The power(s) of observation: theoretical perspectives on surveillance technologies and older people

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ABSTRACT

There is a long history of surveillance of older adults in institutional settings and it is becoming an increasingly common feature of modern society. New surveillance technologies that include activity monitoring, and ubiquitous computing, which are described as ambient assisted living (AAL), are being developed to provide unobtrusive monitoring and support of activities of daily living and to extend the quality and length of time older people can live in their homes. However, concerns have been raised with how these kinds of technologies may affect user's privacy and autonomy. The objectives of this paper are (a) to describe the development of home-based surveillance technologies; (b) to examine how surveillance is being restructured with the use of this technology; and (c) to explore the potential outcomes associated with the adoption of AAL as a means of surveillance by drawing upon the theoretical work of Foucault and Goffman. The discussion suggests that future research needs to consider two key areas beyond the current discourse on technology and ageing, specifically: (a) how the new technology will encroach upon the private lived space of the individual, and (b) how it will affect formal and informal caring relationships. This is critical to ensure that the introduction of AAL does not contribute to the disempowerment of residents who receive this technology.

KEY WORDS – surveillance, ambient assisted living, Foucault, Goffman.

Introduction

The explosive growth of technological media that are able to monitor, track and store information about the movements and actions of individuals has led to increasing levels of social monitoring (Lyon 1994). The term 'surveillance creep' has been used to describe the expanding presence of

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surveillance technology and its intrusion into everyday society (Marx 1998: 2). This includes the use of closed circuit television (CCTV) cameras to observe the movements of individuals in and around urban centres and public spaces (Lippert 2009), customer profiling to monitor consumer behaviours in relation to spending and usage patterns (Rowley 2005), and increasingly forms of online e-surveillance (Welsh *et al.* 2003).

With respect to older people, there is a long history of surveillance of those living in institutional settings, such as hospitals and nursing homes where the layout and design of the facilities have been optimised to allow easy observation of residents and patients (Salzmann-Erikson and Eriksson 2012). More recently, technologies have been introduced to allow fewer numbers of staff to monitor larger numbers of residents and to facilitate the collection of real-time, continuous data (Sixsmith 2013). These technologies include video surveillance, integrated sensor systems (*e.g.* chair alarms, bed and door sensors), tagging and tracking (*e.g.* motion detectors to track wandering) and physiological sensors (*e.g.* self-worn blood pressure devices) within the residential care environment (Bharucha *et al.* 2006). They are justified as a means of safeguarding or improving health and wellbeing, managing high-risk behaviours or as an alternative to restraints (Moffatt 2008). However, concerns have been raised about how surveillance technologies may affect privacy and compromise autonomy (Minuk 2006). Compared with public and institutional settings, private homes have long been considered relatively free of surveillance, but new technologies, such as ambient assisted living (AAL) that track the performance of activities are being developed to facilitate in-home monitoring of those living 'at-risk' in the community. AAL is a combination of stand-alone assistive devices, smart home and telecare technologies that includes (a) in-home sensor networks to monitor the activities, health status and safety of individuals in and around the home (Sixsmith *et al.* 2012), and (b) smart interfaces that provide help and support in everyday tasks of living and the management of chronic conditions, as well as providing communication links to social support and formal services.

Given concerns about how surveillance technologies have been implemented in other settings and how their introduction has been experienced, the purpose of this paper is to consider the potential effects of the introduction of surveillance technologies in the homes of older adults. Specifically, the objectives are (a) to describe the advent of home-based surveillance technologies; (b) to explore how surveillance is being restructured with the use of this technology by comparing its use in four settings: public spaces, institutions, private homes without AAL and private homes with AAL; and (c) to use theories of surveillance to understand and interpret the potential outcomes associated with the adoption of AAL.

For the latter objective, we have drawn upon Foucault's ideas of power, governmentality, surveillance and self-discipline and Goffman's concepts of total institutions and dramaturgical analysis to inform our ideas on the nature and the use of surveillance technologies with older people.

Emergence of surveillance technologies in the care of older people living at home

The surveillance and management of vulnerable at-risk individuals is a core activity of elder care. Institutions have traditionally played this role, but new developments in information and communication technologies (ICT) offer the potential to extend this role into the non-institutional spaces of the home and the community. Doughty, Cameron and Garner (1996) have characterised these technologies in terms of 'three generations of telecare'. The first generation refers to the telephone-based community alarms that require a person to press a button on a watch or pendant to raise an alarm in a call centre or send a message to a care-giver. A second generation of systems has emerged on to the marketplace that aims to monitor the safety and security of clients passively, using body-worn and environmental sensors to track biometric data and detect adverse events such as falls and hazards, including floods and fire. In pilot studies, these technologies have been shown to have positive effects, including improved health and wellbeing (Brownsell, Blackburn and Hawley 2008), enhanced feelings of safety and security (Sixsmith and Sixsmith 2000) and postponement to institutional care (Riikonen, Mäkelä and Perälä 2010). In the United Kingdom (UK), the Department of Health's Whole System Demonstrator (WSD) Pilot Programme involved a large randomised control trial to evaluate the cost-effectiveness of telecare. Preliminary results show significant benefits, including reduction in mortality, emergency room visits, emergency hospital admissions, elective admissions, numbers of bed days and overall costs (UK Department of Health 2011). A third generation of systems are being developed to exploit the potential afforded by state-of-the art ICTs. For instance, the European Union has made considerable investments into their Ambient Assistive Living Joint Programme over the last few years (Sixsmith 2013). Many of the AAL technologies are intended specifically for those with cognitive impairments (*e.g.* to facilitate memory, to track movement among those who wander, to identify emergencies or hazardous situations), which may be used to avoid or postpone admittance to residential care. A key component of AAL is the use of tracking and monitoring technologies to detect potentially problematic changes in health or activity. For example, AAL systems usually include algorithms to identify abnormal activity

compared to a typical activity profile based on previous observations of the individual. The nature and type of observations vary depending on the technology used, potentially involving various actors in the interpretation of the activity data including health-care professionals, family members and older people themselves. In the latter case, AAL could be used as a means of promoting self-management, which might improve conditions such as hypertension, cardiovascular disease, diabetes or obesity (Koch *et al.* 2009), where the older person themselves become the observer, using monitoring data to stimulate positive behaviours or make lifestyle changes.

The use of AAL technologies has been justified as a means of providing enhanced support to people living at home; however, concerns have also been raised about the extent to which privacy is compromised (Reder *et al.* 2010). Attitudinal studies have revealed mixed feelings towards AAL among potential users. On the one hand, many perceive that AAL technologies could be beneficial for prolonging independent living in the community (Courtney *et al.* 2008; Demiris *et al.* 2004, 2008; Percival and Hanson 2006; Steele *et al.* 2009; Wild *et al.* 2008). On the other hand, privacy infringement is a concern with these systems to a lesser extent (*e.g.* if proper controls are not in place) (Steele *et al.* 2009; Wild *et al.* 2008) or greater extent (*e.g.* in terms of the potential for stigmatisation, alterations of pre-existing routines and loss of control of personal information) (Courtney *et al.* 2008; Demiris *et al.* 2004, 2008; Percival and Hanson 2006).

The current discourses surrounding surveillance technology can be characterised in terms of three key themes. Firstly, a *technical discourse* has primarily focused on identifying functional (*i.e.* what the system does) and non-functional (*i.e.* how the system does it) requirements for assistive technologies. In terms of function, there has been a move towards a user-driven approach, developing devices and systems as 'solutions' to identified needs and problems (Woolrych and Sixsmith 2012). Non-functional requirements are ascertained through a human factors approach to ensure that technologies (*e.g.* interfaces) are in line with the abilities and capacities of the end-user. Secondly, a *discourse on rights* focuses on the individual's right to privacy in relation to protection of personal data and intrusion into personal spaces, but also on their right to live independently in their own home for as long as possible. Within this discourse, the focus is on the 'acceptability' of the technology and determining the person's position in relation to trading off the advantages (*e.g.* staying at home) against the disadvantages (*e.g.* loss of privacy) associated with adopting the technology (Courtney *et al.* 2008; Demiris *et al.* 2004, 2008; Steele *et al.* 2009; Wild *et al.* 2008). Thirdly, a *managerialist discourse* refers to the use of rationalist managerial principles in the regulation of social and economic activities, emphasising the efficient use of scarce resources as a key objective and the

creation of micro-solutions to address specific health and social problems. In the field of elder care this has led to the development of technologies for safety, security, the avoidance of harm, the reduction of risk (*e.g.* falls) and the management of chronic diseases (Koch *et al.* 2009). The justification of these solutions is the avoidance of expensive interventions such as hospital and nursing home admissions.

Despite the significance of these issues, few authors have explored the nature and potential impact of surveillance technologies more holistically. A systematic review about the ethics of using assistive technology in the care of community-dwelling older adults by Zwijsen, Niemeijer and Hertogh (2011) found that few studies examined more than one of the nine sub-themes they identified (*i.e.* privacy, autonomy, obtrusiveness, stigma, human contact, individual approach, affordability and safety) and privacy was the most common sub-theme addressed. However, much of the discussion of privacy has been limited to the technical domain of data security and confidentiality or to users' apparent willingness to share monitoring data with others (*cf.* Mattek *et al.* 2013). Much less attention has been given to how the monitoring of individuals may impinge more broadly on a person's everyday life and social and caring relationships (Sixsmith 2013).

The restructuring of surveillance through technology

Historically, surveillance has been very labour intensive, with large numbers of supervisors required to monitor the behaviours of others. For this reason, surveillance tended to be intermittent and *ad hoc*, but the emergence of new technologies has begun to change the nature of surveillance within the care process. We have illustrated this change by comparing the surveillance typically used in four different locations: public spaces, institutional settings, private homes without AAL, and private homes with AAL. We considered how surveillance varies in terms of the number of observers and the number of people being observed. We also compared how observations in each location differed in terms of the types of observations made, numbers of individuals involved, frequency and awareness of being observed.

Different methods of observation tend to be favoured in different settings. CCTV is used in public places and some institutions. For example, in 2004, it was estimated that 40 per cent of institutions in London had cameras in public spaces (Norris, McCahill and Wood 2004). In private homes without AAL observations are generally informal, unless home-care services are utilised, in which case, surveillance practices and monitoring are an important aspect of visits from staff (Vuokko 2008). Residential care facilities have a variety of formal and informal ways to monitor residents,

including bed or chair occupancy sensors that activate alarms if a resident who is at risk of falls attempts to transfer independently. However, their efficacy has been questioned (Shorr *et al.* 2012), and these devices may contribute to 'alarm fatigue' because of the high rate of false alarms that these devices may emit (Cvach 2012). In homes with AAL a wide variety of second- and third-generation devices could be installed, including emergency detection devices, such as flood or fall detectors, and activity monitoring systems (Sixsmith 2013).

The number of observers and people being observed vary considerably depending on the location. In public spaces and institutional settings, there are a large number of potential observers and people being observed, although it should be noted that in residential care settings, staffing has diminished over time, and concerns about the lack of assistance available are common (Mortenson *et al.* 2012). In private homes without AAL, depending on the living situation there may be no observers, or only a relatively small number of people being observed. AAL offers the possibility for large numbers of individuals to be monitored automatically and continually in their homes and to have these data monitored by a relatively small number of people – automatically raising an 'alert' for behaviour that is outside normal parameters (Sixsmith 2013).

Similarly, the frequency of individual observation ranges across settings. The frequency of observation in public spaces and institutional settings varies depending on the time of day and location. Public spaces, like parks, may be relatively crowded in daylight hours during summer conditions, but may be deserted at night or during inclement weather. Likewise, dining rooms in residential care facilities are likely busy during meals, but at night residents' rooms may only be observed infrequently in light of staffing levels. The frequency of observation in private homes without AAL varies depending on time of day, and whether residents live with others or receive formal or informal care. In contrast, computer observations are made constantly in private homes with AAL and these may be supplemented by the observations of co-habitants and visitors.

In the community, people are generally aware of the potential of being observed informally, although they are likely unaware of exact locations where CCTV is being deployed. For example, residents in a city in Canada were aware that street video surveillance existed in their community, but did not know the specific location of the cameras (Lett, Hier and Walby 2010). In other settings, awareness of being observed depends largely on the cognitive status of the individual being observed. For example, individuals with advanced dementia may be unaware of AAL monitoring in their homes; however, among those with mild or moderate dementia AAL may be construed as a sign of dependency that may contribute to a sense of

stigmatisation, which individuals with this diagnosis frequently experience (Batsch and Mittelman 2012). In most settings, the feedback provided to those observed is generally informal (*e.g.* offhand remarks, *etc.*).

In summary, the introduction of AAL represents a marked shift in the amount and type of surveillance experienced by residents in private homes. With AAL, there is continuous ongoing monitoring that is supervised by a small number of observers. With AAL, previously undocumented incidents such as falls or leaving a stove unattended may be identified. Large quantities of quantitative data can be collected about residents' movements and activities and non-normative behaviours can be identified – residents who may not be aware that they are being observed. Therefore, the emergence of AAL as a distinct and novel form of surveillance raises questions about the wider social implications of this new technology.

Towards a theoretical understanding of surveillance and AAL

Most research in technology and ageing stems from a socio-functionalist perspective that sees devices and systems as 'solutions' to particular needs and problems of the individual. While attention may be given to issues of usability, usefulness and acceptability, there is typically very little insight into how technologies transform social relations in the everyday world. This is important, because the outcomes of the introduction of new technologies, especially negative ones, are extremely difficult to predict (Rogers 1995). Moreover, without these theoretical insights, there is always a danger that ageist assumptions about the needs of older people and the less desirable aspects of elder care are embodied in the designs for new technologies. In this section we have drawn upon Foucault's ideas of power, governmentality, surveillance and self-discipline and Goffman's concepts of total institutions and dramaturgical analysis to inform our ideas on the nature and the use of surveillance technologies with older people.

Surveillance literally means oversight, as it is a French compound word that combines the prefix '*sur*' (*i.e.* over) with the verb '*veiller*' (*i.e.* to watch). During the Reign of Terror, the *Comités de surveillance* identified 'enemies of the revolution' for detainment (Rothiot 1998). Surveillance is closely related to supervision (*e.g.* to look over) and the term suggests that observers have power over those beneath their gaze. Famously, Orwell described a dystopia that was maintained through the use of surveillance as a means of social control:

It was terribly dangerous to let your thoughts wander when you were in any public place or within range of a telescreen [surveillance device]. The smallest thing could give you away. A nervous tic, an unconscious look of anxiety, a habit of

muttering to yourself – anything that carried the suggestion of abnormality, of having something to hide. In any case, to wear an improper expression on your face (to look incredulous when a victory was announced, for example) was itself a punishable offense. (1983: 55)

More recently, Lyon defined surveillance as the 'the means whereby knowledge is produced for administering populations in relation to risk' (2001: 6). Lyon (2001) indicated it is the interpretation of risk and the extent to which privacy is compromised that are the primary issues associated with surveillance.

Power and governmentality

Ultimately, surveillance is about power, or the way individuals and groups within society interact and influence one another. Power can be seen in positive terms, for example how a benevolent state can exercise its authority to regulate individuals' actions for the common good. The idea of power can also be construed in more negative terms, where certain groups within society aim to manipulate and control others for their own ends. However, power is not simply the authority that one person has over another. Foucault viewed power as 'as a relationship, which was localised, dispersed and typically disguised through the social system, operating at a micro, local and covert level through sets of specific practices' (Turner 1997: xi). Power is seen as 'permanent, repetitious and self-repetitious. It is not a thing acquired but rather exists in its exercise. Moreover, power relations are not separate from other relations but are contained within them' (Foucault 1980: 97).

Governmentality is a construct Foucault (1997) developed to explain the relationship among sovereignty, discipline and government. Authorities attempt to modify the conduct of individuals to attain state-sanctioned outcomes, such as health, via a variety of approaches (Rose 1997). These include 'technologies of domination' such as institutional and social structures and 'technologies of self' that promote self-discipline (Foucault 1988). For example, governments may promote 'healthier' behaviours by creating programmes that encourage smoking cessation and imposing restrictions on how cigarettes are sold, where smoking is permitted and increasing the price through taxation.

From a governmentality perspective, AAL has the potential to function as both a technology of domination and technology of self. The ability of AAL to detect emergency situations may overcome the limitations of personal alert devices (such as the pendant alarm) that require user activation and consent. Health and activity monitoring might facilitate preventative interventions on the part of care-givers and AAL could be used as a means of keeping people in their homes. However, the information collected could

equally be used to identify and categorise those who are appropriate for institutional care. Furthermore, rather than simply observing residents, AAL could also be used actively to promote lifestyle changes through self-management (Koch *et al.* 2009). For example, improved fitness and weight-loss could be encouraged by providing residents and their care-givers with detailed information about their activity levels, data which previously were only accessible via self-report.

AAL and total institutions

Settings, like prisons, nursing homes and cloisters, are primarily technologies of domination, or what Goffman (1968: xii) refers to as total institutions: 'place[s] of residence and work where a large number of like-situated individuals, cut off from the wider society for an appreciable period of time, together lead an enclosed, formally administered round of life'. People in a total institution are supervised by individuals whose chief duty is surveillance rather than guidance (Goffman 1968). In this sense, surveillance is applied to monitor movements and behaviours with the objective being to achieve control of and compliance amongst individuals and groups, resulting in highly routinised and regimented ways of living. Not surprisingly, serious concerns have been raised about the dehumanising nature of nursing homes, which have been seen to induce dependency and promote passivity among residents (Ice 2002). Given the overcrowded and understaffed conditions found in many residential care facilities (Kayser-Jones *et al.* 2003), it is not surprising that a majority (67%) of seriously ill hospitalised adults surveyed indicate they would be unwilling to live permanently in a nursing home, including 30 per cent who would rather die than be admitted (Mattimore *et al.* 1997). Therefore, policies and practices that determine the quality of these facilities and criteria which establish who can be cared for at home and who should be placed in a facility, represent technologies of domination (Foucault 1988) that encourage and ultimately coerce individuals to accept surveillance technologies within their homes as the preferable option; a choice, but perhaps an illusory one in the face of an unacceptable alternative.

Although AAL may be offered as an alternative to institutionalisation, it might also be viewed as a means of transforming homes into what might seem an oxymoron – 'individualised total institutions', in which particular forms of health behaviour are propagated. While AAL-equipped homes do not require everyone to behave in the same manner, the idea of monitoring deviations from 'typical' activity patterns for an individual has interesting parallels with the process of institutionalisation, where the expected patterns become the specific norms against which activity and behaviour is evaluated.

The individuals being monitored may begin to change their behaviour if they are concerned about the feedback and implications of their actions, such as triggering alarms, warnings and contact from care-givers (Percival and Hanson 2006). By labelling departures from routines as abnormal or deviant, AAL systems may thus discourage variability and spontaneity and encourage routinisation and regimentation within everyday life. For example, residents may avoid changes to their regular patterns (*e.g.* like sleeping in or staying up late) or inviting in guests.

Dramaturgical analysis

Both Foucault and Goffman describe how surveillance can induce self-monitoring; Goffman used a theatrical metaphor to describe how individuals (like actors) adjusted their behaviour (performance) to manage the impression that they made (Goffman 1971). Goffman indicated that places have front- and back-stage areas, which shape and help produce behaviour. He stressed the importance of the back-stage area

as a place, relative to a given performance, where the impression fostered by the performance is knowingly contradicted as a matter of course … It is here that the capacity of a performance to express something beyond itself may be painstakingly fabricated; it is here that illusions and impressions are openly constructed. (Goffman 1971: 112)

Because front-stage behaviour becomes ingrained,

the individual may privately maintain standards of behaviour which he does not personally believe in, maintaining these standards because of a lively belief that an unseen audience is present who will punish deviations from these standards. In other words, an individual may be his own audience or may imagine an audience to be present. (Goffman 1971: 81)

Within the context of surveillance, this raises the potential for individuals to project 'normative' assumptions of what they feel others would deem acceptable behaviour because they fear being labelled deviant or abnormal, *i.e.* promoting self-regulation and censorship.

In many ways AAL may contribute to the erosion of the distinction between private and public space. From a dramaturgical perspective, the constant observation within the home represents a serious disruption of what was previously regarded as a private back-stage area. Currently, the sensors used in AAL provide relatively crude information about behaviour (*e.g.* room occupancy, stove usage, toilet flushing, mobility, falls, *etc.*) and the systems are not intended to provide direct video surveillance of elders in their homes, which would transform the residence into a front-stage area. Although these other types of sensors may seem less intrusive, some attitudinal research suggests that potential users may have difficulty

distinguishing between different types of sensors and anticipate having a sense of 'being watched' even without the presence of video-cameras (Percival and Hanson 2006; Savage 2010; Sixsmith and Sixsmith 2000). This represents a fundamental tension with the provision of AAL. Although it is lauded as a means of facilitating autonomy, it may simultaneously restrict it, as residents alter their behaviours in response to being observed. An awareness of being watched may produce a negative or positive effect on performance, which is described as reactivity (Kazdin 1979). Goffman (1959: 33) indicated that individuals who are being watched who wish to present themselves doing a task appropriately may have little concentration remaining for the activity at hand, 'so individuals often find themselves faced with the dilemma of expression versus action', a predicament that may undermine the reason for their introduction of AAL. As basic activities of daily living usually occur within the back-stage area of home, it is conceivable that those being observed may actually experience a decline in ability, as has been found in cases of performance anxiety (Powell 2004). In this regard, the need to be 'in-face' all of the time may be extremely taxing (Goffman 1967).

The application of technologies such as AAL raises questions about how we conceptualise back-stage and front-stage space within the lives of older people. Whilst the notions of public and private are highly individualised, the home has been identified as a private back-stage domain, which is thought to be critical for self-development and identity (Sixsmith 1986). However, within the home, what is considered private space is interpreted in different ways and perceived intrusions depend upon the type of technology and the granularity of the observations being undertaken. Here, individuals themselves may trade off aspects of their own privacy if the overall outcome is considered beneficial, as described by Essen (2008). Indeed, what is deemed private is neither always easily discernible nor is it spatially bounded, for all settings are imbued with symbolic and affective dimensions related to the ways in which people attach meaning to place (Altman and Low 1992).

The introduction of AAL could contribute to the medicalisation of the home environment (Demiris, Oliver and Courtney 2006), altering how residents perceive their homes, for example diminishing their sense of control over personal space and weakening the sense of refuge they experience (Beringer *et al.* 2011). AAL may also promote passivity, by encouraging users to rely on the system to detect potential problems. As with any monitoring or assessment (*e.g.* brain scans for research purposes; Illes *et al.* 2004), there is also a question about how to deal with incidental findings that AAL systems may identify, *e.g.* outings at unusual times of the day, or undisclosed visitors. These events might be cause for intervention

(*e.g.* wandering behaviours amongst those with dementia) or an important, potentially private, aspect of a resident's independence or social life.

Self-regulation

Foucault (1991) explored how the perception of being observed can result in self-regulation or self-discipline. He used Bentham's (1995) Panopticon as a metaphor to describe the way surveillance can establish a rational social order. A Panopticon is a wheel-shaped prison in which unseen guards at a central hub continually monitor prisoners in their inward-facing cells along the rim. Because of the potential for constant monitoring, prisoners are expected to modify their behaviours accordingly. Foucault suggested that the potential for constant monitoring in everyday social encounters would eventually lead those observed to internalise a sense of surveillance, *i.e.* initiating a process of self-surveillance. Similarly, through the 'clinical gaze' of professionals, like physicians, intimate knowledge is obtained about those who are observed – 'a gaze which each individual under its weight will end by interiorisation to the point that he is his own overseer, each individual thus exercising this surveillance over, and against, himself' (Foucault 1980: 155). Thus, rather than being repressed via 'our social order, it is rather that the individual is carefully fabricated in it' (Foucault 1991: 217).

If normative judgements are provided to residents about their activities, this information would likely encourage self-discipline. This kind of self-reflexivity might be welcomed by those who feel it could promote self-actualisation in a manner akin to Giddens' (1991) 'project of the self'; conversely, Foucault (1991) suggests there is a more sinister aspect to this kind of self-monitoring. In this case, AAL would represent an example of the clinical gaze, *par excellence*, as it would provide real-time, objective knowledge that could be used to encourage self-disciplinary practices. Thus although AAL is intended to promote autonomy and choice, it could be seen as a technology that ultimately empowers experts to govern the ways in which the self can be defined (Buckingham 2008). Furthermore, provision of AAL to those deemed 'at risk' could also be described as a 'dividing practice' (Foucault 1982: 208), which categorises, objectifies and differentiates these individuals.

Technologies of resistance

Recent advances in ICTs have changed the nature of society in unexpected ways. For example, with social networking, it is possible to have a level of privacy that is unprecedented and novel, where an online presence can simultaneously have both identity and anonymity

(Friedman 2008). Within computer-mediated communication, an individual is able to manage and to develop an online identity or presence in a way that is not possible with face-to-face encounters. This presence has been termed the 'hyperpersonal' (Walther 1996), as it allows the individual to selectively edit the version of the on-line self he or she presents to others. While this kind of direct control might be more limited under the constant gaze of AAL surveillance, the individual being observed may still have opportunities to manipulate the system.

Foucault argued that through self-disciplinary processes, carefully regulated, 'docile bodies' might be reproduced, but also asserted that 'where there is power, there is resistance' (1978: 75). Therefore, this kind of surveillance also affords those who are observed a degree of power, as they might, in some cases, choose to act in a way that attracts attention or may discover strategies to circumvent the technology. Friedman (2008) contended that, while the proliferation of cameras and tracking technologies means a society where virtually nothing is private, there is a counterbalance to the coercive observation of individuals. Instead of attempting to protect privacy in the face of technological change, the best solution might be a universal transparency, where everyone watches everyone else (Friedman 2008). In this context, the observers are also observed and held accountable for their actions – a sousveillance to counter the organised surveillance of public authorities (Mann, Nolan and Wellman 2003). For example, in long-term care, a resident who was able to observe when staff came and went could make eye-contact with them and tap her watch if they were arriving late or departing early (Mortenson *et al.* 2012). In a study about attitudes towards AAL by Savage (2010), a participant suggested he might attempt to deceive the monitoring system by activating sensors without performing the associated activities (*e.g.* flushing the toilet without using it; lying in bed without sleeping; opening the fridge without eating, *etc.*). Furthermore, some family members have used 'granny cams' to observe how professional staff treat their relatives (Cottle 2004). These examples illustrate how the social transformative nature of new technology may change the way power relations are acted out within a socio-technical space.

The preceding examples are in keeping with the work of Verbeek, who has suggested that technology does not determine human behaviour, but rather creates the opportunity for alternative forms of autonomy that recognise that freedom is 'a hybrid affair, distributed over people and artefacts' (2009: 238). Thus, rather than trying to prevent the introduction of new technologies like AAL, Verbeek recommends that the focus should become how their design and use can be shaped.

Conclusions

AAL technologies are being promoted as a means of safeguarding the health and safety of older persons and avoiding the expense of institutional care or hospital admission, but the lack of an adequate theoretical basis is a major shortcoming for research and development in this area of technology and ageing (Sixsmith 2013). Theory, far from being an ivory tower activity, is important in shaping practical activities, such as the development of novel AAL systems. This paper has attempted to extend the limited discourse that currently surrounds the development and implementation of surveillance technologies in the care of older people.

To some extent, technologies such as AAL can be seen as a win–win solution. On the one hand, ICT-based care at home is a relatively low-cost service that reduces the social and economic 'burden' of elder care, while on the other hand, it supports the aspirations of people to continue living at home rather than be admitted into institutional care (Sixsmith and Sixsmith 2008). The mutual benefits associated with keeping people living longer at home are seen as a powerful justification for the implementation of ICT-based services. However, these discourses have virtually nothing to say on the potential of technology to transform the everyday lives of frail and vulnerable older people, especially in terms of their social and caring relationships. The fixation on developing technological 'solutions' to specific 'problems' as opposed to understanding the broader social context can be seen as part of what has been described as the microfication of gerontology (Hagestad and Dannefer 2001).

The theoretical perspective in the present paper runs counter to this reductionist tendency by exploring how aspects of everyday life are affected by macro-level social policies and practices. With this reconceptualisation, elder care technology is not just evaluated in terms of narrowly defined attributes such as usability or function, but is also understood as part of larger socially constructed processes of care provision, and technology development, commercialisation and use (Sixsmith 2013).

Within this broader perspective, research on the application of new technologies needs to consider two key areas. First, there is a question about the extent to which surveillance technology encroaches upon the intimate, lived space of the individual. In contrast to public places, AAL technologies are intended to monitor a specific person's activities and movements within the home. This may be considered as a potential breach of the personal domain of the individual, and may encourage residents to alter their behaviours to comply with normative expectations (Foucault 1982, 1991; Goffman 1971). The argument can be made that older people receiving formal or informal care (both within the home and long-term care

institutions) currently experience invasions of their private space by virtue of having carers come into their home and deliver care and that, in fact, such individuals waive some of their rights to privacy to ensure that they are able to stay at home for longer. However, when the carers themselves leave there is the expectation that the home returns to a private space. In contrast, with AAL technologies, there is the potential for the home environment to be monitored continually, a surveillance that the older person may be continually aware of. In this sense, surveillance has the potential to change habitual patterns of behaviour, thus creating a powerful tool for influencing how older people move in and across space and how they interpret a sense of self within the home.

Second, attention should be focused on how the new technology will affect power relations in informal and formal caring relationships, as AAL will provide access to new information about individuals being observed. The introduction of AAL, therefore, raises questions about how the technology will mediate professionals' understanding of their clients. Future studies could explore whether the provision of more objective data about client behaviour supersedes more subjective information that clients currently provide to health-care professionals, perhaps moving towards an approach that encourages client objectification in the care-giving process. Failing to address these areas of concern raises the potential that AAL technologies will become a pervasive aspect of the home environment without fully realising the impact upon the everyday life of the individual.

AAL is ultimately about the management of risk. Given that AAL can be transformative in terms of influencing individual lifestyles and changing existing processes of care-giving, it acts as a 'persuasive technology' that guides and shapes behaviour and decision-making amongst the different actors involved, blurring the boundaries between the human and technological domains (Verbeek 2009). To that end, this paper has tried to explore the specific ways in which AAL attempts to explicitly shape intentions and actions in the hope that this will encourage designers to identify normative affects that are implicit in the application of this technology, to anticipate possible negative side-effects and to be explicit about how AAL will influence behaviour. Although it is difficult to criticise a technology that is intended to promote safety and enable ageing-in-place, it is important to consider how its use will affect power relations between residents and care-givers and the everyday lives of users. This is imperative, because when fear is used as a basis for decision-making, other competing discourses, such as privacy, autonomy and quality of life, may be silenced (Altheide and Michalowski 1999). Careful consideration is necessary to ensure that programmes, policies and technologies that are intended to contain costs by 'protecting' the health of older adults do not

further disempower this already potentially marginalised group of individuals.

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