999	0.20	0.40	0	1	926
$15,000–$29,999	0.10	0.30	0	1	926
$30,000–$49,999	0.19	0.40	0	1	926
$50,000–$74,999	0.23	0.42	0	1	926
$75,000 or more	0.28	0.45	0	1	926
Unemployed	0.08	0.28	0	1	926
Geographic location					
Urban	0.28	0.45	0	1	926
Suburban	0.22	0.41	0	1	926
Town	0.37	0.48	0	1	926
Rural	0.14	0.34	0	1	926

embedded in the respondent's network (Lin and Dumin 1986). The occupations are sampled as follows: All occupations in the U.S. Census are ranked according to their occupational prestige scores and then they are grouped at equal intervals, which is followed by the selection of occupations with the most occupants in each group (Lin, Fu, and Hsung 2001). The position generator offers a broad picture of people's networks with ties of different strength (Chen and Tan 2009).

The survey gave the respondents a list of 22 occupations and asked whether they knew someone in each of the occupations. The occupations included nurse, writer, farmer, lawyer, high school teacher, babysitter (housemaid), janitor, personnel manager, administrative assistant, hairdresser, accountant, guard, production manager, factory operator, computer programmer, receptionist, congressman/woman, taxi driver, professor, hotel bell boy, police officer, and chief executive officer (CEO) in a big company. These 22 occupations have been tested in nationally representative surveys in North America, Europe, and Asia (Lin, Fu, and Hsung 2001; Lin and Erickson 2008). The question was formulated as followed:

> I am going to ask some general questions about jobs some people you know may now have. These people include your relatives, friends and acquaintances (acquaintances are people who know each other by face and name). If there are several people you know who have that kind of job, please tell me the one that occurs to you first. Is there anyone you know who is a ______?

If the answer was yes, the respondent was asked network interpretation questions about the sociodemographic characteristics of each network contact and the characteristics of the tie between each network contact and the respondent. The independent variables are the different types of social capital by tie strength and average embedded resources.

Bonding social capital is indicated by the number of occupations in which the respondent knew someone via strong tie. Bridging social capital is indicated by the number of occupations in which the respondent knew someone via weak tie. Following the literature, closeness or emotional intensity of a relationship is a better indicator of tie strength, compared to relational type, duration, or the frequency of contact (Marsden and Campbell 1984; Marsden 1990; McPherson et al. 2001). Accordingly, tie strength is measured by the respondent's evaluation of the closeness of his or her relation with each contact, using a 1–5 scale where 1 is very close, 2 close, 3 so-so, 4 not close, and 5 not close at all. If the answer is "very close" or "close" the tie is coded as strong, and otherwise as weak.

Average resources via bonding social capital are measured by the mean of occupational prestige score of all accessed occupations via strong ties. Average resources via bridging social capital are measured by the mean of occupational prestige score of all accessed occupations via weak ties. The occupational prestige score of the 22 occupations are based on the Standard International Occupational Prestige Scale (SIOPS) developed by Ganzeboom and Treiman (1996). Existing research has demonstrated that the average resources take into consideration the overall and the average quality of social capital generated by the respondent's social networks (Campbell, Marsden, and Hurlbert 1986; Song 2011).

Control Variables

Privileged individuals are better connected socially and technically. To make sure that the relationship between social capital and the digital divides is not spurious and can be explained away by individual socioeconomic and demographic factors, I further take into consideration the known correlates of the digital divides highlighted in the literature: income, education, race/ethnicity, generation, gender, and geographic location. Other sociodemographic variables are also controlled, including foreign-born, marital status, and unemployment. Gender is dichotomous, coded as 1 if the respondent was female and 0 if male. Foreign-born is a dichotomous variable coded as 1 if the respondent was born outside of the United States and 0 if not. Generations are constructed based on the year of the birth: people born in 1945 or earlier, the older boomer generation (born in 1946–1954), the younger boomer generation (born in 1955–1964), Generation X (born 1965–1976), and Generation Y (born in 1977 or later). Partnered is a dichotomous variable coded as 1 if the respondent was married or living with a partner and 0 if not. Education is classified in three categories: high school or less, college, and postgraduate. Family income is classified in five categories: less than \$15,000, \$15,000–\$29,999, \$30,000–\$49,999, \$50,000–\$74,999, and \$75,000 or more. Unemployment is dichotomous, coded as 1 if the respondent was unemployed and 0 if otherwise. Respondents were asked about the place they lived, and the variable geographic location includes urban (a big city), suburban (the suburbs or outskirts of a big city), town (a small city or town), and rural (a country village or a farm or home in the country).

RESULTS

Table 2 reports the results of multiple logistic regressions on the likelihood of Internet access, Table 3 the results of multiple regressions on the intensity of general Internet use, and Table 4 reports the results of multiple regressions on the intensity of online communication with daily contacts. As online communication requires Internet use, nonusers are excluded from models in Table 4. In all three tables, Model 1 is the baseline model that takes into account only socioeconomic, demographic, and geographic variations, while Model 2 adds bonding and bridging social capital and Model 3 average resources accessible via bonding and bridging social capital.

Internet Access and General Internet Use

Model 1 in Table 2 reveals significant access divides by generation, race, socioeconomic status, and geographic location. Young, better educated, employed, more

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TABLE 2
Multiple logistic regression on Internet access

	Model 1		Model 2		Model 3	
	Odds ratio	SE	Odds ratio	SE	Odds ratio	SE
Women	1.51	0.36†	1.47	0.35	1.58	0.37†
Foreign-born	0.44	0.22	0.43	0.22†	0.42	0.21†
Generation (1945 or earlier)						
1946–1954	2.30	0.91*	2.34	0.91*	2.47	0.99*
1955–1964	5.94	2.32***	6.22	2.39***	6.53	2.52***
1965–1976	7.95	3.22***	8.32	3.32***	8.29	3.30***
1977 or later	15.89	10.19***	17.47	11.07***	18.48	11.83***
Partnered	0.97	0.25	0.99	0.25	0.94	0.24
Race						
Black	0.39	0.14**	0.42	0.15*	0.39	0.14**
Latino	0.73	0.33	0.71	0.31	0.77	0.35
Other	0.61	0.43	0.56	0.39	0.61	0.45
Education						
College	2.96	0.72***	2.85	0.70***	2.91	0.71***
Graduate	7.38	3.32***	7.20	3.31***	6.94	3.19***
Family income (less than $14,999)						
$15,000–$29,999	0.64	0.25	0.66	0.27	0.68	0.27
$30,000–$49,999	1.51	0.50	1.49	0.50	1.55	0.51
$50,000–$74,999	1.68	0.60	1.69	0.61	1.65	0.59
$75,000 or more	5.84	2.49***	5.89	2.52***	5.48	2.35***
Unemployed	0.26	0.10***	0.27	0.10***	0.26	0.09***
Geographic location						
Urban	1.90	0.69†	1.96	0.74†	1.99	0.74†
Suburban	2.97	1.20**	3.10	1.25**	3.02	1.20**
Town	1.50	0.48	1.51	0.49	1.45	0.46
Social capital						
Bonding			0.98	0.04		
Bridging			1.09	0.05*		
Accessible resources						
Via bonding					1.02	0.01**
Via bridging					1.01	0.01
_cons	0.20	0.11**	0.15	0.09***	0.07	0.05***
Log likelihood	−386.25		−383.11		−381.08	
Change in chi-squared (vs. Model 1)			3.94		7.39*	

Note. $n = 926$; significance indicated by $^{***}p < .001$; $^{**}p < .01$; $^{*}p < .05$; $^{\dagger}p < .1$.

affluent, native-born, and white Americans are more likely to have Internet access. On top of the digital divides by individual socioeconomic and demographic characteristics, there is a clear access gap by geographic location: Rural residents are significantly less likely to access the Internet than urban and suburban residents. The gender gap in Internet access is reversed, as women are more likely than men to access the Internet, although the relation is often marginally significant. Model 2 shows that bridging but not bonding social capital at Wave 1 is positively related to the likelihood of Internet access at Wave 2. One unit increase in bridging social capital is associated with a 9 percent increase in the odds of having Internet access at Wave 2. The change in chi-squared from Model 1 to Model 2 is, however, statistically insignificant, indicating that Model 2 does not fit the data better than the baseline model. Model 3 suggests that it is the average embedded resources via bonding rather than bridging social capital that is significantly related to the likelihood of having Internet access. One unit increase in embedded resources via

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bonding social capital can be translated into a 2 percent increase in the odds of having Internet access. The change in chi-squared from Model 1 to Model 3 is statistically significant, indicating that the model with average resources fits the data better than the baseline model.

Model 1 in Table 3 demonstrates that the generational, racial, socioeconomic, and locational gaps in Internet access remain significant to the intensity of general Internet use. Young, better educated, and more affluent people spend more time online in a typical week than older, less educated, and less affluent people. Black Americans spend less time online than white Americans, while the unemployed less time online than the employed. The number of hours spending online in a typical week decreases steadily from urban, to suburb, to town, and to rural area. Model 2 shows that neither bonding nor bridging social capital at Wave 1 increases the intensity of general Internet use at Wave 2. Model 3 shows that embedded resources accessible via both bonding and bridging social capital are significantly related to the intensity of general Internet use ($b = 0.01$, $p \leq .01$). Both Model 1 and Model 2 explain 19 percent of the variations in the intensity of Internet use, indicating that adding bonding and bridging social capital to the baseline model does not offer a better model. Yet, Model 3 explains 20 percent of the variations in the intensity of general Internet use, and the change in R^2 from Model 1 to Model 3 is statistically significant, indicating that adding the average resources to the baseline model provides a better model.

Online Communication With Daily Contacts

Model 1 in Table 4 shows that on top of education and geographic location, there are a few sociodemographic variables significantly related to the intensity of online communication with daily contacts. First, women and singles spend significantly more time communicating online with their daily contacts than men and people who are married or living in a partnership. In general, younger generations spend more time on online communication with their daily contacts than older generations. Model 2 shows that bonding social capital at Wave 1 is significantly associated with the intensity of online communication with daily contacts at Wave 2 ($b = .07$, $p \leq .05$). However, bridging social capital at Wave 1 is significantly but negatively associated with the intensity of online communication with daily contacts at Wave 2. The relation is only marginally significant ($b = -.03$, $p \leq .1$). Model 3 shows that average resources via bonding social capital at Wave 1 is significantly related to the intensity of online communication with daily contacts at Wave 2 ($b = .01$, $p \leq .01$). By contrast, the average resources via bridging social capital at Wave 1 is not significantly related to the intensity of online communication with daily contacts at Wave 2 ($b = .00$, $p > .1$). The baseline model explains 9 percent and Model 2 explain 11 percent of the variations in the intensity online communication. The change in R^2 from Model 1 to Model 2 is statistically significant, indicating that adding bonding and bridging social capital leads to a better model. Model 3 explains 10 percent of the variations, and the change in R^2 from Model 1 to Model 3 is also statistically significant, indicating that adding embedded resources via bonding and bridging social capital leads to a better model.

Overall, bonding social capital per se is not significantly related to Internet access and general Internet use. Yet it is significantly associated with online communication with daily contacts. Thus, Hypothesis 1 is only partially supported. Bridging social capital per se is significantly and positively related to Internet access but not general Internet use. It is negatively related to online communication with daily contacts, although the relationship is only marginally significant. Thus, Hypothesis 2 is only partially supported. Hypothesis 3 is accepted as average resources via bonding social capital are significantly and positively related to Internet access, general Internet use, and online communication. Hypothesis 4 is only partially supported as average resources via bridging social capital are significantly related to general Internet use but do not significantly related with online communication.

DISCUSSION AND CONCLUSION

The digital divide in terms of physical access to technology has narrowed in many aspects in the United States and around the world, sometimes giving rise to complacency (Epstein, Nisbet, and Gillespie 2011). Nonetheless, about one-fifth of Americans still have no Internet access and the nation's standing in terms of broadband connection is mediocre among Organization for Economic Cooperation and Development (OECD) countries (OECD 2011). Eight years after NTIA's cheerful *A Nation Online* report, it published a report in 2010 with a more cautious title, *Exploring the Digital Nation,* with findings revealing a stubborn presence of digital divides by socioeconomic status, race/ethnicity, and urbanity. Aiming to provide 100 million U.S. homes with download speeds at least 100 megabits per second by 2015, the National Broadband Plan in 2010 sparked a new round of debate on the role of government policies and market competition in providing universal access (Federal Commission of Communication 2010).

Both digital divides and social capital are multifaceted concepts that can be operationalized at multiple levels. The existing literature is oriented toward examining how Internet access and use may affect social capital. Few studies have empirically examined how various types of social capital may affect the digital divides. The role of

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TABLE 3
Multiple regression on the intensity of general Internet use

	Model 1		Model 2		Model 3	
	b	SE	*b*	SE	*b*	SE
Women	0.11	0.14	0.10	0.14	0.13	0.14
Foreign-born	−0.40	0.31	−0.38	0.31	−0.44	0.30
Generation (1945 or earlier)						
1946–1954	0.59	0.23**	0.60	0.23**	0.62	0.22**
1955–1964	1.40	0.22***	1.41	0.22***	1.42	0.21***
1965—1976	1.36	0.22***	1.36	0.22***	1.38	0.21***
1977 or later	1.57	0.31***	1.61	0.31***	1.58	0.30***
Partnered	−0.22	0.16	−0.21	0.16	−0.23	0.15
Race						
Black	−0.63	0.24**	−0.67	0.24**	−0.58	0.24*
Latino	−0.51	0.32	−0.54	0.32†	−0.46	0.31
Other	0.09	0.42	0.09	0.42	0.16	0.41
Education						
College	0.48	0.16**	0.48	0.16**	0.44	0.15**
Graduate	0.97	0.22***	0.96	0.21***	0.88	0.21***
Family income (less than $14,999)						
$15,000–$29,999	−0.35	0.30	−0.32	0.30	−0.25	0.30
$30,000–$49,999	0.04	0.24	0.05	0.24	0.09	0.24
$50,000–$74,999	−0.18	0.23	−0.18	0.23	−0.18	0.22
$75,000 or more	0.61	0.23**	0.59	0.24*	0.58	0.23*
Unemployed	−0.73	0.29*	−0.70	0.29*	−0.71	0.28*
Geographic location						
Urban	0.88	0.23***	0.93	0.23***	0.87	0.22***
Suburban	0.74	0.22***	0.79	0.22***	0.68	0.21***
Town	0.56	0.21**	0.58	0.21**	0.49	0.20*
Social capital						
Bonding			0.04	0.03		
Bridging			0.01	0.03		
Accessible resources						
Via bonding					0.01	0.00**
Via bridging					0.01	0.00**
_cons	0.48	0.30	0.26	0.34	−0.45	0.39
Adjusted R^2	0.19***		0.19***		0.20***	
Change in R^2			0.00		0.01***	

Note. $n = 926$; significance indicated by $^{***}p < .001$; $^{**}p < .01$; $^{*}p < .05$; $^{\dagger}p < .1$.

social capital in narrowing or closing digital divides has been frequently mentioned but not empirically examined. Drawing on panel data from the SC-USA survey in 2004 and 2007, this article fills an important gap.

Findings suggests that even after more than one decade of Internet diffusion in mainstream America, education, generation, geographic location, and social capital still shape the contours of digital divides in access and use. First, younger, white, better educated, more affluent, employed, urban and suburban Americans remain more likely to access the Internet and use it more intensively than older, black, less educated, less affluent, unemployed, and rural Americans. In particular, three aspects of digital divides—education, geographic location, and generation—are consistently evident in access, general use, and online communication. More importantly, rural residents access and use the Internet the least in general and for online communication specifically, compared to urbanites and suburbanites. This visible, persistent urban–rural divide underscores that community

TABLE 4
Multiple regression on the intensity of online communication

	Model 1		Model 2		Model 3	
	b	SE	*b*	SE	*b*	SE
Women	0.30	0.11**	0.28	0.11*	0.31	0.11**
Foreign-born	−0.10	0.27	−0.10	0.26	−0.16	0.27
Generation (1945 or earlier)						
1946–1954	0.23	0.21	0.24	0.21	0.27	0.20
1955–1964	0.44	0.20*	0.42	0.20*	0.47	0.20*
1965–1976	0.21	0.21	0.20	0.20	0.26	0.20
1977 or later	0.60	0.30*	0.61	0.29*	0.64	0.29*
Partnered	−0.29	0.13*	−0.30	0.13*	−0.30	0.13*
Race						
Black	−0.10	0.20	−0.17	0.19	−0.08	0.20
Latino	0.00	0.28	−0.04	0.28	0.04	0.28
Other	0.04	0.39	0.15	0.37	0.09	0.38
Education						
College	0.34	0.13*	0.37	0.13**	0.33	0.13*
Graduate	0.73	0.19***	0.78	0.18***	0.68	0.19***
Family income (less than $14,999)						
$15,000–$29,999	−0.28	0.29	−0.23	0.28	−0.22	0.30
$30,000–$49,999	−0.33	0.20†	−0.31	0.19	−0.30	0.19
$50,000–$74,999	−0.21	0.20	−0.20	0.20	−0.18	0.20
$75,000 or more	0.18	0.19	0.15	0.18	0.17	0.18
Unemployed	−0.08	0.26	−0.05	0.26	−0.11	0.26
Geographic location						
Urban	0.53	0.20**	0.55	0.19**	0.49	0.19**
Suburban	0.51	0.20**	0.52	0.19**	0.46	0.19*
Town	0.43	0.19*	0.44	0.18*	0.37	0.18*
Social capital						
Bonding			0.07	0.03*		
Bridging			−0.03	0.02†		
Accessible resources						
Via bonding					0.01	0.00*
Via bridging					0.00	0.00
_cons	0.24	0.28	0.11	0.30	−0.35	0.36
Adjusted R^2	0.09***		0.11***		0.10***	
Change in R^2			0.02*		0.01*	

Note. $n = 762$; significance indicated by $^{***}p < .001$; $^{**}p < .01$; $^{*}p < .05$; $^{\dagger}p < .1$.

resources are required to overcome the digital divides. These baseline findings corroborate existing studies showing that people on the wrong side of the digital divides are often on the wrong side of social inequalities (DiMaggio et al. 2001; van Dijk 2006; Smith 2010; NTIA 2010). Second, while having Internet access does not reduce all types of inequalities in Internet use, the results provide support to the notion that Internet access may reduce some types of social inequalities. The ways in which social inequalities affect the pattern of access are not exactly the same in which they affect the pattern of online communication. For instance, Internet users, regardless of immigration status, race, employment status, and by and large income, have no significant differences in online communication with their daily contacts. The gender digital divide is tilted in favor of women, with men trailing behind women in terms of Internet access and the intensity of online communication. These results resonate with recent studies on the gendered digital divides (Kennedy, Wellman, and Klement 2003; Jones et al. 2009).

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The major contribution of this article lies in a fine-tuned analysis of social capital, especially the differential implications of social capital by tie strength and embedded resources. Putnam (2005) highlights that the "characteristics of bonding social capital and bridging social capital are not 'either-or' categories into which social networks can be neatly divided, but 'more or less' dimensions along which we can compare different forms of social capital" (23). In a similar vein, resources embedded in one's social networks are not categorical either. Along with the class, generation, and geographic differences in Internet access and use, this study identifies significant digital divides by the quality and quantity of social capital. First, bridging social capital is positively associated with Internet access, has no significant relationship with general Internet use, and is negatively associated with online communication with daily contacts. The average resources accessible via bridging social capital are not significantly related to Internet access and online communication. However, they are positively related to general Internet use. Second, while bonding social capital is not significantly associated with Internet access and general Internet use, it is significantly related to online communication with daily contacts. The average resources accessible via bonding social capital are the most versatile: positively related to Internet access, general use, and online communication.

A few factors may help to explain the differential implications of social capital for the digital divides. First, innovations are adopted at a faster rate in an information and communication technologies (ICT)-mediated environment as users receive influence via digital cues (Danowski, Gluesing, and Riopelle 2009). Once people overcome informational, motivational, and technical barriers and gain Internet access, bridging social capital is less crucial in affecting online communication as people can learn new skills online (Jenkins et al. 2006). Second, strong-tie-based bonding social capital can exert more peer pressure than weak-tie-based bridging social capital, which is important for users to engage in online communication (Monge and Contractor 2003; Lee 2009; Zhao, Lu, Wang, and Huang 2011). Third, the results lend support to existing studies showing that most social interaction, on- and offline, remains local and within people's intimate bonding networks, even though technologies have dramatically reduced the transaction cost and enhanced users' capability of building and maintaining social relations at great geographic or social distance (Chen and Wellman 2009).

This study has several limitations that call for future research. The data do not specify whether general Internet use and online communication are motivated by instrumental or expressive needs. As the Internet is a bundle of versatile technologies, it is important to examine how social capital is related to Internet use motivated by instrumental action aimed at accessing economic, political, and social resources and by expressive action for maintaining or protecting existing resources such as health, life satisfaction, or social support (Lin 2011). Second, the data do not allow an examination of the mechanisms that may link social capital with digital divides—that is, whether the relationship between the two is due to more exposure, better support, or stronger peer pressure. Future research needs to examine these mechanisms. Third, the measurement of online communication is limited to communication with daily contacts. Although the frequency of contact is not a good indicator of tie strength (Marsden and Campbell 1984; Marsden 1990), people tend to communicate more frequently with their strong ties than their weak ties (Granovetter 1973). Thus, the focus on daily contacts may overestimate the effect of bonding social capital on online communication. Nonetheless, existing studies have shown that people primarily use technologies to communicate with a small number of close ties (Valkenburg and Peter 2009).

Despite these caveats, the article sheds light on the link between social connectivity and digital connectivity. A large part of the digital divides literature tends to be descriptive, focusing on sociodemographics that shape Internet access and use, and has not provided much theoretical input (DiMaggio et al 2001; van Dijk 2006). This study provides a refined analysis of the relation between social capital and digital divides, highlighting that people who are often labeled as the "information want-nots" tend to be social capital have-nots. The results demonstrate that closing the digital divides calls for a three-pronged approach that enriches individual, community, and network resources. Accordingly, before technologies can boost social capital, there must be the right social capital in place that supports Internet access and use.

New communication technologies, coupled with social capital, have been exclaimed over as the panacea that would cure many social problems (Mariscal 2005). Such romanticization of social capital tends to overlook the absent or limited resources accessible via social capital, especially among members of disadvantaged social groups. Having bonding or bridging social capital on its own is not enough. Bonding with people with resources—in this context, people who know how to use the Internet—would help to close the digital divides.

The findings have implications for policymakers and practitioners. On the one hand, they underscore the importance of community-based initiatives that address local needs, as opposed to relying on a one-size-fits-all solution. If the goal is to promote Internet access, bridging social capital can be helpful. However, if the goal is to promote Internet use and online communication after Internet access is available, it would be most effective to work through resource-rich bonding social capital. On the other hand, the versatility of resource-rich bonding social capital illustrates the challenges of bridging the last one-fifth of the digital divides. Resource-rich bonding social capital is unevenly distributed and takes time to develop. Strong ties are often based on blood, marriage, or shared foci such as school, workplace, or civic organizations. In particular, members of disadvantaged social groups such as racial and ethnic minorities and people with low socioeconomic status have accumulated disadvantage. They are more reliant on informal channels due to their lack of formal resources. Yet their informal social contacts often have limited resources for them to tap into. Thus community initiatives moving beyond supply-driven approach are especially helpful in breaking the vicious cycle of social–technical exclusion and empower the disadvantaged through informal mentoring and training (Markus 1987; Boase et al. 2003; Godfrey and Johnson 2009). To narrow the access and use gaps, what members of disadvantaged groups need is social access that cultivates social capital, especially resource-rich bonding social capital.

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