

ORIGINAL ARTICLE

Locational Privacy in Public Spaces: Media Discourses on Location-Aware Mobile Technologies

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This article analyzes 4 months of popular press articles from major publications about location-aware mobile phones. Our results identify 2 main areas: the control these devices offer over public spaces and the lack of control users have over their location information. This lack of control is often framed as a lack of privacy. We argue that the ability to control and personalize public spaces is not new because previous types of portable media already allowed users to manage interactions with public spaces. However, issues of privacy and control over public spaces are more pronounced with location-aware technologies. Our conclusions suggest that popular press discourses often overlook more complex social issues related to privacy in public spaces.

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Location-aware technologies are mobile interfaces that allow users to retrieve place-specific digital information and connect to nearby people depending on their location. Although mobile phones were initially studied as technologies that removed people from their physical surroundings (Brown, Green, & Harper, 2002; Katz & Ahkus, 2002; Moores, 2004; Plant, 2001), it is now increasingly evident that one of the relevant characteristics of mobile (smart) phones is their ability to allow for diverse types of connections to local spaces and local people (de Souza e Silva, 2006, 2009; de Souza e Silva & Sutko, 2008; Gordon, 2009; Humphreys, 2007). For example, locative mobile social networking (LMSN) software (a.k.a. location-based social networks [LBSN]), such as *Loopt* and *Brightkite*, allows users to see the location of their friends on their cell phone screen (de Souza e Silva & Frith, 2010). Likewise, location-based advertising can deliver coupons whenever a user is within a certain distance of specific stores, and geotagging applications such as *WikiMe* and *GeoGraffiti* allow individuals to access and upload information that is place specific. Because users have the ability to customize the types of information they are willing to interact

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with (which friends they would like to see, which coupons they want to receive, and what information they want to access), we argue that individuals can now use these devices to personalize and control their experiences of public spaces in new ways.

The ability and desire to control interactions with public spaces did not emerge with location-aware technologies. From the book to the iPod, personal mobile media have empowered individuals to engage with the public on their own terms. For instance, reading a book on a train allows individuals to partially withdraw from the public space of the train into the narrative of the book and pay selective attention to their physical surroundings (Schilvelbusch, 1986). The same goes for the iPod or the Walkman: By adding an auditory layer to public spaces, users are able to control the otherwise “chaotic” interaction with urban spaces (Bull, 2006; Hosokawa, 1984). Although location-aware technologies do share many similarities with these earlier forms of media, three major differences make them unique: (a) the increased control users have upon the personalization of their surrounding space; (b) the ability to interact with location-based information, that is, information that is geographically “attached” to the public space; and (c) the consequential privacy concerns associated with sharing one’s location information. With the increased popularization of location-aware mobiles, especially after the release of the iPhone 3G and Google’s Android system in 2008, these issues of personalization, control, and privacy have entered the popular discourse of mass media outlets.

Location-aware mobile devices have generated utopian and dystopian reactions from users. These reactions are both caused by and reflected in the popular press media. In order to broadly understand how media outlets frame issues related to location-aware technologies, we analyzed 4 months of news from major world and U.S. newspapers, magazines, journals, and web-based publications addressing location-based services (LBS). According to Entman, Matthes, and Pellicano (2010), “a frame repeatedly involves the same objects and traits, using identical or synonymous words and symbols in a series of similar communications that are concentrated in time” (p. 177). The authors therefore suggest that media framing “can have a significant effect on how people make decisions and formulate opinions on any given issue or event” (p. 183). Consequently, popular press discourses about the social implications of location-aware technologies will likely influence how users interact with these technologies. Analyzing how the popular press frames issues related to location-aware technologies is critical for shaping our understanding of how these technologies might influence social norms and policy-making processes in the future. As Castells (2009) states, “The politics of news media is the most significant form of media politics” (p. 302), that is, frames created by the media most likely lead to relevant political decision making and social constructs about technology. In this article, we analyze media discourses about location-aware mobiles to examine how the popular press frames the use of these technologies.

Our data analysis highlights two distinct issues. First, articles emphasize privacy concerns that emerge with the use of location-aware technologies, specifically the fears of having one’s location tracked and disclosed to unknown parties. These fears

are generally related to losing control over personal location information. Second, articles highlight the power these technologies give users to control their interactions with public spaces. Ultimately, these articles focus on how our understanding of privacy and control in public spaces is challenged as location-aware technologies are integrated into public spaces.

Our study is unique for two reasons. First, unlike studies that focused on the use of portable media as ways of withdrawing from public spaces (Bull, 2006; Gergen, 2002; Hosokawa, 1984; Plant, 2001), we focus on the ability of location-aware media to manage our relationship to these spaces. Second, unlike studies that focus on privacy as the ability to limit access to oneself or even the right to be left alone (Warren & Brandeis, 1890), we understand privacy in the context of location-aware technology as the ability to control one's surrounding space and one's locational information.

In order to develop this argument, we begin by examining former types of mobile media, such as the Walkman and the iPod, emphasizing (a) how they have been used to personalize and exert control over public spaces, and (b) how their use in public spaces often challenged previous conceptions of public and private. We then show how location-aware technologies differ from earlier types of mobile media due to their ability to allow users to locate information and people in their surrounding space, thus raising new privacy issues. This framework leads to our analysis and discussion of 4 months of media discourses on location-based technologies. We conclude by discussing issues that are not represented in these discourses and call for a deeper examination into the possible social implications of location-aware technologies.

Mobile media: Personalization, control, and privacy in public spaces

Public spaces are often perceived as uncontrolled spaces (Lehtonen & Mäenpää, 1997; Mitchell, 2003). More than a century ago, sociologist Simmel (1950) warned about the growth of urban centers and the consequential overstimulation of senses. For Simmel, the city was incomprehensible in its unfiltered form; consequently, developing a type of mental reserve was necessary to parse out various social situations from the aural and visual chaos of the urban street. He called this mental reserve a *blasé* attitude, which can be understood as a psychological filter through which the metropolitan resident interacted with the city space. The *blasé* attitude was a way of (dis)engaging with the public through a rational and calculating reserve, leading to a personalized way of controlling the apparent chaos of urban life, indispensable for survival in the city.

For at least 2 centuries, individuals have used mobile media, such as books, Walkmans, iPods, and mobile phones, as technological filters to manage their interactions with otherwise uncontrollable surroundings. These technologies are generally framed as "removing" users from public spaces (Plant, 2001; Puro, 2002; Schilvelbusch, 1986). The book was an early example; readers traveling on a train were said to avoid engagement with other individuals in that space. Similarly, the Walkman was met with derision by those who feared its ability to withdraw users from public spaces (Chalmers, 1994; du Gay et al., 1997). For Hosokawa (1984), the ability to soundtrack movement through public spaces isolates the listener from

contact with other people in the vicinity, turning the physical environment into a background to the listener's thoughts. Also, Bull (2001) argued that Walkman use allowed individuals to partially ignore the space they traveled through by imparting a personalized "soundscape" on the public space. In later research, Bull (2006) found iPod users experience public space in a similar manner.

Many of the issues raised by the widespread use of Walkmans and iPods are also echoed in recent mobile phone studies. Mobile phones have been regarded as removing users from their physical surroundings (Fortunati, 2002; Gergen, 2002; Plant, 2001; Puro, 2002). Following the idea of networked individualism, Wellman (2002) suggests "mobile phones afford a fundamental liberation from place" (p. 238). We suggest, however, that mobile phones—and the other mobile media discussed above—do not necessarily remove people from physical space, as much as they provide users with an interface that helps them select and control their interactions with public spaces. Whether it is the book, the Walkman, the iPod, or the cell phone, we view these media as filters (interfaces) that mediate users' interactions with public spaces. Ultimately, they function similarly to Simmel's *blasé* attitude, by which the metropolitan man paid attention to some aspects of public spaces, but ignored others. Therefore, individuals use these personal media as ways of framing their interaction with their surrounding space, not necessarily by withdrawing from it.

However, controlling one's interaction with public spaces has often been perceived as an invasion of the public by the private. As we will see, a strand of the articles we analyzed warns us about our impending loss of privacy with the use of location-aware technologies. What popular press rarely acknowledges, however, is that our distinction between private and public is socially constructed and therefore variable and constantly changing. For example, the development of transportation and communication technologies has contributed to the constant shifting of boundaries between the public and the private. Gant and Kiesler (2002) note that, after the development of transportation technologies such as the train, the separation between work (considered public) and personal life (considered private) grew more definitive because people started commuting to work, no longer working and living in the same place. Although transportation technologies contributed to the creation of more distinct boundaries between the public and the private, communication technologies such as the telephone, the telegraph, and the television were said to bring the public within the private space of home, therefore merging these boundaries again (Boltanski, 1999; Moores, 2004; Williams, 1975). Mobile media, however, because they could be used in public spaces, have often been accused of tainting public spaces with the private. As Chalmers (1994) points out in regards the Walkman, "the ingress of such a privatized habitat in public spaces is a disturbing act" (p. 52).

Nevertheless, although public and private are socially and culturally defined entities (Mante, 2002, p. 119), although their boundaries have shifted through history, and although both have frequently ingressed upon one another, the fact that we are able to talk about "public" and "private" means there are at least some general conceptions that define them as both different from and complementary to each

other. So if public spaces are perceived as “open” uncontrolled spaces, then private spaces are “secluded” controlled spaces. In other words, it is the ability to exert control over spaces that transforms them into perceived private spaces. Communication media, such as the telephone, were claimed to bring the public into the private, thereby “threatening” people’s privacy, because these intrusions were mostly uncontrolled. This lack of control over information flows frequently led to fears about losing one’s privacy inside the private space of the home (Marvin, 1990). From an opposite perspective, mobile media were generally claimed to “privatize” public spaces. They are responsible for imbuing users with a feeling of familiarity that generally belongs to private spaces. By reading a book or listening to music in public, users felt in control over their physical surroundings and therefore created their own personal spaces in public settings (Bull, 2001; du Gay et al., 1997; Manguel, 1997).

Location-aware technologies, however, are different from previous mobile media. All the above-mentioned technologies frame users’ interactions with public spaces by introducing an external code that does not belong to them. For example, a book’s narrative is not necessarily about the place where it is being read; the voice of a cell phone conversation generally comes from elsewhere; and the iPod’s songs are loaded independent of location. Conversely, location-aware devices draw information from the physical surroundings, an interior code. For example, a user equipped with a GPS-enabled mobile phone in Times Square who opens the application *WikiMe* is able to read *Wikipedia* articles about Times Square. LBS can also deliver coupons and offers to users depending on their location. Location-aware mobile interfaces might also help users find other people. LMSN applications such as *Loopt*, *Brightkite*, *Latitude*, and *Whrll* allow users to visualize on a map on their cell phone screen the location of nearby friends or other people using the software. For example, *Brightkite* allows a user to see the position of any other *Brightkite* user in the vicinity of a block (200 m), a neighborhood (2 km), an area (4 km), a city (10 km), or a region (100 km).

There are three important implications of the use of location-aware technologies in public spaces. First, they allow users to interact with previously existing local information, for example, by accessing a *Wikipedia* article about a local facility. Second, they allow users to create local information that might be shared with others in the vicinity, as in the case of writing a review about a local restaurant and attaching longlat coordinates to it. Finally, they allow users to select information from the surrounding space they want to interact with. For example, if a *LooptMix* user is looking for graduate students interested in literature and independent film, she can set her preferences to find people in her environment who are graduate students, like literature and independent films. She is then able to see everyone around her who uses *LooptMix*, attends graduate school, and likes literature and independent film. So, if Simmel’s *blasé* attitude worked as a psychological filter to public spaces, location-aware media literally selects from that space what users would like to interact with. Public space then might be differently experienced by each *LooptMix* user. This

personalized social space, filtered through the mobile interface, shows only other nearby people and information that matches the user's interests.

This context prompts us to ask two main research questions: (a) How are privacy concerns surrounding location-aware technologies framed in ways that are different from other mobile media? and (b) How is the personalization of space promoted by the use of location-aware technologies perceived differently from previous mobile media? To answer these questions, we analyzed popular press discourses on the use of location-aware media. Our analysis revealed two main themes: (a) a somewhat careful approach to the privacy concerns associated with locative media, and (b) a distinctly positive attitude toward the ability to personalize and control public spaces.

Methods

We conducted a LexisNexis search of articles spanning a 4-month period (February 1 to June 1, 2009), which corresponds to a time-frame roughly 6 months after the release of the iPhone 3G and 1 year after the release of Google's Android system in the United States (June 2008). We focused our analysis both on major world and U.S. print and web publications because we aimed at analyzing a wide range of news articles targeted at different segments of the population. According to the Pew Research Center for the People and the Press (2008), "traditionalists," who rely mostly on traditional media sources, still represent the majority of news audience (46%). However, we should not discard the increasing number of net-newsers (13% of the population who point to the web as their primary source for news) and integrators (23% who use both print and web media outlets). Therefore, including both traditional sources and web publications in our search guaranteed that we had news that reached wider segments of the population. With this in mind, we selected newspapers (e.g., *The Globe and Mail*, *The New York Times*, *The Guardian*), magazines and journals (e.g., *Revolution*, *Progressive Grocer*, *PCWeek*), and web-based publications (e.g., *eWeek.com*, *CNN.com*, *Business Week Online*).

It is important to note the limitations of our data. Because of language limitations, we were only able to analyze English-language articles. Although our analysis does include data from publications outside the United States (e.g., *Korea Times*), we were limited to international publications that appear in English. We felt that limiting the print publications we analyzed to national U.S. outlets would skew our data in comparison to the web publication data because many English-language web publications feature international content or are housed outside the United States. It is important to recognize, however, that our data likely does not give a full representation of how location awareness is framed by the popular press outside United States or even how issues of privacy and surveillance might be culturally constructed. As Ito (2005) argues, we cannot lose "sight of the specificities of social, cultural, and historical contexts in structuring the development and deployment of mobile phones" (p. 2). Future research will hopefully expand our analysis to encompass how the media in other nations are framing these technologies and take into consideration specific local cultural and political contexts.

We used the exact search term (*location-based OR LBS OR "location-aware"*) AND *phone* so that we could retrieve all articles that dealt with phones and LBS/location-aware technology. These terms were purposefully broad: Although the focus of our analysis was the personalization of space and privacy, we did not want to start with predefined search terms, such as "privacy," "personalization," or "control" that would narrow the results of our search. We chose to use LexisNexis because it archives a diverse set of news sources and it allows for advanced search techniques (Krippendorf, 2003). LexisNexis is an established resource that is frequently used by researchers interested in performing content analyses (Hoerl, 2007; Saukko, 2006; Landau, 2009; Scharrer, 2002). Our search returned 331 articles. After eliminating obvious duplicates, we were left with 285 articles. From this pool, we discarded articles that were irrelevant or too cursory to contribute content to our analysis. For example, some articles appeared in the results because they featured "lbs." as an abbreviation for "pounds." Also, many articles were clearly advertisements or direct copies of press releases. After discarding nonrelevant articles, we ended up with 83 articles, from 11 web-based publications (40 articles), 14 newspapers (30), and 6 magazines and journals (13) (for an itemized list of sources, see Appendix, Table A1).

Before beginning the data analysis, we agreed that the verbal unit of analysis would be any meaningful phrase, sentence, or paragraph that could address one of the research questions. Data were analyzed by an iterative method of category creation using constant comparison (Geisler, 2004; Glaser & Strauss, 1967). After an initial reading of the data, we developed emerging categories, which corresponded to the major topics addressed in the articles. We coded the sample individually and then met in order to discuss the categories. We then did "check coding" to refine the categories (Miles & Huberman, 1994). We compared the results of our initial reading and found that most articles dealt with topics such as control, advertising/marketing, privacy, security, tracking/stalking, and dating/social networks. These topics became our initial categories. Then we reread the articles, recording which categories were present in each article. Many articles addressed more than one category. For example, the same article could address privacy in the context of social networks and deal with issues of security. We then color-coded meaningful quotes from each article according to each category and cut and pasted these quotes into a separate document. As more quotes were added to the document, the relationships among categories gradually began to solidify. As we worked through the data, we observed that articles dealt mostly with three categories: advertising/marketing, social networking, and security. These categories then constituted the overarching structure of our analysis. In addition, we realized that topics of privacy and control permeated each of these categories. We thus correlated privacy and control with advertising, social networking, and security. Finally, we coded all articles for tone—positive and negative.

Results

The articles we analyzed focused on three distinct but overlapping uses of location awareness: advertising/marketing (32), social networking (29), and safety and security

(10). Articles approached these uses by focusing on two different themes associated with the technologies: the loss of private (location) information (27) and the ability to control and personalize public spaces (34) (Table 1). The analysis that follows addresses these two main themes. In the next section, we analyze the different types of privacy concerns present in the articles, discussing how these concerns are differently presented when dealing with location-based advertising, social networking, and security. Then we move on to an analysis of articles that argue that people gain control over public spaces with location-aware technologies.

The loss of privacy

An immediate consequence of being able to locate people and things is that one can also be located. The possibility of having one's location information disclosed leads to serious concerns about privacy, especially when the person being located has no apparent control over who accesses location information.

Privacy has been conceptualized in many different ways (Solove, 2008), and we are not attempting to come up with yet a new definition of privacy. However, as Solove suggests, privacy issues should be studied contextually. In America, privacy was originally conceptualized as "the right to be left alone," following Warren and Brandeis (1890) article "The right to privacy." The idea of privacy has also been frequently addressed in relation to forms of power: as power to limit access to the self (Bok, 1983), power to conceal information about oneself (Posner, 1998), and power to control one's personal information (Fried, 1969). Solove (2004) claims that, in the context of computer databases, privacy concerns have departed from the traditional "secrecy paradigm" (p. 42), and shifted toward not only a fear of losing control over personal information collected over the Internet, but also the lack of understanding about the process of information collection. Similarly, Gordon (2009) suggests that, with location-aware interfaces, privacy "is no longer defined solely as control over a geographic domain; it is control over the access and production of data within flexible information flows" (Gordon, 2009, p. 26). Following Solove and Gordon, we understand privacy in the context of location-aware technologies as related to control over one's (locational) information.

Indeed, the articles that bemoaned the lack of privacy with location-aware technologies almost invariably pointed to a situation where users lost control over their information, leading to a lack of control over who can track them. The concern with lack of control is not inherently different from previous mobile media and

Table 1 Number of Articles that Addressed Issues of Privacy and Control Correlated to Advertisement, Social Networking, and Safety and Security

	Advertising/ Marketing	Social networking	Security	Positive	Negative	Neutral
1. Privacy	10	16	5	13	8	5
2. Control	16	12	4	25	3	3

follows traditional models of interacting with public spaces: If one is able to exert some form of control over those spaces by “privatizing” them, an individual might feel safer (Lehtonen & Mäenpää, 1997; Simmel, 1950). However, the articles we analyzed did not all deal with privacy in the same way.

Privacy and advertising

The first type of privacy concern represented by the media is related to location-based advertising—advertising that targets users depending on their physical location. These articles frame the fear of losing privacy as an Orwellian, top-down type of surveillance, pointing to a future where large entities, sometimes corporations, though more often the government, can use individuals’ location-aware phones to track them without their knowledge. Individuals lose control over their location information when one application sells their information to an advertising agency, the government, or even an unknown party:

People are being told that they are signing up for marketing when in fact they are being opted into a massive surveillance strategy. (*The Guardian*, April 2)

No one knows whether this mountain of data will turn into a volcano that overwhelms the privacy of all within reach. (*The Guardian*, March 14)

Privacy experts are warning users to make sure they’re aware of what it means to sign up. (CBC News, February 4)

Other articles used typical Orwellian language to express concern with governmental surveillance, arguing that we are heading toward a future where the government tracks our every move:

A truly Orwellian development that has been described by privacy campaigners as “a catastrophic corruption of consent.” (*The Guardian*, April 2)

When it comes to government surveillance, the legal interface between law enforcement and your phone and Internet service providers is a shadowy place, and it’s often unclear what kinds of data companies are willing to provide to the government. (*eWeek*, May 5)

Privacy and social networking

A more prevalent discussion of privacy and location-aware mobile phones concerns location-aware social networking. This exemplifies what we call collateral surveillance, a phenomenon described by the CBC as “people tracking.” Tracking, in this sense, is related to the dangers of letting other people know one’s location:

But isn’t that still a form of tracking movement that some people could find slightly creepy? (*The Daily Telegraph*, April 28)

Let’s just imagine that a jealous partner gains access to your unattended phone and enables Latitude without your knowledge. (*The Times*, March 28)

You may use your phone to find friends and restaurants, but somebody else may be using your phone to find you and find out about you. (*The New York Times*, February 17)

The news outlets that addressed the privacy concerns associated with collateral surveillance argue that disclosing information about a person's location to other peers often seems scary, creepy, connected to unwanted surveillance, and an invasion of privacy. News outlets that warn about the fear of losing privacy point to a situation where people have lost control over their location information, but they have not ceded control to large entities; rather, they have ceded control to other individuals.

Privacy and security

An interesting strand of the privacy discussions about location-aware mobiles concerned the articles dealing with safety and security. In these cases, losing control over one's privacy/location information is not framed as "creepy" or "unwanted surveillance," but rather as a welcome, comforting situation:

The professionals, managers, executives and businessmen segment, which values convenience and security, would appreciate services such as Child Tracker and Vehicle Security. (*The Edge Malaysia*, May 11)

Privacy issues aside, the service could prove invaluable for people traveling alone in unfamiliar areas or dangerous situations. (*CNN.com*, March 11)

The ability to always know where friends and family are can revolutionise our use of technology and will outweigh any privacy concerns. (*Irish Times*, March 27)

News sources claim that location-aware mobile phones can increase safety and security by equipping loved ones with tracking devices to assure they are safe. These articles most commonly dealt with tracking children and vehicles. Other articles, like the CNN article quoted above, referenced tracking spouses or situations where users allow themselves to be tracked to assure security. In these cases, individuals control whom they cede their locational information to, increasing their control over their safety in public spaces.

We coded five references to safety and security that fell inside the privacy theme and four that fell inside the personalization theme; however, unlike with the other topics, we chose to include all articles in this section rather than split safety and security into two distinct themes. By definition, using location-aware technologies to gain safety and security involves giving up private information. For that reason, in the context of safety and security, we chose to include both references to personalization and privacy in this section.

Personalization and control over space

The second overarching theme we identified in the media discourses dealt with how location-aware mobiles allowed users to control and personalize space. Most of the articles that dealt with control and personalization did not mention privacy (23 of 34). For these articles, the potential of location-aware mobile phones is mostly portrayed

positively, focusing on the way people can use these technologies to control their interactions in public space, generally in the form of location-based advertising and social networking. Just as losing privacy is generally portrayed positively when it is used for safety and security, the use of location-aware mobiles is portrayed positively when they give people control over public spaces.

Control and advertising

Although we earlier mentioned a negative portrayal of location-based advertising by *The Guardian*, most articles about this topic were unquestioningly positive, focusing on the opportunities for personalization. The appeal for advertisers is obvious; they can target people by preference when they are near a store and more likely to shop there. Articles also point to benefits for consumers. Many of the articles portrayed location-based advertising as a powerful new tool people can use to manage their surrounding space. People using these services move through a shopping space where they receive advertisements and coupons tailored to both their personal preferences and their location in physical space. Articles claim users can choose and personalize those preferences, and control the offers they receive:

A mobile service that will match a user's profile and whereabouts with offers from nearby restaurants or leisure facilities. (*Caterer*, February 26)

Hold up the phone and the screen will have names or business cards floating above the heads of pedestrians, and have advertisement menus appear next to restaurants. (*Korea Times*, May 11)

What this means is in the future, ads will get so contextually relevant that they won't be considered ads, they'll be considered as relevant information. (*eWeek*, February 5)

Many of the articles that matched this category imagine a future where advertisements become so personalized and contextually relevant that one no longer recognizes them as advertisements, working similarly to Amazon's book suggestions, but brought into physical space.

Control and social networking

Earlier, we discussed articles that dealt with collateral surveillance as a serious privacy concern. These articles argued that people can lose control over their information and consequently their control over their interactions with public space because they cannot control who can locate them. Many articles that dealt with social networking, however, did not adopt such a negative frame, arguing that when users have control over their location information they should not fear losing their privacy. Most importantly, what we see from these articles is that, although privacy is an issue, the ability to control one's personal space often outweighs privacy concerns. One way of controlling what information is disclosed in social networking software is through opt-in features.

Users have to opt in to the services and they can invite only trusted friends to know their location. (*Caterer*, February 26)

Because the service [*Latitude*] is opt-in, these fears [of stalking] are irrational. (*Revolution*, March 1)

Ensuring all information and updates are controlled by you, the subscriber. (*Space Daily*, March 30)

Google's *Latitude*'s privacy settings allow people to choose the level of detail they want to provide about their location, such as whether they only want to share the name of the city or pinpoint what intersection they're at. Users can also hide their information, turn the service off temporarily, or lie about their location by setting it manually. (CBC News, February 4)

These defenses of LBS almost always had to do with the issue of control. They argue that when people have control over whom they share information with, privacy is not much of a concern. By allowing people to opt-in to these services, the technologies are portrayed as giving people control over who they share their information with. Note that the above-mentioned quote states that individuals are also allowed to lie about their location. With cell phones, users could also tell they were in places in which they were not. However, having one's position visualized on a map at a fake location theoretically gives users increasing control over their surroundings.

Although earlier mobile media were often described as isolating individuals, these articles also do not describe location-aware mobiles as isolating people, but rather allowing them to connect to others nearby. Consequently, these applications are framed as social. Frequently, they are contrasted to social networking sites such as Facebook and MySpace stating that, unlike the stationary Internet use, they allow people to actually meet in physical spaces. By imparting a personalized social network on a public space, people can meet up with the other people they share their location with (de Souza e Silva & Frith, 2010; Humphreys, 2007). So, rather than disengaging people from physical space like earlier mobile phones, location-aware technologies are imagined to enable users to reconnect to their physical surrounding. People can go to restaurants recommended by like-minded others, find friends in crowded public spaces, or find other people who have similar interests:

Increasingly location data will be crowdsourced, so you know the places used by people like you. (*The Guardian*, May 7)

The two met after dinner at a bar, where they were joined by another former Stanford student who noticed on his display that they were socializing together. (*New York Times*, February 17)

With new software like Google *Latitude*, which allows you to see where your friends are in relation to your location, expect the emphasis to shift towards localised services, becoming more connected to the people and places around you. (*The Daily Telegraph*, February 21)

Discussion and conclusions

The media outlets we analyzed do not all portray location-aware mobiles as either negative or positive. However, as one would likely suspect, they emphasize certain aspects of location-aware technologies while ignoring others, evidencing the case of one-sided framing. According to Entman (2009), “one sided framing is the emphasis of some elements and suppression of others to promote evaluation and salience of attributes that privilege one actor’s interpretation over another’s.” That is, by choosing to highlight certain aspects of location-aware technologies and ignore others, these media outlets influence public opinion about how people perceive the social use of these technologies (Entman, Matthes, & Pellicano, 2010). Castells’ (2009) has also performed extensive work on media frames, showing how the way media outlets frame information plays a major role in public perception of political issues.

The articles that bemoan the loss of privacy often ignore the safeguards in place (opt-in features), and the articles lauding these technologies’ potential for sociability often elide many possible negative consequences of location awareness. A deeper and more informed discussion about the social implications of location-aware technologies are mostly absent from the media discourses. For example, what happens to our ability to navigate public spaces and interact with nearby people when users are able to impart maps of their social networks on public spaces? What are the power issues raised by the use of location-based advertising? Will certain groups be excluded from interacting with others in public spaces due to the location-aware filters present in some of these applications? When someone searches for restaurants on a Google map, it is almost as if the restaurants that are not listed do not exist. Could the same thing happen to people in public spaces?

When it comes to social networking, few academic works have explored the social implications of location awareness. In their study of the location-based game *Mogi*, Licoppe and Inada (2009) describe a case in which a female player felt she was being stalked by a nearby unidentified player who could see her on his mobile screen, but refused to reveal him/herself. The proximity of an unknown player generated fear, mostly because a player’s location was disclosed to an unidentified other. Awareness of location might also lead to power asymmetries. Licoppe and Inada (2006) describe situations in which both players see each other on their mobile screen, but only one claims he or she can see the other in the physical space of the city, leading to uncomfortable and almost fearful feelings from the player who loses her anonymity. Embedded in the assumptions and fears of *Mogi* players (or any other social networking users) is a shift in the nature of how individuals perceive and acknowledge each other in city spaces. Individuals are typically anonymous in urban spaces, which offered people a sense of privacy and distance from the “public” (Lehtonen & Mäenpää, 1997; Simmel, 1950).

With location-based mobile games and LBSNs, location becomes shared. Licoppe and Inada (2009) suggest that the wide use of location awareness will force us to question how we manage social interactions in public spaces, leading to “the

development of an interaction order founded on the public character of locations” (p. 123).

Likewise, the discussions of locative advertising ignore serious issues. Many of the articles about advertising systems paint a picture of users gaining increased agency over their interactions with advertising in public spaces, arguing that users always opt-in to advertising services and set personal preferences; however, users often do not sign up with marketers. They sign up for one location-aware application that then provides their information to advertisers (de Souza e Silva & Frith, 2010; Farrel, 2009). We can apply the same argument to governmental surveillance. Although the future of location-aware mobile phones is likely not as dystopian as the portrayal of articles that imagine an all-encompassing, Orwellian surveillance system, there are serious concerns about government surveillance that need to be addressed. Many location-aware applications have unclear user agreements that do not address whether they store users' location and whether they are willing to turn over locational history to an interested government agency, reflecting the current status of online privacy where large web companies like Amazon and Google have repeatedly turned over private information to governmental agencies (Solove, 2008). However, we must acknowledge that discussions about traditional models of top-down “Orwellian” surveillance are likely outdated and cannot always be applied to the complex relationships that arise among location-aware technologies, users, and information providers (de Souza e Silva & Sutko, 2009; Solove, 2004).

Finally, we need to problematize the discussion about safety and security. The use of mobile phones for safety and security has been widely acknowledged in the literature (Castells, Fernández-Ardevol, Qiu, & Sey, 2007; Cohen & Lemish, 2005; Dányi, 2005; Gordon, 2007; Ling, 2004). What is new with location awareness, however, is that location is sometimes automatically given, so even if targeted individuals cannot speak on a phone call, their location can be disclosed. There are products being marketed with the rather ominous taglines like “Track your Wife!!” that are ignored by the media outlets we analyzed. Also, although people might not object to tracking a 4-year-old, where should they draw the line? Should they be tracking their children's every move? At what age is this no longer appropriate? The same question can be applied to the old, the mentally unwell, or people who break the law (Monmonier, 2002). Previous research has shown that users are willing to give out private locational information depending on their perception of the usefulness of the application offered to them (Ackerman, Kempf, & Miki, 2003; Ackerman et al., 1999; Barkuus & Dey, 2003). But, as Perusco and Michael (2007) argue, the issues of privacy and control associated with location-aware technologies are complicated and cannot be adequately addressed through superficial, dystopian/utopian arguments.

Finally, we need to interrogate commonly accepted notions of privacy. Some of the sources we read claim that the meaning of privacy may be changing:

If you're not nitpicky about your privacy (which is such a 20th century ideal, anyway), the potential is huge. (*The Globe and Mail*, April 24)

A full-blown map-based, location-aware mobile world would entail rethinking basic American notions of privacy. (*New York Times*, February 17)

These articles indicate an acceptance of LBS as something unavoidable in the near future. As happened with other media, such as radio, television, or even electric light, which were perceived as dangerous and disturbing at their inception, these articles suggest that individuals will eventually get used to having their location information disclosed. It is early to say whether location-aware media will influence how we understand privacy, especially locational privacy. However, like many older types of mobile media, we suggest that they might already be challenging the boundaries of what we perceive as public and private, forcing us to reconsider some of these issues. Whether we are witnessing a shift that will transform location into public information, collateral surveillance as a new model of power and control, or privacy as a form of control, we hope that these issues help start a conversation about the possible social implications of location-aware technology that moves past the typical utopian and dystopian discourses that accompany all new communication technologies.

Location awareness is neither inherently good nor bad. Tracking and sharing location can be used for positive purposes, such as increasing children's safety, and they can be used for negative purposes, such as governmental and corporate surveillance or collateral stalking.

As Lessig (1999) and McChesney (2007) have argued about the Internet, we are at a stage where we can shape the adoption of these technologies and the policies that govern their uses. Hopefully, by analyzing the frames being made in the popular press and identifying topics not being considered, this article is an initial gesture in that direction.

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Appendix

Table A1 Itemized List of Sources

	Title	Source	Date	Type of publication
1	Mobile GPS	Revolution	April 1, 2009	Magazine
2	A man walks into a bar and says, “Did you hear this is gonna be the year of mobile marketing?”	Advertising Age	March 30, 2009	Web

(continued)

Table A1 *Continued*

	Title	Source	Date	Type of publication
3	Alcatel-Lucent jumps into mobile advertising	Techweb	May 21, 2009	Web
4	Many developers not interested in pre, symbian	Techweb	April 9, 2009	Web
5	Opera adds location awareness	Techweb	March 26, 2009	Web
6	NAVTEQ LocationPoint advertising launches in Europe	Space Daily	May 25, 2009	Web
7	Still long way to go for mobile advertising	New Straits Times	February 16, 2009	Newspaper
8	Compact new 12 volt DC gearmotor develops 60 in. lb. torque at 78 rpm	Product News Network	February 3, 2009	Web
9	Eco-aware while on the run	The Globe and Mail	March 12, 2009	Newspaper
10	Skyhook plug-in improves cell phone location accuracy	Techweb	May 21, 2009	Web
11	Now phones are all Apple-flavoured	Daily Telegraph	February 21, 2009	Newspaper
12	Nokia introduces new LBS	Total Telecom	April 1, 2009	Web
13	Who, where, why?; GPS has made smart phones more connective than ever. But will they really bring us closer together?	Globe and Mail	April 24, 2009	Newspaper
14	Pizza chains use social networks for ordering, tracking	Progressive Grocer	February 13, 2009	Magazine
15	Cellphone locator system needs no satellite	New York Times	June 1, 2009	Newspaper
16	The cellphone, navigating our lives	New York Times	February 17, 2009	Newspaper
17	Locale adds skyhook wireless for better location on android	Space Daily	April 19, 2009	Web
18	Telmap unveils MOND2 to improve mobile navigation	Total Telecom	February 5, 2009	Web
19	Clickatell social network customers poised to monetise demand	Total Telecom	May 12, 2009	Web

(continued)

Table A1 *Continued*

	Title	Source	Date	Type of publication
20	United States: Abaq.us announces support for myGeoDiary on android-powered devices	Tendersinfo	May 22, 2009	Web
21	Analyst: Google Latitude not a threat to Facebook, MySpace	eWeek	February 5, 2009	Web
22	New technology boost for mobile internet links	The Weekender	March 12, 2009	Newspaper
23	Technology: Can Google Latitude get my stolen phone back?	The Guardian	February 26, 2009	Newspaper
24	Technology: The end of privacy?: Forget Street View, there is a far more subtle—and pervasive—invasion of your private life being carried out—this time through your mobile phone.	The Guardian	April 2, 2009	Newspaper
25	United States: Vodafone joins mobile application race	Tendersinfo	May 14, 2009	Web
26	In an emergency, who do you call?	Cnn.com	March 11, 2009	Web
27	In-depth—Location-based ads—Vodafone to trial mobile map ads	Revolution	June 1, 2009	Magazine
28	Google people tracker raises privacy issues	CBC News	February 4, 2009	Web
29	Calling up the best deals	Sydney Morning Herald	March 14, 2009	Newspaper
30	WHERE consolidates leadership position as top provider of local content	Space Daily	March 30, 2009	Web
31	Vodafone enters app store battle	Techweb	May 12, 2009	Web
32	Google promises memory loss for Latitude	eWeek	March 5, 2009	Web
33	Technology: Opinion: A short stroll around my hyperlocal	The Guardian	May 14, 2009	Newspaper
34	Technology: Opinion: Nokia—soon to come with apps	The Guardian	May 7, 2009	Newspaper
35	Some parents find it useful	The Straits Time	April 2, 2009	Newspaper

(continued)

Table A1 *Continued*

	Title	Source	Date	Type of publication
36	Turn online social networks into real world interactions	Space Daily	March 30, 2009	Web
37	Smartphone sales ride the economic storm	Vnu.net	February 2, 2009	Web
38	Special report—The shape of things to come	Marketing	March 18, 2009	Magazine
39	Mobile app store users to quadruple by 2014	Techweb	March 26, 2009	Web
40	Is Korea turning into Internet police state?	Korea Times	April 9, 2009	Newspaper
41	Some teething problems for Nokia's new online store	The Irish Times	May 27, 2009	Newspaper
42	MWC Nokia announces Smart Store Ovi	eWeek	February 16, 2009	Web
43	Cell broadcasts could help avert catastrophe	CNN.com	February 5, 2009	Web
44	BlackBook ACCESS mobile perks program launched for location-based marketing	Space Daily	April 24, 2009	Web
45	Reminders from out of the blue	New York Times	April 2, 2009	Newspaper
46	Yahoo rolls out mobile apps	Techweb	April 1, 2009	Web
47	10 secret iPhone powers	PC Magazine	February 12, 2009	Web
48	Motorola's new mobile device mixes flexibility, functionality	Progressive Grocer	March 9, 2009	Magazine
49	A wealth of information at the push of a button; How does Acxiom know I'm right-handed and own a cat? asks Rowena Mason	The Daily Telegraph	April 28, 2009	Newspaper
50	Google's looking at you, kids . . . ; The internet giant's new Street View function is great fun, but could it mean the end of privacy, asks Robert Colvile	The Daily Telegraph	March 20, 2009	Newspaper
51	Location based technologies launches additional PocketFinder Smartphone apps	Space Daily	February 23, 2009	Web

(continued)

Table A1 *Continued*

	Title	Source	Date	Type of publication
52	Telmap unveils personalised location companion	Total Telecom	February 16, 2009	Web
53	THE NEXT NET	Business Week	March 9, 2009	Web
54	Customers on the radar	Caterer	February 26, 2009	Web
55	Phone and beyond	Korea Times	May 11, 2009	Newspaper
56	RIM TMobile throw curve with new BlackBerry	eWeek	February 23, 2009	Web
57	Google's Schmidt talks privacy, Internet domination	PC Magazine	April 18, 2009	Web
58	Special focus: Exciting mobile market	The Edge Malaysia	May 11, 2009	Newspaper
59	Turning nightlife into phone game	New York Times	March 16, 2009	Newspaper
60	New here? The phone shows you around	New York Times	April 23, 2009	Newspaper
61	Google online tool lets you track friends	Newsday	February 5, 2009	Newspaper
62	Where Google meets Facebook meets GPS	The Globe and Mail	February 26, 2009	Newspaper
63	Opera and Skyhook wireless bring geolocation to the web	Space Daily	April 19, 2009	Web
64	Google gives you Latitude to track friends employees via Google maps	eWeek	February 4, 2009	Web
65	Stuck in the web	The Times	March 28, 2009	Newspaper
66	Searching for the new; New gizmos are being launched every day, but which ones will make it big? Danny Fortson tries to find out	The Sunday Times	April 19, 2009	Newspaper
67	Nokia rolls out E52 Smartphone	Techweb	May 6, 2009	Web
68	BlackBerry Curve 8900 hits AT&T	Techweb	May 22, 2009	Web
69	Reality check	Revolution	April 1, 2009	Magazine
70	New Google search changes enables small biz owners to boost ranking	Progressive Grocer	April 10, 2009	Magazine
71	Virgin readies Ocean 2 Smartphone	Techweb	February 2, 2009	Web

(continued)

Table A1 *Continued*

	Title	Source	Date	Type of publication
72	The best iPhone apps for the unemployed	PC Magazine	April 12, 2009	Web
73	Trapeze networks announces Newbury active asset 4.0, WLAN asset tracking and management	Product News Network	April 21, 2009	Web
74	Drive to succeed part of game; Profile—Rory Buckley	The Age	March 17, 2009	Newspaper
75	GETAC introduces its new fully rugged GPS/PDA with on board camera, altimeter and E-compass	Product News Network	March 5, 2009	Web
76	ScenSor low energy radio chips for use in wireless sensors	The Irish Times	March 27, 2009	Newspaper
77	Technology: Game theory: Put down the controller and get some fresh air	The Guardian	May 28, 2009	Newspaper
78	Tell us, where are you exactly?: Jemima Kiss is in the right place to spot Austin's major trend this year: Where you're at	The Guardian	March 19, 2009	Newspaper
79	Google watch—Google kills Bambi, but not data fears	Revolution	March 1, 2009	Magazine
80	Consumer control brings brand loyalty; Mobile program less about advertising, more about positioning for future of banking	Advertising Age	March 30, 2009	Web
81	Google starts twittering news headlines	Techweb	April 28, 2009	Web
82	Air Force concerns highlight popularity of GPS 461899	eWeek	May 23, 2009	Web
83	Beam your ads directly into their brains—well almost	Revolution	May 1, 2009	Magazine
84	DDS award for outstanding body of work—by Alex Dunsdon	Campaign	April 11, 2009	Magazine