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Smartphone location-based services in the social, mobile, and surveillance practices of everyday life

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MSc in Media and Communications

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Carey Wong

ABSTRACT

Location-based services (LBSs) are a category of location-aware applications used through smartphones that access a user's location in order to accomplish a task. The four main delineations of LBSs that serve as the focus of this study are mapping, locational information management, social networking, and geotagging over social media. Previous research emphasizes technologies' impact on how users present themselves to others, navigate physical space, and mediate their privacy. However, since LBSs are a relatively new development, there is a gap in the literature of their definition and function in the everyday lives of their users.

This dissertation aims to fill that gap using interviews to explore the viewpoints of urban smartphone users in the city of London responding to my general research question: how do location-based services function in everyday life? Using a domestication theory framework enables an investigation into the contexts, motivations, and attitudes about LBS and the nature of the communicative processes they produce. The main conceptual ideas drawn from other authors that will be applied to LBSs are their production of a 'hybrid space' between the virtual and real world, physical patterns of social network formation, the presentation of place in relation to personal identity, and participatory surveillance through online information sharing.

Control emerged as the central theme operating throughout users' behaviors with LBSs, including control over the device itself, control over others' communicative access to the user, and control over the type and amount of information shared through applications. LBSs are primarily used for navigation because they are easy to use, convenient, useful, and time-saving, but may also cause problems of dependency and distraction. One finding refutes the notion that LBSs are rejuvenating location-based networking patterns, but instead are found to supplement existing norms of social connection formation; by current etiquettes, meeting people through LBS apps is perceived to be 'creepy'. Geotagging is a commonly accepted practice that is reportedly meant to both inform and inspire jealousy,

yet is frequently perceived as braggadocio, inciting a range of reactions from appreciation to contempt. This is a consequence of participatory surveillance, or viewing and being viewed, enabled by LBSs that affects everyday life more directly and pervasively between close social ties than between a user and an institution.

INTRODUCTION

Early in 2013, smartphones overtook mobile phones by claiming a greater share of cellular device sales for the first time ever. This marker indicates a worldwide shift towards more accessible computing power held in the hands of individuals (Svensson, 2013). The mobile phone was at one point a visible symbol of status, but now many would consider any device without data capabilities to be from the stone ages (Geser, 2004). The increasing ubiquity of smartphones warrants research into what impact this technology is having on both a macro and micro level and from a sociological perspective on our cultural values and everyday behaviours.

By definition, mobile phones allow for greater user mobility as they are not tied down to access points, a limitation that telephone landlines and desktop computers suffer. However, freedom of mobility creates the need to find oneself within physical spaces, which is an issue the technology of the smartphone is now able to tackle. The mobile phone is designed to perform independent of location, but the smartphone actually gains more functionality when moved through space by facilitating connections to both nearby places and people. Smartphones, or phones with more advanced computing abilities than mobile phones, have been described as the 'Swiss army knives' of the technological world, crucially allowing integration with third-party applications (Boyd, 2005). A major innovation of the smartphone is geo-positioning capabilities; in 2008 Apple's iPhone 3G and Google's Android smartphones were the first efficiently 'location-aware' devices to be released, instigating the rise and commercialisation of location-based services (LBSs).

However, there are relatively few studies that thoroughly identify the technical and social potentials and effects of this rapidly developing technology. Even academia is indecisive about how to label this comparatively new field with the terms 'positioning', 'location-aware media', 'location-based services', and 'locative media' being used synonymously (Lindgren, Jedbratt, & Svensson, 2002; Sutko & de Souza e Silva, 2011; Katz, 2008; Hjorth 2009; Nayar, 2010). Only de Souza e Silva and Frith (2010b: 486) emphasise LBSs as 'an attempt to commercialize location awareness... [through] commercial applications made widely

available to the general public'. For the purposes of continuity among a range of ambivalent discourses, LBSs will be used to denote any program that actively or passively utilises the geographical location of users whether for individual or social use. The everyday uses of LBSs will serve as the focus of research for this dissertation.

Although LBSs benefit users by allowing them to more easily navigate, find specific places, locate other LBS users, and share their location over social media, they also generate some apprehension in regards to personal security. In recent months, the United State's National Security Agency (NSA) was exposed for monitoring the phone records and internet activity of millions of Americans and foreigners alike ('Secrets, lies and America's spies', 2013). The media panic over this issue is amplifying public anxieties and inciting global concern over the security of our mobile phones, paranoia about how much surveillance we are unknowingly subjected to, and questions about who may or may not be tracking our daily movements. The current atmosphere of suspicion is central for the exploration of LBSs that have the potential to be used to invade person privacy.

In addition to the corporeal uses of smartphones devices, this dissertation investigates user's attitudes about applications that use locational information and other social or economic issues raised by this potentially invasive feature. Location technology was at one point a superfluous, expensive add-on to mobile services, but they now play an essential role in both emerging applications and those already integrated into daily routines. Although location-awareness is a dynamic technology that is arguably still in its infancy, the effects of LBSs on social interactions, individuals' behaviours, and cultural ideas will be central to my examination. The fact that this technology is relatively new and unexplored, yet already integrated into everyday practices is exactly what makes it an important subject of research.

THEORETICAL REVIEW

There is an abundance of research on mobile phones, but the smartphone has been relatively neglected with only a handful of studies addressing LBSs. In this section I will review the relevant theoretical framework for exploring LBSs drawn from current research on location-aware media, mobility and sociability studies, and the domestication theory as a framework for researching this topic. Additionally, I will address issues of privacy and surveillance that are pronounced with this form of media.

Defining location-based services

Since LBSs are a considerably new development and have not garnered much attention, there is a relatively large gap in the literature concerning them. Chang and Goodman (2010) define location-aware media as 'the representation and experience of place through digital interfaces' made possible by advancements in geo-positioning and the increasing utilization of geographic location in the online experience' (110). de Souza e Silva (2010a) similarly describe LBSs as mobile interfaces that enable a user to access digital information attached to physical places and also 'connect to nearby people depending on their location' (503). These explanations point out the key aspects of LBSs, emphasising how they digitally mediate real life and our experience of both physical locations and social interactions.

One of the major uses of LBSs is using GPS navigational applications such as *Apple Maps* or *Google Maps* with 50% of UK adults using map applications on their smartphones (Ofcom, 2013). Beyond navigation, the functions of LBSs can be further subcategorised into location-based mobile games (LBMGs), location-based social networks (LBSNs), location-based advertising, locational information management, and geotagging applications (Katz, 2008; Licoppe & Inada, 2006; de Souza e Silva & Frith, 2010a; de Souza e Silva & Frith, 2010b). These groupings are not mutually exclusive since LBS applications can encompass one to potentially all of these features. For example, *Foursquare* functions as a game, a social network, and a navigational map (Frith, 2013; Ofcom, 2013).

As for how users are accessed through LBSs, Ofcom (2013) delineates between two kinds: 'active services' initiated by the user and 'passive services' activated by an outside actor. For example, an active service would be a user requesting directions or information on a location, whereas a passive service would be a user locating another person unknowingly, such as a parent locating a child. Considering the work of Sutko and de Souza e Silva (2011), passive services can be further categorised as either an *eponymous* interface that shows a user's location to friends or an *anonymous* interface that shows a user's location to unknown agents. Passive services tend to raise more concerns about privacy and surveillance that will be discussed later on.

Studies of LBSs, LBMGs, LBSNs

The following is an overview of the existing literature that focuses on the more popular areas of location-aware media, namely location-based services (LBSs), location-based mobile games (LBMGs), and location-based social networks (LBSNs).

Mobile gaming

There have been a few specific case studies exploring how LBMGs can alter our experience of digital and physical spaces, allowing users to be simultaneously connected with physically distant others and others sharing contiguous space. Mobile games can turn street corners into territory markers and roads into the virtual fields of play, augmenting urban space, and layering 'localised informational objects relevant to the ongoing game activity' onto physical spaces (Chang & Goodman, 2010; Licoppe & Inada, 2006). Applying these findings to LBSs generally, location-awareness causes users to adjust their movements dependent on the virtual information found within physical space while managing both their onscreen activity and public social interactions. Hjorth (2009) suggests that the focus of mobile communication is moving away from the visualities of 'screen-ness' and moving into more 'haptic' uses of mobile media, engaging movement and physicality into the use of technology. Location-aware gaming transforms perceptions of urban spaces and the way we can move through them, altering the relationship between virtual space and real life (de Souza e Silva, 2009). The literature on LBMGs can inform studies of LBSs generally, since these findings point to the idea that location-aware media create *hybrid spaces* that users can interact with in between the virtual and real world.

Hybrid space

One of the major consequences of mobile telephony technology is its compression of time and space, meaning its ability to overcome spatial, temporal, and social space (Geser, 2004; Hjorth, 2009). Although mobile media have been described as removing the importance of spatial proximity, location-aware media are designed around the importance of physical space, place, and locality (Frith, 2013; Hjorth, 2009). Uniquely prominent with LBSs are their ability to personalise nearby spaces and digitally attached information to public spaces that can be accessed through an application. A user can access information, such as pictures of a landmark or restaurant reviews, shared by others or add their own information about a place, creating a digital filter over public spaces that personalises their experience of the world (de Souza e Silva & Frith, 2010a, 2010b). In other words, a digital layer of information becomes entwined with physical space, affecting not only the user's experience of space but also the way they choose to navigate it. Hjorth (2009) equates mobile media as not just another screen, but a space within itself; Frith (2013) applies this idea to location-aware media by coining the term 'hybrid space'. In this sense, public space is no longer a tangible material, but rather 'an emergent, rapidly evolving, and highly reflexive feature of the

codevelopment of location-aware technology' that is constantly expanding and altering spaces (Licoppe & Inada, 2006: 58).

The idea of joining information to the real world is not new, but is an essential part of cyberspace theory. Using Nayar's (2010) work, conceptions of cyberspace as a connection, extension, and augmentation of real-life conditions can be applied to the mobile world, strengthening the notion of a third, hybrid space. Nayar emphasises that cyberspace is 'a process rather than an object, a series of actions, negotiations, and interactions in dynamic relations' (4). Digital technology changes how users negotiate both virtual and material spaces that we encounter in everyday life. However, how the hybrid space of mobile applications affect social behaviours and practices is a gap in the literature my research will contribute to.

Mobility and sociability

Mobile phones are the fastest diffusing communication technology in history and are massively changing the way we organize and coordinate our lives (Castells, 2008; Ling, 2004). In contrast to landlines, the key advantage of mobile phones is their mobility, which unbind the user from a physical location. Mobile phones have created a shift from 'location-based to person-based social systems' since a telephone number now represents a mobile person rather than a fixed point of presence (Geser, 2004; Mitchell 2010). As a result of the user's freedom of movement, location telling has become an important aspect of context that is commonly shared during interactions over the phone (Arminen, 2005). However, Arminen (2003) finds that sharing a spatio-temporal location, such as saying how many minutes away you are from a meeting point, is often more important than sharing a precise geographical location. This creates an interesting dynamic for LBSs since geographical location is their axial feature. Although mobile phones liberate communicative interactions from physical proximity, there are greater social and commercial benefits of location dependence because of the proliferation of LBSs. One could then ask, are LBSs rejuvenating location-based social systems by allowing users to socially network with people in the surrounding locations? Information about location is becoming integral to mobile device applications, which is an area that needs to be explored further.

People have a deeply-rooted need to have social interactions with people spatially close to them, and technologies are embedded in this social practice (Geser, 2004). Therefore, LBSs that use physical location for social networking should supplement the pattern of relationship formation based around stable locations. Previous research has shown that

information and communication technologies (ICTs) and mobile phones generally supplement users' existing local social connections rather than extend their networks to strangers. In fact, using mobiles may actually decrease sociability by acting as shields to new acquaintances, which 'interfere with rather than help face-to-face connections, enslaving users rather than freeing them' (Hjorth, 2009; Geser, 2004, 2005; Livingstone, 2010; Green, 2002). These findings suggest one view on the debate, that location-aware media reinforce existing patterns of social interaction and may even make us less sociable.

Conversely, some authors suggest that LBSs help us to select, control, and manage our relationships with spaces, not necessarily retreat from them (de Souza e Silva & Frith, 2010a). LBSs connect users to their physical surroundings by enabling social networking based on physical space, 'people can go to restaurants recommended by like-minded others, find friends in crowded public spaces, or find other people who have similar interests' (de Souza e Silva & Frith, 2010a: 514). In this sense, locative mobile social networks (LMSNs), or LBSs that enable mobile users to digitally view and connect with nearby people, create new patterns of social networks. Are LBSs changing how users interact with digital space, physical space, and their social networks? This dissertation aims to contribute to this debate by investigating whether LBSs reinforce or restructure the patterns of social networking created by mobile phones.

Identity management

The following section outlines how location sharing can function in the production of one's identity, focusing on a reinterpretation of the presentation of self theory and location geotagging in self-representation.

Presentation of Place

Goffman's (1959) presentation of self theory suggests that individuals attempt to shape the way they are viewed by others by changing their appearance and accommodating their self-presentation to different social situations. Sutko & de Souza e Silva (2011) re-purpose this theory in application to location-aware media, introducing the idea of the 'presentation of place'. In conjunction with social media, 'the social network informs and influences the place, and the place informs and influences the social network (812). This illustrates the two-way nature of social information: users get information from viewing their friends' locations and their friends get information by viewing the user's location. Central to the

presentation of place is the notion that using LBSs will show your location, and more importantly your location will be *seen* by others.

Our consumption of technology shapes our identity; consequently we perceive the identities and interpret the social positions of others by their technological consumption (Ling, 2004). Young people have always been concerned with how they present themselves, and online content in the digital age has become a major factor in how identities, lifestyles, and social relations are constituted and displayed to others (Livingstone, 2010). For example, some use the mobile phone as an extension of their bodies and wear it like a fashion accessory (Katz, 2006). In the age of smartphones, using LBSs to find the coolest club or the best restaurant could be perceived by others as a marker of status and higher social positioning because they have both the technological ability and the know-how to use it. Additionally, the social networking aspect of location-based application allows people to perform identity through sharing their location. In this sense, physical locations can essentially become 'digital objects to be collected and competed over' (Frith, 2013: 257).

Geotagging

One major advantage of LBSs is the ability to post information from a location in real-time, instead of having to return to a computer to do so. A common use of in-the-moment information sharing is geotagging, or attaching your current geographical location to media shared through an LBS. Location can be tagged to a variety of LBSN posts, such as statuses, private messages, and check-ins on *Facebook,* although most of the academic research so far has focused on photographic geotags. Photographic images visually record experiences of moments and places, which become objects of shared memory and discussion as well as self-expression (Lee, 2009). The ability to upload photographs on-location enables a digital storytelling performance, giving deeper meaning to photographs and influencing people's perceptions of the photographer, their story, and their environment in real-time. Lee (2009) characterises snapshot culture as a practice of adventurous people on move, now intensified by the ubiquitous personal devices in our pockets that 'make the world in public and private spaces more visible and transparent' (237). The materiality of photography is digitalising, which results in a change in photographic performance and how photographs are communicated. In this sense, geotagging is a key component in the presentation of place.

As a consequence of geotagging, the photographer's experience in physical places is limited by the obligation to take, edit, and share photos while they remain stationary. This means that often the present gets put on hold while the user engages with their device, pressured to

post their location before moving out of range. Hjorth (2009) terms this the 'politics of immediacy'.

Geotags are accumulated on social geographical maps, or digital maps that display the user's entire collection of geotagged locations; each pinpoint serves as evidence of travels, personal history, and complex relationships. Similar in practice to the enormous photo albums relatives bring out at reunions, the online digital map acts as 'an instrument of collective show and tell' (Lee, 2009: 238). On the South Korean social map website *Cyworld*, users post content, images, and stories to their maps in order to 'improve the reputation of his or her [homepage]' (242). Sharing geotagged posts online is a communicative activity where users express themselves creatively whilst simultaneously influencing others' perceptions of them. Practices of geotagging support the reworking of Goffman's concept of presentation of self that includes place as a part of identity.

Privacy and participatory surveillance

With the introduction of iOS 6 to the iPhone in September 2012, Apple moved the settings for location services, which originally had their own section, to the privacy section. This seemingly mundane organisational modification symbolises an important shift in the way location services are thought about; location sharing implies tracking and content monitoring and therefore involves personal privacy (Katz, 2008). However, Barkhuss and Dey (2003) identify two types of location-based services: *location-tracking* services and *position-aware* services. Users tend to be more concerned about *location-tracking* services that actively monitor their location as opposed to when their mobile phone reacts passively to its own location in *position-aware* services. The authors find that services that track location become less of a concern if users find them useful, and such services can be successful if the users have control over the ability to turn the tracking off. Unfortunately in the digital age, issues of privacy are not just users losing control over the dissemination of their personal information, but lacking understanding about how to protect their data; even if they wish to resist invasions of privacy, many do not know how.

Control seems to be a major theme in discourses of privacy, specifically the amount of control a user has over public space and the insufficient control users have over their locational information and therefore their privacy (de Souza e Silva & Frith, 2010a). With the mobile phone, there is at least the choice to pick up the call or respond to the text, or not to, which is a luxury being jeopardised by LBSs on smartphones. With LBSs, some users fear that they are being accessed and tracked without realising it or that they will accidentally

broadcast their location to people. Privacy fears framed by the media may reflect real issues, but the problem is that this may also be media hype. In examination of the actual uses of LBSs, I aim to identify to what extent the claims set forth by de Souza e Silva and Frith operate in every practices.

While users react negatively to invasions of privacy by advertisers and social networks, some argue that with increased levels of control (such as being able to opt-in, turn off, or lie about their location) privacy concerns are unwarranted (de Souza e Silva & Frith, 2010a). Discussions concerning the increased safety location tracking allows are generally positive, such as how protection is increased while travelling alone or locating children. Direct surveillance through GPS applications is commonly seen between parents and children over *keitai* mobile phones in Japan (Matsuda, 2009). Although in this case, the monitoring aspect is less related to tracking and more about a strong concern for the child, providing parents with more 'remote control' and greater peace of mind. Surveillance is being normalised, but also taken for granted when it is perceived as good in regards to increased safety rather than negative in regards to privacy invasions.

In digital times, people are getting used to being surveilled and providing data about themselves (Lyon, 2011). Social media is shifting the vertical view of top-down surveillance into horizontal, peer-to-peer surveillance in which users voluntarily upload and make their personal data visible online. In fact, the awareness of being monitored by others, particularly romantic interests, friends, and family, through such platforms enhances the user's ability to construct their identity by controlling what information is shared about themselves, thus actively engaging in 'participatory surveillance' (Albrechtslund, 2008). Lyon (2012) characterises social media surveillance as 'being watched and watching' where users both disclose their own data online that is surveilled by a range of external parties in addition to surveilling others for their own personal purposes; a third of social media users in the US, UK, and Canada admitted to monitoring others in ways that would embarrass or displease them, furthering Albrechtslund's explanation of participatory surveillance. One problem this is creating is the normalisation of 'fun' surveillance, which may lead to the normalisation of harmful types of surveillance. Lyon contends that with the proliferation of social media and data sharing applications, we are developing into a surveillance culture, and whenever a critical shift in mentality occurs there is a need to explore what is happening and why.

CONCEPTUAL FRAMEWORK

The main theoretical approach I will use to frame my research project is the domestication theory, which is an approach used to investigate the complex role ICTs play in everyday life and how the user and the artefact in question, in this case LBSs, create new social practices, communication patterns, and forms of life. ICTs are dynamic in their design, function, social and economic impact, as well as their production of private and public cultures. In order to make sense of the process of how this happens, Silverstone, Hirsch, and Morley (1992) developed the four elements of what has become known as 'domestication': how an ICT is imagined to function, the construction of a spatial environment for the ICT, the way the ICT is used temporally in everyday life, and the meaning of the ICT within discourses and public displays.

Although the concept of 'domestication' was originally developed to characterise the use of information and communication technologies inside the home, it can also be used to analyse perspectives and social relationships beyond the domestic realm and has been previously applied to mobile technologies (Haddon, 2003; Hjorth, 2009). Haddon emphasises the importance of how an ICT is consumed in addition to how it is used, consumption implying the meanings and experiences associated with an ICT. Vitally, the experience of ICTs is context-dependent and embedded in social life, therefore studying everyday practices provides insight into how and why people accept, employ, and ignore certain technologies in everyday life.

A key concept I will use to frame my analysis is the presentation of place, the reworking of Goffman's presentation of self theory. This idea will be used to illustrate how LBSs function in the user's performance of identity by associating with a specific type of place. In relation to mapping and navigation through LBSs, I will use Frith's (2013) concepts of hybrid space (and their effect on decisions of mobility) and spatial legibility (the ability to 'read' a space through digital media), which are both alterations on how users view their surroundings. These will be used in conjunction with the concept of a technological filter that enables the management, personalisation, and control of urban spaces (Sutko & de Souza e Silva, 2011; de Souza e Silva & Frith, 2010b). I will also employ the notion of participatory surveillance to illustrate why users modify their behaviours with LBSs (Albrechtslund, 2008).

Sutko and de Souza e Silva (2011) note that future research should consider different contexts, socially and spatially, within different cultural and geographical places. My

research will add a contribution by looking at users from a range of countries with experiences in the city of London for comparison to experiences in smaller towns. Additionally, the age group for my sample has undergone the transition from the adoption of mobile phones to smartphones, which also provides for interesting comparisons. This dissertation aims to evaluate and extend the aforementioned existing, but still preliminary, theories on location-aware technologies taking into account different social and geographical contexts.

RESEARCH OBJECTIVES

Given the ubiquity of mobile phones and increasingly smartphones and LBSs, it is necessary to examine how these technologies are being used and analyse their sociocultural effects within the larger sphere of communicative media. My overarching research question for this study is **'How do location-based services function in everyday life?'** Granted that this is a very broad subject to cover, I will use the domestication theory to frame my research in conjunction with the pre-existing knowledge of LBSs I acquired through a pilot study. My extensive investigation of existing location-aware applications identified four main purposes of LBSs used on a daily basis: mapping, locational information management, social networking, and geotagging. These four categories provide methodological guidance for a more in-depth exploration of:

- The context of LBS use: where and in what situations are they used?
- How are LBSs influencing individual behaviours, public displays, patterns of interaction, and social norms in relation to mobile phones?
- What sociocultural and economic issues arise from the proliferation of location-services?
- How can the findings of this study be applied to the design of future LBSs and other location aware applications?

My contribution will be to provide an overview of LBSs, a categorisation of features, changing social interactions, and central issues, the overview that is missing from academic literature. As mentioned previously, the smartphone takeover in the mobile world is a key moment that calls for an examination of this increasingly pertinent technology.

RESEARCH DESIGN AND METHODOLOGY

In this section I will outline my justification for choosing an interviewing methodology and how I designed the interview process.

Interviewing research strategy

Interviewing is the most appropriate methodology for understanding not only how people use their technologies but also the motivations behind their actions. Bauer & Gaskell (2000) contend that the 'interview provides the basic data for the development of an understanding of the relations between social actors and their situation' (39). In this case, the social actors are users of LBS applications on smartphones and their situation is the social and behavioural context in which they use the technology. Interviewing discovers social phenomena that differ from the beliefs of the researcher, while providing large enough quantities of information to identify trends and analyse their significance. Knowledge is gained through conversational and interactive dialogue that can probe into new and interesting directions. Information can be tapped through the 'pipeline' of the interviewing process (Holstein & Gubrium, 1997). Unlike surveys and diaries, interviewing is a collaboration of knowledge by both the interviewer and the interviewee where meanings can be negotiated in the moment rather than interpreted after the fact. A qualitative measure gives more insight into why people use technology in diverse ways, which gets at the core of behaviour rather than simply a quantitative identification of overall trends. Meaning is actively constructed and socially situated, which is the flexible characteristic of knowledge that interviewing accesses (Bauer & Gaskell, 2008; Holstein & Gubrium, 1997).

At the same time, interviewing does have its drawbacks. Firstly, because the interview is a social process, it is subject to the same social norms as a conversational interaction. This means that the respondent's responses may change because they are talking to a real person rather than marking answers to an anonymous survey or writing personal details in a private journal. Knowledge is not an objective entity, but rather is constantly being mediated and altered depending on the context, process, and social situation in which it's given (Holstein & Gubrium, 1997). As I interviewed people who were relatively in the same age group as myself, they were more likely to view me as a peer, which was both advantageous and damaging to the answers I received. On the one hand, my interviewees were more comfortable talking to me, leading them to talk more candidly about their

experiences. But at the same time, they may have held back when talking about their unusual habits or their online dating experiences because they feared judgment. Additionally, an interview runs the risk of missing information if the interviewee thinks what they have to say is boring, irrelevant, or offensive since they are speaking to an actual person (Berger, 1998). Another issue I encountered was the respondent's occasional inability to explain why they did something, only what they did, which is significant if the purpose of the interview is to obtain their behavioural motivations. Generally, the conversational nature of interviewing was beneficial for exploring novel uses of LBSs that emerged through tangential discussion that I had not thought to work into my topic guide. Although this qualitative approach cannot provide generalisations across populations, they successfully offer a deeper understanding of the social practices of technology.

Methodological considerations

Sampling strategy

The background statistics I used to determine the key groups to sample from were taken from the 2013 report on mobile services from Ofcom, a trusted source of information about communications industries in the United Kingdom. According to Ofcom, more than half of all adults now own smartphones. 35% of adults in the UK use their smartphone for satellite and map navigation and 38% of social network users 'check-in' at locations using their smartphone.

The sampling for this research was taken from a selection of educated young adults, or 'critical case' users from ages 18-34, which according to Ofcom statistics is the highest demographic for smartphone Internet use at an average of 55% of the population. Young people are more likely to experiment with the technology, are more impressionable from their exploratory network of peers, and more influenced by the trends and fashions of technology (Haddon & Vincent, 2009); this leads to broadening norms and behaviours that become the 'critical case' for interesting and novel uses of ICTs. Additionally, the 18-34 age group is 'more willing to share data with companies [and] download applications that allow them to be tracked geographically' (Lyon, 2012).

The data I draw from in this dissertation comes from 14 interviews conducted on smartphone and LBS users aged 19-29 (although the sample would have allowed up to age 34, none older than 29 were selected) and ranging from 40-100 minutes. My research sample included 8 women and 6 men, 12 who are attending university, and 2 who are

employed full-time. My participants were from a range of countries and backgrounds, 5 from the United States, 4 from the United Kingdom, 2 from Canada, one from Belgium, one from Argentina, and one from Nigeria, although all of them have lived in London for at least one year, justifying the use of Ofcom's statistics based on UK residents. This also allows for comparison of different geographical experiences to those in the urban city of London. Without time constraints, I would have ideally interviewed at least 30 respondents, but given the time and resource constraints of a master's dissertation, I had to decrease the data to a feasible and practical amount for analysis. Also, I drew most of my sample from my peers and acquaintances from university and athletic teams. With more time I would liked to have drawn from a less concentrated sample of educational and socioeconomic backgrounds, although interviewing from my personal network did increase the trust and comfort of the interview environment.

Design of research tools

The groundwork for this research project was laid out by my pilot study in which I identified four main uses of location-based services from personal experience and observation: navigation, finding places, finding people, and social media. In conjunction with existing literature on location-aware media and taking my preliminary findings into account, these delineations developed into four analogous categories: mapping, locational information management, social networking, and geotagging, which formed the organisational basis for my topic guide (Appendix B). It should be noted that the LBSs of mobile gaming and location-based advertising functioned very minimally in everyday life, if at all, and were left out as subjects for my research. Using the domestication theory to frame my questions, I asked about how LBSs function in the everyday choices and habits of my interviewees. Also important were questions comparing social and behavioural patterns from before and after they started using smartphones.

The interviews were carried out over the course of two weeks using the grounded theory approach during my data collection, meaning I audio-recorded and then transcribed my interviews immediately after I performed them, engaging early in the open coding process to modify my questions and tactics for future interviews (Charmaz, 2006; Glaser & Strauss, 1967). After completing all of the interviews and transcriptions, I used my initial findings to further organise the complete set of collected data into groupings of similarities, experimenting with conceptual labels that would form the basis of my open code. This first stage of thematic analysis of interviews consists of reading each transcript and highlighting

key moments that directly related to the theoretical framework or that I identified as an interesting phenomenon.

RESULTS AND INTERPRETATION

My findings after the interview process and subsequent thematic analysis are outlined and discussed in this section. I will preface this discussion by noting that my findings are relevant to the United Kingdom, United States, and Canada as the majority of my participants hail from those countries and all currently live in London. In order to capture an encompassing span of behaviours associated with LBSs, I sampled a range of participants who self-identified as either inexperienced, average, or expert users of LBSs (3, 5, and 6 identified respectively). Their names have been changed here in order to maintain their confidentiality.

Table 1

Respondent demographics and smartphone experience

Respondent Alias	Age	Sex	Country of Origin	Time owning smartphone	Smartphone Experience (Self-reported)
Alex	22	M	United Kingdom	1 year	Average
Amanda	23	F	Belgium	3 years	Expert
Austin	19	M	United States	6 months	Average
Brad	24	M	United States	6 months	Inexperienced
Caroline	19	F	United States	1 year	Expert
Farrell	23	M	Nigeria	5 years	Expert
Flora	29	F	Argentina	1 year	Average
Hannah	21	F	United Kingdom	2 years	Average
Jeyla	27	F	United States	2 years	Inexperienced
Lana	26	F	Canada	1 year	Average
Louise	22	F	United Kingdom	6 months	Inexperienced
Mark	25	M	Canada	1.5 years	Expert
Parker	24	M	United States	2 years	Expert
Sammy	29	F	United Kingdom	4 years	Expert

Analysis of the Interviews

Guided by my pilot study on this topic, the categorisations of data emerged into an axial code of five areas: control, navigation, social relations, self-representation, and privacy. *Control* surfaced as the core code that functions within all other areas, similarly to in de Souza e Silva and Frith's (2010a) study of location-aware media.

Control

The idea of control is relevant not only to the technological controls within the smartphone and applications, but also how much control the user has over their physical space, social relationships, visibility of location, and privacy. Firstly discussing the technology itself, most users claimed to know where their LBS settings were, though only four could actually locate them without eventual assistance from me. One two knew how to and had actually changed their settings after the initial application download. This trend among the participants reflects the real issue that users are losing control over their privacy from a lack of understanding how to work increasingly complex technologies. Flora illustrates this issue by voicing a common concern among inexperienced and average users.

> Flora: It would be really annoying if I turned that on by accident and then people could actually find exactly where I was. I feel like it would be easy for me to unwittingly turn something on or accept when I meant decline and not realize what I'd done.

Users are particularly confused by the privacy controls on *Facebook*, which are constantly changing. Mark wanted to remove automatic location tagging from his *Facebook* but did not realise he also needed to change the settings on his *Facebook Messenger* and thus got caught in a lie about where he was.

In all cases, the settings for LBSs were on/off on both Android and iOS. Depending on the user, some reported giving permissions to all applications but others reported not giving permissions to any applications in order to save battery life and only permitting singular applications to run as they were needed. However, Mark discussed how increasing the nuances of controls, for example giving locational access to someone during a specific meeting time, would make LBSs more successful. However, this presents the inherent problem in technological controls: people want more options for control, but the greater the number of controls there are, the less likely people are to understand or spend the time learning how to use them. Inexperienced user Louise felt differently from expert user Mark.

> Louise: I feel that privacy settings always change without letting us know and then because I'm never really on top of things technologically, I'm always the last to know. If I learned more about it, then I could do it. As long as they make it simple to turn on and off, not that you have to go to your shop and do it.

Parker alternatively notes that he 'enjoy[s] having more control when [he] want[s] it' and would appreciate having more choices. For the designers of LBSs, their challenge is to understand how much control is neither too simple nor too advanced and will cater to the needs of the largest variety of user experience. In relation to both technological design and human-smartphone interaction, control is a reoccurring theme throughout my findings with emphasis on continuity, accessibility, and ease of usability.

Navigation

After considering all of the interview responses, LBSs did not appear to be a necessity for navigation in urban spaces because people are capable of reading maps and street signs. However, users still deploy LBSs depending on the time and situation of use, mainly for the purpose of easing various dynamics of their lives (Kaasinen, 2003). A few common themes emerged as to why users will choose to navigate using LBSs, including the following:

1. LBSs are time savers. Directions can be looked up after leaving the house rather than meticulously memorised from a map or printed from a computer. Locating oneself within space is an automatic feature that requires no effort on the part of the user. The removal of 'layers of process' is beneficial to users by significantly cutting down planning time.

> Lana: It automatically fills in London for my home city when I'm searching for flights and it saves me like half a second of typing it in. I don't suppose I ever have to use it. I am capable of reading a standard map, but it just makes it easier.

2. LBSs are convenient and easy to use.

> Amanda: I'm not dependent; I could perfectly live without it. But it does make some things much easier, mostly finding the quickest train, getting from one place to another.(...) Getting from point A to point B.

3. LBSs are useful. A frequently reported use of LBSs is to find new and interesting places that cannot be located by an address, an ability afforded by LBSs' access to 'more precise information when you're searching for stuff'. As a result, if an application is not designed well and does not align with the user's expectations of what is valuable, it will not be used.

> Q: Do LBSs change how you find places from before you had a smartphone?
> Mark: Yelp changes it so that I get what I want, I know how much it's going to cost, and I know how long it's going to take me to get there, and it makes me happy. There's no settling due to uncertainty. (...) In effect it makes life less uncertain but at the same time it makes life less interesting.

4. LBSs are spontaneous. An impact of mobile phones is that they allow people to 'live more spontaneously' since social arrangements and activities can be organized on the fly, which is another continuity of coordination patterns that LBSs extend in practice (Katz, 2008). With the accessibility of information at the user's fingertips, shops can be looked up on the go and location changes can be negotiated without having to call for directions.

> Parker: I'll use my phone to look up places and find out how to get there easily. And it made for a better night because we found good places to go to that I wouldn't otherwise have known how to get there or I wouldn't have premeditated and look up beforehand. Spontaneous.

5. LBSs are trustworthy (in most cases). Effective navigation of transportation using LBSs requires a level of trust in the device, which relates to the both the geographical context and manner of transportation. When addressing the use of maps whilst walking, most responses were positive.

> Alex: I trust my iPhone, it seems to always get me where I want to go. It's got a great sense of direction.

Whereas in the cases of driving, most responses were negative because of a lack of trust in the technology, the dangers of attending to screens while driving, the inaccuracy of non-urban city spaces, and the slow speed of the technology not matching the high speed of movement.

> Jeyla: I haven't found those very beneficial because I don't know if I trust them. I don't know if I want to take detours, I'm not sure if it would be worth it to stick it out it it's the direction I know. So I don't think I trust my phone.

Attitudes towards public transportation provided mixed reviews. One issue users came across was when their virtual maps misaligned with reality. For example, Brad was on a bus that his *Google Maps* did not notify him was on diversion, and because he trusted the accuracy of his smartphone, he ended up being thirty minutes late. In contrast, although Farrell finds reading bus stop signs easier than using an application, he depends upon the accuracy of late night bus arrival times through an app since during that time of day the buses are more variable in their reliability. This example illustrates how LBS applications can prove to be most functional when used in combination with non-virtual resources.

It is important to contextualise these findings to the environment of urban cities where developers tend to focus their attention, transportation services are concentrated, and WiFi/data connections are readily available. Respondents suffered more problems while using map applications when outside of urban centres such as London, San Francisco, and New York where they found there were decreased quantity and quality of information and inferior navigational accuracy.

Urban cities are becoming hybrid spaces, intertwining physical locations and networks of communication (Mitchell, 1995); 'people have to constantly manage the transition between those dimensions of their experiences' between cyberspace and physical space, the screen and the haptic, the virtual and the real (Castells, 2008: 449-50). This means that people using their handheld devices to navigate are simultaneously managing their movements and the information on their screens. This results in a phenomena frequently mentioned by respondents: the distracted pedestrian on their smartphone that becomes a human obstacle others must manoeuvre around. The interesting part is that although annoyance and frustration is generally felt towards such people, most of the respondents admitted to having been that distracted, traffic jam-causing person at some point.

> Louise: I am way less aware of my surroundings because I'm just looking at the little blue dot and which way it's moving. Yeah and you can run into people. I think it's normal that if you have something in front of you, you would just look at it, at the thing that's moving.

This supports the idea that there is a technological filter within the hybrid space of digital maps that, if the application is open, people will pay attention to even though they are capable of moving without it. This distracted multitasking caused a variety of problems for

the participants, including blindly following their phone so that 'you don't really know how you got there and you have no idea how to leave', bumping into people, getting hit by a car, having their phone stolen out of their hand, and missing a beautiful area of the city from walking with their head down. About half of the respondents mentioned following the 'blue dot' or the arrow on their phone that became the virtual representation of their moving bodies. This also supports the notion of spatial legibility and 'reading' spaces since certain symbols such as dots and arrows can be read and understood as an individual's physical location situated within a larger environment.

Although a frequent response to why the participants use LBSs was for their ease of use, some users reported feeling 'too wrapped up into finding awesome places to go' and almost enslaved by their dependency on their phones to get places, feeling 'lost' without them. However, in general participants used LBS applications to fulfil their mobility needs and gain reassurance in their daily lives in comparison to when they only had mobile phones.

> Brad: It's really difficult to remember the stone age [of mobile phones]. I think now it creates more certainty. I find myself less anxious when I have to leave for whatever, I know how to better schedule my time. I don't get lost anymore.

Time efficiency is a frequently mentioned benefit of using LBSs for both navigation and when dealing with social interactions and LBSNs.

Social Networking Patterns

The ubiquity of smartphones means they are losing their symbolism of status, additionally equalising the access to information among smartphone users. As a result, people within a social group that have smartphones trade off responsibilities for navigation because LBSs make everyone capable. In one case, Farrell uses his Samsung Galaxy to compete with other iPhones to see whose device will come up with directions faster.

> Austin: Yeah I think there's a new social etiquette. It levels the playing field. There's no 'best sense of direction' anymore provided you're in a developed country or a city with access to WiFi, then it's just whoever draws first.

For some of the respondents, their status comes from an ability to use more advanced programs, such as when Parker impressed some girls by 'finding all these cool bars and they were loving it'. Although every user reported different uses of LBSs within their social roles, they appeared to be extensions of existing patterns of behaviour. Caroline took on the role of

navigator, but noted that she probably would do that with or without LBSs; perhaps Parker would also find a way to impress those girl with or without his LBSs as well.

de Souza e Silva and Frith (2010a) claim that LBSs are creating new patterns of social networking and coordination. However, the responses gathered from my interviews suggest that LBSs reinforce both the user's role in a group and the way they connect with others. Although there are applications for finding nearby people such as *Find My Friends* and dating applications *Tinder* and *Grindr*, they did not seem to function significantly in the lives of most of my interviewees. The participants who did report use of social networking LBSs were more likely to have previously tried meeting people through virtual means, such as Internet dating websites. This is further evidence supporting the argument that LBSs do not create new patterns of behaviour, but supplement and facilitate existing behavioural trends.

A few of the participants' comments highlight how the design and function of an LBS needs to be well-suited for quick and mobile use in order for it to succeed. Mark contends that although he tried to use the *OKCupid* dating app, the users of this dating service expect time-intensive 'cover letter' style messages. Although Mark still uses *OKCupid* through his computer, it was not worth it to use the location-based application in mobile situations because it lacked time efficiency. He believes that the less time-intensive mobile dating app *Tinder* is much better suited as an LBS because it is a quick-fire, tactile design which allows the user to view a new person every second, flipping through them like filing cards. Parker, who frequently uses *Tinder,* similarly assesses that the speed of the application is perfect for on-the-go use since he 'doesn't have time to have a pen pal'.

Generally for the rest of the respondents, the idea of socially networking with strangers over locative applications is 'creepy' and they would not do it themselves, although they did not mind if others engaged in such activities. Austin suggests that people who put their information on those types of applications are 'asking for it', as in asking to be approached by strangers at the risk of it being perceived as creepy and unwanted.

> Farrell: I prefer meeting people face to face and through other people that I know. (...) It just makes more sense to me than, that person is ten metres that way and I have been creepily staring at them and I have the opportunity to perhaps make a move through an application. There is a reason why it exists and it can be useful, but I find it creepy and enough people see it as creepy for it not to become mainstream yet.

Farrell's preference of meeting face-to-face with familiar people is consistent with the preferences of every other participant interviewed. Using LBSs to locate people, friends or strangers, 'doesn't seem useful' because they would rather be texted or called to meet up in order to maintain some control over their accessibility; being found unknowingly by the *Find My Friends* app would be 'stalkery'.

> Hannah: Like if I wanted you to know where I was, I would've told you. So the same applies more so for strangers. (...) I always think first I want to see this person so I should ask where they are. It's first the person and then the location not the location first and see what people are around.

Again, *control* arises as central to concerns of users, in this case control over how accessible they are and how others can communicate with them. Although consumers tend to desire the newest and trendiest phones with all of the latest capabilities, the primary functions of mobile phones remain to communicate, kill time, and save time (Arminen, 2007). In relation to location, 'people routinely use mobiles to communicate where they are, when they come, and to arrange meetings' which is vital to the real-time coordination of activities that mobility fundamentally necessitates (Arminen: 11). In response to the problems of mobile communication, the majority of the respondents grew up primarily use texting and calling to share their location and further maintain social connections. Even with the proliferation of LBSs, their preferred communicative channels remain the same. The attitudes of the participants in this research project refute de Souza e Silva and Frith's contention that LBSs are restructuring patterns of social networking from mobile phones.

Representation of Self and Place

The feature of LBSs that this section focuses on is the ability to geotag, the feature of posting your location on social media platforms either as a singular post or tied to other media. The situations in which the participants will tag their location were surprisingly uniform; most will only post their location or 'check-in' when travelling on holiday and not within their own city unless it is during a special occasion, such as a concert or a sporting event. Parker claims that he does not check-in everywhere he goes 'because then people won't follow [him]' and he personally values social media attention highly. This brings up the important point that when tagging your location through LBSs, it is meant to be seen by your network. We can apply Goffman's redefined presentation of *place* theory for this phenomena to argue that LBS users are now integrating the locations they have been into how they both perceive

and produce their identities; practices of social media geotagging become part of their performance to be viewed by others.

Another unexpectedly consistent set of responses came from asking about how the participants viewed others who tag their location through LBSs. The range of attitudes was on average an indifferent 'I don't care' and at worst a contemptuous 'I will delete them from my newsfeed'. Generally, the participants found excessive or banal geotagging annoying and unnecessary, not seeing the point in checking-in 'if they're not going "places"'.

> Alex: If you're trying to make yourself seem important or make it seem like you're having the best time of your life, then that's sad. Why are you doing that? If you're having the best time then why are you on Facebook tagging yourself (...) But I think the difference is if it's between friends or 'Facebook friends'. If it's between friends you can do it on a case by case basis. Whereas if it's just people you happened to click yes to [a friend request], then it's either indifference, or depending on the picture probably negative. People are really judgmental and that's why I avoid it.

This point illustrates the 'judgmental' and critical nature of sharing through social media. 'Facebook friends' may be able to view your posts being part of your social network, but are not close enough to refrain from criticising you. From a less disparaging perspective, Louise views geotagging as a 'less invasive way of letting people know what people are doing and where they are at all times' which can be beneficial for keeping friends up to date; 'if they're going to different cities or different countries then it's cool'. Generally, the more friendly they are with the person doing the tagging, the more likely they are to accept or even appreciate the information they have to share.

Contradictorily, when the participants were asked about why they geotag their location, the majority responded that they wanted to show off their life to the people in their network. This is a surprising reply given that those same people had just harshly criticised others for the exact same blatant boasting. Only four of the participants had viewed their own social geographical map on *Facebook* that shows their entire geotagging history; about half of those were extremely proud of their collection of locations whereas the others thought it was not a fully encompassing representation of their experiences and travels.

> Caroline: I mean I would like people to see [my map] because I like to show off, but I don't ever look at it on anybody else's. And I don't think anyone would ever see mine, unless they were seriously Facebook stalking they would check it out. But I don't think I've ever looked at anybody else's.

Caroline's response aligns with the presentation of *place* theory in application to LBSs because her social map has become a virtual representation of her identity; in this case someone who has lived in many places and has had many different experiences. This leads me to argue that the presentation of *place* through social maps, although technically shared publically, actually contributes more to an individual's perception of themselves than others' perceptions of the individual. This can be illustrated further with Parker's response:

> Parker: I love the fact that we have [a map] because I can see that my Facebook has spanned four continents and like a million countries, I mean that's cool to look at. Yeah it's for my own personal use. I hope other people see but I know they don't. (...) because I wish people knew that I'm really worldly and cultured. I look at my own a lot, because it's cool that's why.

In this instance, LBSs have become a personal tool that he uses to reflect on what he appreciates about himself, given that he feels his map accurately represents his experiences. Conversely, the users who were unaware of their social map either felt that it was unnecessary since they already know what they have done in their life or they felt that it could be an interesting tool for reliving memories. Importantly, the participants who do use geotagging and social maps do so because they gain something by presenting their place through LBSs, whether for personal satisfaction or to enhance their identities as seen by their social networks.

Privacy and Participatory Surveillance

Lyon (2011) and Albrechtslund (2008) both describe notions of the mutual surveillance that occurs over social media. People upload or allow access to their locational information which serves the fundamental purpose of being seen by others, while simultaneously the user is viewing the analogous information of others. In this way, LBSs cause social interactions to become 'participatory surveillance', meaning users are both the viewer and the viewed. The high level of information shared over social media is normalising surveillance, even if undertaken by peers, and can lead to invasions of privacy. This threat is exemplified by unwanted public geotagging through LBSs:

> Hannah: But then a friend of mine checked me in at a restaurant and I wasn't too happy because it was a very expensive restaurant and people don't need to know. I don't normally go to those types of restaurants, and people don't need to know - it's horrible - that I was with her.

In this instance, Hannah's personal details were exposed both to her and her friend's network without her consent. Although public visibility is the nature of social media, this is still considered an invasion of Hannah's privacy even if it was her friend that was doing the sharing. The theme of control presents itself again here, since the loss of control over who sees both her location and who she is with causes her discomfort. This also stems from misaligned notions of social media etiquette between Hannah and her friend, meaning there was a lack of understanding of what information is acceptable to be shared with others through LBSs. In another case, Austin needed to evade being tagged in an *Instagram* post when he had lied about his location to his girlfriend.

> Austin: I bailed quickly because in my mind, it would not have looked good if I had mislead [my girlfriend] as to where I was going (...) But in effect I was forced to leave a social setting that I wanted to be in because I potentially would have had my privacy overthrown by social media.

While Hannah was disturbed by the information over-share after the fact, Austin takes this one step further by actually changing his location in order to avoid a privacy disruption. Interestingly, in both cases the participants' friends were unknowingly causing problems through what they perceived as regular use of social media. 'White lies' commonly arose as a major reason among participants for wanting to control privacy on LBSs. One problem that occurred with many of my respondents was having their attempts at deception foiled by the automatic tagging feature on *Facebook* and *Facebook Messenger*, which attaches the user's location without their consent. Automatic location tagging forces the user to be conscious when they are messaging or using social media since it enforces honesty, which is troublesome in cases like lying about being late to a meeting.

> Louise: You can easily get caught out because you don't naturally think of, oh I just made a white lie and now I'm going to have to switch off all of my applications.

Interestingly this problem was less pronounced in the urban city of London where the boroughs are so close together that automatic tagging is often inaccurate. In one case, this bug benefitted Alex who had lied while trying to avoid meeting up with his friend; since Alex's location was tagged 'Bethnal Green' instead of 'Shoreditch', his friend could not see he was actually at home. Multiple participants noted a similar point: knowing where your loved ones were all the time would 'just bring up questions that people would prefer not knowing the answer to'; in other words when it comes to continuous location tagging, innocence is bliss. It emerged that the main audience that all of the participants did not want having full

and constant access to them was their loved ones: friends, family, and especially significant others.

> Sammy: I don't want my friends to know where I am because maybe I want to go someplace, like if I go to some women's health clinic to get some kind of test, I don't want my boyfriend to know.

Mark also wanted to hide his movements from his girlfriend, who he postulated would either be unhappy to find out if he perhaps was cheating on her with her best friend, or conversely, be unhappy to ruin the surprise that he was buying her an engagement ring. Not all reasons for wanting to keep your location hidden are negative. Regardless of motives, users were typically more concerned about being tracked and monitored by those that they knew, over institutions like the government or the police. This is because LBSs engage social networks in participatory surveillance where users watch the actions and movements of others while they are simultaneously being watched.

Although there was much discussion during interviews about the difficulties of peer surveillance and how to avoid them, the attitude towards institutional surveillance was relatively uniform. Given the tempestuous atmosphere regarding the NSA's overextended surveillance, I was surprised to discover that the respondents in this study generally did not care whether or not the government was monitoring them. The rationale behind this outlook was that sometimes government monitoring is warranted; the users did not have anything to hide anything anyway and they did not know the person who was monitoring them, so why should they care? Only two participants objected to the idea of government surveillance for the exact reason that they do not know the person who is tracking them, therefore they have no reason to trust them. Even then, they disliked the idea of being tracked by an unknown entity, but have 'learned to deal' and gotten used to the idea. Three participants brought up the prevailing concern, which was not actually about institutional monitoring, but rather what worse it could lead to and what other privacy assaults may become normalised.

> Farrell: If that all becomes standard to be constantly located, we're just taking another step towards a big brother style society. I know it mostly will be fine, but it also could not be.

This is consistent with Lyon's (2012) argument that users are gradually becoming used to the publication of their information and tolerant of non-invasive surveillance, which may be normalising deleterious surveillance and invasions of privacy. In light of the NSA scandal, users are becoming more aware and concerned with institutional surveillance. However,

after taking a closer look at the domestication of LBSs, I have found that privacy breaches committed by close social ties are drastically more consequential in everyday life practices.

CONCLUSION

The goal of this research project was to provide an all-encompassing look at location-based services, what functions they serve, how they are used, what behaviours and social interactions they change, and the issues surrounding them as a novel and rapidly changing technology. Although interviewing is subject to human error and researcher bias, it is the best method for delving into the motivations, beliefs, and attitudes that users are experiencing. Given the large quantities of data provided by this method, there was a range of opinions within a variety of different sociocultural areas that concern LBSs: control, navigation, social relations, self-representation, and privacy. A significant insight is that control is a central factor in how the user engages with the technology, particularly when controls are lacking or challenging for the average user to find. LBSs are contributing to changes in how we navigate the world, whether it be in managing the hybrid space between the physical and virtual worlds, reading the spatial information tied to locations, or becoming unwittingly distracted by a dependency on technology.

In addition to more deeply exploring the exaggerated phenomena of mobile telephony, my contribution is to refute the assumption that LBSs are creating new social patterns of social interaction. The applications that allow users to connect with people within physical proximity are not only ignored by the majority of my participants, but are viewed as creepy and unnatural. Location sharing through LBSs may contribute to the development of personal identity, using associations with certain places to enhance perceptions of self, but issues of privacy and surveillance are becoming more pronounced under scrutiny of the public eye. A key finding in relation to everyday practices is that the fear of participatory surveillance by close social ties such as friends or family takes precedence over the latent awareness of surveillance conducted by institutions.

Although smartphones claimed more sales than mobile phones in the world this year, this project focused on smartphone use in a specifically urban environment with the majority of participants from developed nations. Future research could examine the impact of LBSs in alternative markets and what diverse opportunities they are providing for users in developing countries. This dissertation provides an overview of the facets of LBSs and points in new directions for more in-depth investigations of how they function in everyday

life. However, the most pervasive characteristic of location-aware technologies is their constant progression, modification, and innovation. This means that in a year's time the flexibility of LBSs will have been utilized for novel imaginations, providing untold avenues for further research and exploration.

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APPENDIX: Interview Topic Guide

You and your smartphone

- Tell me about yourself
  - Age? What countr(ies) are you from? Where do you live now? What is your highest level of education? What is your occupation?
- Tell me about your mobile phone history
  - What type of smartphone do you use? How long have you used smartphones?
  - What mobile (cell) phones have you used before? When did you first start using mobiles?
  - Why did you start using a smartphone, what first attracted you to it?
  - What is your level of experience in using smartphones?

Location-based services (LBSs) use

- LBS controls
  - Do you know where your LBSs settings are located?
  - Which LBSs do your phone and/or applications use?
  - How much control do you have over them? Do you use these controls?
  - Did you discover that any applications were using your location that you didn't know about? Any surprises?
- Why did you start using LBSs?
  - How (or from who) did you find out about the existence of the LBS that you use?
  - Was there 'pressure' from your networks to use them?
- How would you describe LBSs to someone who didn't use them (general functions, appeals, and drawbacks)?

Mapping & navigation

- Describe your experience using LBSs to navigate or get information about where you are. (e.g. GPS, maps, compass, traffic, "find your phone", train/tube/bus apps, weather)
  - Why do you use them this way?
  - Any benefits, drawbacks, or unforeseen consequences of using this service?
- Does being able to use this service change anything about your relationships with other people? (e.g. role of navigator, information-holder, status)
- Do you have any experience with 'fences' or geofencing? How do you feel about geofencing?
- Do LBSs change the way you navigate from before you had a smartphone? Describe experiences.
  - Is there a new social etiquette created by smartphones with navigation?

Locational information access

- Describe your experience using LBSs to locate places or businesses. (e.g. Google search, Yelp, finding restaurants, bathrooms, parking spots, ATMs, Tripadvisor, Timeout)
  - Why do you use them this way?
  - Any benefits, drawbacks, or unforeseen consequences of using this service?
- Do you receive ads or deals from nearby places? (e.g. "Location based iAds", Groupon, 'check-in' deals)
  - What are the benefits and difficulties of using this service? Any unforeseen consequences?
  - If no, would you like or use this service, and why?

- Do LBSs change the way find places near you from before you had a smartphone? Describe experiences.

Social networking

- Describe situations in which you use LBSs to find people, friends or strangers. (e.g. "Find friends", drop a pin, mobile dating [Tinder, Grindr])
    - If not, would you ever use them?
    - Why do you use them in that way and with those specific people?
    - And benefits, drawbacks, or unforeseen consequences of using this service?
- Do people use LBSs to locate you? (e.g. friends, spouses, bosses, parent/child) How?
    - Describe situations where you benefitted from this service.
    - Describe situations where this service caused a problem, the consequences, and/or your tactics for evading them.
    - Has anyone monitored your location, followed or stalked you?
    - How do you feel about people being able to locate you? Is this an invasion of privacy?
- If you learned more about how to control settings, would you feel more comfortable using them?
- How have LBSs affected your *existing* relationships? How have LBSs affected your ability to form *new* relationships?
- Do LBSs change the way you locate people (or are located) from before you had a smartphone? Describe experiences.
    - E.g. do you still prefer to text/call or rather meet face-to-face?
    - Is there a new social etiquette for locating people and/or being located?
    - What do you feel is its future?

Social media & geotagging

- Describe situations in which you use your location on social media. (e.g. "Checking-in", geotagging statuses or photos, social maps, FB, Twitter, Foursquare, Instagram)
    - Why do you *share* your location?
    - How do you feel when other people share your location?
    - Any benefits, drawbacks, or unforeseen consequences of using this service?
- Have you ever used social maps for your own personal memory or to relive experiences? (Are the maps more for yourself or for others?)
- Does your social media ever *automatically* tag your location? How do you feel about that?
- Do you think identifying your location or places you've been on social media changes the way people see you?
    - How do you view other people who do this?
- Have you experienced or considered any privacy issues when sharing your location on social media?
- Do LBSs change the way you use social media from before you had a smartphone? Describe experiences.
    - Is there a new social etiquette for location sharing over social media?
    - What do you feel is its future?

General uses and consequences

- How have LBSs changed the way you interact with people? Move through space? See the world?
- Do LBSs influence how you manage your phone and applications, your physical environment, and your mobile networks simultaneously?
- Are there any creative or surprising ways you (or someone you know) use LBSs?
- Does having LBSs on your smartphone significantly impact your life?
    - Could you live without them? Or would you want to...

- Are there any other ways LBSs function in your life that we haven't covered, or anything you would like to add?

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