

This article was downloaded by: [173.71.24.124]

On: 20 May 2013, At: 10:38

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Mobilities

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/rmob20>

Splintered Space: Hybrid Spaces and Differential Mobility

Jordan Frith^a

^a Communication & English Departments, North Carolina State University, Raleigh, Virginia, USA

Published online: 19 Jan 2012.

To cite this article: Jordan Frith (2012): Splintered Space: Hybrid Spaces and Differential Mobility, *Mobilities*, 7:1, 131-149

To link to this article: <http://dx.doi.org/10.1080/17450101.2012.631815>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.tandfonline.com/page/terms-and-conditions>

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae, and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

Splintered Space: Hybrid Spaces and Differential Mobility

JORDAN FRITH

Communication & English Departments, North Carolina State University, Raleigh, Virginia, USA

ABSTRACT *Early theories of the internet imagined that individuals would begin living most of their lives online, decreasing the importance of physical mobility and urban spaces. With the development of internet-enabled mobile phones, these early predictions have been proven false. The internet has not decreased the importance of physical mobility; instead, the digital information of the internet has begun to merge with physical space, leading to new types of hybrid spaces. These hybrid spaces are becoming increasingly common, and they may change the way physical space is negotiated and understood. At this early juncture, however, it is crucial to critically examine the development of hybrid spaces and how they may lead to issues of exclusion and exacerbate issues of access. This essay takes a critical approach to the development of hybrid spaces, arguing that what is often lost in discourses about these new understandings of space are questions of who gets to experience this convergence of the digital and the physical.*

KEY WORDS: Mobile technologies; hybrid space; smartphones; mobility; access

Introduction

The most common theoretical approach to information communication technologies addresses how they shift time-space relationships, often discussing how they overcome both spatial and temporal constraints (Giddens, 1990; Virilio, 1997, 2000; Castells, 2000). These approaches represent the tendency to focus so much on informational flows that we forget that for information to flow, it must flow through specific places. Much of the literature on access disparities falls into this trap, examining how people who do not have access to digital technologies are left out of the global networks of information and capital flows. No doubt they are, and as Erikson (2005) says about Castells' (2000) network society, the organising logic of these new information networks is exclusion. But too often we become enamored with how technology compresses space between two points, ignoring how they change the perceptions of space at those two points. Focusing only on how unequal

Corresponding Address: Jordan Frith, Communication & English Departments, 122 Winston Hall, North Carolina State University, 4436 Stonewall Drive, Raleigh NC 27604, Virginia, USA. Email: jhfrith@ncsu.edu

1745-0101 Print/1745-011X Online/12/010131–19 © 2012 Taylor & Francis
<http://dx.doi.org/10.1080/17450101.2012.631815>

access excludes individuals from the global flows of information misses an important point: with the rise of digital technologies, the less fortunate are also being excluded from ways of understanding the places they inhabit.

To many internet theorists of the 1990s, it may have seemed strange to argue that the digital divide has begun to exclude people from experiences of place. To scholars such as Negroponte (1995) and Lèvy (1997), the digital spaces of the internet were supposed to reduce the need to understand and traverse physical spaces (Couclelis, 2007). Rather than living our lives in the corporeal world that needs to be navigated and managed, we would transcend to a disembodied reality, and the bits running through servers would replace feet walking the streets. While we have seen the rise of the digital compete with physical spaces in some cases, notably in the competition between brick and mortar stores and online shopping sites, for the most part physical space has not become less important. People have not all begun working from home, shopping from home, and socialising from home. To contrast such claims, all one needs to do is head out on a metropolitan highway during rush hour. At the beginning of the second decade of the twenty first century, it is clear that these theorists who imagined the digital overcoming the physical were wrong.

Rather than replace the physical, the digital has instead become part of the physical in many ways. Blogs, Wikipedia pages, restaurant review sites, and numerous mapping applications provide information about local places (Hardey, 2007). These sites exist as digital information on a screen, but they also relate information about specific localities, often to people living in those localities. Now, with the rising popularity of internet-enabled smartphones, it is even more apparent that the digital spaces of the internet are interconnected with physical places. Smartphones are, in a way, a refutation of the virtual reality movement of the 1990s that imagined reality moving from the physical world to immersive virtual environments (McCullough, 2004; Hansen, 2006). The world of bits did not do away with the need for physical mobility; instead, smartphones show that the spaces we move through and the digital information we interact with have merged.

The shift from sedentary to mobile internet access is not a minor point. When mobility and digital information merge, the nature of the information changes. A prominent example of this shift can be seen in the development of location based services (LBSs). LBSs began to gain prominence with the release of the iPhone in 2007, and they take advantage of mobile phones' internet connection and Global Positioning Systems (GPS) technology. These services locate users in physical space and provide information about that space. LBSs include a wide range of applications, ranging from applications that map Wikipedia articles about users' surrounding space to Location Based Social Networks (LBSNs) that map the position of the members of users' social networks. As mobile individuals access digital information that is mapped onto physical space, the nature of both the digital and the physical change (Ishii, 1999). The information becomes a part of that space, and the interface of the mobile device becomes a representation individuals use to negotiate their interactions with physical space. As I argue below, the mobile interface works as the screen through which the individuals may transform the city into a new type of database city by reordering and mashing up different pieces of information about the spaces they move through. de Souza e Silva (2006) argued that these developments have led to a new type of hybrid space: 'a conceptual space created by the merging of borders between physical and digital spaces, because of

the use of mobile technologies as social devices' (de Souza e Silva, 2006, p. 264). de Souza e Silva makes the point that hybrid spaces are created not only by new technological capabilities. Rather, they are the merging of those capabilities (space augmented by digital information), the mobility of the users, and the socially constructed nature of the digital information. These all combine to form the hybrid space, and the widespread use of smartphones will be a key medium in the linking of the physical and the digital. Despite de Souza e Silva's argument that hybrid spaces are not created by new technologies, without access to the right technologies, there is no access to the hybrid space. The space remains unchanged for the millions of people for whom the additional digital information imbedded in the physical space may as well not exist. In other words, people who move through hybrid spaces penetrated with digital information have a qualitatively different experience of mobility than those who do not.

This article contributes to the existing body of literature on mobile computing in Human-Computer-Interaction and Engineering (Dourish, 2001; Palen *et al.*, 2001; Greenfield, 2006), as well as the mobile computing literature in the social sciences (de Souza e Silva, 2006; de Souza e Silva & Frith, 2010; Thrift, 2004) by arguing that at this early stage in the development of hybrid spaces, issues of differential mobility and exclusion must be critically examined. The adoption of more and more advanced mobile technologies forces analyses of mobility to take into account that differentiated forms of mobility include more than the differentiated ability to move from one place to another; they must also include discussions of *how* people experience mobility and how access to different mobile technologies allow individuals to exert more control over their mobile experience. By establishing the concept of the personalised database city and drawing from both experimental art projects such as *Urban Tapestries* and commercial services such as *Foursquare*, we will be better able to conceptualise how these technologies may lead to insularity and exacerbate issues of exclusion from mobile experiences. These examples support the article's main argument that we can already see how these new hybrid spaces are contributing to new forms of differential mobility, and as hybrid spaces continue to proliferate, we must pay close attention to who is being excluded from these new experiences of space.

Differential Mobility

For most of the twentieth century, the social sciences were mired in what Jensen (2009) calls 'sedentary thinking'. Sedentary thinking emphasises structures, or enclaves in Jensen's terminology, over flows of movement. The dominant meaning of place was thought to be located in its structures, whether institutional structures or dwelling places such as the home. Sheller and Urry state that, 'sedentarism treats as normal stability, meaning and place, and treats as abnormal distance, change and placelessness' (2006, p. 208). Sedentarism dominated social scientific thought for most of the twentieth century, but as is always true when discussing disciplinary paradigms, there was a strand of thought that rebelled against its assumptions. Deleuze and Guattari (1987), tracing this strand of 'nomad philosophy' through Leibniz to Spinoza and Nietzsche, became possibly the most influential of the late twentieth century nomad philosophers. For Deleuze and Guattari, it is not the nodes in the network that matter most, it is the paths people travel.

Drawing from the works of Deleuze and Guattari (1977, 1987) and others, Sheller and Urry (2006) proposed a new mobilities paradigm that focuses on issues surrounding mobility. This new paradigm asks new questions about everyday life and contrasts with traditional thought by focusing on the travel to and from the sedentary enclaves that comprise the urban landscape (Jensen, 2009). One of the most valuable aspects of this focus on mobility has been to show that mobility is a resource distributed unequally among social groups. Much of this research has focused on how certain groups are excluded from forms of mobility, whether through legislative regulation (Massey, 1994, 2005; Lewis, 2006; Drakakis-Smith, 2007), or through modes of transportation (Graham & Marvin, 2001; Wood & Graham, 2005; Hine, 2007). Many of us may live in an increasingly fluid world marked by travel, both virtual and physical, but at the same time there are large groups of people who still cannot find a bus to catch or do not have access to the networks of information flows.

While focusing on the differential mobility present in contemporary society has been productive (Graham & Marvin, 2001; Wood & Graham, 2005), Massey (1994) reminds us that a simple equation of mobility with power is analytically misleading. For many people, mobility is a reflection of the lack of power they have over their lives. Take the woman forced to work in the suburbs who commutes over an hour to work each way. She is certainly mobile, but that mobility is not a choice. Or take the example Massey gives of displaced people forced to migrate for political or economic reasons. They certainly have less power, less freedom, than the man who lives in the gentrified part of downtown and walks to work. These examples clearly show that a blind equation of mobility with freedom will not do.

Maybe as important as actual movement (mobility), or the potential for movement (motility), is *how* people move through space. Clearly there is a difference between someone driving a car to work and someone who takes a city bus. Even if the travel time is nearly equal, which it most likely is not, there is a qualitative difference in these two types of mobility. One is often more pleasant than the other, depending on things like traffic and the quality of public transportation. This difference in the qualitative nature of mobility extends to more than modes of transportation. It extends to how much control individuals have over their experiences while mobile. It is not just the ability to move, but the manner of movement, the way that movement is experienced. Analyzing the ways people manage their experiences with everyday mobility provides a productive avenue to examine the construction of the city as a whole. As Jensen argues, 'The meaning of place in the city is constituted by the movement as much as by their morphological properties' (2009, p. 140). But that movement has obviously never been equal, and with the development of new mobile technologies, the nature of that inequality may begin to fundamentally change. Those who have access to mobile technologies are able to experience mobility in a qualitatively different way than those who do not. With the spread of smartphone technologies, this divide will only widen as the technological elite are able to occupy new forms of hybrid spaces.

Later in this paper, I will discuss the growth of hybrid spaces and how they provide individuals with increasing control over the space they move through; however, it first must be noted that individuals have used mobile technologies to manage travel time for over two centuries. In the next section, I will briefly discuss a pre-digital divide between those who could use the technology of the book to recapture travel time and those who could not. The book gave readers power over

how they managed their interactions and experiences while mobile. I will then move on to auditory mobile technologies and discuss how those who had access to mobile auditory technologies could aestheticise their experience of the city as they occupied the intermezzo between two points. The goal is not to focus on who can travel and who cannot but, instead, focus on the qualitative nature of that travel. If place is truly constructed by movement, it is important to examine how that movement is experienced.

Reading, Listening, Moving

With the growth of the city in the nineteenth and twentieth centuries, city dwellers were faced with nearly overwhelming amounts of sensory stimulation. For many people who had moved from rural areas to the city, the streets of the metropolis were the first time they were confronted by huge masses of strangers. These individuals had to develop a way to manage their experience with urban spaces, or else they risked being overwhelmed by the totality of the space. Simmel (1950) claimed that urban individuals developed what he called the *blasé attitude*, which served as a sort of filter that allowed them to disengage from the multiplicity of activity occurring on urban streets. According to Simmel, the metropolitan individual develops ‘an organ protecting him against the threatening currents and discrepancies of his external environment which would uproot him’ (1950, p. 410).

While the formation of the *blasé attitude* allowed people to deal with crowded spaces more on their own terms, people also used technology to accomplish the same goal (de Souza e Silva & Frith, 2010). Not coincidentally, the development of the book as a mobile technology was closely linked to the growth of mobility in the nineteenth century (Manguel, 1997). In his work on the development of the railway, Schivelbusch (1986) discusses how the experience of mobility for European first class railway travelers was shaped by the book. Faced with trains that placed passengers in eight person compartments, passengers turned to the book as a way to avoid interacting with the strangers they shared the space with; however, the prevalence of reading on the railway was exclusive to the first class railway cars. He gives a number of reasons, ranging from the spatial design of lower class cars to the lack of experience lower class travelers had with the carriage as a form of travel. Lower class passengers occupied crowded, loud railway cars, and reading would have been difficult. Also, these passengers likely were not as literate as the passengers on the first class trains. The rich could escape the strangers on the railway car by focusing on the narrative of the novel or a newspaper; the poor did not have the option of that escape and had to engage with the stimulation and strangers present in the railway car.

Over 150 years after the growth of the railway and railway literature, Sony released the Walkman, a technology that reconfigured experiences of mobility. The Walkman gave individuals the opportunity to personalise their auditory experience while mobile (Hosokawa, 1984; du Gay *et al.*, 1997; Bull, 2000, 2001, 2004). Listening to music while walking through the streets or sitting on the subway allowed for a different experience of shared spaces, and a different relationship to the mobility of everyday life. Bull argues that Walkman users ‘successfully prioritize their own experience, personally, interpersonally and geographically’ (2000, p. 9). The prioritisation of the auditory relationship with city streets or subway cars gave Walkman users an increased control over their experience of space. By imparting a personalised

soundscape on the spaces they moved through, Walkman users were able to white-wash the sounds of the urban area, which follows a greater trend to mask some of the unpleasantness of urban spaces. Lefebvre (1991) discusses how modern cities have undergone ‘immense deodorising campaigns’ to blot out natural smells. The difference between the deodorising campaigns and the Walkman user was that the white-washing of the unpleasant smells of urban space was the same for everyone who shared that space; the people who did not have Walkmans were still subjected to the unpleasant sounds of the city. The same is now still true for the iPod. Those who own and use the technology experience mobility in a qualitatively different way. Their movement is personalised, syncopated to the rhythms of their choosing.

Travel has also become more productive with the growth of information communication technologies. Train passengers are now able to stay connected to work and friends while mobile through the use of laptops and cell phones (Lyons & Urry, 2005; Berry & Hamilton, 2010). Travel time has traditionally been conceptualised as ‘dead’ time that is lost in the passage between two points (Green, 2002), but with the development of mobile communication technologies, that time has become productive. Lyons and Urry hypothesise that:

The boundaries between travel time and activity time are increasingly blurred. Specifically, many people are using travel time itself to undertake activities. The cost to the individual of travel time is reduced as travel time is converted into activity time. (Lyons & Urry, 2005, p. 263)

As the earlier discussion of the book and the Walkman shows, travel time could be made more productive before the growth of laptops and cell phones. With laptops and cell phones, however, travel time could be made economically and socially productive in new ways. Perry *et al.* (2001) call the information technologies that reconfigure relationships between time and mobility ‘Lazarus devices.’ Just as Lazarus rose from the dead, these mobile technologies “resurrect” mobile time that would have previously been considered “dead” (Green, 2002, p. 289). Cell phones, for example, allow individuals to maintain contact with distant others while mobile, leading to new types of sociability that have been labeled with terms such as telecooing (Habuchi, 2005), selective sociality (Matsuda, 2005), connected presence (Licoppe, 2004), and micro-coordination (Ling & Yttri, 2002; Ling, 2004, 2008). But the idea that mobile devices ‘resurrect’ dead time has a rather troubling implication: for mobile individuals who do not have access to these technologies, their time remains dead. We now have two tiers of travel even for people who share the same subway car. For one, their time is economically or socially productive. For the other time is lost, and travel time may remain barren and wasted.¹

These examples show that mobility is not just a matter of examining access to transportation, modes of transportation, or travel time. Mobility is also differentiated by the experience of travel even as individuals share the same space, and with the adoption of internet-enabled mobile phones, that differentiation may be increasing. The divide between those who have access to smartphones and those who do not may have more serious social implications than were present with these earlier mobile technologies. In the following section, I examine how the growth of hybrid spaces may bring the digital divide so present with the internet into physical spaces. Hybrid spaces allow for new relationships to mobility, but these relationships raise serious questions about who has access to the necessary technologies.

0's, 1's and City Streets

Differential mobility is nothing new. From the first time one person carried another, there have been differences in the ways mobility was experienced (Wood & Graham, 2005). In the information age, those differences have become more pronounced. In their book *Splintering Urbanism*, Graham and Marvin (2001) highlight the many ways the infrastructure of urban areas have splintered access to services and mobility. New infrastructural developments, including paid fast-lanes and privatised skywalks, restrict access to infrastructure and places. In the chapter of their book devoted to the internet, the authors discuss how differential internet access has also splintered urban areas. They argue that those with high speed internet access cocoon themselves in their homes and communicate through the screens of their computers. Because they can communicate at a distance, they can avoid the pitfalls of urban life and stay comfortable through the virtual mobility of an internet connection.

Splintering Urbanism was published in 2001 and echoes the 1990s discourse about how the internet would decrease the importance of physical mobility. While their analysis was appropriate for the time it was written, it may not be as appropriate now. In the last decade, the internet has become mobile and moved into physical spaces where there is a push to develop 'smart' infrastructure and map digital information. Some individuals do undoubtedly use the internet to avoid travel, but it is unlikely that physical travel has decreased significantly (Couclelis, 2007). Instead, the internet has become tied to physical mobility in new ways, leading to a new form of splintered urbanism: the divide between those who have access to hybrid spaces and those who do not.

Despite de Souza e Silva's (2006) point that hybrid spaces are not created through technology, the technology is a necessary component of the hybrid space. The development of hybrid spaces is part of what has been called the ubiquitous computing paradigm, first formulated by Xerox Parc scientist Mark Weiser. Ubiquitous computing is a post-desktop model of computing that brings networked computing power to everyday things and activities, directly contrasting the desktop paradigm that imagined that individuals could become increasingly sedentary while living their lives in cyberspace. Instead, computing leaves the desktop and moves out into the lived spaces of the city (Dourish, 2001; Thrift, 2004; Greenfield, 2006; Hannam *et al.*, 2006). The traditional division between digital and physical becomes blurred because the spaces of the city become increasingly networked and infused with digital information. As Thrift says, "Through open internet access, the computing environment will be able to run continuously. . . Computing will be a constant" (2004, p. 183). But the question needs to be asked: computing will be a constant, but for whom?

In this section, I highlight different ways that internet-enabled phones are leading to new forms of splintered urbanism. Many of the services discussed in the following sections are undoubtedly useful, and some of these examples were designed with progressive goals in mind. It is not productive to denounce smartphone users or blindly criticise the development of hybrid spaces. No technology is universally accessible, especially when it is first released. Print media were technologies of the elite until literacy in Western countries began to approach 100%. The internet, while certainly not accessible to everyone, also has been highlighted for its democratic potential (Negroponte, 1995; Castells, 2009). Smartphones will likely follow the same trajectory, and criticising them as inherently atomising would be to fall into the

worst kind of technological determinism. These spaces are what we make them, and they do not have to serve commercial interests. As the *Urban Tapestries* example discussed below shows, they can also provide new ways to construct urban identity. The fact remains, however, that these spaces are only accessible to the less than 20% of the population of industrialised nations who own smartphones. At this stage in the development of these technologies, it is important to critically examine how hybrid spaces may lead to new types of sociability and exclusion in urban spaces.

The Database and the Personalised City

In the later decades of the twentieth century, the development of Geographical Information Systems (GIS) showed that information became more valuable and useful if it could be located in geographical space and mapped (Pickles, 1995; McCullough, 2004). The GIS industry was based on this premise, and in the last decade, these systems have become more accessible and usable. New Web 2.0 mapping technologies have made it easier for individuals and software developers to include geographical coordinates in all types of data and manipulate those data on digital maps (Haklay *et al.*, 2006; Miller, 2006). Everything from photos on services like Flickr to messages on Twitter now include longitude and latitude coordinates that make it possible to map their point of origination. Other services, such as Location Based Social Networks (LBSNs), map the location of the members of users' social networks. Smartphones have been instrumental in the push to locate everything, and many smartphone applications use geolocated data to provide information about surrounding space.

The proliferation of geolocated data serves multiple purposes, but one of the major functions is to make urban space seem more legible and understandable. By allowing users to choose myriad ways to map information about their surrounding space, LBSs imply control over the information present in that space. Users can personalise maps of the places they pass through, imparting everything from Wikipedia pages about surrounding buildings to personal, geotagged messages left by friends. According to Brewer and Dourish (2008), one of the functions of networked mobile technologies is to increase the 'legibility of spaces and actions – how it is they can be read and understood as conveying particular sorts of messages' (2008, p. 971). The personalising tendencies of LBSs allow users to determine the types of legibility they want to represent. They can access local tweets, gas prices, Thai restaurants, or the best routes for travel. They can, in a sense, read the space through the mapping technologies of their smartphones, and the representations are constructed by their preferences and personal choices.

Legibility was built into the urban spaces of cities long before the adoption of smartphones. As Lefebvre points out, urban planners desire to make cities seem readable in a quest for 'formal-functional transparency' (1991, p. 145). By making the signs and symbols comprising urban space accessible to inhabitants, the city gives the impression that it is functional and free of ideology. But Lefebvre denounces the supposed intelligibility built into urban spaces, saying that 'the impression of intelligibility conceals far more than it reveals' (1991, p. 145). We should fear the spaces we think of as most transparent because it is precisely that illusion of transparency that conceals hidden agendas and political aims. LBSs increase the perception of the intelligibility of urban spaces by implying that the

information mapped by these services give a true representation of the information present in that space. However, just as the functionalism-formalism built into supposedly intelligible space conceals ideology, so does the functionalism of smartphone applications. These applications allow users to choose the information to display about the spaces they travel through, but that is far from a value neutral action. Rather, the personalisation of mobile mapping technologies is part of the push towards customisation and personalisation that defines late capitalist production, seen most notably in the digital spaces of the internet (Beer, 2009). Just as the internet allows users to personalise their information seeking activity while online, constructing personalised profiles and personalised preferences, LBSs allow users to personalise information seeking and the ordering of experience while moving through physical space.

The personalisation offered by these services introduces an interesting paradox. Pickles, discussing the historical development of mapping practices, writes that ‘The result was an ambiguous form of state cartography producing maps for popular consumption; state cartography democratised access to spatial information, but it did so by prioritising the interests of the military, the state and private property in its selection of objects to map and the symbolization to use’ (2004, p. 13). The mapping capabilities on smartphones invert this relationship. The state no longer completely controls what information appears on the map. People create their own maps by choosing from layers of spatialised information, though of course their choices are limited. While the construction of the semiological system of the map is democratised by these personalised mapping practices, the access to the map becomes individualised and personal. No two people will see the same map when using a LBSN; no two people will display the same information about saved routes and short-cuts using wayfinding LBSs. While these maps do not completely re-imagine the state produced cartographic representation of the city, they do allow for increased control over that representation, at least for people who have access to the right services. They can manipulate the map of their surrounding space, accessing information available only to people with the right technologies.

Like most information found online, the information used to manipulate these maps and services is drawn from databases. Manovich (2002) argues that the way meaning is constructed has moved from narratives to databases. Each web page is drawn from a database as soon as the user links to the page, often combining different factors (such as the user’s browser and search history) to construct the web page. Gordon (2010) argues that the development of urban spaces in the US has reflected this change in the way meaning is constructed. Gordon uses the examples of the Hollywood and Highland developments in Los Angeles to show how newly built touristic places are what he calls database cities that are built to allow inhabitants to construct their own narratives from the information built into the space. In other words, these spaces are built as a database, waiting for users to activate pieces of information and personalise their narrative of the city.

The database city has developed in concord with what Gordon (2010) calls digital possessives, which he defines in two parts:

It [the digital possessive] is the transformation of relation into observable and lasting objects: in digital networks, relations are material. And it is the ordering of those objects within personal interfaces. (Gordon, 2010, p. 182)

The digital possessive can be seen most obviously in the growth of possessive pronouns online: ‘my’ Facebook page, ‘my’ Amazon profile, ‘my’ search preferences. With digital possessives, people ‘can obtain greater control in ordering the data of people and places with which they come into contact’ (Gordon, 2010, p. 163). These sites allow users to materialise their subjectivity and also give them some semblance of control over the vast expanses of the internet. Just as Simmel’s early twentieth century urbanites developed a *blasé* attitude to carve out their space in the chaos of city streets, internet users construct personalised preferences as a form of control over digital spaces.

Gordon (2010) confines his discussion mostly to specific instances of the database city (Hollywood and Highland) and the construction of online spaces. However, with the rise of hybrid spaces, I argue that the city as a whole becomes both a database city and a digital possessive by allowing individuals to exert increased control and personalisation over the information they access while moving through the city, and that the search for ways of ordering experiences of the urban goes back much further than contemporary urban developments in Los Angeles. In his writings on Mexico City, Garcia Canclini (2001) claims that urban space has become fractured through multicultural conflict and architectural signs that exhibit no cohesive history. He compares the city to one of the dominant media of his time: ‘As in the videos, the city has been created by plundering images from everywhere, in any order whatsoever’ (Canclini, 2001, p. 85). The plundering of signifiers from different styles has led to a decline in metanarratives, and individuals now must construct meaning from the streets of the city because it lacks the forced narrative of coherent structure. Dickinson (1997), writing about Old Pasadena, claims individuals do the same through a rhetoric of walking that exposes the database like nature of the street and forces individuals to match up experiences and meanings because the supposed coherence of the street is exposed as incoherent layering. It is this urge for control over the signifiers present in all spaces, an urge to order them and personalise them, that links smartphones to the idea of the database city. Through the interface of the mobile device connected to a diverse set of databases, the individual is able to exert control over signifiers and construct a semi-narrative out of the fractured city streets. As MacCannell (1999) argues, we always search for ways to piece together the fractured nature of the Modern experience; turning the city into a database to be reordered and read from a personal screen might be the newest method to piece together the discontinuity of the contemporary city.

The experience of the city as a representation through the mobile screen is also more personal than the typical experience of a crowded urban area. The map on the interface of my mobile phone is ‘my’ map; it displays the information I choose to display; it maps the location of ‘my’ friends; ‘my’ favorite restaurants; and ‘my’ preferences. So for these users, the places they inhabit become semiological systems consisting of their preferences. There is no need to recognise the restaurant around the corner if it does not match one’s preferences. Compare this development with how Gordon discusses the database city of Hollywood: ‘In the database city, the user is not lost to an avalanche of signifiers; she is given the authority, motivation, and framework to filter them’ (Gordon, 2010, p. 199). With the growth of LBSs, there is no reason that statement need be confined to specific American urban areas. In a hybrid space, individuals no longer face an ‘avalanche of signifiers’; instead, they draw the information they need from the databases supporting these services. Information not in the database need not exist.

As huge web companies like Google and Facebook have shown, anytime a database contains personal information, concerns about privacy must be acknowledged. With LBSs, the issues of privacy become even more pronounced because individuals share their location with services when they access place-specific information (Perusco & Michael, 2007; Zhong *et al.*, 2007; Blumberg & Eckersley, 2009; de Souza e Silva & Frith, 2010). Websites like PleaseRobMe and ICanStalkYou show that privacy issues are especially serious when people share their location with members of their social networks. As Beer (2009) shows, with the development of newer, better algorithms by services like Google, Facebook, and Pandora, what individuals gain in convenience they often lose in privacy. We can expect to see the same with LBSs that add valuable location data to the data collected from each user. Because of these privacy concerns, some will undoubtedly decide that the personalisation and control gained through new hybrid spaces will not be worth the information they are forced to give up. Despite these concerns, however, more and more services are being built for new smartphones, and analysts expect adoption rates to continue to increase (Entner, 2010).

What this means for urban sociability and planning remains to be seen. It is likely that as hybrid spaces continue to develop, urban planners and architects will design places with a consideration of the merging of physical and digital information (McCullough, 2004; Greenfield, 2006). The problem is that the databases this information is drawn from are only available to those who have the right mobile devices. For those who do not, the geolocated information may as well not exist. They have no access to the recent traffic update, the geotagged note describing the history of a place, the geolocate cafe coupon, or a geotagged restaurant suggestion. This may seem like a minor loss, but many of these geotagged pieces of information allow for enhanced mobility in public spaces and an enhanced ability to control the information one accesses while mobile. As smartphones become more widespread, it is likely that more information traditionally found in analog form (signs, coupons and so forth) will become digital and geolocated, raising the specter of a two-tiered system of access on the streets of the city.

Insularity and Control

What frightens people about cities is also what makes them great: they are sites of unexpected encounters, encounters we cannot always control. It was this constant contact with strangers that sociologists such as Simmel (1950) and Goffman (1963, 1990) saw as one of the defining aspects of urban life. Modern cities, however, are often built to decrease the chance of random contact. Skywalks and underground private 'streets' are designed to keep strangers out, homogenising the places people pass through. The growth of city infrastructure supporting automobility accomplishes much the same thing, allowing people to move from node to node without having to socialise while traversing the paths of the city. In a more egregious example, supermarkets in the UK have experimented with models where the prices of groceries are different depending on the time of day. Rich people who do not want to share a supermarket aisle with the less fortunate can choose to pay more for that privilege. The heterogeneity of the city may be what makes it exciting, but it is also what many modern planners work hard to overcome.

Location based social networks (LBSNs), such as *Fousquare*, *Loopt*, *Brightkite*, *GoWalla* and *Latitude*, are designed to overcome randomness and chaos. LBSNs allow users to map the location of members of their social network while they move through the streets of the city. These applications use GPS to locate users in physical space, and those users share their location with their friends. LBSNs work like Facebook, except brought into physical space through the interface of mobile phones. These are distinctly urban applications that construct hybrid spaces designed to control the randomness of the city by letting users know at all times where their friends are and who may be nearby (Humphreys, 2010).

Urban spaces should be places of encounters. Massey (2005) says that we can perhaps best think of the dynamism of space as the intersection of heterogenous elements; maybe we can best conceptualise the city the same way. The streets of the city, the public places of the city, are places where heterogenous elements intersect. Richard Sennett (1977) calls this intersection of elements public life, and it is the disintegration of the public life of the city he outlines in his book *The Fall of Public Man*. Sennett writes that 'A city ought to be a school for learning how to lead a centered life. Through exposure to others, we might learn how to weigh what is important and what is not' (1992, p. xiii). The public life of the city, however, has been on the decline for decades. Sennett traces this decline to the growth of individuality and argues that private life has invaded public life. With the primacy of the individual in modern life, city dwellers expect to interact with others in terms of their private lives. In private life, ties are strong ties; it is public life where weak ties are fashioned and where horizons are expanded. When we lose our weak ties by creating insular communities defined by strong ties, we lose the 'codes of impersonal meaning' that had long defined interactions in urban places (Sennett, 1977, p. 5).

One of the factors affecting the decline of public life is the growth of insular community. Whereas many scholars view community in idealistic terms (Rheingold, 1993; Putnam, 2000; Parker, 2006), Sennett (1977) argues that cities have been built to encourage the insularity of community, decreasing the intermixing of heterogenous elements (see also Jacobs, 1961). He sees insular community much as Harvey (1996) sees place: as an often reactionary construction designed to exclude difference.

In the three decades after Sennett wrote *The Fall of Public Man*, much changed about the way community is constructed. In his most biting analysis of community – a discussion of the Forest Hills community in New York – Sennett conflates community with neighborhood. The community he criticises is comprised of similar individuals who are geographically proximate. With the proliferation of the internet and mobile phones, people are more able to construct communities that do not rely on physical proximity (Rheingold, 1993; Hampton & Wellman, 2001; Wellman, 2001, 2002). Instead, what Sennett calls community may be best reformulated as a social network. Discussing the shift from community to social networks, Wellman (2002) argues that we have moved from groups defined by local community to what he calls networked individualism. With networked individualism, social networks begin to dominate over groups. Sociality becomes less place dependent, and one is no longer defined as much by community associations; instead, people are often defined by their personal social network, which is now 'sparsely knit, linking individuals with little regard to space' (Wellman, 2002, p. 1). Wellman's argument that we have moved completely from community is overstated. Scholars have made the argument that participation in local community is on a steep decline (Putnam, 2000), but many

people still maintain close ties with their neighbors and other people nearby, and social networks rarely exist with ‘little regard to space’ (Larsen *et al.*, 2006). The main point of Wellman’s argument does ring true, however. People are no longer forced to socialise mainly with people who live in the same community. They are now able to maintain relationships at a distance and construct a personalised social network not as reliant on proximity.

LBSNs complicate the relationship between traditional community and networked individualism. They cannot be equated directly with the idea of community as neighborhood because they are based on mobility, but they also do not fit comfortably within Wellman’s (2002) discussion of networked individualism. Whereas online social networks are not place dependent and many people have Facebook friends who are not geographically close, LBSNs are based on physical proximity. The hybrid spaces these services create merge the physical streets of the city with digital information that includes friends’ location and the messages friends embed with geolocative metadata. In other words, the services only work well if friends are nearby. The most productive way to theorise how LBSNs may affect sociability and exclusion in the streets of the city is to combine the idea of geographically bounded community and the lessened place dependence of networked individualism. LBSNs do rely greatly on place, but unlike with neighborhoods, the network moves with each member (de Souza e Silva & Frith, 2010). They also represent the dominance of social networks over community because they are distinctly individualised.

The issues of exclusion are important to consider. Sennett (1977, 1992) argues that sociability between strangers has decreased because of the growth of individualism and private life. LBSNs allow users to map their private lives, to visualise the location of their strong ties and meet up with those who may be nearby. The purpose of LBSNs is to lead to serendipitous connections between friends at the expense of connections between strangers. Those who are not members of an individual’s social network simply do not appear on the map; they are excluded from the network and, in a way, excluded from the user’s perception of the place. By not having access to these applications, the space remains unchanged for most people; for those who do use the applications, as they move through the city it begins to resemble the controlled sociability of a Facebook profile (Humphreys, 2010). Here we see elements of mobility added to what Sennett criticises about community. Strong ties become stronger as they are visualised on a map, meaning that as long as someone familiar is nearby, there is no need to associate with strangers. The space becomes personal, but only personal for those who have access to the right services. Everyone else is left out of the network, with no way to get in.

Geotagging: The Writing’s on the Wall

Long before the development of commercialised LBSs, artists were taking advantage of location aware capabilities. The new art form that emerged has often been referred to as locative media art (Tuters & Varnellis, 2006). Locative media artists have used location awareness for different purposes, including mapping individuals’ movement on a virtual map (*Amsterdam Real Time*), the tracking of milk as it travels from nation to nation in the global economy (*MILKproject*), and the exposure of issues of trust in interpersonal relationships (*Uncle Roy All Around*

You; The Familiar Stranger). Many of these art projects use location awareness for progressive purposes, attempting to re-imagine the ways individuals interact with urban spaces.

One of the notable locative media art projects was the *Urban Tapestries* project developed by the cultural think tank Proboscis (Angus, 2003; Silverstone & Sujon, 2005). The goal of *Urban Tapestries* was to 'collect the largely invisible pathways left by urban occupants in order to better understand the identities and specificities of place' (Silverstone & Sujon, 2005, p. 6). *Urban Tapestries* accomplished that goal by equipping users with location aware mobile devices and asking them to annotate city space. They recorded audio or textual stories of experiences they had in those spaces, and other users could then access those narratives as they moved through the streets. *Urban Tapestries* created representations of what Lefebvre (1991) calls the 'everyday life' that socially produces space. Users could socially annotate urban spaces, changing the way they were perceived by people who accessed those annotations. Other locative media art projects, such as Blast Theory's *Rider Spoke*, sought to do much the same thing by allowing people to geotag their stories about the out of the way places of the city.

Early forms of social annotation art projects were limited by technological capabilities and often relied on cellular triangulation to determine users' location. With the increasing market penetration of smartphones and the developments of LBSs, many of the technological constraints have been overcome. The basic principles driving social annotation projects have been adapted by commercial services and made available to anyone who owns a smartphone. Smartphone users can now leave notes pinned to specific places using a wide array of services. Now that these applications are widely available, it is important to consider the issues of just who gets to tell the story of a place.

As *Urban Tapestries* and *Rider Spoke* show, the social annotation of urban spaces has the potential to subvert the dominant narratives of the city and allow for a more tactical, in De Certeau's sense of the word, approach to spatial narratives; however, there are issues of access that remain unexamined in many locative media projects. In one of the earliest pieces written about the future of locative media, Russel (2001) addresses how social annotation can lead to new experiences of urban space. He writes that:

there are notes in boxes that are empty

every room has an accessible history

every place has emotional attachments you can open and save

you can search for sadness in New York (Russel, 2001, p. 3)

Every room may someday have an accessible history, but it is a history accessible to a select few. One person may walk by a street corner and access an audio recording or a video about that place, even as the person she walks next to does not even realise she is missing something. On a more mundane level, many LBSs are built on a model that thrives on user-generated reviews about specific places. When other users log into the place or search for the place, they are able to scroll through reviews and suggestions. These uses are obviously more mundane than a complete

reimagining of local connections to the city, but they still represent an occasionally important, useful source of information. For those with smartphones, their experience of the city is augmented; for others, the city remains the same. For now at least, geotagging works in a similar fashion to public graffiti – if spray paint required a monthly data plan.

A Forward Facing Conclusion

This article began by arguing that smartphone adoption may be linking the digital divide to differential mobility in new ways. Throughout this article, I have alluded to ways that divide may be felt with the construction of new forms of hybrid spaces. At this early stage in the development of new LBSs and in a period where the move towards a full pervasive computing environment is only beginning to be felt, we can point to concrete consequences of existing exclusion from hybrid space and also suggest possible consequences to the path we appear to be heading down. In this concluding section, I will begin by highlighting a few areas where, even at this early stage, the inability to access the correct services have begun to limit opportunities. I will then move to a suggestive discussion of the future with the hope that pointing to problems as they arise will start a serious discussion about the types of environments we are building.

Throughout this paper, the examples of hybrid spaces, whether something as simple as accessing a place-specific Wikipedia layer on Google Maps or the chance to access personal narratives of a neighborhood through a project like *Urban Tapestries*, suggest new ways of knowing place. By bringing the searchability of the internet into the information contained in physical places, hybrid spaces afford new ways of organising and filtering experience, transforming the physical city into a database city of sorts, ready to be reordered and personalised. The hybrid space is more malleable than physical space because information can be filtered through the interface of the mobile devices. Hybrid spaces also afford opportunities only available to smartphone users. Through marketing services, individuals can sign up for locative advertising offers they receive as they move past a place of interest. Other applications like *Foursquare* and *GoWalla* provide information about places through user-generated messages that are only available if one has the right phone. There are also the issues of exclusion of a more social type, which were discussed above in reference to LBSNs.

There are also power issues at play here that come into clear focus when the conceptualisation of mobility moves past equating mobility with power and, instead, takes into account how that mobility is experienced. For the experienced smartphone user, the city becomes a site to be controlled through the interface of the mobile phone. That control can take many forms, including turning the streets of the city into a more familiar space filled with likeminded individuals (Humphreys, 2010), or accessing information that is only present in digital form. The ability to exert this control in hybrid spaces is different from the types of control we can typically exert over our experience of physical space. For example, signs that were part of the physical landscape can now be personalised whether in the form of directions, advertisements, or historical markers.

As hybrid spaces continue to develop, the issues raised in this article are likely to become more serious than an inability to access special offers or geolocated messages. The growth of mobile computing will likely affect most aspects of our

everyday lives, which after all, is the ultimate goal of the ubiquitous computing paradigm. Objects will increasingly be linked to each other through a wireless connection and, according to some models, the mobile phone will become the hub for all these connections because it is always carried on the person (Golding, 2005). While there has been valuable literature written on the design of pervasive environments (Dourish, 2001; McCullough, 2004; Dourish & Bell, 2007), little has been written on the social implications once these environments are designed.

Designers have already suggested that the mobile phone will someday become an all-in-one device, existing as your credit card, your pass into a building, your personal identification (Golding, 2005). For the phone to work as such, it must be internet-enabled and networked. As the environment is built with considerations of hybrid spaces, people who cannot control the pervasive environment will have their opportunities increasingly constrained. We can see this with something as mundane as a system that allows people with the right phones to control the music in a bar (Mahato *et al.*, 2008), and it is far too easy to imagine much more worrisome applications.

Greenfield, discussing the growth of ubiquitous computing environments, argues that, 'the infrastructure that gets us these amenities also lends itself to repression, exclusion, and reinscription of class and other sorts of privilege' (2006, p. 259). The beginning of these forms of privilege already exist in mundane forms with exclusive offers through services like *Foursquare*, available only to the 2 million or so mostly technologically savvy Foursquare users. It is also possible to imagine that the goal of *Urban Tapestries* – to allow people who previously had no voice to tell the story of place – can be inverted through a commercial system that only welcomes the stories of certain types of individuals with access to the right mobile technologies and the right networks.

Issues of access and exclusion will be closely tied to future studies that explore the forms of differential mobility suggested in this article. Physical mobility will be affected by the virtual mobility afforded by smartphone technology. Hybrid spaces will affect the way we perceive the spaces we move through, and the spread of hybrid spaces raises the specter of a two-tiered system of city travel: one group will move through malleable, personalised, digitally infused streets, and the other group will move through streets that remain as impersonal as ever. As Deleuze and Guattari stated, 'the life of the nomad is the intermezzo' (1987, p. 380). But not all nomads, and certainly not all intermezzos, are created equal.

Note

1. There is a certain ideological bent to some writings on travel time. For many people, of course, travel time is not lost just because it is 'unproductive' in the economic or social sense. The time may be spent lost in thought, talking to strangers, or sleeping. Some individuals consciously choose not to fill their travel time with media use, just as many people will choose not to purchase smartphones.

References

- Angus, A. (2003) Urban tapestries contexts. Available at <http://www.vimeo.com/1065977> (accessed 11 January 2009).
- Beer, D. (2009) Power through the algorithm? Participatory web cultures and the technological unconscious, *New Media & Society*, 11(6), pp. 985–1006.

- Berry, M. & Hamilton, M. (2010) Changing urban spaces: Mobile phones on trains, *Mobilities*, 5(1), pp. 111–129.
- Blumberg, A.J. & Eckersley, P. (2009) On locational privacy and how to avoid losing it forever. Available at <http://www.eff.org/wp/locational-privacy>
- Brewer, J. & Dourish, P. (2008) Storied spaces: Cultural accounts of mobility, technology, and environmental knowing, *International Journal of Human-Computer Studies*, 66(12), pp. 963–976.
- Bull, M. (2000) *Sounding Out the City: Personal Stereos and the Management of Everyday Life* (Oxford: Berg).
- Bull, M. (2001) The world according to sound: Investigating the world of walkman users, *New Media and Society*, 3, pp. 179–197.
- Bull, M. (2004) Thinking about sound, proximity, and distance in Western experience: The case of Odysseus's Walkman, in: V. Erlmann (Ed) *Hearing Cultures: Essays on Sound, Listening, and Modernity*, pp. 173–191 (New York: Berg).
- Canclini, N. G. (2001) *Consumers and Citizens: Globalization and Multicultural Conflicts*, trans. G. Yudice (Minneapolis: University of Minnesota Press).
- Castells, M. (2000) *The Rise of the Network Society* (Oxford: Blackwell).
- Castells, M. (2009) *Communication Power* (Oxford: Oxford University Press).
- Couclelis, H. (2007) Misses, near-misses and surprises in forecasting the informational city, in: H.J. Miller (Ed) *Societies and Cities in the Age of Instant Access*, pp. 71–83 (Dordrecht, The Netherlands: Springer).
- de Souza e Silva, A. (2006) From cyber to hybrid: Mobile technologies as interfaces of hybrid spaces, *Space and Culture*, 3, pp. 261–278.
- de Souza e Silva, A. & Frith, J. (2010) Locative social mobile networks: Mapping communication and location in urban spaces, *Mobilities*, 5(4), pp. 485–505.
- de Souza e Silva, A. & Frith, J. (2010) Locational privacy in public spaces: Media discourses on the personalization and control of space by location-aware mobile media, *Communication, Culture & Critique* 3(4).
- Deleuze, G. & Guattari, F. (1977) *Anti-Oedipus: Capitalism and Schizophrenia*, trans. R. Hurley, M. Seem & H.R. Lane (New York: Viking Press).
- Deleuze, G. & Guattari, F. (1987) *A Thousand Plateaus: Capitalism & Schizophrenia*, trans. B. Massumi, (Minneapolis: University of Minnesota Press).
- Dickinson, G. (1997) Memories for sale: Nostalgia and the construction of identity in old pasadena, *Quarterly Journal of Speech*, 83(1), pp. 1–27.
- Dourish, P. (2001) *Where the Action Is: The Foundations of Embodied Interaction* (Cambridge, Mass: MIT Press).
- Dourish, P. & Bell, G. (2007) The infrastructure of experience and the experience of infrastructure: Meaning and structure in everyday encounters with space, *Environment and Planning B: Planning and Design*, 34(3), pp. 414–430.
- Drakakis-Smith, A. (2007) Nomadism a moving myth? Policies of exclusion and the gypsy/traveler response *Mobilities*, 2(3), pp. 463–487.
- du Gay, P., Hall, S., Janes, L., Mackay, H. & Negus, K. (1997) *Doing Cultural Studies: The Story of the Sony Walkman* (London: Sage).
- Entner, R. (2010) Smartphones to overtake feature phones in US by 2011, *Nielsenwire*. Available at <http://blog.nielsen.com/nielsenwire/consumer/smartphones-to-overtake-feature-phones-in-u-s-by-2011/>(accessed 21 September 2010).
- Erikson, K. (2005) On the ontology of networks, *Communication and Critical/Cultural Studies*, 2(4), pp. 305–323.
- Giddens, A. (1990) *The Consequences of Modernity* (Cambridge: Polity Press).
- Goffman, E. (1963) *Behavior in Public Places; Notes on the Social Organization Of Gatherings* (New York: Free Press of Glencoe).
- Goffman, E. (1990) *The Presentation of Self in Everyday Life*, Rev. ed. (New York: Doubleday).
- Golding, P. (2005) The future of mobile in the 3g era, in: P.P. Glotz, S. Bertschi & C. Locke (Eds) *Thumb Culture: The Meaning of Mobile Phones for Society*, pp. 235–250 (London: Transaction Publishers).
- Gordon, E. (2010) *The Urban Spectator: American Concept Cities from Kodak To Google*, pp. 235–250 (Lebanon, NH: Dartmouth College).
- Graham, S. & Marvin, S. (2001) *Splintering Urbanism: Networked Infrastructures, Technological Mobilities, and The Urban Condition* (New York: Routledge).

- Green, N. (2002) On the move: Technology, mobility, and the mediation of social time and space, *The Information Society*, 18, pp. 281–292.
- Greenfield, A. (2006) *Everyware: The Dawning Age Of Ubiquitous Computing* (London: New Riders).
- Habuchi, I. (2005) Accelerating reflexivity, in: M. Ito, D. Okabe & M. Matsuda (Eds) *Personal, Portable, Pedestrian: Mobile Phones in Japanese Life*, pp. 165–182 (Cambridge, MA: MIT Press).
- Haklay, M., Singleton, A. & Parker, C. (2006) Web mapping 2.0: The neogeography of the geoweb, *Geography Compass*, 2(6), pp. 2011–2039.
- Hampton, K. & Wellman, B. (2001) Long distance community in the network society, *American Behavioral Scientist*, 45(3), p. 476.
- Hannam, K., Sheller, M. & Urry, J. (2006) Mobilities, immobilities and moorings, *Mobilities*, 1(1), pp. 1–22.
- Hansen, M. (2006) *Bodies in Code: Interfaces with Digital Media* (New York: Routledge).
- Hardey, M. (2007) The city in the age of web 2.0: A new synergistic relationship between place and people, *Information Communication and Society*, 10(6), p. 867.
- Harvey, D. (1996) *Justice, Nature and the Geography Of Difference* (Cambridge, MA: Blackwell).
- Hine, J. (2007) Travel demand management and social exclusion, *Mobilities*, 2(1), pp. 109–120.
- Hosokawa, S. (1984) The walkman effect, *Popular Music*, 4, pp. 165–180.
- Humphreys, L. (2010) Mobile social networks and urban public space, *New Media & Society*, 12, pp. 763–778.
- Ishii, H. (1999) Tangible bits: Coupling physicality and virtuality through tangible user interfaces, in: Y. Ohta & H. Tamura (Eds) *Mixed reality: Merging Real and Virtual Worlds*, pp. 229–246 (New York: Springer).
- Jacobs, J. (1961) *The Death Of Life of Great American Cities* (New York: Random House).
- Jensen, O. (2009) Flows of meaning, cultures of movements – urban mobility as meaningful everyday life practice, *Mobilities*, 4(1), pp. 139–158.
- Larsen, J., Urry, J. & Axhausen, K.W. (2006) *Mobilities, Networks, Geographies* (Aldershot, England; Burlington, VT: Ashgate).
- Lefebvre, H. (1991) *The Production Of Space* (Malden, MA: Blackwell Publishers).
- Lévy, P. (1997) *Collective intelligence: Mankind's Emerging World in Cyberspace*, trans. R. Bononno (New York: Plenum Trade).
- Lewis, G. (2006) Journeying toward the nation(al): Cultural difference at the crossroads of old and new globalisations, *Mobilities*, 1(3), pp. 333–352.
- Licoppe, C. (2004) Connected presence: The emergence of a new repertoire for managing social relationships in a changing communication technoscape, *Environment and Planning D: Society and Space*, 22, pp. 135–156.
- Ling, R. (2004) *The Mobile Connection: The Cell Phone's Impact on Society* (San Francisco: Morgan Kaufman).
- Ling, R. (2008) *New Tech New Ties* (Boston: MIT Press).
- Ling, R. & Yttri, B. (2002) Hyper-coordination via mobile phones in Norway, in: J. Katz & M. Aakhus (Eds) *Perpetual Contact: Mobile Communication, Private Talk, Public Performance*, p. 139 (New York: Cambridge University Press).
- Lyons, G. & Urry, J. (2005) Travel time use in the information age, *Transportation Research Part A*, 39, pp. 257–276.
- MacCannell, D. (1999) *The Tourist: A New Theory Of The Leisure Class*, 2nd ed. (Berkeley, CA: University of California Press).
- Mahato, H., Kern, D., Holleis, P. & Schmidt, A. (2008) Implicit personalization of public environments using bluetooth. Paper presented at the CHI April, 2008 Extended Abstracts on Human Factors in Computing Systems, Florence, Italy.
- Manguel, A. (1997) *A History Of Reading* (New York: Penguin Books).
- Manovich, L. (2002) *The Language Of New Media* (Cambridge, MA: MIT Press).
- Massey, D. (1994) *Place, Space, and Gender* (Minneapolis: University of Minnesota Press).
- Massey, D. (2005) *For Space* (London: Sage).
- Matsuda, M. (2005) Mobile communication and selective sociality, in: M. Ito, D. Okabe & M. Matsuda (Eds) *Personal, Portable, Pedestrian: Mobile Phones in Japanese Life*, p. 123 (Cambridge: MIT Press).
- McCullough, M. (2004) *Digital Ground: Architecture, Pervasive Computing, and Environmental Knowing* (Cambridge, MA: MIT Press).

- Miller, C. (2006) A beast in the field: The google maps mashup as gis/2, *Cartographica*, 41(3), pp. 187–199.
- Negroponete, N. (1995) *Being Digital* (New York: Vintage Books).
- Palen, L., Salzman, M. & Youngs, E. (2001) Discovery and integration of mobile communications in everyday life, *Personal and Ubiquitous Computing Journal*, 5(2), p. 109.
- Parker, B. (2006) Constructing community through maps? Power and praxis in community mapping *The Professional Geographer*, 58(4), pp. 470–484.
- Perry, M., O'Hara, K., Sellen, A., Brown, B. & Harper, R. (2001) Dealing with mobility: Understanding access anytime, anywhere, *ACM Trans. Comput.-Hum. interact.*, 8(4), pp. 323–347.
- Perusco, L. & Michael, K. (2007) Control, trust, privacy, and security: Evaluating location-based services, *IEEE Technology and Society Magazine*, 26(1), pp. 4–16.
- Pickles, J. (Ed) (1995) *Ground Truth: The Social Implications of Geographic Information Systems* (New York: Guilford Press).
- Pickles, J. (2004) *A History Of Spaces: Cartographic Reason, Mapping, and The Geo-Coded World* (New York: Routledge).
- Putnam, R. (2000) *Bowling Alone: The Collapse and Revival of American Community* (New York: Simon and Schuster).
- Rheingold, H. (1993) *The Virtual Community: Homestead on The Electronic Frontier* (Cambridge, MA: The MIT Press).
- Russel, B. (2001) Headmap: Location aware devices. Available at <http://tecfa.unige.ch/~nova/headmap-manifesto.PDF> (accessed 6 January 2009).
- Schivelbusch, W. (1986) *The Railway Journey: The industrialization Of Time and Space in The 19th Century* (Berkeley & Los Angeles: University of California Press).
- Sennett, R. (1977) *The Fall Of Public Man* (New York: Knopf).
- Sennett, R. (1992) *The Conscience Of The Eye: The Design and Social Life Of Cities* (New York: Norton).
- Sheller, M. & Urry, J. (2006) The new mobilities paradigm, *Environment and Planning A*, 38(2), pp. 207–226.
- Silverstone, R. & Sujon, Z. (2005) Urban tapestries: Experimental ethnography, technological identities and place. Available at <http://www.lse.ac.uk/collections/media@lse/pdf/EWP7.pdf>
- Simmel, G. (1950) *The Sociology Of Georg Simmel*, trans. K. Wolff (New York: Free Press).
- Thrift, N. (2004) Remembering the technological unconscious by foregrounding knowledges of position, *Environment and Planning D: Society and Space*, 22, pp. 175–190.
- Tuters, M. & Varnellis, K. (2006) Beyond locative media: Giving shape to the internet of things, *Leonardo*, 39(4), pp. 357–363.
- Virilio, P. (1997) *Open Sky*, trans. J. Rose (London; New York: Verso).
- Virilio, P. (2000) *The Information Bomb*, trans. C. Turner (London; New York: Verso).
- Wellman, B. (2001) Physical place and cyberplace: The rise of personalized networking, *International Journal of Urban and Regional Research*, 25(2), pp. 227–252.
- Wellman, B. (2002) Little boxes, globalization, and networked individualism, in: M. Tanabe, P. Van den Besselaar & T. Ishida (Eds) *Digital Cities Ii: Computational and Sociological Approaches*, pp. 10–26 (Berlin: Springer).
- Wood, D. & Graham, S. (2005) Permeable boundaries in the software-sorted society: Surveillance and the differentiation of mobility, in: M. Sheller & J. Urry (Eds) *Mobile Technologies of the City*, p. 177 (London: Routledge).
- Zhong, G., Goldberg, I. & Hengartner, U. (2007) Louis, Lester and Pierre: Three protocols for location privacy, *Privacy enhancing technologies*, 4776, pp. 62–76.