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Keith N. Hampton

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Abstract

This article argues that the literature on digital inequality—in its focus on individual characteristics, behaviors, and outcomes—has overlooked change within the context of where social and civic inequalities are reproduced. This omission is the result of a failure to explore the role of ecological context within the study of the digital divide and the role of communication within the study of collective efficacy. Social cohesion, and an expectation for informal social control at the neighborhood level, is a function of both ecological context and media context. Those embedded within settings where prior media, including the telephone and face-to-face contact, could not overcome contextual barriers to collective action, namely within areas of concentrated disadvantage; may now, as a result of local Internet use, experience reduced social and civic inequality. This article is based on the results of a 3-year naturalistic experiment that examined the use of the Internet for communication at the neighborhood level. It proposes a new measure of collective efficacy – in place of network measures or perceived cohesion – based on the direct observation of communication practices. The analysis includes a model of the ecological characteristics associated with neighborhoods that adopted the Internet as a means of local information exchange, and it provides a comparison of the content of electronic messages exchanged within areas of advantage and those of extreme poverty, unemployment, and racial segregation. Findings suggest that as much as the Internet supports social and civic engagement in areas where it is already likely to be high, it also affords engagement within contexts of extreme disadvantage.

Keywords

social networks, collective efficacy, digital divide, neighborhood, community, social cohesion, collective action, social disorganization

[1]Annenberg School for Communication, University of Pennsylvania, Philadelphia

Corresponding Author:
Keith N. Hampton, 3620 Walnut Street, Philadelphia, PA 19104
Email: khampton@asc.upenn.edu

Early studies of the Internet and inequality focused on variation in individual and household access based on demographic factors that included age, race, gender, urban/rural location, and socioeconomic status (National Telecommunications and Information Administration, 1999). As inequality in access declined, the focus expanded to recognize that variation in knowledge influenced the purpose for which the Internet could be employed (Mossberger, Tolbert, & Stansbury, 2003). The resulting literature has found few, if any, instances in which individuals who experienced the most concentrated forms of disadvantage—inequality of not only the digital type but of many types—have benefited from the Internet in a way that reduced inequalities associated with social and civic engagement. As a result, some have concluded that there is a Matthew effect (Merton, 1968) or magnifying glass effect (Matei & Ball-Rokeach, 2003) associated with Internet use; that is, those who originally had more resources and knowledge experienced abundance as a result of the Internet, and those who originally had little gained little or at least gained at a slower rate (Hargittai, 2003). This article provides an alternative perspective. I argue that the literature on digital inequality, in its focus on individual behaviors and outcomes, has overlooked change within the context where social and civic inequalities are reproduced. The Internet reduces the transaction costs of communication, which in turn undermines contextual constraints on social and civic involvement. Those embedded within settings where prior media use, including the telephone and face-to-face contact, could not overcome contextual barriers to collective action, namely within contexts of concentrated disadvantage, may now, as a result of local Internet use, experience reduced social and civic inequality within the social settings in which they are currently embedded.

The purpose of this research was to test the influence of Internet use on social structure within different local contexts, comparing contexts that, in absence of the Internet, either constrain or promote the formation of social networks and civic engagement. This was accomplished through a 3-year naturalistic experiment that examined the adoption and use of Internet services for local communication at the neighborhood level. The analysis includes a model of the ecological characteristics associated with neighborhoods that actively adopted the Internet as a means of local information exchange, and it provides a comparison of the content of electronic messages exchanged within areas of advantage and those of extreme disadvantage.

Social Affordances and Inequality

Inequalities in individual access and use of the Internet closely map to demographic characteristics that are associated with many other inequalities. Some digital inequalities have diminished or are declining, such as those related to gender and age, whereas others—specifically, those related to race and socioeconomic status—have moderated only slightly or have remained stable over time (DiMaggio, Hargittai, Celeste, & Shafer, 2006). For the disadvantaged, disparities in skill, lower levels of autonomy, a lack of social support, limited access to the technical means for access, and divergent purpose of use, in comparison to more advantaged users, all work to undermine the potential

benefits of the Internet (DiMaggio et al., 2006). For example, less privileged Internet users are less likely to use the Internet for broad forms of information seeking associated with civic participation (Shah, Cho, Eveland, & Kwak, 2005). They are also less likely to use it for e-mail, which has been linked to more diverse networks, (Boase, 2008), which in turn is linked to mobilization and collective action (Granovetter, 1973). As a result, the most disadvantaged are less likely to use the Internet for social and civic engagement. However, by focusing on barriers that individuals encounter in trying to achieve increasingly higher levels of access and knowledge, research on digital inequality has negated a focus on how affordances of the Internet may disrupt established contexts in which social and civic inequalities are reproduced.

Affordances are the perceived capabilities of an object, environment, or technology (Gaver, 1991; Gibson, 1979; Norman, 1988). Arguably, the dominant perceived affordance of the Internet, as a means of communication, is one that involves exchange over distance. The earliest observers of the Internet noted this affordance to participate in the inexpensive, instantaneous exchange of resources with geographically dispersed others, expressing it through such concepts as the "space of flows" (Castells, 1996) and the "death of distance" (Cairncross, 1997). Whereas distance is perceived as the dominant affordance of Internet communication, it may not be the only communication affordance. Researchers have argued that when a critical mass of people within a shared local environment adopt the Internet, such as a neighborhood or workplace, they cultivate an increased awareness that the Internet affords communication within local space as much as it does across distant space—a concept referred to as *glocalization* (Hampton, 2001; Hampton & Wellman, 2003; Hampton, 2007).

Adoption of the Internet for local communication within a local setting may vary on the basis of the ecological constraints of the environment. However, there is virtually no existing research on the the relationship between ecological context and media use. Whereas an extensive sociological literature exists on neighborhood or contextual effects, from a communication perspective the role of ecological context remains relatively unexplored. In fact, within the literature on contextual effects, there is an implicit assumption that social contact operates through only one channel; that is, meaningful social interaction takes place only through in-person contact. This is problematic for both the study of space and the study of media: Studies of the Internet often ignore the role of physical place and context in everyday life, and studies of ecological context often ignore that a variety of media (old and new) can be used to form and maintain social ties. The result has been a failure to explore the possibility that some media likely afford social contact at different rates within different ecological contexts, which may influence inequalities derived from social interaction.

The Importance of Media in Context

Those who study communication have not paid much attention to the role of ecological context in local social contact—namely, because the prevailing theory that explains the role of context on social and civic engagement, *collective efficacy*, has ignored the

role of media. Collective efficacy is defined as the presence of local social cohesion and a shared expectation for informal social control, or collective action (Sampson, 2006). Although often used within the study of criminology, collective efficacy is not exclusively a theory of crime; it is also employed more broadly in the study of neighborhood context and well-being (Sampson, 2003). Examples of informal actions characteristic of high collective efficacy include neighbors' intervening to prevent an act of vandalism, organizing to defend a local institution (e.g., a fire hall threatened with budget cuts), offering support to an injured or ill neighbor, and providing mutual assistance during a natural disaster. Unlike theories that attribute outcomes to explanations based on variation in "different kinds of people," collective efficacy focuses on the influence of "different kinds of places" (Kubrin & Weitzer, 2003). Places have different levels of collective efficacy based on variation in ecological context. For example, local contexts that are high in racial segregation or family disruption undermine the formation of collective efficacy (Sampson, 2006). The concentration of these factors (e.g., neighborhoods with high levels of poverty, unemployment, and racial segregation) are indicative of a context that reliably predicts low levels of collective efficacy. The underlying perspective is that community-level instability constrains friendship choices and reduces local social cohesion and a norm of informal social control.

The theory of collective efficacy recognizes that social cohesion is directly measured through the presence of social networks. In this way, collective efficacy breaks from traditional theories of social disorganization that attribute local social problems to macrofactors, such as invasion and succession (e.g., immigration), the breakdown of traditional institutions (e.g., church, family, local government), and mobility (e.g., telephone, automobile; Park & Burgess, 1925; Shaw & McKay, 1942; Sutherland, 1924). In breaking from traditional social disorganization theory, collective efficacy acknowledges that social ties vary in strength. It does not argue that idealistic, strong ties must dominate networks for social cohesion to be present. Social cohesion is measured as supportive exchange within neighborhood relations. For social cohesion to enable social control, those who share a local context do not need to be friends. On the contrary, not only are intimate-neighbor relations not the norm in North American cities (Wellman, 1979; Fischer, 1982), but frequent in-person contact does not increase local surveillance, the formation of community norms, informal social controls, or community intervention in local disturbances beyond what is achieved through a more modest level of interaction (Bellair, 1997). In fact, the prevalence of dense, strongly tied, cohesive cliques may be indicative of local social structures that focus on the exchange of resources important for daily survival but are otherwise poorly organized for linkages to outside resources that are instrumental to successful collective action and resource acquisition (Granovetter, 1973).

In recognition that strong ties are not required for social cohesion (in fact, they may have a negative influence on collective efficacy) and that minimal levels of social contact may be all that is necessary to establish a local network for social and civic engagement, the role of media may have been discounted within collective efficacy under an assumption of "limited effects" (Pooley & Katz, 2008). Frequency of

interaction is the only variation in communication that has been explored (Bellair, 1997). In addition, the channel of interaction is assumed to be face-to-face but is more often left unspecified. In spite of this omission, there is evidence of variation in local social cohesion based on the adoption of different media for interpersonal communication.

The telephone has long been the primary channel of communication used in the exchange of social support with strong ties (Wellman, 1979). The affordances of the telephone freed most in the modern urban environment from having to maintain strong ties in a neighborhood setting (Fischer, 1992). Yet, there remain pockets of urban settlement with low levels of telephone penetration (Mueller & Schement, 1996). When William Julius Wilson (1987) observed that the *Truly Disadvantaged* often focus on maintaining strong local ties over ties that reach beyond the neighborhood setting, he may have observed a contextual effect that was in part associated with low rates of telephone penetration in inner-city neighborhoods. In a context where the cost of telephone use (adoption and long-distance use) remained relatively high, the cost to maintain ties at a distance also remained high, and the neighborhood setting remained a more central focus for the formation and maintenance of strong ties. As a result—extrapolating from Granovetter's theory of weak ties (1973)—small, dense cliques of strong ties are likely to form in areas of socioeconomic disparity, whereas large, less transitive networks of weak ties (indicative of high collective efficacy) are likely to form in areas where the telephone affords the maintenance of strong ties at a distance. It should not be surprising if there are other ecological influences associated with media use. It may also be, as argued here, that communication afforded by the Internet overcomes the contextual constraints of previous media.

Glocalization

Studies are limited of how neighborhood uses of the Internet influence social and civic life. The most concerted work has been by those who build community networks or community technology centers. However, the focus of *community informatics* has mostly been technical, centered on the development of network infrastructure, hardware, and management information systems for disadvantaged communities (Gurstein, 2007). The small number of studies that have explored the influence of Internet use on local involvement include my study of Netville (Hampton, 2001), a suburban Toronto neighborhood. This study found that Internet users had three times as many local weak ties as their nonwired counterparts and that wired residents communicated more frequently with neighbors online and offline (Hampton & Wellman, 2003). I also found that wired Netville residents demonstrated unexpectedly high rates of collective action (Hampton, 2003). In a similar study of Israeli neighborhoods, Mesch and Levanon (2003) found that use of a neighborhood e-mail list increased the size of local social networks and participation in the extended community. And, in an extensive long-term analysis on the outcomes of providing Internet access to Blacksburg, Virginia, Kavanaugh and colleagues concluded that Internet use facilitated participation in local civic activities (Kavanaugh, Carroll, Rosson, Zin, & Reese, 2005).

One of the few studies to explore variation by residential context in the affordances of the Internet for local communities was my longitudinal study (Hampton, 2007) of social networks within four middle-class Boston neighborhoods: two suburban neighborhoods, an apartment building, and a gated community. I speculated that local affordances of the Internet were analogous to affordances offered by urban common spaces (Kuo, Sullivan, Coley, & Brunson, 1998). When an infrastructure that supports tie formation is provided (through physical design or a communication technology), it supports the formation of local networks, provided that the context of the residential environment otherwise supports tie formation. For example, although I found that residents of the suburban neighborhoods and the apartment building desired more contact with their neighbors and had high level of Internet access and knowledge, the ecology of the apartment building was not supportive of local tie formation; it was populated by young, single, childless, transient adults in contrast to the residentially stable, child-oriented setting of the suburbs. I concluded that where context, desire for tie formation, and an infrastructure for communication align, the Internet is likely to afford collective efficacy. However, I considered only well-off, middle-class communities and did not explore the possibility that media use could undermine contextual constraints.

A Context of Structural Instability

I argue that two distinct types of community-level instability are responsible for contexts that are incompatible with collective efficacy. *Fugacious instability* results from stage in the life course and self-selection, such as that observed in my study of the apartment building of young, childless transients (Hampton, 2007). *Structural instability* is predominantly socioeconomic and a result of external pressures, such as poverty and racial segregation. Individuals within a context of structural instability are unlikely to have the opportunity to escape context owing to changes in lifestyle or life cycle. The ecological context generated through fugacious instability is entirely different. One is a context where constraint on collective efficacy results from environmental choice (Michelson, 1977) where there is little expectation, desire, or priority placed on local social cohesion; the other results from a context induced by inequality.

A context of structural instability is often induced through the concentration of inequality, such as the presence of poverty, unemployment, and racial segregation. In a context of structural instability, individual desire and motivation to build a network of broad social ties and develop a norm of informal social control may be high but unattainable, given the ecological context and options for local communication. This is where the Internet holds the most promise because it may afford local cohesion and collective action. This affordance contrasts with expectations based on the literature on digital inequality, which assumes a Matthew effect, and with the literature on collective efficacy, which assumes that local social cohesion and collective action do not vary depending on media context.

Why would the Internet afford collective efficacy within a context of structural instability? An interactive electronic medium such as e-mail allows for instantaneous

and asynchronous communication that removes many of the communication barriers associated with local, in-person, and telephone contact. It can overcome barriers that include temporal mismatches (e.g., in predicting when neighbors are home and available for contact), spatial and territorial obstacles (Newman, 1972), and psychological hurdles (including fear of embarrassment; McKenna, Green, & Gleason, 2002). E-mail may also overcome barriers associated with urban disorder and victimization, where the perception of physical safety is low. Unlike most media, e-mail has characteristics of both an interpersonal communication technology and a broadcast technology; it can be used for one-to-one and one-to-many communication. Other Internet technologies, such as a Website, may reduce the cost of local participation and provide a membership roster, forum, and central repository for documentation that mimics many of the organizational characteristics of traditional local institutions that aid the formation of ties and collective action, such as neighborhood associations (Mesch & Schwirian, 1996).

This reasoning leads to the following prediction: The Internet will reduce the influence of concentrated disadvantage on the formation of collective efficacy such that when the Internet is adopted as a means of local communication, it will afford collective efficacy at rates similar to those observed in contexts that do not exhibit high levels of ecological instability. However, realization of this trend depends on at least modest levels of Internet penetration within areas of concentrated disadvantage. In the late 1990s and early in this century, such levels of access did not likely exist. However, although digital inequalities persist, a significant number of people within disadvantaged communities are now using the Internet; that is, individuals access the Internet at home, at work, and through public access facilities. The existing literature suggests that if the Internet did not afford any change in collective efficacy, then the number of neighborhoods that exhibit high levels of collective efficacy within a context of concentrated disadvantage would remain low. For example, of the 20% most disadvantaged areas in the United States, only a small fraction—certainly less than 10% and more likely less than a few percent—would exhibit levels of collective efficacy consistent with what is generally found in areas that are free of significant structural or fugacious instability. Evidence of even a small number of communities within areas of concentrated disadvantage adopting the Internet for local communication and using it to achieve high levels of collective efficacy would be an improvement on the status quo. Evidence that truly disadvantaged communities are adopting at a higher rate than other communities is evidence of a trend of shrinking inequality.

Method

Data for this study were collected through a Website created as part of a university research project called *i-Neighbors*. The project Website was released in August 2004 and allowed anyone in the United States or Canada to create a series of Internet services that could be used for communication and information exchange at the neighborhood level.

The i-Neighbors Website provides the research team with the opportunity to identify and observe instances when the Internet was adopted as a means of local communication

within residential environments; to examine the ecological context where adoption took place; and to explore how the Internet was used in relation to collective efficacy within different contexts. This article is based on use within the United States during the 3 years following the initial launch of the Website.

The i-Neighbors Website was designed as a naturalistic experiment. Unlike field studies in which events are systematically manipulated, there is no direct manipulation in a naturalistic experiment. No attempt was made to target the project Website to specific users or geographic communities. No additional technology or training was given to participants. Adoption of the site was a result of word-of-mouth, Internet search, and mass media coverage of the site. The primary goal was not to create a new, unique tool for local Internet communication but to provide a service that would sample from those who perceived a local affordance for Internet use.

The i-Neighbors Website was designed to resemble a traditional commercial Website. Visitors to the Website were invited to enter their zip codes and view lists of digital neighborhoods that corresponded to neighborhoods in their geographic area. If a visitor's neighborhood was not listed, the participant had the option of adding his or her neighborhood to the list of communities.[1] Visitors could create an account, join the digital version of their geographic neighborhood, and, if other residents of their neighborhood had joined, communicate and share information.

Within a digital neighborhood, a user could create a personal profile with the option to include a picture, birth date, gender, street address, phone number, personal Website, number of children, personal interests, household pets, and a more detailed personal description. Users had the option of using the following services specific to their digital neighborhoods:

E-mail list: each neighborhood had a single e-mail address; a message sent to that address was redistributed to all residents registered in a neighborhood. Users could also access an archive of past e-mail discussions.
Directory: a list of all users and their profile information.
Events calendar: a group calendar.
Photo gallery: a forum to share photographs.
Reviews: a forum to review and rate local companies and services.
Polls: multiple-choice surveys to be administered to other residents of a neighborhood.
Documents: the capability to store and share documents.
GovLink: allowed users to see a list of their elected officials (local, state, and federal), type a message to an official, and have the message faxed to the office of that official.
Invitations: permitted users to print custom posters and flyers on their printer or send e-mail invitations to advertise the Website.

Before a potential user could join i-Neighbors, he or she had to agree to a Terms of Use, as approved by the university's institutional review board. The Terms mirrored a

traditional informed consent document in a format that was familiar to Internet users. Participants were informed that i-Neighbors was an ongoing research project, that participation was voluntary and could cease at any time, that logs of user activity would be recorded and analyzed, and that, given the public nature of the Website, any communication or information exchanged through the site would not be considered confidential.

In August 2007, after 3 years of operation, the i-Neighbors Website had attracted 30,221 participants who created 6,072 digital neighborhoods. The i-Neighbors communities correspond to geographic communities dispersed over 3,914 zip codes (12.5% of all U.S. zip codes). There was considerable variation in membership size across neighborhoods; the majority (80%) attracted only 1 or 2 participants, whereas some attracted hundreds of users. Over 3 years, 27,831 e-mails were sent using the site's neighborhood e-mail lists. List messages were redistributed to i-Neighbors participants who subscribed to each list, corresponding to 1,602,106 e-mails received from neighbors. Participants also used i-Neighbors to post 5,700 photos of their neighborhoods, contribute 1,766 reviews of local companies, share 1,777 documents, create more than 15,000 calendar events, administer 2,141 polls, and send 191 faxes to elected officials.

This article focuses on those neighborhoods that were the most active users of the i-Neighbors site. The most active are defined as the 50 neighborhoods that accounted for 91% of all e-mail messages that were sent using i-Neighbors' neighborhood e-mail lists (25,308 of 27,831 messages). E-mail messages are the focus of this analysis; they were the dominant medium used for local Internet communication, and they provide a direct measure of collective efficacy.

Measures

Ecological context was calculated using census tract microdata from Summary File 3 of the 2000 U.S. Census. All U.S. census tracts were assigned a measure of disadvantage based on measures previously used in the literature on collective efficacy (Sampson, 2006). The index consists of three variables: extent of racial segregation (measured as percentage Black), the percentage of residents below the poverty level, and unemployment rate. The index was constructed by transforming the items to z-scores, with the mean of the items forming the index. With location data provided by project participants, each of the 50 most active neighborhoods was identified at the census tract level and assigned a corresponding value on the disadvantage index. Neighborhoods in the highest 20th percentile of the index were considered to be in a context of concentrated disadvantage.

Collective efficacy is typically measured directly, using sociometric surveys of neighborhood networks and ethnographic observation of collective action (Hampton, 2007; Hampton & Wellman, 2003), or indirectly, using a series of Likert-type scales as perceived social cohesion and informal social control (Sampson, Raudenbush, & Earls, 1997). Network surveys are costly, time-consuming, and reliable but depend on an accurate

roster of neighborhood residents and participation from a large proportion of the population. Likert-type scales can be administered to a smaller random sample of a neighborhood population, but perception of social cohesion and likelihood of intervention in a social problem may deviate from more direct measures. This article replaces measures of collective efficacy based on sociometry or perceived cohesion and control with measures based on the direct observation of communicative practices, as recorded through the i-Neighbors e-mail lists.

High collective efficacy is evident through the presence of social cohesion and informal social control. There are multiple textual indicators of social cohesion. The most explicit is reference to other forms of social interaction, such as telephone and in-person meetings (Haythornthwaite, 2005). Another overt measure is reference to social sharing, or talking about emotional experiences, which is associated with decreased social distance and the exchange of social support (Collins & Miller, 1994; Pennebaker, 1997). Less overall emotion and more antagonistic emotion, such as flaming, is expressed with strangers (Derks, Fischer, & Bos, 2007). More implicit measures include personalization, informality, and shared context. High context suggests commitment, shared norms, and a sharp distinction between in- and out-groups (Hall, 1976). Similarly, informality and personalization suggest shared knowledge and a high degree of closeness (Goffman, 1966; Heylighen & Dewaele, 2002). Informal social control or collective action is evident through textual references to local concepts and local social problems. Examples include references to a shared place (e.g., street, neighborhood, community), people (e.g., person, resident, neighbor), and actions (e.g. issue, plan, problem), as well as references to victimization (e.g., drugs, crime) and the role of outside institutions (e.g., police).

Content analysis of electronic textual exchanges through the i-Neighbors lists provides for a comparison of collective efficacy levels between those neighborhoods within a context of concentrated disadvantage and those in more advantaged areas. The high volume of messages collected through i-Neighbors makes manual coding of e-mails an onerous task. To eliminate this constraint, the coding of textual indicators of collective efficacy was automated through the use of computer software. As no single application could be identified that would adequately code the multiple textual dimensions associated with collective efficacy, two programs were used to analyze the content of e-mails sent to neighborhood lists: Linguistic Inquiry Word Count 2007 (LIWC) and Internet Community Text Analyzer (ICTA). The two programs provide a complementary analysis—one focused on the affective and structural components of the text, the other focused on the concepts expressed within e-mails.

LIWC focuses on the emotional, cognitive, and structural components of a text. It uses a predefined dictionary to analyze a body of text, by counting various structural composition elements and the proportion of words that fall into categories based on the predefined dictionary. The program examines each word in a text, matches target words to a predefined dictionary, and generates an output that includes linguistic dimensions, such as the percentage of words in the text that are pronouns, articles, verbs, and so on; paralinguistic dimensions, such as fillers and nonfluencies (e.g., *hmm*, *uh*, *umm*); and

word categories that tap social, affective, and cognitive psychological constructs. Designers of the LIWC dictionary have refined the program over a number of years, drawing on samples of written and spoken language, emotion-rating scales, and the categorization of words based on the ratings of independent judges. Pennebaker, Chung, Ireland, Gonzales, and Booth (2007) provided a complete discussion of the construction of the LIWC dictionary, with tests of internal reliability and external validity.

ICTA is a Web-based application that was specifically designed for content analysis of Internet forums and e-mail lists (Gruzd & Haythornthwaite, 2008). In contrast to LIWC, ICTA focuses on words that suggest topics, as well as nonstandard words (e.g., LOL, ROTFLOL). ICTA removes all common words from a text and then counts the frequency at which remaining concepts occur across messages. Common words are stop words that perform a grammatical function but are not likely to have much to do with the topic of a message (Luhn, 1959). ICTA uses a list of 571 stop words maintained by the Natural Language Toolkit.[2] For the remaining words, ICTA uses the Porter Stemming Algorithm (Porter, 1980) to identify concepts by removing common morphological and inflexional endings from words; for example, words like *help*, *helped*, and *helpfully* (but not *helper*) would be considered part of the same concept of *help*. ICTA then counts the frequency at which concepts appear across messages.

Findings

Context of Glocalization

> We are having problems occur again in the neighborhood. We were made aware yesterday that a home a couple of houses down from us was broken into two nights in a row. They kicked in the front door and stole all the appliances out of the home. Please be looking out for all people that look suspicious. I want to thank you Mike for letting us know about the kids at the park. All information given is a good lead to finding these kids. If you see any manhole open, please close it up; we would hate for any child to fall in one. We want to thank everyone for looking out for the neighborhood. (Neighborhood e-mail list, 62th percentile for disadvantage)

The most active i-Neighbors communities ranged from neighborhoods that were among the first to join i-Neighbors to those that had been using the site for only a few months (Mean = 1 year, 11 months). They were spread across 17 states with significant concentrations in Georgia (n = 13), Maryland (n = 7), Pennsylvania (n = 6), North Carolina (n = 4), and Florida (n = 3). Most digital neighborhoods represented geographic areas that encompassed 50 to 150 housing units. However, one had only 24 homes on a single street, and another extended over 2,000 homes.

Not only did digital neighborhoods represent different-sized geographies, but membership was dynamic. Over time, new users joined, others left; there may have been more than one i-Neighbors member in a household; and some households shared a

single i-Neighbors account. However, none of the most active digital neighborhoods grew to more than 200 accounts, and none contained fewer than 12. At the peak level of membership, the majority of the most active digital neighborhoods had between 25 and 95 members, with a mean of 60.

Fourteen of the most active were located in census tracts classified on the disadvantage index as within the top 20th percentile for the most disadvantaged areas in the nation, only one of which was located in a suburban area. Six of the 14 were within the top 10th percentile for areas with the highest concentration of disadvantage. Twenty-one of the remaining most active neighborhoods consisted of new home developments. All but 1 of the 21 had not even begun construction of the first home until after i-Neighbors was launched, in 2004; the other neighborhood broke ground in 2001. Twenty of the 21 were located in areas considered suburban or ex-urban. The remaining 15 most active were located in well-established, middle-class suburban neighborhoods.

This analysis suggests that two distinct types of neighborhoods were likely to use the Internet for local communication. The first type—the majority type—consisted almost exclusively of middle-class suburban neighborhoods. As has been explored by others, new suburban neighborhoods are often an ideal context for collective efficacy. As observed in the Netville study (Hampton, 2001), when neighborhoods of this type adopt the Internet for local communication, it leads to high levels of social cohesion and collective action. Similarly, well-established, middle-class suburban neighborhoods are also ecologically supportive of collective efficacy and the local affordances of Internet use (Hampton, 2007).

The second type of neighborhood, which represented 28% of the most active digital neighborhoods, was in a context of concentrated disadvantage: residential areas with the highest levels of structural instability in America. Truly disadvantaged neighborhoods represented only slightly more than one quarter of the most active i-Neighbors communities. However, if Internet use at the local level contributes to social cohesion and informal social control in a context that is otherwise unlikely to experience high collective efficacy, this would represent a significant decrease in social and civic inequality between the most advantaged and most disadvantaged communities.

The Internet and Collective Efficacy

> I have a neighbor who is very nice and is an older woman and I don't know her situation but think it would be a good thing to assist her. I noticed that kids and even adults have been throwing trash on her lawn in the back and side and have asked them to stop repeatedly, but no one seems to pay me any attention. I would like to form a group of people to come and assist me one Saturday morning to do a little lawn work and give her some support so this can stop. I think if her area were cleaned up a little more, they may think twice before doing it. If you are interested please e-mail me back so that I can form this team. If this works out, maybe we can do this more often for those who are in need of help. (Neighborhood e-mail list; 83rd percentile for disadvantage)

Content analysis was performed on the 25,308 e-mails exchanged within the 50 most active digital neighborhoods. To enable a comparison, the 14 digital neighborhoods that were within the 20th percentile for the most disadvantaged areas in America (n = 11,334 messages) were compared to the neighborhoods within contexts that tend to be more supportive of collective efficacy, the remaining 36 mostly suburban and ex-urban digital neighborhoods (n = 13,974 messages). The average neighborhood list exchanged 5.38 e-mails per week, with a range of 1.5 messages per month to 3.24 per day. Though not statistically different ($p > .05$, one-way analysis of variance), disadvantaged areas were exchanging slightly more e-mails per week (7.63) than advantaged areas (4.50).

ICTA identified the frequency of unique word concepts: 459,721 were identified in the text of the disadvantaged e-mail lists, and 323,866 were found across the lists in the more advantaged areas. Table 1 lists, in rank order, the 50 concepts that appeared most frequently in e-mails from disadvantaged areas, along with their corresponding ranks in advantaged areas. There was a high degree of overlap among the most frequent concepts. The disadvantaged lists shared with the other lists all but 13 of the 50 most common concepts.

LIWC counted various structural and affective elements. Table 2 provides a comparison of the features from e-mails exchanged within the context of disadvantage and advantage; each dimension is expressed as a percentage of all words used within an e-mail list.

Social Cohesion

The most explicit measure of social cohesion is the presence of social interaction. The very use of a neighborhood e-mail list implies interaction, and likley tie formation, and maintenance. However, the content of the lists suggests additional interaction. References to non-Internet media, such as *call* (which appeared in more than 12% of all e-mails), were frequent across lists but were more prevalent within disadvantaged areas; *call* and *contact* each appeared 4% more often and *meet* appeared 3% more often. Reference to *e-mail* appeared in just over 8% of all messages, but was slightly less frequent within disadvantaged areas (–0.58%).

Social sharing is evident through the presence of emotional processes. There was a statistically significant but not substantive difference in the occurrence of emotional processes (e.g., happy, cried) between the texts of disadvantaged and more advantaged areas (–0.55% in disadvantaged areas). Although the rate of affective processes was similar, the context of the emotion was divergent. E-mails from advantaged areas contained a higher proportion of positive emotional words (e.g., *love*, *nice*, *sweet*). Although they shared a similar overall level of negative emotions, disadvantaged areas expressed a disproportionate amount of anger. Words associated with anger (e.g., *hate*, *annoyed*) were infrequent in general, but they were almost twice as prevalent within a context of disadvantage (0.33% compared to 0.18% within advantages areas). The small and disproportionate level of anger expressed within disadvantaged areas

Table 1. Internet Community Text Analyzer: Concept Appearance in Disadvantaged and Advantaged Neighborhoods

	Rank		E-mail (%)		
Concept	Disadvantaged	Advantaged	Disadvantaged	Advantaged	Difference
Neighborhood	1	4	18.38	12.09	6.29
Time	2	1	17.37	14.97	2.40
Community	3	13	16.24	9.33	6.91
Call	4	3	16.08	12.43	3.65
Neighbor	5	2	15.79	13.82	1.97
Work	6	7	14.92	11.20	3.73
Meet	7	6	14.81	11.69	3.13
House	8	10	14.62	10.20	4.43
People	9	11	14.52	9.63	4.89
City	10	149	13.24	2.71	10.53
Make	11	9	13.11	10.90	2.21
Street	12	36	12.93	5.52	7.41
Year	13	12	12.79	9.42	3.37
Inform	14	21	12.36	7.33	5.03
Good	15	8	11.38	10.95	0.42
Day	16	17	10.95	8.63	2.33
Home	17	5	10.87	11.89	–1.02
Live	18	23	10.28	7.13	3.15
Park	19	51	10.11	4.67	5.44
Contact	20	27	9.74	6.20	3.54
Interest	21	15	9.58	9.05	0.53
Back	23	20	9.31	7.40	1.92
Place	24	41	9.13	5.25	3.89
Area	25	32	8.12	5.85	2.28
E-mail	26	16	8.11	8.70	–0.58
Person	27	34	7.78	5.68	2.11
Thing	28	24	7.68	6.79	0.89
Great	29	14	7.67	9.32	–1.65
Week	30	18	7.57	7.69	–0.12
Member	31	126	7.56	3.00	4.57
Include	32	79	7.54	3.60	3.94
Police	33	135	7.45	2.93	4.52
Hope	34	19	7.36	7.51	–0.16
Office	35	133	7.33	2.97	4.36
Resident	36	47	7.29	4.80	2.49
www	37	75	7.26	3.69	3.57
Block	38	150	7.24	2.71	4.53
Org	39	263	7.23	1.71	5.52
Lot	40	35	7.19	5.52	1.67
Free	41	70	7.10	3.80	3.30
Put	42	22	6.92	7.23	–0.31

(continued)

Table 1. (continued)

	Rank		E-mail (%)		
Concept	Disadvantaged	Advantaged	Disadvantaged	Advantaged	Difference
Issue	43	29	6.90	6.04	0.86
Problem	44	30	6.83	5.96	0.87
Plan	46	26	6.74	6.27	0.48
Car	47	94	6.73	3.35	3.38
pm	48	171	6.63	2.45	4.17
Night	49	25	6.63	6.35	0.28
Saturday	50	93	6.61	3.36	3.25

should not be equated with antagonism, which might suggest anonymity or lack of cohesion. The overall level of antagonism, as measured through the presence of profanity or swear words, was negligible across lists (< 0.03% of all words).

Measures of formality, personalization, and contextual understanding are less direct measures of social cohesion. They are textually manifest through variation in message length, word size, use of pronouns, common verbs, punctuation, and the presence of various cognitive processes (e.g., tentativeness).

E-mails sent within advantaged areas had a significantly higher proportion of pronouns, adverbs, common verbs, and interjections (exclamation points). These linguistic dimensions are associated with more informal text and shared knowledge (a high degree of deixis; Heylighen & Dewaele, 2002). In addition, advantaged areas used shorter e-mails—a mean of 77 words compared to 115 ($p < .01$, two-tailed)—a smaller proportion of big words (> 6 letters), and fewer words per sentence. The pattern of shorter e-mail exchanges, shorter sentences, smaller words, and less formal text suggests a higher level of shared contextual understanding. The smaller proportion of pronouns used within disadvantaged areas also suggests a more impersonal dialogue. The frequent use of first-person plural (e.g., *we*, *us*, *our*) and more frequent identification of out-groups and third-person plural (e.g., *they*, *their*, *they'd*) suggest that advantaged areas had a clearer sense of collective identity.

However, some measures obtained by LIWC underestimate the degree of informality and shared knowledge within a context of disadvantage. Principally, LIWC captured a substantially smaller proportion of words for analysis within disadvantaged areas, 78% versus 83%. Words not found in the LIWC dictionary are more likely to be contextually specific. The use of shorthand or language that deviates from standardized English may be unique to a context of disadvantage and thus indicative of high levels of social cohesion.

In addition, evidence suggests that the perception of shared norms and collective identity within advantaged areas may have been less prevalent than what was implied through residents' e-mails. Residents in advantaged areas used a higher proportion of

Table 2. Linguistic Inquiry Word Count 2007: Percentage of Words Within Text

Processes	Disadvantaged % (*SD*)	Advantaged % (*SD*)
Linguistic		
Dictionary words	78.46 (4.45)**	82.93 (2.45)**
Words per sentence[a]	20.09 (2.35)**	17.86 (2.01)**
Words > 6 letters	21.49 (3.74)***	17.04 (1.81)***
Total pronouns	10.22 (2.70)***	13.36 (1.54)***
Personal pronouns	6.03 (1.78)***	8.47 (1.19)***
First-person singular	2.00 (1.02)***	3.11 (0.69)***
First-person plural	1.32 (0.34)***	2.06 (0.54)***
Second person	1.35 (0.36)**	1.72 (0.43)**
Third-person singular	0.55 (0.41)	0.63 (0.28)
Third-person plural	0.81 (0.21)*	0.96 (0.25)*
Impersonal pronouns	4.20 (0.98)*	4.89 (0.61)*
Common verbs	14.08 (1.42)***	16.44 (1.11)***
Auxiliary verbs	7.64 (1.41)***	9.44 (0.77)***
Adverbs	3.12 (0.78)**	3.89 (0.53)**
Negations	1.02 (0.36)*	1.23 (0.26)*
Interjections	0.56 (0.19)**	0.95 (0.50)**
Swear words	0.02 (0.02)	0.03 (0.04)
Psychological		
Affective processes	4.06 (0.36)***	4.61 (0.69)***
Positive emotions	2.96 (0.38)***	3.62 (0.75)***
Negative emotions	1.05 (0.28)	0.94 (0.24)
Anxiety	0.17 (0.06)	0.13 (0.06)
Anger	0.33 (0.10)***	0.18 (0.10)***
Sadness	0.18 (0.08)	0.18 (0.06)
Discrepancy	1.59 (0.43)***	2.28 (0.37)***
Tentative	2.72 (0.62)***	3.32 (0.48)***
Inhibition	0.78 (0.11)*	0.66 (0.21)*
Exclusive	2.22 (0.56)**	2.68 (0.33)**

$n = 14$ neighborhoods (disadvantaged); $n = 36$ neighborhoods (advantaged).
[a]Not expressed as a percentage.
*$p < .05$. **$p < .01$. ***$p < .001$. Two-tailed.

negations (*no*, *not*, *never*), first-person singular (e.g., *I*, *me*, *mine*), and language that emphasized discrepancies (e.g., *should*, *would*, *could*) and exclusions (e.g., *but*, *without*, *exclude*). These linguistic patterns suggest that their texts may have been more individualistic and defensive than what was found within disadvantaged areas. E-mails within advantaged areas also had a higher proportion of words that were categorized as tentative (e.g., *maybe*, *perhaps*, *guess*), which suggests hedging, less agreement, or less consistent belief in an outcome.

The content of neighborhood e-mails suggests that both areas frequently discussed interacting online, in person, and through other media; disadvantaged areas discussed this even more so than advantaged areas. E-mails from both neighborhood contexts suggest similar levels of social sharing, although divergent emotional experiences. Texts varied in how they operationalized informality and shared contextual understanding, and both processes were evidenced within advantaged and disadvantaged contexts, although not to the extent that they were substantively divergent. Evidence of collective identity is equally complex. E-mails within disadvantaged areas appeared to have less sense of shared identity. However, this observation is complicated by textual clues—specifically, in measures of defensiveness and tentativeness, which suggest that advantaged areas expressed less agreement, more hedging, and less constancy in beliefs—they assumed a higher level of collective identity than what may have existed. Despite some variation, the final analysis suggests that both contexts contain relatively high, if not similar levels of social cohesion.

Social Control

Evidence of informal social control includes reference to local people and places as well as local social problems and institutions that play a role in formal social control.

Reference to the concepts of *issue*, *problem*, and *plan* appeared individually in 6% to 7% of all messages sent to neighborhood lists, with little variation between disadvantaged and advantaged areas. Concepts that reference local places, such as *neighborhood* and *community*, appeared separately in more than 16% of all e-mails sent within disadvantaged areas but appeared 6% to 7% less frequently in advantaged areas. Other concepts related to physical space maintained the same pattern; that is, they appeared more frequently in e-mails from disadvantaged neighborhoods: *city* (+11%), *street* (+7%), *park* (+5%), *block* (+5%), *place* (+4%), *house* (+4%), *office* (+4%), *area* (+2%). The one exception was the concept of *home*, which appeared in more than 10% of all e-mails but was approximately 1% less frequent in disadvantaged neighborhoods.

Reference to local groups or people, such as *neighbor*, were frequently made in both disadvantaged and other neighborhood lists (14% to 16% of all e-mails) but appeared most often in disadvantaged areas. For example, *people* appeared 5% more frequently, whereas *person*, *resident*, and *neighbor* each appeared 2% more often. The exception was the concept of *kid*, which ranked as the 40th most frequent concept in advantaged areas (5% of e-mails), compared to 86th in disadvantaged areas (3% of e-mails).

The only outside group or institution to appear among the most frequent concepts was *police*, which appeared in over 7% of e-mails from disadvantaged areas but in only 3% of e-mails within other areas. Concepts related to criminal activity or victimization were relatively infrequent overall but were more prevalent in disadvantaged areas. Reference to *crime* appeared in 5% of e-mails sent with disadvantaged areas but in only 1% of e-mails with more privileged contexts. Mention of *drugs* appeared in 1.40% of disadvantaged e-mails but in less than 0.25% of e-mails on other lists.

In terms of percentage of communication, disadvantaged areas made more frequent reference to concepts likely to be associated with informal social control. They made more frequent reference to concepts associated with local place, local people, social problems, and institutions for addressing local problems. The results of this analysis suggest that neighborhoods in a context of disadvantage experienced levels of informal social control and collective action that were similar, if not more extensive, than those of advantaged areas.

Conclusion

> Before, people would call me with information that I knew needed to be spread around, but I did not have the tools to do it and it was frustrating. . . . We have a powerful way to communicate with each other whenever we need to. . . . We have caught criminals and forced [government] to give us more police protection; given out tips for securing our homes; removed a postal carrier from our neighborhood who drank on the job and misdelivered mail for years; created lasting friendships; cleaned up our streets; recommended neighbors who are skilled craftspeople to each other; found homes for stray animals; fixed water leaks; kept each other informed of important neighborhood news; recommended neighborhood restaurants; and, yes, even vented some frustration. Seven weeks ago, I had a bicycling accident and broke my femur. Through [the e-mail list, the community] found out about my situation and people made an outpouring of support, which has been vital to my recovery and helpful to [my wife] and me in many practical ways. (Neighborhood e-mail list; 93rd percentile for disadvantage)

Studies of digital inequality have primarily focused on individual behaviors and outcomes. As a result, some have concluded that there is a Matthew effect such that access and use of the Internet provide social and civic benefits to those who were already well off but provide comparatively small benefits or no benefit to those who originally had little. By focusing on individual attributes, research on digital inequality has overlooked the role of place and context in the reproduction of inequality. This article argues that unique affordances of the Internet undermine ecological constraints on social and civic inequality. Specifically, to an extent not achieved through previous media, the Internet reduces the transaction costs of local communication. Reduced barriers to interaction augment prevailing social and civic inequalities produced through the influence of ecological context. The Internet serves as a contextual leveler between advantaged and disadvantaged communities by affording the formation of collective efficacy—local social cohesion and informal social control—within a context of concentrated disadvantage.

According to data collected through a naturalistic experiment—a Website that monitored the adoption and use of the Internet for communication at the neighborhood level—28% of the most active neighborhoods were found to be located in a context of concentrated disadvantage (i.e., within the 20th percentile of U.S. census tracts with

the highest concentration of racial segregation, poverty, and unemployment). An analysis of the content of messages exchanged within these neighborhoods found evidence of social cohesion and informal social control that were similar to rates found in more advantaged areas. This finding suggests that when the Internet is used for local communication within an area of concentrated disadvantage, it overcomes contextual constraints on the formation of collective efficacy. In addition, the rate of Internet adoption for local communication by communities within concentrated disadvantage is slightly higher than what would be expected at random (28% of the most active are from the 20% most disadvantaged areas) and considerably higher than what would be expected given preexisting ecological constraints and assumed levels of Internet access and use. This conclusion suggests that social and civic inequalities that result from contextual constraints on social cohesion and informal social control are reduced as a result of the Internet. The Internet affords social cohesion and collective action in neighborhood settings that are otherwise unlikely contexts for collective efficacy.

Given the available evidence, this conclusion does need to be tempered. A natural experiment such as i-Neighbors may not be generalizable. The current level of Internet use for local communication is relatively low (Hampton, Sessions, Her, & Rainie, 2009), and I do not know how well the i-Neighbors Website was able to sample from this trend. It is also possible that i-Neighbors disproportionately attracted neighborhoods within a concentrated disadvantage that had preexisting high collective efficacy, although there is no indication that this was the case. Although direct observation of communication practices offers a new and possibly preferred measure of collective efficacy, this approach shares the limitations of methods ranging from content analysis to ethnomethodology (Garfinkel, 1967; Krippendorff, 2004) from which it borrows—mainly, the risk of misinterpretation, oversimplification, and the loss of understanding that can result from the reduction of complex discourse by outside actors. Although computer-assisted analysis provides benefits in terms of data management and a sense of objectivity, there may be unknown biases as a result of local variation in the use of terms or emotional context. It is also likely that the observed trend is slow moving. Digital inequalities in individual access persist; these inequalities are concentrated in areas of community-level instability; and this ecological inequality inhibits the realization of the Internet's affordances for local connectivity.

While the long term implications and depth of any trend toward reduced social and civic inequality, as a result of changes to contextual effects associated with Internet use, should be explored further, it seems clear that media play an integral role in collective efficacy. Contrary to contemporary theories of social disorganization that assume limited media effects, variation by context appears to exist in the affordances of media for local communication, and some channels of communication may afford interaction within ecological contexts that otherwise constrain collective efficacy. This highlights (a) the need to revise existing theories of neighborhood and contextual effects to deal with the role of media context and (b) the need to pay greater attention to the role of place and ecological context by those who study communication.

Access and use of the Internet mirror other inequalities in terms of access to material resources and the production and use of information. However, this "Matthew effect" (Merton, 1968) should not be assumed to extend to social and civic inequalities. The evolving channels of information and communication exchange associated with the Internet have unique affordances related to the way we interact, form, and maintain social networks. These affordances may provide new opportunities within contexts that previously lacked affordances for social and civic involvement.

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Notes

1. A participant was asked to identify his or her neighborhood as an area of 500 homes or fewer, or the size of a single apartment building.
2. See http://www.nltk.org/.

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Bio

Keith N. Hampton is an assistant professor in the Annenberg School for Communication at the University of Pennsylvania. His research interests focus on the relationship between new information and communication technologies, social networks, and the urban environment. Recent publications include “The Social Life of Wireless Urban Spaces” (Journal of Communication), and *Social Isolation and New Technology* (Pew Internet & American Life Project). More information on his research can be found at www.mysocialnetwork.net.