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From Atoms to Bits and Back Again

Writing about emerging media presents a unique set of challenges. Whatever one writes will take long enough to complete and publish that many of the emerging media technologies analyzed will have changed. In few areas is that truer than in the study of mobile applications. In June, 2008, the Apple app store was still a month from being released; the Google app store did not exist. Slightly more than half a decade has now passed, and the mobile ecosystem has changed. Apple's app store has more than 1 million applications available for download, and the Android counterpart – the Google Play Store – now has over 1 million available applications that have been downloaded 50 billion times (Fiegerman, 2013).

Mobile applications are a key part of the move from basic feature phones to smartphones. Smartphones are mobile devices that allow people to place phone calls, send text messages, browse the Internet, use GPS and other forms of location awareness, and run third-party applications. Over half of all mobile phone users in at least 15 countries now own smartphones (Google, 2014), and the growth rates have been impressive. In the United States, 33 percent of the general population owned smartphones in 2011 compared to 56 percent just two years later (Smith, 2013); smartphone ownership rates in the UK nearly doubled over the same period (Ofcom, 2013). While many parts of the world have seen slower smartphone adoption, the International Telecommunication Union (ITU) points out that "In developing countries, the number of mobile broadband subscriptions more than doubled from 2011 to 2013" (ITU, 2013: 6). The increasing adoption of these miniature computers impacts

the time and place of the Internet. Many people no longer only use the Internet in certain places at certain times. Instead, the mobile Internet becomes intertwined with people's everyday practices, operating in the background of many of their conversations and travels through physical space (Gordon and de Souza e Silva, 2011).

Smartphone usage does not represent a simple extension of older Internet practices. People do use their phones to accomplish many of the same tasks as they would with desktop and laptop computers. They check Facebook to see what their friends are doing; they go to Wikipedia to settle arguments; they browse their favorite websites. However, many smartphone applications add an important element to the way people interact with digital information: physical location. They do so because smartphones are examples of locative media. Locative media refers to any form of media – ranging from in-car GPS displays to RFID tags – that feature location awareness, which is a device's ability to be located in physical space and provide users with information about their surroundings. As covered in chapter 2, smartphones rely on a variety of techniques for location awareness, and these techniques are what enable applications like Google Maps and Yelp to know where a smartphone is on a map of physical space. Not all mobile applications take advantage of smartphones as locative media, but many do, and these mobile applications are called location-based services. They are the focus of this book.

Location-based services include everything from mapping services like Waze to popular social applications like Instagram that enable people to tag photos with location information. The applications are able to map different types of information because the pieces of digital information include latitude and longitude metadata, meaning they can be precisely placed on digital maps and positioned relationally to the location of the smartphone. Location is only one of many types of metadata included in the information with which users interact, but the argument throughout this book is that location data is an increasingly crucial piece of digital information (Gordon and de Souza e Silva,

2011). When people open up a smartphone application to provide them with information about their surroundings, they access digital information as an informational layer intertwined with the physical space they experience. Consequently, possibly the major social consequence of location-based services is that they not only impact the types of digital information people access, but they can also affect the way people navigate physical space and interact with those around them.

Smartphones as locative media show how physical places have begun to affect the mobile Internet and how the mobile Internet has begun to affect physical places. In some ways, the growth of location-based information seems like an obvious step in the maturation of the Internet. After all, why would people not use the information at their fingertips to learn more about the places they inhabit? However, to understand why smartphones as locative media represent a change in how the Internet is understood, it helps to examine how the Internet was originally conceived as "placeless." As the next section shows, many people argued that the Internet would make place less important. People would move their social lives online, spend most of their time in virtual communities, work from home, and congregate in and travel through physical space less and less (Kellerman, 2006). The implicit assumption, still present in expressions like "in real life" that oppose the offline to the online, is that the Internet represents a separate space from the physical world. The examples of location-based services detailed throughout this book show why the conceptual separation of the physical and digital into two separate spheres is untenable. Instead, the digital and physical are being merged in new ways, and this chapter concludes by explaining how the intertwining of the digital and physical is addressed in the rest of the book.

Communication media and the annihilation of space and place

Human beings can only cover a limited distance with their physical bodies. If people attempt to communicate a message with no outside assistance, the distance they can communicate is limited by how loud they can yell. People overcome this limitation through media technologies. Written language allowed people to transcribe messages that were transported to other places. The printing press allowed for the mass distribution of the same communication across physical space (Eisenstein, 1979). People even experimented with non-textual, non-verbal media to overcome physical distance. For example, African tribes developed an intricate language of "talking drum" beats that allowed towns to communicate across distance using sound (Gleick, 2011).

The growth of electronic media, first with the telegraph and then the radio and telephone, also enabled messages to overcome great distances. The telegraph was an important development in communication media and represented the first instance of people sharing textual messages across physical space without the need for physical travel (Carey, 1989). To send a letter or distribute a book, a human body had to physically transport the document. Telegraphs removed bodies from the equation, and the importance of that change did not go unnoticed by contemporary observers. For instance, an 1844 article in the *Baltimore Sun* about the completion of the Washington–Baltimore telegraph line claimed that "Time and space has been completely annihilated" (Rosen, 2012). This same feeling – that space was being annihilated through new communication media – was later echoed when people could transmit their voices through the telephone (Fischer, 1994; Marvin, 1988), broadcast messages into homes using the radio (Peters, 1999), and watch live events taking place on the other side of the world on television (Meyrowitz, 1985; Parks, 2005). These media, along with physical transportation technologies such as the railroad and airplanes (Schivelbusch, 1986), all contributed to the experience

that physical space was being overcome. The far was brought near, the absent made present.

The Internet contributed to the same feeling of the annihilation of physical space, possibly to an even greater degree. With the development of the World Wide Web in the early 1990s, people were able to create chat rooms and Multi-User Domains to build relationships with distant others (Baym, 2010), companies built global networks of information flows that lessened the importance of national borders (Castells, 2000), and many scholars and popular sources argued that the Web would lessen the importance of physical space (Gordon and de Souza e Silva, 2011). This sentiment can be seen in a famous 1994 MCI commercial about the Internet. The commercial featured a 12-year-old Anna Paquin describing the "Information Super Highway" as a road that will connect all points on the globe. The most famous statement from the commercial is when Paquin says this road "will not go from here to there. There will be no more there. We will all only be here" ("No More There," 1994). Few quotes better encapsulate the belief that distinct places would be made meaningless by the new communication technology of the Internet. The Internet would allow people to be everywhere all at once, overcoming distance and lessening the importance of being in any one place at a given time.

Even the dominant earlier metaphor of the Internet – cyberspace – showed how people viewed the online world as separate from physical spaces, so separate that it needed its own spatial metaphor to differentiate it from other parts of daily life. And some cultural critics went so far as to argue that cyberspaces would begin to replace the importance of physical spaces. One of the most famous thinkers to do so was Nicholas Negroponte (1995), the founder of the MIT Media Lab. Negroponte's predictions opposed the world of atoms (the physical) to the world of bits (the digital). He argued that the future lay in bits not atoms, whether in the forms of digital spaces in which to socialize or digital spaces in which to trade (Morgan, 2004). As Negroponte claimed,

> As we interconnect ourselves, many of the values of the nation-state will give way to those of both larger and smaller electronic communities. We will socialize in digital neighborhoods in which physical space will be irrelevant and time will play a different role. (Negroponte, 1995: 6)

Negroponte predicted that people would turn away from physical space to live their lives online.[1] He was not alone in this line of thought. Futurists such as Hans Moravec (1990) imagined worlds in which people download their consciousness into wired mainframes. Philosopher Paul Virilio (1997) expressed fear that the age of instant access would lead to a future in which people would not even care about the physical world enough to meet up to have sex. People were supposedly heading toward a future in which the life of the body was replaced by life on a screen. As is fairly obvious, these predictions of the world of atoms being overcome by the world of bits never fully played out in reality.

Early Internet research did suggest that people who spent more time online tended to interact less offline (Kraut et al., 1998). However, these findings changed as more people went online and more scholars began studying the interactions between digital and physical sociability (Kraut et al., 2002). Sociologists Lee Rainie and Barry Wellman's (2012) book *Networked: The New Social Operating System* is an excellent synthesis of statistical research that shows people who spend more time communicating online also tend to spend more time communicating with people offline in physical space. Research has also shown that, in contrast to predictions that people would turn to the Internet as a substitution for physical travel, people who use the Internet frequently do not travel significantly less (Kellerman, 2006). Rather than replacing the need for physical social interaction and mobility, the Internet has instead been enfolded into people's everyday lives (Baym, 2010), and the online and offline "intersect with one another in a complex fashion" (Morgan, 2004: 5). People still travel to work, meet with friends, and walk city streets. They just now often do so in a way that intertwines the world of atoms with the world of bits.

While it is possible to look at oppositions of the digital and physical as outdated, strands of that thought survive today. People still use the phrase "in real life" (IRL) to compare interactions in the physical world to something that happens online, and best-sellers such as Sherry Turkle's (2010) *Alone Together* still argue that online life is distracting people from the physical world. The implication is that individuals have a physical life (real life) and an online life (unreal life?). "In real life" implies that what happens online is somehow less important, despite the relationships people build online and the online resources they use to accomplish a variety of offline tasks (Baym, 2010). The separation becomes even more tenuous when analyzing the uses of smartphones as locative media. Offline interactions are increasingly permeated by digital data, particularly through the growth of location-based services that provide people with information about their surrounding spaces.

The place of locative media

The number of mobile applications has increased rapidly over the last half decade, with more than a million applications available on Android phones and iPhones. Many of the most popular applications are location-based services. A national survey in the United States found that 74 percent of adult smartphone users use their phone to get information about their surrounding space (Zickuhr, 2013), and a national survey in the UK found that 69 percent of smartphone users access maps through their device (Ofcom, 2013). That 69 percent likely underrepresents the number of people who use location-based services because these applications cover far more than just mapping services. Review sites like Yelp use location to provide people with information; Facebook allows people to tag their posts with location information; Instagram includes location information in the photos people share.

These examples all show why it is not analytically useful to keep trying to separate the physical and the digital. Instead,

location-based services merge the two into what communication scholar Adriana de Souza e Silva (2006) calls a "hybrid space" – a key concept that forms part of the theoretical framework in the following chapters. Hybrid spaces are formed through a combination of three elements: social interaction, digital information, and physical space. The digital information people access in hybrid spaces is not exterior to the place; it becomes a part of that place for the user, just as a street sign or other physical informational becomes a part of a place. Hybrid space is a valuable conceptual tool because it refuses the urge to separate location-based digital information from the physical place it describes.[2] Instead, the digital plays a role in shaping how people "read" physical places (de Souza e Silva and Frith, 2012). If people use their smartphones to pull up a list of nearby restaurants on the mobile application Yelp, other people's reviews can impact how they read their surroundings and make choices about a place. If people report an accident on the highway using the mobile application Waze, they might encourage others to make an alternative mobility choice because of the merging of the digital and physical in the hybrid space. As sociologist Michael Hardey (2007) argued, digital location information "is providing new ways of seeing, experiencing and understanding the city" (p. 867).

These new ways of seeing and experiencing the city show why smartphones as locative media require an understanding of more than how people interact with their mobile screens; analyses need to examine how these interactions impact people's experience of their surrounding space. The focus on the relationship between locative media and place is the major thread tying the following chapters together, and unlike some media studies approaches, this book draws from spatial thinkers to discuss how the growth of hybrid spaces may impact society. Chapter 2 introduces key concepts to understand the social impacts of locative media and begins by focusing on the importance of place in people's social worlds before moving on to the mobilities turn, which focuses on the crucial role movement plays in people's lives. After all, mobile media, ranging from the newspaper to the

smartphone, are tools people use to exert control over their experience of physical movement (de Souza e Silva and Frith, 2012). And as shown in chapter 2, locative media represent a shift in the already complicated relationship between mobile media and place.

After establishing a conceptual framework in chapter 2, chapter 3 provides background on how location-based services work. The chapter explains location awareness by detailing GPS, Wi-Fi-enabled location, and cellular triangulation before moving on to an account of mobile "generations" to show how mobile telephony arrived at the 3G and 4G mobile connections so crucial to the growth of location-based services. The chapter concludes by discussing the two most popular smartphone operating systems – Android and iOS – and explaining how the growth of app stores has changed the mobile media landscape.

Chapters 4–6 analyze three types of location-based services: navigation applications, social networking applications, and applications that allow people to contribute and access geotagged information. Chapter 6 also mentions mobile gaming, though this book not devote a chapter to mobile gaming because so much excellent research already exists on the topic (cf. Hjorth, 2011). Each of these chapters examines specific location-based services, but the focus is more on user practices and how location information impacts people's experiences than on the design of any specific application. As digital media researcher Nancy Baym (2010) wrote,

> Trying to list specific types of digital media is frustrating at best. Between this writing and your reading there are bound to be new developments, and things popular as I write will drop from vogue. *Let this be a reminder to us of the importance of remaining focused on specific capabilities and consequences rather than the media themselves.* (p. 13; italic emphasis added)

Baym's advice applies to the study of location-based services. Some of the mobile applications discussed in this book might not exist by the time the book is published; other applications may be updated and look significantly different than they do

now. For this reason, chapters 4–6 analyze the consequences and capabilities of location-based services rather than specific applications as a way to ensure the analysis in this book will remain useful regardless of the ways in which the mobile applications examined change.

The focus on practices rather than individual applications shifts in chapter 7, which moves away from user practices to instead discuss the location-based service Foursquare. The chapter uses Foursquare as a case study to explain how market forces can shape contemporary location-based services because Foursquare is an interesting example that split its features into two separate applications (Foursquare and Swarm) in part to address a shift in the developers' overall goals. Some of the applications analyzed in chapters 4–6 are relatively new startups, and they must seek out funding sources and ways to monetize their service. By looking at how one specific application has managed the business side of mobile development, chapter 7 shows that these applications do not develop in a vacuum. They collect data and offer services with the goal of eventually becoming viable businesses. The discussion of location information as commercial data continues in chapter 8, which analyzes privacy issues that accompany the sharing of location information with other individuals, as well as the ways in which governments and law enforcement use location data.

The book ends with an eye to the future. Chapters 2–8 focus mostly on the industrialized world, both because of my research experience and because smartphones have not been as widely adopted in the global South; however, as discussed the concluding chapter, that will likely change in the near future as cheaper smartphones hit the market and adoption increases in the developing world. The final chapter also raises questions about how the growth of hybrid spaces and the reliance on location-based services may lead to new forms of inequality, and the book concludes by discussing how the potential future of "The Internet of Things" may affect the ways people use smartphones as locative media.

The following chapters cover a variety of topics, but the central thread tying them together is the argument that smartphones as locative media have begun to shift how people experience physical place. Locative media show how online data now shapes offline experiences. As discussed above, the Internet was originally conceived of as placeless, but location-based services show that digital information is increasingly organized around physical locations. That shift is a major one, and it has contributed to a partial change in how spaces are produced and understood through digital information accessed through smartphone screens. People can never be sure what the future holds for emerging media, but they can attempt to capture the present moment in a way that will help them understand what comes next. The following chapters focus on theory and user practices that will help in analyzing the contemporary moment of locative media and the future impacts as location information further shapes interactions with both digital information and physical space.

2

Mobilities and the Spatial Turn

This chapter might be read as part of a printed book. It might be read on an eReader, on a tablet computer, or on a mobile phone. Regardless of how the chapter is accessed, the person reading it *in place*. The place might be a dorm room or a library, an apartment or a coffee shop. The reader might be able to glance around the room and remember things that happened there, or she might have no particular attachment to the place at all. Either way, she is still occupying a physical place reading this text. This chapter is about that place and so many others.

"Place" is a term used all the time. People ask friends if they want to come over to their place. Family members talk about the places they visited over the summer. If two friends feel homesick right now or wish they were somewhere else, they long for one place over another. Place structures much of individuals' thought and memory, yet despite how commonly people use the term, "place is clearly a complicated concept" (Cresswell, 2004: 50). But it is a concept that remains centrally important to the world and raises questions about how the experience of place changes with the introduction of emerging media. As a thought experiment on why place has such a complex relationship to media usage, return to the first paragraph. As this chapter is read, the reader is physically in place somewhere. However, imagine for a second that rather than reading this academic book, the reader is fully engrossed in the narrative of her favorite novel. That novel likely has a physical setting, for example the nineteenth-century English countryside of Jane Austen or George R. R. Martin's Westeroos. Those are both places even though they are not physical places like a dorm room or a coffee shop. The "imagined

places" of novels raise an important question for media studies scholars (Jansson and Falkheimer, 2006), particularly those that study mobile technologies: are people still "in place" in a dorm room or library if they are also engrossed in the imagined place of the novel? Some variation of that question has shaped much of the analysis of mobile media, ranging from the Walkman to the mobile phone (de Souza e Silva and Frith, 2012). When people call someone or engage with their mobile phone screen, are they still fully present in the physical place they move through? How are the answers to these questions impacted by locative media?

To best address these questions, it is important to explore how people understand place. To do so, this chapter first discusses the "spatial turn" and the "mobilities turn" in the humanities and social sciences, which are two related theoretical movements that shed light on the prominent position of place in the social world. The chapter then analyzes how people use older forms of mobile media, such as the book, the Walkman, and the mobile phone, to exert some control over their experience of movement, and it concludes by explaining how locative media shift the relationship between mobile media and place.

The importance of the space and place

Social theory is filled with binaries people use to understand the social world. Academic thought has absence/presence, virtual/physical, and private/public to name a few. One of the dominant binaries throughout much social theory of the nineteenth and twentieth centuries was space and time. Time was often seen as the more important of the two (Massey, 2005). Time was viewed as dynamic and progressive and was used to mark the "stages" or "eras" of human development, seen notably in Marshall Mcluhan's media eras or Karl Marx's stages of history. Space and place, on the other hand, have often been viewed "as a location on a surface where things 'just happen' rather than the more holistic view of places as the geographical context for the mediation of physical, social and economic processes" (Agnew,

2011: 317). As geographers John Agnew and James Duncan (1989) claimed, "the concept of place has been marginalized within the discourse of modern social science and history" (p. 2).

Space and place began to see a resurgence in academic thought in the 1970s and 1980s with the "spatial turn" in the humanities and social sciences. Human geographers Yi Fu Tuan (1977) and Edward Relph (1976) developed influential work that focused on how people experience place. Philosophers Michel de Certeau (1988) and Henri Lefebvre (1991) analyzed how spaces are socially produced and how that production shapes the lived experience of individuals. Lefebvre and de Certeau also dealt explicitly with the role space and place play in producing and reproducing power structures, a focus adopted by important cultural geographers such as David Harvey (1991), Doreen Massey (1994), and Edward Soja (1996). These thinkers all raised different questions about space and place, and they came from different disciplinary backgrounds. However, what united the work of the major thinkers mentioned above was an agreement that space and place play a key role in how people experience the world.

The effects of the spatial turn in cultural theory are still being felt today as more social scientific and humanistic disciplines adopt the work of major spatial thinkers. The effect has already been felt in media studies research, which was fairly quick to recognize the ways in which emerging media can affect people's sense of place. One of the earliest, most influential examples was communication scholar Joshua Meyrowitz's (1985) book *No Sense of Place,* which examined how television exposed people to new places and altered impressions of their local environment. Media theorists Nick Couldry and Anne McCarthy's (2004) edited collection *MediaSpaces* also provided a detailed account of how spatial configurations relate to media consumption. At the center of this research and the mobile media research examined later is the question of how people's sense of place is impacted as they adopt new media. However, to best analyze the spatial impacts of mobile media, it helps to examine the different ways

place has been conceptualized and outline the definition drawn from throughout the rest of this book.

Conceptualizing place

"Place" is the kind of indeterminate, subjective term that frustrates attempts at simple definition. Think of how people use the word in terms of scale. A home is often thought of as a place ("want to come over to my place?"). Even a room in a home can be a place distinct from other rooms. But a neighborhood can also be a place, and on a larger scale, so can cities and nations. The complication of scale raises the question of what people mean when they talk about place. In many ways, the answer is subjective. Places are where individuals make them. Tuan (1977) describes this idea in his opposition of the terms "space" and "place": "what begins as an undifferentiated space becomes place as we get to know it better and endow it with value" (p. 6). In Tuan's terms, space and place are a necessary binary. Space is "that which allows movement" and "place is pause; each pause in movement makes it possible for location to be transformed into place" (p. 6).

Tuan's opposition of space and place arises frequently.[1] For example, Relph (1976) also viewed space as the abstract multitude from which individuals carve out a sense of place. Other scholars, such as philosopher Edward Casey (1996) and computer scientists Steve Harrison and Paul Dourish (1996),[2] opposed space – seen as the abstraction of a geometrically measured product of science – to place as the lived experience. What is key to all these conceptualizations is that place becomes more than a site upon which people act. Place instead plays a role in shaping action and identity. As Casey (1996) wrote, "To live is to live locally, and to know is first of all to know the place one is in" (p. 18).

The idea of living locally directly relates to media studies and the mobilities research I discuss later. One of the fears expressed about communication media and globalization in general is that they potentially damage the authenticity of individual places.

These arguments often focus on how people's increased movement and their ability to use communication technologies to communicate with distant others contribute to homogenization and placelessness (Relph, 1976). An example of this argument can be found in the work of anthropologist Marc Augé (1995), who argued that human lives are increasingly filled with "non-places" that lose their meaning and distinction from other places. Augé defined non-places as "spaces of circulation (freeways, airways), consumption (department stores, supermarket), and communication (telephones, faces, television, cable networks)" (p. 110). No doubt, if Augé had been writing five years later, the Internet likely would have become one of his prime non-places.

Augé's concept of non-places has been influential but has been criticized for ignoring the place-making tendencies of humans (Merriman, 2004). I grew up in Virginia in the suburbs of Washington, DC. These suburbs featured the types of homogenization Augé and others who write about "placelessness" discuss (Relph, 1976). The movie theater closest to my house is one of four movie theaters within a 5 mile radius. All four are located in shopping centers that might seem the same to an outsider. But I remember one as the place I got my first job as a 15-year-old. I can still tell stories about that job. That movie theater and those shopping centers may seem interchangeable, but going back to Tuan, Casey, and others, humans construct a sense of place regardless. An airport that might be a non-place for one person might be the place another met his wife.

The case of the airport also raises interesting questions about place and mobility. Mobility can refer to many things, including people's ability to move through physical space (physical mobility) or the ability to substitute physical travel with phone calls or Internet searches (virtual mobility) (Kellerman, 2006). These forms of mobility are part of what Augé and Relph argue contribute to the increasing homogenization of place. However, the idea that places can be "authentic" or that movement (whether virtual or physical) harms a sense of place has been questioned by other scholars, including geographer Doreen Massey (1994).

Massey argued that geographers must adopt a "progressive sense of place" that recognizes that communication media and transportation technologies can actually *increase* one's sense of place because the understanding of the local is always formed relationally ("my town is different from that town because ..."). In her conceptualization of place that I adopt throughout this book, she pointed out that places are not "local" in the sense they can be viewed as fixed, bounded, and authentic. Instead, places are always the sites of flows. What makes a place distinct is the types of information, people, and goods that flow through it, and in a later work, Massey (2005) described place as a specific set of trajectories coming into contact. Her view of place as the process, rather than result, of various flows opens up the understanding of place. Places are not self-contained; they are not static. Instead, "what gives a place its specificity is not some long internalized history but the fact that it is constructed out of a particular constellation of social relations, meeting and weaving together at a particular locus" (Massey, 1994: 154).

Understanding place as open rather than closed, as dynamic rather than static, allows for the observation of how the social construction of place happens from both the inside and outside. Notably, a "progressive sense of place" also recognizes the importance of movement, which is key to understanding the ways in which people use mobile media to shape their experience of place.

Movement and openness

The late 1990s and 2000s saw a further "turn" in academic thought called "the mobilities turn." The mobilities turn builds on the spatial turn and focuses on movement of all types, whether physical movement, virtual movement, material movement, or even imaginary movement (Sheller and Urry, 2006). The focus on mobility is important because even as spatial analysis has increased, "travel has been for the social sciences seen as a black box, a neutral set of technologies and processes" (Sheller and Urry, 2006: 208). In other words, approaches to space and

place often view movement as "dead time" spent going from one place to another (Green, 2002; Lyons and Urry, 2005). In traditional analyses, it was the destination that mattered, not the journey. Mobilities researchers, on the other hand, still value the importance of fixed destinations, but they argue that experiences of place cannot be divorced from the flows of both people and things: "Places are thus not so much fixed but are implicated within complex networks by which 'hosts, guests, buildings, objects and machines' are contingently brought together to produce certain performances in certain places at certain times" (Hannam, Sheller, and Urry, 2006: 13).

Mobilities researchers' establishment of a "movement-driven social science" (Urry, 2007: 18) is, in part, an attempt to rethink the concept of place by positioning place as the result of flows of various kinds. The focus on movement raises questions about how places are socially produced: how are places positioned in the various networks of people, ideas, and material that flow in the global economy (Sheller, 2010)? Who is allowed to move freely and who has their mobility either restricted or forced (Cresswell, 2010)? How do people use mobile technologies to influence their experience of movement (de Souza e Silva and Frith, 2010b; Wilken, 2010)? The answers to these questions and many others are what make up the performative identity of place, which contrasts with some influential concepts of place discussed in the previous section. Tuan defined space as movement and place as pause. Augé viewed sites of transit as the "non-places" of contemporary life. The mobilities turn, in contrast, sees place as the result of flows, not pause. Equally importantly, sites of transit and movement are not separate from the construction of place. Without understanding how people experience movement, scholars cannot understand how a place's identity is performed (Jensen, 2009).

One of the valuable contributions of the mobilities turn has been the recognition of the role technologies play in the experience of mobility and the construction of place. Much of this research has focused on transportation technologies. For

instance, Wolfgang Schivelbusch's (1986) work on train travel showed how the railway compressed space and time by reducing travel time between cities. Other mobilities research focused on how people use mobile technologies to mediate their experience of movement (Frith, 2012b; Wilken, 2010). The next section examines earlier forms of mobile media from a mobilities perspective to show the complex relationship between mobile media use and place.

Mobile media and spatial experience[3]

Computer scientist Alan Kay half-jokingly claimed that "technology is anything that was invented after you were born" (quote in Kelly, 2005: n.p.). Kay's joke obviously does not work as a rigorous definition of technology, but in many ways the definition applies to many people's understanding of mobile media. When I ask my students what they think of when I use the term "mobile media," almost no one ever mentions older media like the paperback novel. However, books are an important mobile media form people used to control their experience of movement and place.

The paperback book became popular in the mid-nineteenth century and is still popular today. To some degree, paperback books' popularity and availability was made possible by new developments in printing technologies (Manguel, 1997). However, their rapid growth in popularity was also a result of changing mobility practices (de Souza e Silva and Frith, 2012). The mid-nineteenth century was the period in which railway travel began to take off in the UK. Miles of tracks were built, and people who rode the railway were confronted with a new social situation: they were forced to travel with strangers for extended periods of time in contrast to the more private setting of the eighteenth-century coach (de Souza e Silva and Frith, 2012; Manguel, 1997; Schivelbusch, 1986). To negotiate this new form of mobility, people turned to paperback novels as a technology that allowed them to exert a certain sense of control over their

experience of the setting and mediate their experience of place. They could use the book or the newspaper to engage with a text rather than the strangers in their shared compartment, and "Our current assumption that 'travel' means 'reading' arrived only with the railways" (Flanders, 2006: n.p).

People still use books to mediate their experience of mobility, but they are just as likely to have headphones in their ears as they are to have their head in a book, a tendency that began in 1977 when Sony released the original Walkman. The Walkman was a cultural sensation, and as Adriana de Souza e Silva and I (2012) argued, much of the marketing of the Walkman focused on a combination of mobility and privacy. People were able to listen to music while mobile and exert control over the private auditory environment with which they interacted (du Gay, Hall, Janes, Mackay, and Negus, 1997). Later forms of mobile media, most notably the iPod, gave people even more control over their experience of movement because they could carry their "auditory identity in the palm of [their] hand" (Bull, 2006: 145). They could basically pick a song to match their mood, and that song would become a soundtrack to their movement through physical space.

Here is where the earlier theories of place and mobility become so crucial to understanding how people use these mobile technologies. Place, using a common definition, is a meaningful location, and critics have argued that people use mobile media to make place less meaningful by engaging in the mediated space of the song or the narrative of a novel rather than their physical surroundings (Bloom, 1988; Gergen, 2002). One example of this criticism is Du Gay and colleagues' (1997) book about the Sony Walkman, which examined how the Walkman complicated the division between private and public because people turned to the private experience of headphones rather than the public spaces they moved through. Sociologist Michael Bull (2000, 2007), in his extensive ethnographic work with Walkman and iPod users, made similar arguments. His work revealed that people construct "mobile media sound bubbles" that allow them to shield themselves from the actual auditory experience of a place: "It

appears that as consumers become immersed in their mobile media sound bubbles, so those spaces habitually passed through in daily life increasingly lose significance and turn progressively into the 'nonspaces' of daily life that users try, through those self-same technologies, to transcend" (Bull, 2004: 189).

The mobile phone has been analyzed in much the same way as these other forms of mobile media. Analyses of the mobile phone frequently featured discussions of how mobile voice calls distracted people from their experience of place. In particular, mobile phone research included multiple examinations of how mobile phones allowed people to bring private relationships into public space (De Gournay, 2002; Hoflich, 2005), and psychologist Kenneth Gergen (2002) claimed that people who talk on their mobile phones are not fully inhabiting that physical place. Instead, he argued that mobile phone users enact a form of "absent presence." They may be physically present in a place, but they are rendered absent because they are more engaged in their remote conversation than their physical surroundings. Gergen's view that mobile phones damaged experience of place have been echoed in many popular press accounts that view mobile phones as lessening people's connection to the places they move through (Quenida, 2013). These criticisms of mobile telephony are basically criticisms of the ways in which people use mobile media to control their experiences of mobility.

To some degree, some of these criticisms of mobile media are overstated. Research shows that people who use mobile media still find ways to engage with place (Gordon and de Souza e Silva, 2011; Humphreys, 2005; Ling, 2004). People may seem distracted while talking on mobile phones or walking around with headphones in their ears, but that does not mean they experience a form of placelessness (de Souza e Silva and Frith, 2012). Instead, they enact a different form of mobility, mediating their movement through mobile media and altering their sense of place. Returning to Massey, there is no "authentic" sense of place to be polluted by the use of mobile media; instead, the place changes as the constellations of people and technologies found

in one physical location changes. However, while the mobile phone, the book, and mobile auditory media do not lead to true placelessness, they do contribute to a more isolated experience of place than the forms of locative media examined in the rest of this book. The final section of this chapter discusses how locative media complicate traditional understandings of the interaction between mobile media and place.

What changes with locative media

Reading, listening to music, and talking on a mobile phone are three different activities. All three activities, however, have at least one significant thing in common: they introduce an informational layer to one's experience of place that is exterior to that place (de Souza e Silva and Frith, 2012). Whether it is the narrative of a novel, a favorite song, or a phone conversation with a friend, these are all forms of mediation that are not place-dependent. People can listen to the same song or have the same mobile phone conversation regardless of their physical location. In a sense, the fact that this layer of mediation feels so separate, so private, is key to why mobile media have often been criticized as detracting from a sense of place.

Locative media work on a different principle. Unlike the iPod or a text message to a friend, the information people access when they use locative media is *about* the places they inhabit. The location-based digital information is tied closely to that place, not an exterior informational layer introduced through the text of a book or a song blared through headphones. Compare two possible experiences with a mobile phone. The first experience involves walking down a street while talking to a friend on the phone. The phone user contacts a distant person rather than engaging with anyone nearby or paying close attention to her surroundings. The second experience involves the person standing on that same street and using her phone to look at a mapping application. She clicks through the application and pulls up the "restaurant" category to see a map of nearby places. She finds a list of places, reads what other people wrote about the

places, and then maps a route from her location to the restaurant she chose. She is able to engage in these two activities with her smartphone, just like she can listen to music or read an eBook on her smartphone. But using a location-based service suggests a different relationship between her mobile device and her surrounding space. The information she receives depends on her physical location, meaning she would receive a different set of spatially encoded information if she stood on a different street in a different city (de Souza e Silva and Sutko, 2011). The same is not true for the mobile phone call or music played through her headphones.

Here is where the concept of hybrid space examined in the previous chapter is useful for understanding the social impacts of smartphones as locative media. Hybrid space conceptualizes what happens as the Internet leaves the desktop and moves out into the physical world. Importantly, however, hybrid spaces are not just places affected by the location-based information of the mobile Internet; hybrid space are also spaces that show how physical place shapes the meaning of the mobile Internet. In a hybrid space, the physical location determines the information one receives, just as the location-based information influences how people move through and make decisions about their physical space. The smartphone screen then becomes a way for people to mediate their experience of space and movement by accessing spatial information.

The ways in which spatial information converge and are organized around different locations also shows why Massey's progressive sense of place can be such a useful conceptual tool for understanding locative media because it shows how place is dynamic and always changing. Seeing a friend share a location on Facebook or Instagram can make a place seem more appealing. Bad reviews on an application like Yelp or Socialight can make a place seem less desirable. An alternative route on a mapping application may encourage someone to make a different mobility choice. The person's experience of place may change as new types of location-based information become

embedded in nearby locations, meaning that the place as a collection of specific trajectories shifts as new, more durable trajectories make their mark on a place through the digital traces they leave behind. The shifting of trajectories, the change in the informational layers composing contemporary places, is the major reason why locative media are important from a social perspective. Place is not static; it does not have a fixed meaning that cannot change. Instead, place is dynamic and open to new flows of information, so people's sense of place can be impacted as they adopt new mobile applications and find new ways to use locative media to negotiate experiences of physical and virtual mobility. Ultimately, as researchers Paul Dourish and Genevieve Bell (2011) argue, locative media "become a new lens through which the spatialities of urban space can be viewed" (p. 120). As the spatial turn suggests, how people see and experience place matters, and that experience can alter as people enfold new forms of mobile media into their everyday lives.

Conclusion

For much of the twentieth century, space and place were viewed by philosophers and other scholars as less important than time (Massey, 2005). Time was where the action happened; time was how people marked progress and the dynamic changes of history. Space and place, on the other hand, were often viewed as static sites where time passed. That began to change with the spatial turn in the humanities and social sciences. The spatial turn refocused attention on the importance of space and place. Human geographers such as Yi Fu Tuan (1977) and Edward Relph (1976) began to think deeply about how people understand place, and other scholars, such as Henri Lefebvre (1991) and David Harvey (1991), began to analyze the vital role space and place play in the social world.

While the spatial turn brought place to the forefront of some lines of thought, thinkers still tended to view place as rather static. Tuan viewed place as pause; Relph opposed "authentic" places to

placelessness, criticizing media and mobility as damaging the importance of place. In response, scholars began examining the crucial role mobility plays in the social construction of place. One of the most influential scholars to do so was geographer Doreen Massey (1994). Massey embraced a "progressive sense of place" that refused the tendency to view place as self-contained. Massey argued that places are the result of various flows. Building on Massey's ideas, later scholars embraced the mobilities turn that argued that place cannot be understood without understanding movement (Sheller and Urry, 2006). Rather than view travel as "dead time" (Green, 2002), mobilities scholars argue that mobility is an essential element that shapes how people experience place. Places are not merely a set of fixed destinations. Places are performances, and part of those performances is mobility.

The spatial and mobilities turns are important for the study of mobile media. People have often used mobile media to shape their experience of movement. They read on trains, they use the Walkman and the iPod to create "mobile media sound bubbles" (Bull, 2004), and they use mobile phones to engage with distant others while mobile. Critics have argued that mobile media can detract from people's sense of place because people engage more with their media than they do with their surroundings (Gergen, 2002). What unites the book, the Walkman, the iPod, and the mobile phone is that they all introduce a layer of mediation that is external to people's experience of place. A narrative of a novel or a song played through headphones remains the same regardless of the place in which it is experienced.

Locative media alter the relationship between mobile media and place, which is key to understanding their social impacts. People still use smartphones to mediate their experience of mobility, but they do so by interacting with information that is part of that place and forming hybrid spaces in which digital information and physical space merge (Gordon and de Souza e Silva, 2011). In these hybrid spaces, the digital influences experiences of place, but places also influence experiences of the digital. This co-construction of place and locative media is the

most relevant shift from older forms of mobile media to the locative media discussed throughout this book. To best understand the social impacts of locative media, it is necessary to analyze how they impact people's experience of place and mobility. How place is experienced matters. And experiences of place cannot be separated from the different technologies used to mediate mobility.