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Mobile Phones will not Eliminate Digital and Social Divides: How Variation in Internet Activities Mediates the Relationship between Type of Internet Access and Local Social Capital in Detroit

Bianca C. Reisdorf[1], Laleah Fernandez[2], Keith N. Hampton[2],

Inyoung Shin[3], & William H. Dutton[2,4]

[1] Department of Communication Studies, University of North Carolina at Charlotte; [2] Department of Media and Information, Michigan State University; [3] Department of Communication, University of Wisconsin-Milwaukee; [4] Oxford Internet Institute, University of Oxford

Abstract

This study examines the relationship between mode of Internet access, variety of online activities, and the potential for the Internet to contribute to local social capital in distressed, urban communities. Based on a sample of 525 telephone surveys in Detroit, findings show that breadth of access predicts participation in a larger variety of online activities, which is associated with higher levels of local social capital. Neither public Internet access, home broadband, nor Internet access through a mobile phone data plan alone affords participation in a full range of social capital-enhancing activities. The findings highlight the potential problems of initiatives that assume equivalent social outcomes through non-equivalent modes of access, such as providing Internet access through mobile phones in place of home broadband. Efforts to enhance a city's social infrastructure by providing Internet access are best served when individuals have multiple points of access available.

Keywords: digital inequalities; urban; redevelopment; mobile; leapfrogging; concentrated disadvantage

Introduction

The Internet has the potential to aid in urban redevelopment by improving access to formal and informal resources that can improve daily life. These include economic, cultural, social, and educational opportunities (Gonzales, 2016; Hampton, 2010; Mesch, 2012). Yet, in areas that have experienced urban decline, fixed broadband Internet access may be unavailable. In the past, initiatives to increase access often focused on public spaces, such as libraries (Bertot, Real, & Jaeger, 2016). More recently, there is a growing assumption that the provision of Internet through mobile phones will address digital divides (Marler, 2018). In both approaches, there is often an implicit assumption that the mode of access – whether people get online at home, at work, through a mobile phone, or in a public place – does not have a meaningful impact on what people do online, or augment how, or if, access supports a city's social infrastructure. Arguments that suggest that the mode of access is essentially interchangeable drive our interest. We argue that efforts to enhance a city's social infrastructure by improving the physical infrastructure for Internet access are likely to fall short, if they focus on only one point of access. The mode of access affords and constrains what people do online, which, in turn, limits the potential for the Internet to contribute to outcomes, such as local social capital.

The scholarship on digital divides has moved away from studying the variation in who has physical access to the Internet to a focus on individual differences in skill, activity, and outcomes. In line with prior research on access and different types of Internet use (e.g., Stern, Adams, & Elsasser, 2009; van Deursen & van Dijk, 2019), we argue that variation in the mode of access continues to play an indirect but important role in outcomes associated with Internet activities. Those who have more diverse access to the Internet, including access at home, work, and in public places (e.g., a library), have an opportunity to participate in a greater breadth of

online activities and, as a result, to experience better outcomes (Dutton & Blank, 2014; Hassani, 2006). However, evidence of a relationship between mode of access, variation in online activity, and outcomes, such as social capital, are largely unexplored, particularly from settings in which digital and other inequalities are most extreme.

This paper examines digital inequality in the context of one of America's most acute examples of concentrated disadvantage, the city of Detroit. Few American cities compare with the reputation of Detroit in terms of economic decline and social inequality. More than 1.5 million, largely white residents have fled the city since the 1950s, so that Detroit is among the most segregated cities with the highest rate of concentrated poverty of any major, American city (Kneebone & Holmes, 2016; Stebbins, Sauter & Comen, 2017). Detroit has the highest violent crime rate in America; more than half of its households experience food scarcity; more than 25% of homes are unoccupied;[1] and although the official unemployment rate is twice the national average, the actual unemployment rate may be as high as 20% (Graham, 2018). Detroit's digital divide is among the most extreme in the nation: 63% of the city's low-income households lack a home Internet connection (Wheeler & Clybrun, 2015) compared with 35% of U.S. homes (Pew Research Center, 2018). Many in Detroit rely on free Wi-Fi in public spaces, mobile phone data plans, or computers provided through public libraries.

Our analysis is based on a sample of 525 telephone surveys from residents of three Detroit neighborhoods, which represent communities of concentrated disadvantage (very high levels of poverty and racial segregation) (Sampson 2012). The evidence supports our contention that the mode of access matters, whether on a mobile phone, at a workplace, in a public place, or

[1] Based on U.S. Census American Community Survey public use microdata 2017 (5-year estimates; https://censusreporter.org/profiles/16000US2622000-detroit-mi/).

through a home Internet provider. Breadth of access predicts variety in online activity, which in turn predicts higher local social capital. This relationship exists, because different modes of access afford participation in specific online activities (e.g., mobile phones afford higher levels of social media use). A limited set of online activities is associated with higher local social capital (e.g., access to news, medical information, etc.). One is most likely to achieve participation in the full set of social capital-supporting Internet activities through the use of a broad range of access points and devices. These findings highlight the potential problems of public policy efforts that assume equivalent social outcomes through non-equivalent modes of access.

Digital Inequality

The predominant perspective is that the most pronounced divides are not simply a result of variation in how people access the Internet, but of the different ways people utilize the information at their fingertips (Ragnedda & Muschert, 2013). This perspective derives from a shift in the study of digital inequality. Emphasis has moved away from “first-level digital divides,” which focused on demographic differences in who has access to the Internet and who does not (Norris, 2001; Rogers, 2001). Emphasis is now on “second-level divides,” which include an awareness of gradations in Internet activities and skill (DiMaggio & Hargittai, 2001; Dutton & Blank, 2013; Dutton & Reisdorf, 2019; Livingstone & Helsper, 2007), and “third-level divides,” which explain how these differences affect outcomes (van Deursen & Helsper, 2015). Kelley (2014) takes this perspective to its extreme and suggests that there cannot be an access divide, because the same information is available to anyone regardless of the device used to access the Internet. However, we argue that there are more than individual differences in use at play. Different types of technology are more or less accessible to different groups, different

devices require different types of skills, and modes of access can afford different types of uses. The mode (the point of access and device used to get online) affects the potential to engage in different online activities, the ability to access information, and, in turn, the ability to form and maintain local social capital. Thus, the mode of access plays an indirect role by reinforcing or overcoming inequalities that are related to individual and community well-being.

Divides in Access and Activity

Where and if people go online remains closely tied to socioeconomic status. In the US, those who are white, have higher incomes, and more years of formal education are more likely to have broadband access in their homes (Pew Research Center, 2018). Those who are Black and African American are not only less likely to have home Internet access, but they are less likely to access the Internet at work, even when they hold jobs that are similar to those who are white (Turner, 2016). As a result, people of color and residents of low-income communities are more likely to rely on Internet access that is available in public spaces, such as libraries and community centers (Dailey, Bryne, Powell, Karaganis, & Chung, 2010; Rhinesmith, 2012).

Despite the greater reliance on Internet use through public spaces, poorer areas tend to have access to fewer public libraries. Libraries that are located within lower income areas tend to be open for fewer hours and to regulate access, excluding people who appear to have poor hygiene and who might engage in activities judged to be less appropriate (Berman, 2007). Public institutions are also likely to have equipment that is broken or not up to date and to impose time limits on access (Dailey et al., 2010; Rhinesmith, 2012). Gonzales (2016) notes the additional logistic cost of public Internet access; low-income patrons, who are less likely to own cars, need to organize transportation, including relying on public transportation schedules. Public access is

generally reported as the least desirable place to use the Internet, and the home the most desirable (Dixon et al., 2014).

Provision of Internet access through a mobile phone has been offered as an alternative to public Internet access and a solution to the low penetration rates of home-based Internet connections in disadvantaged areas. The mobile "leapfrogging" argument suggests that the availability of wireless, broadband phone networks can overcome the absence of infrastructure for fixed-line, broadband Internet access. This argument utilizes devices (i.e., smartphones), which have higher levels of adoption, relative to computers, among lower-income groups (Brown, Campbell, & Ling, 2011; Kavanaugh, Puckett, & Tatar, 2013; Marler, 2018; Pearce & Rice, 2013; Tsetsi & Rains, 2017). Although leapfrogging is increasingly suggested as a solution to digital divides in the rural United States (Nandi et al., 2016), where fixed-line infrastructure is also likely to be absent, it has a more established history in the scholarship on international development (Armenta, Serrano, Cabrera, & Conte, 2012; Chircu & Mahajan, 2009; Kyem & LeMaire, 2006; Wang & Liu, 2018).

Not all scholars are optimistic about mobile leapfrogging. Despite the potential to overcome limitations in the availability of fixed-line access, researchers have questioned whether the design of mobile phones allows users to perform the same range of activities with the same level of attention, which they can accomplish through computers (Dunaway, Searles, Sui, & Paul, 2018; Mascheroni & Ólafsson, 2016; Park, 2015; Wijetunga, 2014).[2] Digital literacy, confidence, and frequency of use are higher among those who do not depend exclusively on mobile phones as their mode of access (Puspitasari & Ishii, 2016; Katz, Moran & Ognyanova,

[2] For a comprehensive overview on the mixed findings of mobile use and digital inequalities, please refer to Marler (2018).

2019; Kumar, Hemmige, Kallen, Giordano, & Arya, 2019). Napoli and Obar (2014) suggest that mobile Internet access creates what they call “a mobile Internet underclass,” i.e., Internet users who are less engaged, produce less content, and seek less information. Gonzales (2016) also finds that mobile users are likely to experience significant periods of disconnection, as they struggle with maintaining equipment (see also van Deursen & van Dijk, 2019) and the cost of mobile data plans. Among other issues, these periods of disconnection lead to disruptions in access to health services, lost employment, and lost public benefits (Gonzales, Elms & Suri, 2016).

Often lost in the discussion of what mobile devices do not support is a broader recognition that affordances for Internet activities vary by more than type of device (Davis & Chouinard, 2016), as context matters too. A primary reason for the general preference for home Internet access over access in public relates to the lack of privacy afforded by libraries and other public spaces. The home is the primary place where Internet users can engage in activities that are perceived to be private, e.g., accessing health information, shopping, and banking (Hassani, 2006; KPMG, 2017). Despite the desirability associated with home Internet access, it may not be the ideal setting, and computers may not be the ideal device for all Internet-based activities. For example, the any-time, any-where mobile access afforded by mobile phones may be especially conducive to using social media, streaming music, and accessing news (Mossberger, Tolbert, & Anderson, 2014; Perrin, 2017). Having access to the Internet at work or school might seem essential for supporting the timely completion of work and school projects. Accessing the Internet from public spaces, such as libraries, might also support work or school-based activities. Yet, because the location does not have the same expectations for productivity as work and

school, public access may also be conducive to more diverse online activities (Hampton, Livio, & Sessions Goulet, 2010).

Because of a range of influences, including differences among the types of technology that is more or less accessible to different groups, variation in the skills required to fully utilize different devices, differences in the activities afforded by different devices, and preferences and restrictions on activities in different places, each mode of access affords different types of activities. Controlling for demographic factors, we hypothesize that:

H1: Different modes of Internet access afford the opportunity to participate in different online activities, such that:

a) mobile access affords entertainment and social uses, such as using social media, streaming music, and getting news;
b) public access (e.g., a library) affords uses that are instrumental or for entertainment, but not private in nature, such as finding information related to work/school, getting news, and downloading music;
c) home access affords primarily personal, private uses, such as finding health information and shopping;
d) work/school access affords primarily work- and school-related uses, such as finding information as part of someone's job or for homework.

Multimodal access is needed to experience the Internet's full informational and social potential (Hargittai, Piper, & Morris, 2018; Lee, Park, & Hwang 2015; Mossberger et al., 2014). Dutton and Blank (2014) refer to those who access the Internet through multiple devices and modes of access as "next generation users." Next generation users are those who have multiple

devices for accessing the Internet, some of which are mobile, enabling them greater access at any time from any place.

H2: Those with higher incomes and higher levels of formal education will use a larger range of modes to access the Internet; they will have greater breadth of access.

Although prior evidence also suggests that socioeconomic status predicts the variety of activities in which people participate online (Livingstone & Helsper, 2007; Hargittai & Dobransky, 2017), few studies explore the relationship between digital inequality and the variety of online activity take into account variation in modes of access. Exceptions include, Katz, Moran & Ognyanova (2019), who found that low-income parents who used both a home and mobile connection, in comparison to those who used only a single connection point, engaged in a broader range of online activities. Hargittai and colleagues (2018) found that older adults with higher incomes, and more years of formal education, had what they called greater autonomy of use, measured as the number of access points. This greater autonomy, in turn, translated into variations in Internet skills. Although breadth of access may depend on many traditional measures of inequality, we believe that the variety of Internet activities is less dependent on socioeconomic status than on the breadth of access. Therefore, we hypothesize the following.

H3: Controlling for breadth of access, education and income do not predict the variety of use.

This argument is closely related to van Deursen, Helsper, Eynon, and van Dijk's (2017) conceptualization of the sequential and compound nature of digital inequalities. Inequalities in socioeconomic background affects access, which in turn affects the development of skills, variety of uses, and lastly, outcomes, such as social capital. If confirmed, this would suggest that mode of access matters for local social capital; by failing to control for mode of access, scholars

risk attributing digital inequalities in how people use the Internet to socioeconomic factors, when such inequalities are explained by differences in breadth of access.

Local Social Capital

Access to informal resources is particularly important in an urban context in which formal resources, such as economic capital, are scarce. Whereas social capital refers to the ability to access and mobilize resources embedded in social networks (Bourdieu, 2002; Coleman, 1988), local social capital refers to a subset of resources that are especially relevant for local, economic, cultural, and educational opportunity, and quality of life, including insulation from health problems and crime. The role of local social capital tends to be especially important for those who are locally dependent (Hoogerbrugge & Burger, 2018). In distressed urban areas, local social capital is associated with higher local social cohesion, information sharing, collective action, social support, reductions in crime, expectations for informal social control, and improved health and life-satisfaction (Maass, Kloeckner, Lindstrøm, & Lillefjell, 2016; Moore & Recker, 2017; Putnam, 2000; Sampson, 2012).

A debate persists about whether Internet use in general contributes to or distracts from people's social relationships (Hampton & Wellman, 2018; Przybylski, Orben, & Weinstein, 2019; Turkle, 2015), and from local social capital in particular (Dotson, 2017; Skoric, Zhu, Goh, & Pang, 2016; Willis, 2017). However, the empirical evidence tends to support the conclusion that Internet access is associated with local social capital. Case studies (Hampton & Wellman, 2003; Mesch & Levanon, 2003; Mosconi et al., 2017), large-scale interventions (Gad, Ramakrishnam, Hampton, & Kavanaugh, 2012; Hampton, 2010), and representative national samples (Hampton, 2011) have found that home Internet users maintain a larger number of neighborhood ties, have more contact with local ties (on- and offline), experience increased local

ties over time (Hampton 2007), and are better able to organize for local, collective action (Hampton, 2003). Hampton, Livio, and Sessions Goulet (2010) found that those who used the Internet in public spaces were less likely to be socially isolated and had more diverse, social networks. Urban places where social media users have higher levels of bridging social capital also tend to be those areas where crime rates decline faster (Hristova, Williams, Musolesi, Panzarasa, & Mascolo, 2016). Public places, including libraries and public parks, are part of the social infrastructure that builds social capital (Buschman, 2018; Klinenberg, 2018); Internet access can attract more diverse and frequent use of those spaces (Hampton, Livio, & Goulet 2010; Kim, 2018). Yet, the use of a particular device or Internet use in a specific location are unlikely to affect social capital directly. Rather, the mode of access affords participation in specific online activities that might enhance or detract from people's social network and their ability to access social resources (H1). For example, Hampton et al. (2010) observed that a dominant online activity of people who use the Internet in public spaces was accessing news; news consumption (Shah, Kwak, & Holbert, 2001), and news sharing (Goh, Ling, Huang, & Liew, 2019) are associated with higher levels of social capital. Thus, although the breadth of Internet access predicts the variety of online activates in which an individual is likely to participate, it does not directly predict local social capital; that relationship is indirect.

H4: The breadth of access shapes the variety of use, which in turn, amplifies one's local social capital.

Differentiating Variety of Use

Breadth of access predicts variety of use, because specific modes of access and types of devices are hypothesized to afford different types of online activities (H1). Whereas the variety of online activity is a useful construct in the relationship between breadth of use and local social capital

(H4), a limited set of online activities is likely to be associated with higher social capital. Some online activities are more "capital-enhancing" than others (Hampton, Lee, & Her, 2011; Zillien & Hargittai, 2009).

Differentiation in media activities is especially important to understand the relationship to social capital. For example, prior research suggests that although using television for entertainment is generally viewed as unsupportive of social capital (Putnam, 2000), using television for news information is supportive of social capital (Norris, 1996). Activities such as social media use (Hampton, Sessions Goulet, Rainie, & Purcell, 2011; Skoric, Zhu, Goh, & Pang, 2016), health information seeking (Hale, Goldner, Stern, Drentea, & Cotten, 2014), and online shopping (Amblee & Bui, 2011; Doha, Elnahla, & McShane, 2019) have been associated with higher social capital. However, research on how specific online activities are related to *local social capital* has been less developed. Ball-Rokeach and colleagues have demonstrated the importance of sharing and consuming local news in diverse urban environments for local social capital (Ball-Rokeach, Kim, & Matei, 2001), and recent work has extended this to include a relationship between social media and community cohesion and sense of connectedness (Kim, Shin, Cho, Jung, Shon, & Shim, 2019; Lai & Chen 2016). This link may be stronger amongst those with lower education (Bobkowski, Jiang, Peterlin, & Rodriguez 2019), or in a context of concentrated disadvantage (Hampton, 2010). The similarities between online news consumption and the intake of online health information may extend the relationship between health information and social capital to the local level (Kim, Lim, & Park, 2015; Rice, 2006). Some urban areas lack accessible and affordable shopping options, and some evidence suggest that shopping online frees time and financial capital (Etumnu, Widmar, Foster, & Ortega, 2019), that

can be reinvested locally as social capital. As such, there is likely an ideal set of online activities that maximize local social capital. Based on the existing literature, we hypothesize that:

> H5: Online activities contributing to local social capital in the urban setting are likely to include use of the Internet for a) news, b) health information, c) social media use, and d) shopping.

Methodology

Data Collection and Sample

Conducting a survey on digital inequality in Detroit presented a number of unique challenges. Notably, more than 25% of homes in Detroit are considered vacant (although some estimates suggest that that more than 10% of vacant homes may be occupied by squatters),[i] and we were unable to identify a database of valid mailing addresses or telephone numbers. As such, there was no list from which to draw a probability sample of city residents. Given our interest in urban areas and residents who are especially disadvantaged, probability sampling from residents at large, even if it had been possible, would not have been an ideal method to sample from our population of interest. Drawing on discussions with local community members and Census data, we identified three Detroit neighborhoods, which typify concentrated economic and racial inequalities: Cody Rouge, Milwaukee Junction, and 7/8 Mile–Woodward. Cody Rouge is the largest of the three neighborhoods (est. 4,712 households), and 19.4% of occupied households have an annual income below $10,000. 7/8 Mile–Woodward (est. 3,289 households) and Milwaukee Junction (est. 1,916 households) are even more economically depressed; 40% of households in 7/8 Mile–Woodward and 30.8% in Milwaukee Junction have incomes below $10,000/year. Ninety percent of the population of Cody Rouge and Milwaukee Junction and 79% of 7/8 Mile–Woodward identify as Black or African American.

The Quello Center at Michigan State University, partnered with a local institution, the Center for Urban Studies' Survey Research Unit at Wayne State University, to conduct the survey in November and December 2017. A preliminary list of postal addresses from the three neighborhoods was generated by cross listing a full list of local addresses with the U.S. Postal Service's Coding Accuracy Support System. This system verifies address accuracy and eliminates addresses that are vacant and have been verified by individuals who have recently completed a change of address form. This reduced the list of occupied households from 9,917 homes to a list of 4,938 homes. We mailed an introductory and two reminder postcards to each address. Of these, postcards from 1,720 addresses were returned as undeliverable, reducing the total number of known, occupied homes to 3,218 households. (This put the estimated number of vacant homes at 67.6%.) The postcards provided a brief overview of the study; invited an adult from each household to call and complete a survey in the language of his/her choice, including Spanish, Arabic, or Polish; and offered participants an incentive - a $10 gift card to be used at a local store, as well as an opportunity to be included in a random drawing for a $100 Visa gift card. At the same time, the Survey Research Unit drew on an existing, but incomplete database of home/landline phone numbers from the three neighborhoods and called residents with an invitation to participate. (This approach had limited success because of a large proportion of disconnected numbers.) All surveys were completed over the phone.

The final sample included 525 completed interviews (92% call-in, 8% call-out). Thirty-four cases were dropped from our analyses due to missing data on one or more variables. The average participant was 53 years old (sd=15.8), female (81%), and Black or African-American (88%). More than one-third of participants reported a disability or health problem that prevented them from doing everyday tasks (36%). Participants were told that "according to the U.S. Census

Bureau, the average household income in Detroit is $26,000." The survey asked, "To the best of your knowledge, is your household income far below average [-2], below average [-1], average [0], above average [1] or far above average [2]?" (mean=-0.4, sd=1.1). Three-quarters of the sample (76%) reported that their annual household income was at or below the Detroit average income of $26,000. Education was measured on a seven-point scale that ranged from less than high school (1), high school/GED (2), some college (no degree; 3), 2-year associate degree (4), 4-year college degree (5), some postgraduate college (no degree; 6), to a postgraduate or professional degree, such as a Master's, Doctorate, medical or law degree (7) (mean=3.9, sd=1.6). Nearly half (48%) had a high school degree or some college experience (but no degree), 18% had a 2-year associates degree, and roughly one-third (34%) had a post-secondary degree. Thirty-five percent had children eighteen years old or younger living in their home, and 30% were married or living in a committed relationship.

A conservative participation rate is estimated at 12.1% of households, based on addresses validated through the delivery of a postcard (although we suspect that the actual vacancy rate could be higher, because postcards may have been delivered to unoccupied homes): Cody Rouge (N=344; participation rate: 10.7%), 7/8 Mile – Woodward (N=97, participation rate: 18.2%), and Milwaukee Junction (N=84, participation rate: 14.5%). Hampton (2007) used a similar methodology to survey predominately white, middle-class residents of four Boston area neighborhoods and reported a response rate of 26%. Survey nonresponse tends to be considerably higher among Black/African-American and low-income populations (Dillman, Smyth, & Christian, 2014). Given the challenges of surveying in this context, in addition to the high rate of vacant homes, we believe our methodology and resulting data are as robust as possible and representative of communities of concentrated disadvantage (Sampson, 2012).

Mode of Access and Variety of Use

Modes of access were measured as a series of dichotomies. Participants were asked if they had "a contract with an Internet service provider for your home" (home internet access, 62%), "currently a data plan on your cellphone" (mobile data plan, 65%), and if they used the Internet at "work" or "school" (work/school access, 39%) or in a library or other community space (public space, 37%). These four modes of access (work or school, public space, ISP, and data plan) were combined into a measure of breadth of access (0-4) (mean 2.0, SD 1.1).

The type and variety of use were based on six dichotomous variables. Participants were asked a binary, yes/no question, if they do any of these things online: shop (72.1%), get news (75.6%), download or stream music (62.1%), get health or medical information (74.9%), use social media, such as Facebook or Instagram (70.3%), and get information for school- or work-related projects (70.5%). These six items were combined into a measure of variety of activity (0-6) (mean 4.3, SD 1.8).

Local Social Capital

To measure local social capital, we used the resource generator approach pioneered by van der Gaag and Snijders (2005). The resource generator has undergone extensive validity testing and been used on a variety of populations in and outside the study of the Internet and related technologies (see Appel et al., 2014). Resource generators ask participants about their ability to access a range of specific resources through people whom they know. For example, participants might be asked if they know anyone who can "speak and write a foreign language" or "reads a professional journal" (van der Gaag & Snijders, 2005). The intent is not to enumerate all possible resources available through personal relationships, but to represent a range of resources, sometimes limited to a specific domain, that are more or less accessible. As such, access to the

specific resource is a proxy for access to a broader range of resources. The resulting index is a measure of the heterogeneity of resources available within a person's social network, and, as such, it is a particularly good measure of bridging social capital (Appel et al., 2014). Although the generators developed by van der Gaag and colleagues are widely used, no particular list of resource generators is considered standard. Rather, researchers develop a parsimonious list of resources specific to the individual research questions and context of the population under study. We adapted van der Gaag's index for the specific context of disadvantaged communities in Detroit and focused on a set of personal skills and support items. Participants were asked if they "know anyone who" knows a lot about computers; owns a second home; can give advice on conflict; knows about finances; plays an instrument; can help move; can recommend a hotel/restaurant; can lend a tool; and can lend a vehicle/give a ride. These nine items were combined in to an index of local social capital (mean 11.2, SD 4.4).

Analyses

We conducted three sets of analyses using M-plus 7.0 (Muthén & Muthén, 2012) based on maximum likelihood estimation. First, we conducted logistic regressions to examine the relationship between sociodemographic factors and different Internet activities. We then performed a series of regression analyses to specify a path model that incorporates direct and indirect relationships between sociodemographic factors, breadth of access, variety of use, and local social capital. To test the significance of any indirect effects in our model, we employed the bootstrapping approach provided by M-plus (Muthén & Muthén, 2012). The bootstrapping approach provides the most accurate inference for the indirect effects among other path analysis methods, because no assumption is made about the shape of sampling (Hayes, 2017). We used 5,000 bootstrapped, bias-corrected re-samples. Unlike the normal theory approach (i.e., the Sobel

test), the bootstrapping method provides a confidential interval. If a confidence interval does not contain zero, an indirect effect is statistically significant. In our final step, we used a linear regression to examine the relationships between different modes of Internet access and types of use and local social capital and predictors.

Results

Breadth of Access

As anticipated, different modes of access afford different types of activities, shown in Table 1. Internet access through a mobile phone data plan was associated with a higher likelihood of using the Internet for entertainment, social media, and getting news (H1a). Those with a data plan were 2.33 times more likely to use social media, 2.15 times more likely to download or stream music, and 1.71 times more likely to access news online, compared with those without a data plan. Unexpectedly, those with a data plan were also 1.66 times more likely to shop online. Like mobile data, accessing the Internet in a public place (e.g., library) was also associated with activities related to entertainment, such as streaming music (1.86 times more likely) and accessing news information (1.99 times more likely). Those who used the Internet in public spaces were 2.24 times more likely to use the Internet for health and medical information, and 2.50 times more likely to get information for school or work projects (H1b). Home access primarily afforded activities considered more private, such as finding health information (1.93 times more likely), and online shopping. Of all types of Internet access, access through an ISP at home was by far the strongest predictor of using the Internet for shopping online (3.43 times more likely). As hypothesized (H1d), access to the Internet through school and work was associated only with participation in online activities related to school or work (2.57 times).

[Table 1 about here]

Although mobile data plans and public access provided for participation in the most extensive number of online activities, no single mode of access afforded participation in a full range of activities. Online activities related to school or work were best afforded by access in those places or in a public place; and online shopping was more likely for those with a home ISP and/or a mobile data plan. Social media use was largely dependent on having a mobile data plan, and online news were largely consumed by those with mobile or public access.

While demonstrating the positive impact that public access and mobile phone access can have on opportunities to participate in online activities, these findings also reveal that public or mobile access alone is unlikely to enable participation in a diverse range of online activities. The mode of access seems to restrict some types of activities. For example, health information was less likely to be consumed by those who were limited to a mobile data plan or to work- and school-based access. Streaming music online was an unlikely activity for those who could access the Internet only at work, school, or through a home ISP. The breadth of access assured participation in the largest range of online activities.

Inequality in Access and Activity

As shown in Table 2, breadth of access is associated with a range of socioeconomic variables. As hypothesized, those with higher incomes (H2a; beta=.161) and a higher level of education (H2b; beta=.125) report using a wider range of modes to use the Internet. Whereas age (beta=-.391) and reporting a disability (beta=-.130) are negatively related to breadth of access, being married or living with a partner (beta=.079), as well as having children living in the home (beta=.097) are positively associated with having a greater range of modes of access to the Internet. As anticipated, and consistent with prior research on first-level digital divides, breadth of Internet

access is heavily dependent on higher socioeconomic status and the absence of inequalities, such as a disability.

[Table 2 about here]

Unlike breadth of access, variety of Internet use is not dependent on socioeconomic status. As hypothesized (H3), neither level of education nor income directly predicts engagement in a wider range of Internet activities. Once we control for breadth of access (beta=.335), age (beta=-.295) is the only significant socioeconomic predictor for variety of use. Access to one or a small number of modes of access limits the range of online activities. As documented in Table 3, a significant indirect, positive relationship persists between measures of education, income, and variety of use. Age (b=-.015) and disability (b=-.158) have significant, negative indirect relationships, whereas children living at home (b=.119) and being married or living with a partner (b=.101) have indirect, positive relationships to participation in a wide range of online activities. An ad hoc analysis (not shown) finds that when variables for breadth of access are not controlled for, education (p=0.020), but not income (p=0.075), has a direct relationship to the variety of Internet use. This highlights the analytical risk associated with failing to control for breadth of Internet access. Researchers may falsely identify variation in the activities that disadvantaged populations do online, attributing those differences to individual differences or inequalities in human capital, rather than to variation in the breadth of Internet access.

[Table 3 about here]

Local Social Capital

The path analysis in Figure 1 and Table 2 explores the relationship between socioeconomic status, breadth of access, variety of Internet use, and local social capital. Only two variables directly predict local social capital: variety of use (beta=.310) and education (beta=.173). Given

that years of education typically was among the strongest relationships to social capital (Appel et al., 2014), the magnitude of the relationship—roughly half that of breadth of access—is substantive.

[Figure 1 about here]

Table 3 outlines those variables that have significant indirect effects on local social capital. As expected (H4), there is a significant indirect relationship between breadth of access and local social capital mediated by variety of use (b=.216). There are additional indirect, negative relationships between age and social capital (b=-.006) and disability status (b=-.065), and positive, indirect contributions from education (b=.018), income (b=.035), being married or living with a partner (b=.041), and having children in the home (b=.049).

[Table 4 about here]

Whereas the variety of Internet use directly predicts local social capital, not all Internet activities may be related to local social capital. Table 4 shows the results of a regression that predicts local social capital based on participation in specific Internet activities. As expected, the relationship between the variety of use and local social capital is driven by a subset of online activities. Getting news online (H5a), health and medical information (H5b), and online shopping (H5d) were associated with higher local social capital. Getting health or medical information (beta=.160), getting news information (beta=.116), and shopping (beta=.108) were all positively related to local social capital. Unexpectedly, social media use was not associated with local social capital (H5c), nor were music streaming or using the Internet for school or work. Using the parsimonious measure of variety of Internet use based only on online activities that are social capital-enhancing, an ad hoc analysis (not shown) that replicates the path model in Table 2 demonstrates increased precision in estimating the population parameter for the indirect

relationship to breadth of access (95% LCI=.046, 95% UCI=.126) and a slightly larger coefficient (increasing from .216 to .237). This increases confidence in the finding of an indirect relationship between breadth of use and local social capital that is mediated by variety of *capital-enhancing* Internet activities.

Discussion

Internet access in disadvantaged, inner city neighborhoods is considerably lower than in most other urban contexts across the United States. This digital divide is driven by a combination of factors, including cost, gaps in broadband infrastructure, and lower adoption rates fueled by uncertainty about the value of the Internet (Tsai & LaRose, 2015). As such, the benefits of Internet use in these contexts, such as higher levels of local social capital (Hampton, 2010; Mesch, 2012), are often unrealized. This contributes to a widening of the divide between advantaged and disadvantaged populations.

The phenomenal uptake of mobile Internet has contributed to the thesis that accessing the Internet through mobile phones and data plans may be enough to tackle digital divides. Our findings challenge this thesis. We explored the relationship between the mode of Internet access, participation in various online activities, and local social capital in the context of one of the United States' most disadvantaged urban environments, the City of Detroit. We found support for our hypotheses (H1a-d) that different modes of access – at home, in public, at work/school, and through mobile phones – afford participation in different online activities. Multimodal users, those whom Dutton and Blank (2014) call "next generation users," who have access to a broad range of access points and devices, make more varied use of the Internet (Hargittai et al., 2018; Stern et al., 2009). Moreover, as hypothesized (H2a-b), divides in income and education largely predict this greater breadth of access.

Whereas those with higher education and incomes are most likely to go online through multiple modes of access, we also found that the breadth of access was more restricted for those who were older and those with disabilities (Dobranksy & Hargittai, 2016), and more common for those who are married or have children. Contrary to the common assumption that socioeconomic variables predict variety of Internet use, in the context of disadvantaged communities in Detroit, it is the *breadth of access*, not socioeconomic background (H3), that shapes variation in the breadth of activities that residents engage in online. In line with previous research, once we controlled for breadth of access, having a disability did not in predict variation in the kinds of activities respondents engaged online (Dobransky & Hargittai, 2016). For those with a disability, addressing constraints on diversity of access may play a major role in addressing digital divides related to engagement in disparate online activities.

We expected that using the Internet for a variety of uses rather than simply having Internet access would drive the relationship to social capital. We verified an indirect relationship between the breadth of access and local social capital that was mediated by the variety of Internet activities in which people engage (H4). This finding adds support to van Deursen, Helsper, Eynon, and van Dijk's (2017) work on sequential and compound digital inequalities. In line with their position, we recognize the potential recursive nature of our findings. It is conceivable, if not likely, that higher levels of social capital contribute to diversity in modes of access, as well as more frequent and diverse Internet activities.

The range of online activities that contribute to local social capital include accessing news (H5a) and health information (H5b), as well as online shopping (H5d), but not, as we expected, the simple use of social media (H5c). Although other research generally supports a link between social media use and social capital, research on *local* social capital is more inconsistent.

Some reports show that early adopters tended to know fewer neighbors (Hampton, Lee, & Her, 2011), whereas later reports found that this relationship had disappeared (Hampton, Sessions Goulet, Rainie, & Purcell, 2011). The broader relationship between news information and local social capital has been more consistently established (Ball-Rokeach et al., 2001; Shah, 1998), as is the link between searching for health information and social capital (Rice, 2006; Putnam, 2000). Yet, some may question a link between online shopping and social capital. One possible interpretation is that online shopping (which generally requires a credit card) is a proxy for socioeconomic status. But, because we control for income, we find this explanation unlikely. Whereas online shopping may appear as a luxury, it is increasingly used at all levels of shopping, from luxury goods to single items paid for at a grocery store till. In line with this, Etumnu and colleagues (2019) find that the primary drivers of online grocery shopping are time and economic savings. Poor and minority areas have fewer retail outlets, including stores for groceries, drugs, and clothing (Alwitt & Donley, 1997; Powell, Slater, Mirtcheva, Bao, & Chaloupka, 2007). Local stores in low-income areas tend to have less selection and to be less affordable (Page & Ridgway, 2001). It is estimated that a typical U.S. consumer can save $8,800 a year by shopping for goods and services online (Wheeler & Clyburn, 2015). Although the inner-city neighborhoods of Detroit are not typical in terms of their average income or expenditures, they may still reap significant economic savings through online commerce. When physical shopping is difficult, because of the absence of stores or other inconveniences, travel for shopping may also displace time that would otherwise be invested in local social capital.

Our sampling of online activities was limited by our approach to data collection. Survey research is often constrained in its ability to differentiate exposure and engagement with media and content. It is likely that, in addition to the activities discussed in this paper, there are other

online activities that contribute to local social capital. Activities that we found to be related to local social capital were those that served as sources of information on public affairs, health information, and activities that allowed people to recoup time to potentially reinvest in local engagement. The list of activities could be further differentiated and expanded to include similar activities, such as use of local discussion forums, online banking, looking up product and price information (Zillien & Hargittai, 2009), online government services, and use of do-it-yourself (DIY) videos and resources (Hargreaves & Hartley, 2016). However, as with the activities we have already explored, these too are likely to be dependent on different modes of access. For example, watching DIY videos may consume large amounts of data, thus have limited use through mobile phone plans with limited bandwidth and data caps, while activities like completing government forms may be so private that they are relegated to home access. Given the wide range of possible online activities, future research might focus on differentiated versions of the activities we have identified, and a qualitative approach that would allow for a more detailed exploration of how online activities are linked to local social capital.

Conclusion

Residents of distressed, urban areas are disproportionately affected by limits to the extent of their Internet access, which constrains what they do online. In response, as part of broader initiatives aimed at reversing urban decline, public policy initiatives have focused on providing Internet access as an intervention to help reduce social and economic inequalities. Policies often focus on providing Internet access in public spaces, such as libraries, and increasingly, by providing mobile data plans in place of at home Internet access. These initiatives are based on the premise that where and how people access the Internet does not affect what people do online or outcomes such as social capital. Our findings show that no *single* mode of access was linked

to the full range of capital-enhancing Internet activities. Access through a mobile data plan afforded access to news information and online shopping, whereas public access afforded news and medical information but not e-commerce. Although home-based access through an ISP afforded the more private activities of accessing medical information and online shopping, it was less likely to afford access to news information. Internet access at work and school had a specialized affordance for completing work and school projects that did not contribute to local social capital. The social infrastructure of disadvantaged urban communities cannot be made whole by leapfrogging home access or omitting the need for diverse points of Internet connectivity. Polices that hope to reduce social and digital divides by focusing on the provision of a single type of Internet access could therefore fall short of affording the same kinds of uses and opportunities that are associated with varied types of access. It is, therefore, crucial that policymakers consider supporting a wide range of modes of access to enable an equally wide range of online activities. This diversity of activities, we posit, could then contribute to increasing local social capital in distressed, urban communities.

Author Information

Bianca C. Reisdorf, Department of Communication Studies, University of North Carolina at Charlotte, bianca.reisdorf@uncc.edu.

Laleah Fernandez, Department of Media and Information, Michigan State University, fernan85@msu.edu.

Keith N. Hampton, Department of Media and Information, Michigan State University, khampton@msu.edu.

Inyoung Shin, Department of Communication, University of Wisconsin-Milwaukee, kongse87@gmail.com.

William H. Dutton, Quello Center, Michigan State University, Oxford Internet Institute, University of Oxford, william.dutton@cs.ox.ac.uk.

Data Availability

The data used in this study are available from Professor William H. Dutton and should be requested via email at william.dutton@cs.ox.ac.uk.

Software Information

We conducted the analyses in this paper using M-plus 7.0.

References

Alwitt, L. F., & Donley, T. D. (1997). Retail Stores in Poor Urban Neighborhoods. *Journal of Consumer Affairs*, 31(1), 139-164.

Amblee, N., & Bui, T. (2011). Harnessing the influence of social proof in online shopping: The effect of electronic word of mouth on sales of digital microproducts. *International Journal of Electronic Commerce, 16*(2), 91-114.

Appel, L., Dadlani, P., Dwyer, M., Hampton, K. N., Kitzie, V., Matni, Z. A., Moore, P., & Teodoro, R. (2014). Testing the validity of social capital measures in the study of information and communication technologies. *Information, Communication & Society*, 17(4), 398-416.

Armenta, Á., Serrano, A., Cabrera, M., & Conte, R. (2012). The new digital divide: the confluence of broadband penetration, sustainable development, technology adoption and community participation. *Information Technology for Development, 18*(4), 345-353.

Ball-Rokeach, S. J., Kim, Y.-C., & Matei, S. (2001). Storytelling Neighborhood: Paths to Belonging in Diverse Urban Environments. *Communication Research*, 28(4), 429-463.

Berman, S. (2007). Classism in the stacks. *Journal of Information Ethics*, 103.

Bertot, J. C., Real, B., & Jaeger, P. T. (2016). Public Libraries Building Digital Inclusive Communities: Data and Findings from the 2013 Digital Inclusion Survey. *The Library Quarterly*, 86(3), 270-289.

Bobkowski, P. S., Jiang, L., Peterlin, L. J., & Rodriguez, N. J. (2019). Who Gets Vocal About Hyperlocal. *Journalism Practice*, 13(2), 159-177.

Bourdieu, P. (2002). The Forms of Capital. In N. W. Biggart (Ed.), *Readings in Economic Sociology* (pp. 280–291). Oxford, UK: Blackwell Publishers Ltd.

Brown, K., Campbell, S. W., & Ling, R. (2011). Mobile Phones Bridging the Digital Divide for Teens in the US? *Future Internet*, 3(2), 144-158.

Buschman, J. (2018). On Democracy and Libraries. *The Library Quarterly*, 88(1), 23-40.

Chircu, A. M., & Mahajan, V. (2009). Perspective: Revisiting the digital divide: An analysis of mobile technology depth and service breadth in the BRIC countries. *Journal of Product Innovation Management*, *26*(4), 455-466.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American journal of sociology*, *94*, S95-S120.

Davis, J. L., & Chouinard, J. B. (2016). Theorizing Affordances: From Request to Refuse. Bulletin of Science, Technology & Society, 36(4), 241-248.

Dailey, D., Bryne, A., Powell, A., Karaganis, J., & Chung, J. (2010). *Broadband adoption in low-income communities.* Brooklyn, NY: Social Science Research Council.

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). Internet, mail, and mixed-mode surveys. Hoboken, NJ: John Wiley.

DiMaggio, P., & Hargittai, E. (2001). *From the 'digital divide' to 'digital inequality': Studying Internet use as penetration increases*. Princeton, NJ: Sociology Department, Princeton University.

Dixon, L. J., Correa, T., Straubhaar, J., Covarrubias, L., Graber, D., Spence, J., & Rojas, V. (2014). Gendered space: The Digital divide between male and female users in internet public access sites. *Journal of Computer-Mediated Communication*, *19*(4), 991-1009.

Dobransky, K., & Hargittai, E. (2016). Unrealized potential: Exploring the digital disability divide. *Poetics*, *58*, 18-28.

Doha, A., Elnahla, N., & McShane, L. (2019). Social commerce as social networking. *Journal of Retailing and Consumer Services*, 47, 307-321

Dotson, T. (2017). *Technically Together: Reconsidering Community in a Networked World.* Cambridge: MIT Press.

Dunaway, J., Searles, K., Sui, M., & Paul, N. (2018). News Attention in a Mobile Era. *Journal of Computer-Mediated Communication, 23*(2), 107-124.

Dutton, W. H., & Blank, G. (2014). The emergence of next generation internet users. *International Economics and Economic Policy*, *11*(1-2), 29-47.

Dutton, W. H., & Blank, G. (2013). *Cultures of the Internet: The internet in Britain. Oxford internet survey 2013 report*. Oxford: Oxford Internet Institute.

Dutton, W. H., & Reisdorf, B. C. (2019). Cultural divides and digital inequalities: attitudes shaping Internet and social media divides. *Information, Communication & Society*, *22*(1), 18-38.

Etumnu, C. E., Foster, K. A., Widmar, N. O., Lusk, J. L., & Ortega, D. L. (2019). *Drivers of Online Grocery Shopping (No. 290858).* Agricultural and Applied Economics Association.

Gad, S., Ramakrishnan, N., Hampton, K. N., & Kavanaugh, A. (2012, December). Bridging the divide in democratic engagement: Studying conversation patterns in advantaged and disadvantaged communities. In *Social Informatics (SocialInformatics), 2012 International Conference on* (pp. 165-176). IEEE.

Goh, D., Ling, R., Huang, L., & Liew, D. (2019). News sharing as reciprocal exchanges in social cohesion maintenance. *Information, Communication & Society*, 22(8), 1128-1144.

Gonzales, A. (2016). The contemporary US digital divide: from initial access to technology maintenance. *Information, Communication & Society*, *19*(2), 234-248.

Gonzales, A., Ems, L., & Suri, V. R. (2016). Cell phone disconnection disrupts access to healthcare and health resources. *New Media & Society 18*(6), 1422-1438.

Graham, L. (2018, February 16). Detroit's true unemployment rate. *Michigan Radio.* Retrieved from http://www.michiganradio.org/post/detroits-true-unemployment-rate

Hale, T. M., Goldner, M., Stern, M., Drentea, P., & Cotten, S. R. (2014). Patterns of online health searching 2002–2010: Implications for social capital, health disparities and the de-professionalization of medical knowledge. In *Technology, Communication, Disparities and Government Options in Health and Health Care Services* (pp. 35-60). Emerald Group Publishing Limited.

Hampton, K. N. (2003). Grieving for a Lost Network: Collective Action in a Wired Suburb. *The Information Society*, *19*(5), 417-428.

Hampton, K. N. (2007). Neighborhoods in the Network Society: The e-Neighbors Study. *Information, Communication and Society, 10*(5), 714-748.

Hampton, K. N. (2010). Internet Use and the Concentration of Disadvantage. *American Behavioral Scientist, 53*(8), 1111-1132.

Hampton, K. N. (2011). Comparing Bonding and Bridging Ties for Democratic Engagement: Everyday Use of Communication Technologies within Social Networks for Civic and Civil Behaviors. *Information, Communication & Society, 14*(4), 510-528.

Hampton, K., Sessions Goulet, L. S., Rainie, L., & Purcell, K. (2011). Social networking sites and our lives. *Pew Internet & American Life Project, 16*, 1-85.

Hampton, K. N., Lee, C., & Her, E. J. (2011). How new media affords network diversity: Direct and mediated access to social capital through participation in local social settings. *New Media & Society*, *13*(7), 1031–1049.

Hampton, K. N., Livio, O., & Sessions Goulet, L. (2010). The social life of wireless urban spaces: Internet use, social networks, and the public realm. *Journal of communication*, *60*(4), 701-722.

Hampton, K. N., & Wellman, B. (2018). Lost and Saved… Again: The Moral Panic about the Loss of Community Takes Hold of Social Media. *Contemporary Sociology*, 47(6).

Hampton, K. N, & Wellman, B. (2003). Neighboring in Netville: How the Internet Supports Community and Social Capital in a Wired Suburb. *City and Community*, *2*(4), 277–311.

Hargittai, E., & Dobransky, K. (2017). Old Dogs, New Clicks: Digital Inequality in Skills and Uses among Older Adults. *Canadian Journal of Communication, 42*(2). Available at: https://cjc-online.ca/index.php/journal/article/view/3176

Hargittai, E., Piper, A. M., & Morris, M. R. (2018). From internet access to internet skills: digital inequality among older adults. *Universal Access in the Information Society*, 1-10.

Hargreaves, I., & Hartley, J. (Eds.). (2016). *The creative citizen unbound: How social media and DIY culture contribute to democracy, communities and the creative economy*. Bristol, United Kingdom: Policy Press.

Hassani, S. N. (2006). Locating digital divides at home, work, and everywhere else. *Poetics*, *34*(4), 250-272.

Hayes, A. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: Guilford Press.

Hoogerbrugge, M. M., & Burger, M. J. (2018). Neighborhood-Based social capital and life satisfaction: the case of Rotterdam, The Netherlands. *Urban Geography, 39*(10), 1484-1509.

Hristova, D., Williams, M. J., Musolesi, M., Panzarasa, P., & Mascolo, C. (2016). Measuring Urban Social Diversity Using Interconnected Geo-Social Networks. *Proceedings of the 25th International Conference on World Wide Web*. Montreal, Canada.

Katz, V. S., Moran, M. B. & Ognyanova, K. (2019) Contextualizing connectivity: how internet connection type and parental factors influence technology use among lower-income children, *Information, Communication & Society, 22*(3), 313-335.

Kavanaugh, A., Puckett, A., & Tatar, D. (2013). Scaffolding technology for low literacy groups: From mobile phone to desktop PC?. *International Journal of Human-Computer Interaction, 29*(4), 274-288.

Kelley, M. J. (2014). Urban experience takes an informational turn: mobile internet usage and the unevenness of geosocial activity. *GeoJournal, 79*(1), 15-29.

Kim, Y.-C., Lim, J. Y., & Park, K. (2015). Effects of Health Literacy and Social Capital on Health Information Behavior. *Journal of Health Communication, 20*(9), 1084-1094.

Kim, Y.-C., Shin, E., Cho, A., Jung, E., Shon, K., & Shim, H. (2019). SNS Dependency and Community Engagement in Urban Neighborhoods: The Moderating Role of Integrated Connectedness to a Community Storytelling Network. *Communication Research, 46*(1), 7-32

Kim, Y.-L. (2018). Seoul's Wi-Fi hotspots: Wi-Fi access points as an indicator of urban vitality. *Computers, Environment and Urban Systems, 72*, 13-24.

Klinenberg, E. (2018). *Palaces for the people : how social infrastructure can help fight inequality, polarization, and the decline of civic life*. New York: Broadway Books.

Kneebone, E., & Holmes, N. (2016), *U.S. Concentrated Poverty in the Wake of the Great Recession*, Brookings [Online]. Available at: https://www.brookings.edu/research/u-s-concentrated-poverty-in-the-wake-of-the-great-recession/

KPMG (2017). *2017 Global Online Consumer Report.* Available online: https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2017/01/the-truth-about-online-consumers.pdf

Kumar, D., Hemmige, V., Kallen, M. A., Giordano, T. P., & Arya, M. (2019). Mobile Phones May Not Bridge the Digital Divide: A Look at Mobile Phone Literacy in an Underserved Patient Population. *Cureus*, *11*(2), e4104-e4104.

Kyem, P. A. K., & LeMaire, P. K. (2006). Transforming recent gains in the digital divide into digital opportunities: Africa and the boom in mobile phone subscription. *The Electronic Journal of Information Systems in Developing Countries*, *28*(1), 1-16.

Lai, C., & Chen, W. (2016). Welcome to the Club: From Multimodal Voluntary Participation to Community Involvement. *International Journal of Communication*, *10*(25).

Lee, H., Park, N., & Hwang, Y. (2015). A new dimension of the digital divide: Exploring the relationship between broadband connection, smartphone use and communication competence. *Telematics and Informatics*, *32*(1), 45-56.

Livingstone, S., & Helsper, E. (2007). Gradations in digital inclusion: Children, young people and the digital divide. *New Media & Society, 9,* 671–696.

Maass, R., Kloeckner, C. A., Lindstrøm, B., & Lillefjell, M. (2016). The impact of neighborhood social capital on life satisfaction and self-rated health: A possible pathway for health promotion?. *Health & Place, 42*, 120-128.

Marler, W. (2018). Mobile phones and inequality: Findings, trends, and future directions. *New Media & Society*, *20*(9), 3498-3520.

Mascheroni, G., & Ólafsson, K. (2016). The mobile Internet: Access, use, opportunities and divides among European children. *New Media & Society*, *18*(8), 1657-1679.

Mesch, G. S. (2012). Minority Status and the Use of Computer-Mediated Communication: A Test of the Social Diversification Hypothesis. *Communication Research*, *39*(3), 317–337.

Mesch, G. S., & Levanon, Y. (2003). Community Networking and Locally-Based Social Ties in Two Suburban Localities. *City & Community*, *2*(4), 335-351.

Moore, M. D., & Recker, N. L. (2017). Social Capital Groups and Crime in Urban Counties. *Deviant Behavior*, *38*(6), 655-667.

Mosconi, G., Korn, M., Reuter, C., Tolmie, P., Teli, M., & Pipek, V. (2017). From Facebook to the Neighbourhood: Infrastructuring of Hybrid Community Engagement. *Computer Supported Cooperative Work (CSCW)*, *26*(4), 959-1003.

Mossberger, K., Tolbert, C. J., & Anderson, C. (2014, July). Digital citizenship: Broadband, mobile use, and activities online. In *International Political Science Association conference, Montreal*.

Muthén, L. K., & Muthén, B. O. (2012). Mplus: Statistical analysis with latent variables (Version 7) [Computer software]. Los Angeles, CA: Muthén & Muthén.

Napoli, P. M., & Obar, J. A. (2014). The emerging mobile Internet underclass: A critique of mobile Internet access. *The Information Society*, *30*(5), 323-334.

Norris, P. (2001). *Digital divide: Civic engagement, information poverty, and the Internet worldwide*. Cambridge University Press.

Norris, P. (1996). Does television erode social capital? A reply to Putnam. *PS: Political Science & Politics*, *29*(3), 474-480.

Page, C., & Ridgway, N. (2001). The impact of consumer environments on consumption patterns of children from disparate socioeconomic backgrounds. *Journal of Consumer Marketing*, 18(1), 21-40.

Park, Y. J. (2015). My whole world's in my palm! The second-level divide of teenagers' mobile use and skill. *New Media & Society*, *17*(6), 977-995.

Pearce, K. E., & Rice, R. E. (2013). Digital divides from access to activities: Comparing mobile and personal computer Internet users. *Journal of Communication*, *63*(4), 721-744.

Perrin, A. (2017). Smartphones help blacks, Hispanics bridge some - but not all - digital gaps with whites. *Pew Research Center.* Retrieved from http://www.pewresearch.org/fact-tank/2017/08/31/smartphones-help-blacks-hispanics-bridge-some-but-not-all-digital-gaps-with-whites/

Pew Research Center (2018). *Internet/Broadband Fact Sheet.* Retrieved from http://www.pewinternet.org/fact-sheet/internet-broadband/

Powell, L. M., Slater, S., Mirtcheva, D., Bao, Y., & Chaloupka, F. J. (2007). Food store availability and neighborhood characteristics in the United States. *Preventive Medicine*, 44(3), 189-195.

Przybylski, A. K., Orben, A., & Weinstein, N. (2019). How Much Is Too Much? Examining the Relationship Between Digital Screen Engagement and Psychosocial Functioning in a

Confirmatory Cohort Study. *Journal of the American Academy of Child & Adolescent Psychiatry*.

Puspitasari, L., & Ishii, K. (2016). Digital divides and mobile Internet in Indonesia: impact of smartphones. *Telematics and Informatics*, *33*(2), 472-483.

Putnam, R. D. (2000). *Bowling alone*. New York, NY: Simon & Schuster.

Ragnedda, M., & Muschert, G. W. (2013). *The digital divide: The internet and social inequality in international perspective.* New York, NY: Routledge.

Rhinesmith, C. (2012). Free library hot spots: Supporting broadband adoption in Philadelphia's low-income communities. *International Journal of Communication, 6*, 2529–2554.

Rice, R. E. (2006). Influences, usage, and outcomes of Internet health information searching. *International journal of medical informatics*, *75*(1), 8-28.

Rogers, E. M. (2001). The digital divide. *Convergence*, *7*(4), 96-111.

Sampson, R. J. (2012). *Great American City: Chicago and the Enduring Neighborhood Effect.* Chicago, IL: University of Chicago Press.

Shah, D. V. (1998). Civic engagement, interpersonal trust, and television use: An individual-level assessment of social capital. *Political Psychology*, *19*(3), 469-496.

Shah, D. V., Kwak, N. R., & Holbert, L. D. (2001). "Connecting" and "Disconnecting" With Civic Life: Patterns of Internet Use and the Production of Social Capital. *Political Communication, 18*(2), 141–162.

Skoric, M. M., Zhu, Q., Goh, D., & Pang, N. (2016). Social media and citizen engagement: A meta-analytic review. *New Media & Society, 18*(9), 1817-1839.

Stebbins, S., Sauter, M. & Comen, E. (2017, July 21). Detroit remains most segregated city in America. Detroit Stats. Retrieved from http://detroitstats.com/detroit-continues-as-the-most-segregated-city-in-america/

Stern, M. J., Adams, A. E., & Elsasser, S. (2009). Digital inequality and place: The effects of technological diffusion on Internet proficiency and usage across rural, suburban, and urban counties. *Sociological Inquiry*, *79*(4), 391-417.

Tsai, H. Y. S., & LaRose, R. (2015). Broadband Internet adoption and utilization in the inner city: A comparison of competing theories. *Computers in Human Behavior*, *51*, 344-355.

Tsetsi, E., & Rains, S. A. (2017). Smartphone Internet access and use: Extending the digital divide and usage gap. *Mobile Media & Communication, 5*(3), 239-255.

Turkle, S. (2015). *Reclaiming Conversation: The Power of Talk in a Digital Age*. Penguin Press.

Turner, S. D. (2016). *Digital Denied: The Impact of Systemic Racial Discrimination on Home-Internet Adoption. Free Press Report.* Retrieved from https://www.freepress.net/sites/default/files/legacy-policy/digital_denied_free_press_report_december_2016.pdf

Van der Gaag, M., & Snijders, T. A. (2005). The Resource Generator: social capital quantification with concrete items. *Social Networks*, *27*(1), 1-29.

Van Deursen, A. J., & Helsper, E. J. (2015). The third-level digital divide. In *Communication and Information Technologies Annual* (pp. 29-52). Emerald Group.

Van Deursen, A. J., Helsper, E., Eynon, R., & van Dijk, J. A. (2017). The compoundness and sequentiality of digital inequality. *International Journal of Communication, 11*, 452-473.

Van Deursen, A. J., & van Dijk, J. A. (2019). The first-level digital divide shifts from inequalities in physical access to inequalities in material access. *new media & society*, *21*(2), 354-375.

Wang, L., & Liu, C. (2018). The mobile Internet underclass: Reality or hyperbole?. *Journal of Information Science*, *44*(5), 569-579.

Wheeler, T., & Clyburn, M. (2015, October 27). *Detroit's Digital Divide.* Retrieved from https://www.fcc.gov/news-events/blog/2015/10/27/detroits-digital-divide

Wijetunga, D. (2014). The digital divide objectified in the design: Use of the mobile telephone by underprivileged youth in Sri Lanka. *Journal of Computer-Mediated Communication*, *19*(3), 712-726.

Zillien, N., & Hargittai, E. (2009). Digital distinction: Status specific types of internet usage. *Social Science Quarterly*, *90*(2), 274–291.

Willis, K. S. (2017). *Netspaces: Space and place in a networked world.* London: Routledge.

Table 1. Logistic regressions predicting different types of Internet use (N=491)

	Social media	**Download music**	**News**	**Health / medical info**	**School / work info**	**Shop**
	Odds ratio	Odds ratio	Odds ratio	Odds ratio	Odds ratio	Odds ratio
Age	.97**	.956***	.981*	.985	.962***	.953***
Male	1.209	1.214	1.862*	1.012	1.116	.892
Black	.97	1.13	1.059	.855	.86	1.114
Disability	1.146	1.231	.885	1.354	.822	.936
Education	1.105	1.038	1.032	1.041	1.14	1.07
Income	1.004	1.062	1.126	1.041	.926	1.222
Married or partner	.857	1.033	1.323	1.15	1.238	.967
Children at home	2.216**	.812	1.26	.977	1.974 *	1.109
Cody Rouge	1.408	.78	.876	1.118	1.033	.943
Seven Mile	1.288	1.056	1.11	1.054	1.068	.523
Data plan	2.325***	2.149**	1.712*	1.219	1.364	1.657*
Work/school	1.724	1.016	1.129	1.269	2.565**	1.458
Public access	1.499	1.855**	1.991*	2.241**	2.502**	1.227
ISP	1.263	1.41	1.443	1.931**	1.109	3.434***
constant	2.663	7.506**	3.337	2.467	4.702*	5.795**
pseudo-R^2	.184	.162	.097	.07	.226	.215

*p < .05. **p < .01. ***p < .001

Table 2. Path analysis (N=491)

	Breadth of access			**Variety of use**			**Local capital**		
	b	beta	(s.e.)	b	beta	(s.e.)	b	beta	(s.e.)
Age	-.028	-.391***	(.003)	-.033	-.295***	(.005)	.015	.102	(.008)
Male	-.163	-.057	(.112)	.181	.041	(.173)	-.082	-.014	(.253)
Black	.084	.028	(.119)	.035	.007	(.183)	.012	.002	(.267)
Disability	-.301	-.130**	(.095)	.066	.018	(.147)	.220	.046	(.214)
Education	.085	.125**	(.028)	.061	.057	(.043)	.245	.173***	(.063)
Income	.161	.161***	(.042)	.036	.023	(.065)	.169	.082	(.095)
Married or partner	.191	.079*	(.094)	.132	.035	(.145)	.281	.056	(.212)
Children at home	.226	.097*	(.102)	.233	.064	(.158)	.192	.040	(.231)
Cody Rouge	.034	.014	(.122)	-.005	-.001	(.187)	-.533	-.108	(.273)
Seven Mile	-.062	-.021	(.151)	-.033	.007	(.232)	-.659	-.109	(.338)
Breadth of access				.525	.335***	(.069)	.055	.027	(.107)
Variety of use							.410	.310***	(.066)
constant	3.141	***	(.270)	4.529	***	(.457)	3.419	***	(.779)
R^2	.289			.317			.168		

*p < .05. **p < .01. ***p < .001

Table 3. Significant indirect effects from path analysis (N=491)

	b	(s.e.)	95% CI	
			Lower limit	Upper limit
Education→ Breadth of access→ Variety of use	.045	(.016)	.016	.079
Age→ Breadth of access→ Variety of use	-.015	(.003)	-.020	-.010
Disability→ Breadth of access→ Variety of use	-.158	(.059)	-.286	-.055
Income→ Breadth of access→ Variety of use	.084	(.024)	.039	.133
Married→ Breadth of access→ Variety of use	.101	(.052)	.004	.208
Children→ Breadth of access→ Variety of use	.119	(.057)	.006	.233
Breadth of access→ Variety of use→ Local capital	.216	(.051)	.117	.318
Education→ Breadth of access→ Variety of use→ Local capital	.018	(.007)	.006	.034
Age→ Breadth of access→ Variety of use→ Local capital	-.006	(.002)	-.010	-.003
Disability→ Breadth of access→ Variety of use→ Local capital	-.065	(.028)	-.126	-.020
Income→ Breadth of access→ Variety of use→ Local capital	.035	(.012)	.014	.061
Married→ Breadth of access→ Variety of use→ Local capital	.041	(.023)	.001	.090
Children→ Breadth of access→ Variety of use→ Local capital	.049	(.025)	.002	.104

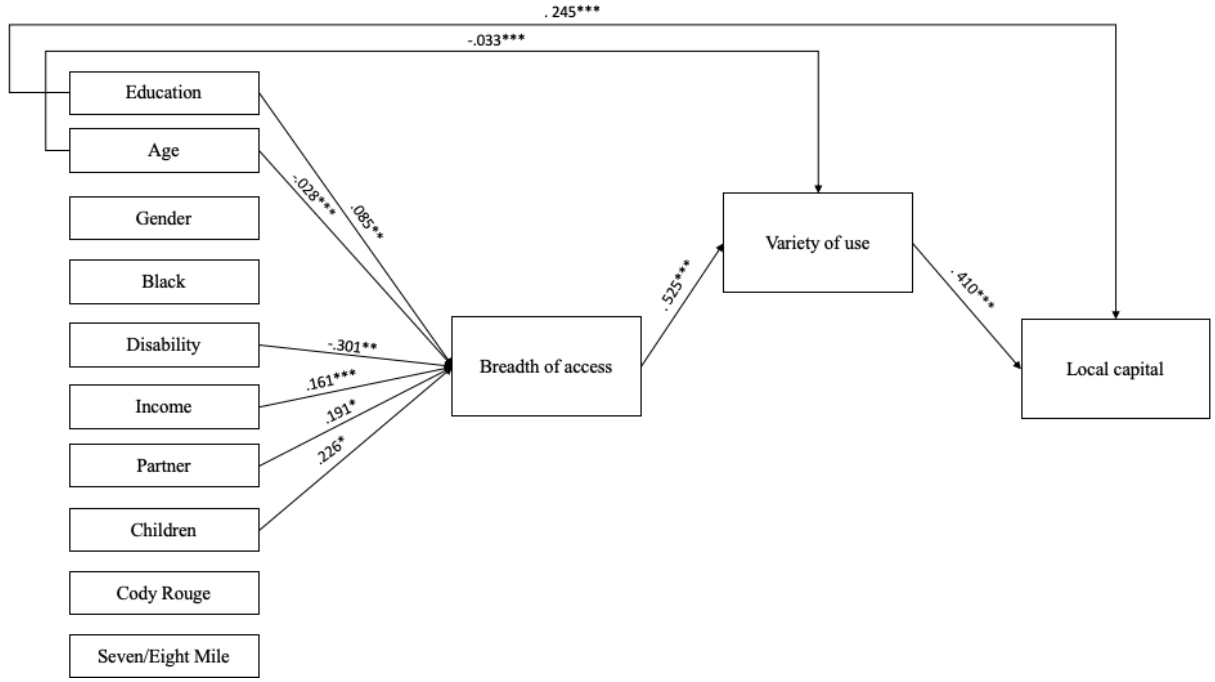
Table 4. Linear regression predicting local social capital (N=491)

	b	beta		(s.e.)
Education	.249	.177	***	(.063)
Age	.012	.081		(.008)
Male	-.073	-.012		(.251)
Black or African American	.034	.005		(.265)
Disability	.228	.047		(.216)
Income level	.161	.078		(.096)
Married or partner	.277	.055		(.211)
Children at home	.199	.041		(.232)
Cody Rouge	-.558	-.114	*	(.272)
Seven Mile	-.641	-.106		(.338)
Data plan	.156	.033		(.221)
Work/school access	.111	.023		(.237)
Public access	.024	.005		(.217)
ISP	-.039	-.008		(.217)
Social media	.309	.061		(.242)
Download or stream music	-.134	-.028		(.227)
News	.627	.116	*	(.259)
Health or medical information	.856	.160	**	(.249)
School / work information	.203	.040		(.248)
Shop	.560	.108	*	(.256)

constant	3.484		***	(.740)
R^2	.184			

*p < .05. **p < .01. ***p < .001.

Figure 1. Path analysis for breadth of access on variety of use and local social capital



*$p < .05$. **$p < .01$. ***$p < .001$; N=491. Only significant paths shown.