Mobile Technologies and the Spatiotemporal Configurations of Institutional Practice

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One of the most significant contemporary technological trends is institutional adoption and use of mobile and location-based systems and services. We argue that the notion of "location" as it manifests itself in location-based systems is being produced as an object of exchange. Here we are specifically concerned with what happens to institutional roles, power relationships, and decision-making processes when a particular type of information—that of spatiotemporal location of people—is made into a technologically tradable object through the use of location-based systems. We examine the introduction of GPS (Global Positioning Systems) technologies by the California criminal justice system and the institution of parole for monitoring the movements of parolees, with consequences both for the everyday lives of these parolees and the work practices of their parole officers. We document the ways in which broad adoption of location-based and mobile technologies has the capacity to radically reconfigure the spatiotemporal arrangement of institutional processes. The presence of digital location traces creates new forms of institutional accountability, facilitates a shift in the understood relation between location and action, and necessitates new models of interpretation and sense making in practice.

Introduction

As information technology (IT) has changed in character and capacity, different issues have arisen in institutional and personal settings around its adoption and use. For example, the rise of minicomputers and, subsequently, personal computing prompted debate around institutional decentralization and autonomy (e.g., Barley, 1986; George & King, 1991), while the widespread emergence of the Internet made possible the investigation of new forms of virtual organizing (e.g., Hinds & Kiesler, 2002; Olson & Olson, 2000). Broad adoption of technology in private organizations and public institutions resulted in changes in information flows, which in turn allowed people to alter their institutional roles and reconfigure existing power-relationships and decision-making processes (Barley, 1990; Burkhardt & Brass, 1990; Contractor & Seibold, 1993; Travica, 1998).

Arguably, one of the most significant contemporary technological trends is the increasing importance of mobile and location-based systems and services. The emergence of new mobile technology platforms, along with the convergence of the mobile telephone and computational capacity in the growing smartphone market, has resulted in IT services increasingly being deployed on devices that are able to track and respond to location as they move around in the world. It is not simply that these technologies enable new kinds of mobile work, although they certainly do (Brown, Green, & Harper, 2002); our interest here is directed towards the ways that location information itself becomes increasingly important to individuals and institutions.

We have argued elsewhere that location-based services offered via mobile technologies transform location from a socially constructed concept into a technologically tradable object (Shklovski, Vertesi, Troshynski, & Dourish, 2009). The notion of "location" as it manifests itself in location-based systems is being produced as an object of exchange—

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that is, the relevance of location is that it is being treated as an object that is designed to move around. Such a notion of location, when reified as a representational object in technological systems, rapidly becomes embedded in a network of exchange—it becomes something that people might "give out," "receive," or "trade" with others.

This "commodification" of location—the transformation of location into an independent object, imbued with meaning and value, and divorced from its context and social relations of production (Marx, 1867 (1976)—echoes early discussions in information sciences around information as process and information as object (Buckland, 1991; Kirk, 1999). Yet while Buckland's famous piece considered the situational nature of "information as thing" as it pertained to information sciences, subsequent discussions were primarily concerned with information management in organizational contexts. Here we are specifically concerned with what happens to institutional roles, power relationships, and decision-making processes when a particular type of information—that of spatiotemporal location of people—is made a technologically tradable object through the use of location-based systems in an institutional context. We discuss the introduction of GPS (Global Positioning System) by the California criminal justice system for monitoring the movements of parolees, with consequences both for the everyday lives of these parolees and the work practices of their parole officers. The broad adoption of location-based and mobile technologies radically reconfigured the spatiotemporal arrangement in this institution's processes. To the extent that parole work is spatiotemporal work—concerned, inter alia, with where people go, with whom, and when—location-based technologies would seem to offer the capacity to extend the "reach" and effectiveness of the criminal justice system, in much the same way that information technologies have long been seen as opportunities for organizational innovation.

Orlikowski (2007) has argued that scholars examining these issues should recognize the enmeshing of social and material considerations in studies of organizational practice and institutional change, echoing a broader turn towards materiality in cultural and social analysis (e.g., Keane, 2003; Leonardi & Barley, 2008; Miller, 2005). In our investigation, material considerations—including the spatial and temporal aspects of technologically monitored activity—play a central role in what we might otherwise expect to be a conventional drama of IT deployment. We argue that the turn towards mobile and location-based services signals a significant expansion of the forms of practice to be examined and connected (Mazmanian, Orlikowski, & Yates, 2005). In these systems, location and presence have become technologically tradable objects. In the case we studied, this has significant implications for each different group of actors and participants, particularly the parolees and parole officers. For the parolees, GPS as a technology becomes a new lens through which to experience the spaces they occupy, the accountabilities of their presence to different social groups, and the structure and organization of everyday space as a site of practice and habitation (Troshynski, Lee, & Dourish, 2008). For the parole officers, the automated production of a record of parolee movements creates a responsibility to examine, understand, and account for any unexpected information, often displacing other forms of surveillance and interpersonal interaction. More broadly, for the parole system of which each group is part, GPS monitoring transforms location information from a resource for case management into an object of institutional accountability.

In what follows, we first examine existing research on adoption of mobile technologies and the kinds of sociotechnical process that users engage in to make sense of these technologies. We also consider how topics of surveillance and privacy arise as concerns in discussions of location-based services. We then present the research setting and the background to our case, with an emphasis on the conditions under which our participants are introduced to and uptake the technology. In our previous work, we detailed work-related changes that parole officers (POs) had undergone as a result of the deployment of GPS (Shklovski et al., 2009). We have also described the experience of the parolees in their daily lives as wearers of the GPS device (Troshynski et al., 2008). Here we build on this work and explore what challenges all of our participants, the POs and the parolees, encountered in the course of the technological implementation of the GPS into the institution of parole, given their institutional roles. As the main function of GPS technologies is to capture and transmit information about mobility in time and space, we will consider how parolees and POs negotiate the materiality of the GPS devices, the resulting heightened meaning of location, and the notions of legibility in the context of the hierarchy of the criminal justice system. We then explore how both POs and parolees negotiate the meaning of presence as they address how GPS technology reconfigures the everyday nature of parole work as well as the daily lives of parolees.

Background

Technological innovation as it is implicated in institutional change is often politically as well as economically motivated. In fact, much of the top-down mandated technological change could be seen as an attempt to inscribe notions of behavioral control into large-scale technological systems by design. As Pfaffenberger (1992, p. 283) notes: "The technology is designed not only to perform a material function but also to express and coercively reinforce beliefs about the differential allocation of power, prestige and wealth in society." Mobility and location have long been sites of concerns regarding the differential allocation of power, prestige, and wealth to be articulated and made effective.

Massey (1993) introduced the notion of "power-geometries" to highlight the confluence of questions of power, spatiality, and mobility, noting that:

> different social groups and different individuals are placed in very distinct ways in relation to these flows and interconnections. The point concerns not merely the issue of who moves

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> and who doesn't, although that is an important element of it; it is also about power in relation to the flows and the movement. Different social groups have distinct relationships to this anyway—differentiated mobility: some are more in charge of it than others; some initiate flows and movement, others don't; some are more on the receiving-end of it than others; some are effectively imprisoned by it. (Massey, 1993, p. 61)

These concerns can become more acute in institutional settings where power is inscribed within hierarchical structures that are designed to control, delineate, and limit the flows and movements of those at the bottom.

Mobility and Surveillance in Institutional Contexts

Technologization of mobility in organizations and institutions is often interpreted in two ways. On the positive side, it is seen as enabling new kinds of efficiencies, both through the opportunity to keep in touch while on the move and by allowing the "dead time" of movement from one location to another to become productive time (Brown et al., 2002). Yet mobility is also seen as risky because it enables workers to escape the confines of space under the physical control of the organization and is thus connected to notions of freedom and flexibility (Cresswell, 2006). Organizations have long capitalized on new information technologies to increase and expand employee surveillance beyond the spaces under direct control of the employer (Mishra & Crampton, 1998; Moore, 2000). Location-based technologies increase employer reach beyond institutional boundaries not only by making employees reachable anytime and anywhere (Mazmanian, Orlikowski, & Yates, 2006) but also by potentially collecting information about employees' spatiotemporal locations (Anderson & Dourish, 2005). Thus, technologization of mobility in organizations can also be understood as a way to regain control of a mobile workforce through technologies of visibility and surveillance.

Studies of the emergent social practices that surround mobile technology use emphasize the ways that these technologies are bound up in the social production of space and spatiality (e.g., Dourish & Bell, 2011; Ito, Okabe, & Matsuda, 2005). As Cresswell (2006) has noted, mobility itself is a socially contested category, one that encompasses both the threatening rootlessness of the tramp and the valorized global mobility of the high tech business "road warrior." The opportunity for mobile technologies to be incorporated into or to intensify regimes of surveillance is one of the core concerns explored in these analyses. Mobility itself is increasingly a target of surveillance activities due to its precarious nature bound up with connotations of transgression, resistance, and escapism from social or legal structures. Molz (2006) draws on Foucault to argue that:

> By making subjects wholly transparent to an invisible and regulatory gaze, the panoptic model of state control encouraged individuals to internalize this institutional gaze and discipline their own actions and behaviors. Collecting and recording information about individuals' identities, bodies, and behaviors became an effective way of regulating populations and producing self-disciplining individuals while normalizing state practices of surveillance. (Molz, 2006, p. 380))

Increasingly, surveillance through mobile technologies involves not just collecting data and monitoring movements, but also ensuring that an expectation of being watched becomes a normal component of mobile practices (Shklovski, Mainwaring, Skúladóttir, & Borgthorsson, 2014).

Concerns about surveillance frequently arise in the context of corporate surveillance of technology users (e.g., the public discussion in 2011 of Apple's purported tracking of iPhone users[1]). Such discussions are never far from considerations of privacy as an important concern about whether and how location information collected through mobile devices may be used, what is made legible, when and to whom. However, our focus here is on a different and more explicit surveillance regime that arises in the context of the criminal justice system, in particular, the GPS tracking of paroled sex offenders. One reason for studying this particular space is that discussions of privacy are, largely, moot, at least as far as the legal system is concerned. Privacy-based appeals against GPS monitoring laws have been launched in several states and have been uniformly rejected. Privacy, then, is not at issue here for us, and this is central to our analytic stance. Given that (again, in the eyes of the law, and in the eyes of the state), privacy is not a relevant consideration, we can turn our attention to processes and practices that lie behind, and are often obscured by, traditional notions of privacy. Giving the game away only slightly, the point here is this: While privacy is not formally a consideration, nonetheless, a series of complex social processes concerning the framing, disclosure, and use of location information are unquestionably present.

Technologies of Criminal Surveillance

Adoption of technology in the criminal justice system is not new, either as an organizational phenomenon or as an object of research (Manning, 1992; Sorensen & Pica, 2005). For example, Harper considered the role that technology played in the evolving relations between police and criminals (Harper, 1991). Although the two groups existed in different life worlds and their interactions were governed by an expectation of having conflicting relationships premised by differential power, they were nevertheless bound by the same rules of behavior at least when negotiating with each other (Harper, 1991; Sudnow, 1965). Harper conceptualized this as a kind of game where criminals tried to disguise their activities and detectives tried to uncover them—a negotiation to either avoid or manage accountability for their actions. For detectives, information technology then became a device that gave them some initial temporary advantages. In particular, the imagined capacity of the technology to

[1]http://www.guardian.co.uk/technology/2011/apr/20/iphone-tracking-prompts-privacy-fears

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provide access to large amounts of information led criminals to believe that detectives could search for and access case files with greater efficiency. Consequently, this led the criminals to act as though detectives were better informed than they actually were (Harper, 1991). In this case, the presumption of technological surveillance alone was sufficient enough to transform relations between detectives and criminals.

As the criminal justice system increasingly goes through the process of technologization, addition of technologies of surveillance is a logical step. Gilliom (2001) defines surveillance as "roughly translated as watching from above—implies that the observer is in a position of dominance over the observed" (Gilliom, 2001, p. 3) and suggests that "surveillance manifests a way of seeing and knowing the world that excludes much of our true complexity while moving small clusters of characteristics to the forefront" (Gilliom, 2001, p. 9). In a sense, technological systems mediate our experiences of the world where possible actions are delineated given the limits and boundaries of the technology at play. Yet when technology enters the world not only as a tool of surveillance but also as an interpretation of law exemplifying the intent of the state, something interesting happens. This may be due to the reality that technologies tend to have deficiencies that never quite live up to their expectations. In order for the surveillance system to work, implementation often requires that such deficiencies be accommodated. This often necessitates that policies are enacted and that laws are rewritten, all in accordance with the nature and limits of the technology being considered.

We see this process at work particularly in the enforcement of sex offender legislation. Throughout the United States Criminal Justice System, emerging surveillance technologies continue to be promoted as effective means for controlling recidivism rates for released offenders on parole. The perception of reducing re-offense rates combined with the political attractiveness of technologies to supervise offenders more effectively and affordably have both accelerated their broad adoption and implementation (Troshynski et al., 2008; Troshynski, 2011). It should be noted that the use of surveillance technologies to monitor parolees is driven by several factors including prison overcrowding, the need for cost-effective criminal justice policies, and the need for politicians to demonstrate to the public that they are "tough on crime" (Simon, 2007). As sex offenders historically have been ostracized and demonized by society to a greater extent than any other group of convicted felons, they are often chosen to be on the leading edge of this form of technological advance (Simon, 1998).

Managing the Spatial Movements of Sexual Offenders

The basis for analyses presented here is a qualitative research study conducted between 2006 and 2008 that investigates the use of GPS as a tool for the community management of sexual offenders on parole in California. Participants for this study include parolees on GPS as they were learning how their movements were monitored and managed as part of their parole conditions, and POs handling GPS caseloads as they were also learning how to understand and to incorporate the information produced by the new technology as a part of their parole duties. Our study was conducted at a particularly interesting moment in terms of the changing policies of technological monitoring of paroled sex offenders. A significant piece of relevant legislation—California's "Jessica's Law" (details to follow)—went into effect during the course of our study. Before discussing the details of our study, then, it is instructive to review the evolving legislative regime in effect.

During the 1990s, the United States federal legislature implemented initiatives that required mandatory registration with law enforcement authorities for all repeat sex offenders after their release from prison. The Jacob Wetterling Crimes Against Children and Sexually Violent Offender Registration Act (U.S. Code. Vol. 42, Section 14071) passed as part of the Federal Violent Crime Control and Law Enforcement Act of 1994, required states to create and implement a sex offender and crimes against children registry. Shortly thereafter, Megan's Law (Pub. L. No. 104-145, 1996) amended the Wetterling Act and mandated further requirements for states to establish community notification systems for all registered sex offenders.[2] As a result of Megan's Law, local law enforcement agencies within each state have developed an extensive database of registered sex offenders that includes information pertaining to their location of residence, work, and descriptions of any potential movements to and from work (Simon, 1998). Although all U.S. states have enacted sex offender community notification laws, these laws differ in their implementation and enforcement from state to state (Nieto, 2004).

Several states have enacted further punitive legislative initiatives. The original Jessica Lunsford Act was passed by the Florida legislature in 2005 and established an electronic monitoring program within the state's Department of Corrections, a 25-year mandatory minimum sentencing for convicted sex offenders, lifetime electronic monitoring of all convicted sex offenders, and a new felony offense for those tampering with electronic monitoring equipment (The Florida Sexual Predators Act: The Jessica Lunsford Act, Fla. St. § 775.21, 2005). Several states have adopted similar regulations known commonly as Jessica's Law. In California, the Sexual Predator Punishment and Control Act of 2006 (California Jessica's Law) enforced mass electronic monitoring of all convicted sex offenders, including juveniles, for the rest of their lives (The California Sexual Predator Punishment and Control Act: Jessica's Law, Amendment to Cal Penal Code § 288, 2006).This law removed the existing designation of a "high-risk sexual offender" (HRSO) and introduced a new classification of a "sexually violent

[2]Megan's Law was passed on May 17, 1996, and amended Section 170101(d) of the Violent Crime Control and Law Enforcement Act of 1994 (42 U.S.C. § 14071(d)) to provide for publicly disseminating information about released sexually violent offenders (Nieto & Jung, 2006).

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predator" (SVP). Not only did the law broaden the definition of what types of crimes count toward the SVP classification scheme (now indecent exposure and public-order crimes like soliciting/prostitution "count" as a sex crime), but it also expanded the definition of aggravated sexual assault of a child (by lowering the required age difference between the offender and the victim from 10 to 7 years), prohibited probation in lieu of prison for all sex offenses, eliminated early release from jail for maintaining good behavior, provided longer penalties, expanded a list of crimes that qualify for life sentences in prison, and extended the duration of parole. In addition, the law increased penalties for child molestation as well as for violent and habitual sex offenses committed by both juveniles and adults (now such "status offenses" are classified as a sex crime). This and other changes in the law made more people eligible for a sex offense charge/conviction while also making more sex offenders eligible for the SVP status.

Jessica's Law also implemented a community ban on registered sex offenders—even those whose crimes did not involve children or those convicted of a sexual misdemeanor such as indecent exposure—from living within 2,000 feet of a school or park. As a result, the number of registered sex offenders has increased substantially, while strict prohibitions outlawing them from living within numerous residential areas have made it extremely difficult for them to find stable living arrangements (Nieto & Jung, 2006).

Electronic Monitoring Implementation in California

To comply with the electronic monitoring requirements associated with Jessica's Law, the State of California implemented a GPS enforcement scheme in 2006. Location information is reported from a body-worn GPS unit, typically attached to the ankle of the parolee, which signals its location to a monitoring center every few minutes through a direct link with a localized cellular telephone network. The technical implementation of this particular system resulted in the GPS data being relayed to the authorities with several minutes of delay. In principle, GPS monitoring enables local parole and enforcement agencies to continuously monitor the sex offenders' locations and the amount of time they have spent there. In practice, however, the use of GPS monitoring has rarely produced expected results (Renzema & Mayo-Wilson, 2005; Troshynski et al., 2008; Turner et al., 2007).

The use of GPS tracking devices has allowed the legislature to define specific geographic areas from which released and supervised offenders are prohibited. This is enforced through parole administration, usually as a condition of parole. For instance, when a court orders a sex offender to have no contact with the victim, boundaries are set at an appropriate distance around the victim's place of residence and employment or educational institution, commonly referred to as exclusionary zones. Under Jessica's Law, exclusion zones are vaguely described as any region within 2,000 feet around a school, park, or other place "where children frequent." Another common condition of parole is a curfew requiring the parolee to stay in their place of residence or employment during certain hours, commonly referred to as an inclusionary zone. When defined exclusionary or inclusionary zone boundaries are broached, the GPS monitoring devices trigger warning notices, via e-mail or text message, that are then sent to the applicable PO. If no alarms or warning notices are received, POs read the reports produced by the system on the movement of each monitored parolee on a daily or weekly basis, depending on parole condition assignments (Turner et al., 2007). Parolees do not receive direct alarms or notifications that they have breached prescribed boundaries. They find out about their infringements only if their PO deems it necessary to notify them of their transgressions directly. Terms such as "parole" and "technical violation" are discussed throughout conversations with our participants, highlighting a change in relationship, or game at play, between parolee and PO.

In the State of California a parolee is an individual who has completed their prison sentence, has been released from institutional custody, and is going through the process of reintegrating back into society. Parole here refers to post release supervision, which requires that all the terms and conditions associated with the individual's release are satisfactorily met and typically lasts for 1–3 years. Because of the newly adopted constraints of Jessica's Law, sex offender parolees in our study were under post release supervision in conjunction with GPS surveillance for life. In this study, typical conditions of parole included meetings with POs, meetings with a therapist and/or group counseling sessions, prohibitions from possession of drugs and firearms, compliance with curfews, maintenance of the 2,000-foot exclusionary zones, and preservation of the GPS unit. Tougher prohibitions against surfing the Internet were also commonplace. Care of the GPS unit is included in the conditions of parole for offenders classified as SVP: tampering with the strap that attaches the device to the wearer's ankle, failing to charge the device (which holds 12–18 hours of charge at a time), and the destruction of their GPS unit are now felony technical violation of parole punishable with additional prison time (a common technical violation experienced by our participants was GPS units running out of charge).

Traditionally, parole was highlighted as an institution geared towards successful reintegration and rehabilitation of parolees (ex-convicts who successfully served their prison sentence). Recently, however, political and economic pressures have occasioned a gradual shift toward management of offenders through struggles with resources available for reintegration work (Simon, 1993; Lynch, 1998, 2000; Werth, 2011, 2013). In the State of California, a PO is an individual directly responsible for providing supervision support to the parolees on issues related to securing employment, housing, and other areas of assistance (i.e., treatment for substance abuse, referrals for mental health, and family counseling). However, as we have previously suggested, the introduction of GPS has foregrounded the necessity of surveillance, data analysis, and interpretation in service of recidivism prevention (Shklovski et al., 2009). In our study

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the system consisted of an ankle bracelet GPS unit with an instrumented strap worn by the parolee, the computer interface that POs used to retrieve and display parolee movements on a map, and the system of alarms that were delivered via e-mail and Short Message Service (SMS) to the POs. In conducting their work, each PO reviews the GPS data stream showing patterns of parolee movements, called "tracks." They can also see whether the device recorded tampering with the strap, how much charge each device has, and when it was last charged. For all sex offenders on a caseload, POs must also check for and respond to any system notifications or alarms. Technical difficulties and false alarms are a constant problem. Indeed, POs are now required to give their mobile phone numbers to parolees on their caseload, in the event of technical difficulties with the devices. Due to increases in workload as a function of the use of the GPS, efforts have been made to reduce parole caseload sizes from an average of 40 per PO to an ideal of 20 active cases each (Turner et al., 2007).

Research Study

In January of 2006, just 6 months before Jessica's Law was passed, the State of California launched a pilot study examining GPS monitoring as a means to supplement the community supervision of released sex offender parolees. The research project described here was carried out from May 2006 until July of 2008 in conjunction with the larger GPS pilot program evaluation. To fully understand the implementation of the GPS technological supervision project, researchers conducted interviews with POs and parole administrators (hereafter referred to as POs) who handled sex offender parolee caseloads and were therefore involved with the larger evaluative program in California. Additionally, in order to understand the effectiveness of the GPS, focus groups with paroled sexual offenders (hereafter referred to as parolees) were also conducted.

Interviews With Parole Officers

Participants for this portion of the study included POs supervising paroled sex offenders on GPS surveillance ($n = 13$), parole supervisors who oversaw POs in each office ($n = 3$), and technical support personnel involved with the program onsite ($n = 3$). Since San Diego County was the first to implement the sex offender GPS management program, POs were recruited and interviewed from parole offices within this county. The research team successfully interviewed all POs having anything to do with supervising and overseeing sex offender caseloads.

All interviews relied on an open-ended script and lasted for ~1 hour. Questions focused on changes made to parole supervision as a result of Jessica's Law and the use of GPS, including conversations about original expectations of GPS programs, how technological data generated by GPS are used by POs, any challenges to original implementation of GPS, solutions experienced during initial phases of the GPS program, as well as recommendations for improvements in GPS parole practices. Supplemental questions posed to parole supervisors included their thoughts about general requirements for agents handling GPS caseloads, common concerns agents have, and the nature of their relationship with the GPS vendor. All interviews were both tape-recorded and manually recorded. Participants responded in their official capacity and no identifiers were collected.

Focus Groups With Paroled Sex Offenders on GPS

For obvious reasons, the experience of parolees in the parole system is a sensitive topic. We had organizational access for a limited period of time, and constraints too upon the form of engagement with parolees, whom we could interview only in focus group settings. We completed seven focus groups with six to seven paroled sex offenders participating in each. The total number of parolees participating in the focus groups was 47. All parolees were recruited from five site locations within San Diego County with fliers indicating that participation was welcome but voluntary and that participants could leave the focus group at any time (only one did). Focus groups lasted for ~90 minutes and were held after hours at the offices of the clinicians who provide mandatory sex offender treatment as well as at parole offices that provide parole services to focus group participants. To clarify further, *all* focus group participants were parolees classified by parole as SVPs after the adoption of Jessica's Law. Those who participated before Jessica's Law were equipped with GPS units because they were originally classified as high-risk sexual offenders (HRSO) and were part of a larger GPS evaluation project. Those who participated after were classified as SVPs and equipped with GPS units due to the newly enacted mandatory legal provisions implemented via Jessica's Law. Participants in the second group did not necessarily have a similar conviction history (although all were convicted of some type of sexual offense) as the new law broadened the definition of what types of crimes qualified offenders for an SVP classification.

During each focus group, participants were asked to discuss their initial reactions to Jessica's Law, being placed on GPS as part of their parole sentence, their current thoughts about the GPS parole program, what kind of an impact GPS has on their everyday lives, as well as their thoughts on the benefits and drawbacks to the GPS program. Each participant had the opportunity to respond to every question to the entire group. The overall goal of the focus groups was to initiate conversation between participants, seeking out collective consensus and divergence, and to understand their opinions of Jessica's Law and of GPS more broadly. All information shared during focus groups as well as interactions and physical gesturing was recorded without identifiers.

Two researchers conducted interviews and focus groups in several locations, taking care not to create a link between focus group (parolees) and interview (parole officer) participants. During the research timeframe, an analysis of the

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demographics and characteristics of the parolee participants confirmed that parolees participating in this project were similar in age, race/ethnicity, and conviction history to other sex offender parolees within the State of California (see Turner et al., 2007). However, to maintain parolee confidentiality the focus group and demographic data were kept separate and parolee participants remained completely anonymous to us.

Data Analysis Procedures

Conversations with these participants help contribute to our understandings of the experiences of "others" and are used as a constructive counterpoint to the dominant discourse surrounding criminal and deviant behavior as well as how to manage and punish such ex-convicts with new surveillance technology. These unique dialogs have not been a part of the considerable debate surrounding sex offenders, sex offender legislation, community supervision, successful parole strategies, or successful implementation of surveillance technologies as a tool of the criminal justice system. Therefore, the use of interviews with POs and supervisors coupled with focus group conversations with parolees provides useful and insightful information from the perspective of those individuals that are the closest to the everyday tracking of a newly created category of parolees.

Given the pre and post timing of this investigation due to the passage of Jessica's law this paper presents an analysis of four different data sets. Two include interviews conducted with Parole Officers and Parole Supervisors (POs throughout) before ($n = 9$) and after ($n = 8$) the implementation of Jessica's Law. The remaining data were collected through focus group interviews with parolees equipped with GPS anklets: two before ($n = 10$) and five after ($n = 37$) the law was passed. All transcripts (interviews and focus groups) were collected and reviewed and coded under an open coding scheme grounded in the themes and issues discussed by all participants.

We followed a grounded theory approach to provide procedures for analyzing rich qualitative data (Charmaz, 2006; Corbin & Strauss, 2008; Emerson, 2001). Data analysis was conducted through an iterative process of comparing and contrasting examples from the data collected throughout the research timeframe. For example, during the initial phase of the project (pre Jessica's Law focus groups and interviews), transcribed data were carefully read and divided into analytical units. Examples of inductive categories that emerged from the initial open coding for focus groups include conversation of struggles with identity (due to new SVP classification), modifications to daily routines (changes in activities, hygiene), changes in relationships (with family, friends, and POs). Parolees also talked about their understanding of Jessica's Law and of GPS. Original thematic codes for these conversations include GPS as all-knowing, permanent, eliciting emotion, and GPS as alibi. Issues with GPS technology were also a topic of conversation including technical problems (problems with charging, tampering, and anxiety over maintenance). Original codes derived from interviews with POs and administrators include the transformation of parole work (reorganization of workdays, adoptions of new work policies/practices, changes in work load, changes in in-person visits), understanding GPS as a new "tool" for parole (general understandings of GPS technology, changes in perceptions of GPS used for parole, changes in parole training, overall thoughts about the strengths and limitations of GPS for parole). POs, specifically, discussed how they made sense of the "tracks" they were now required to read every day. Here, themes included defining physical place via the virtual, coping with the limitations of GPS (drift/tracking), and a new focus on location awareness, accountability, and responsibility.

These original theoretical categories were further refined through discussions among ourselves and with other research colleagues. When a new dimension of analysis was agreed upon, we continued to engage in additive heuristic exercises (Abbott, 2004) and semiotic clustering techniques (Feldman, 1995; Manning, 1987). The goal in these analyses was to look for detailed meaning throughout the data. For the purposes of this paper, we focus on categories organized into three broad thematic groups—structuring space, structuring time, and the disciplining of work and life practices. These three groupings of data were tested and adjusted in the course of the second phase of data collection (post Jessica's Law focus groups and interviews). Here we took particular care to note differences in attitudes toward GPS tracking technologies and the range of concerns expressed by participants. At the conclusion of data collection we combined and reanalyzed all of the data as a single corpus. The focus on concerns around the use of the physical GPS devices and their connection to the digital representations of movement led to further inquiries into notions of legibility which in turn highlighted the way institutional roles and relationships were implicated within the parole system as a whole.

All data excerpts presented here are reproduced exactly as spoken by respondents. Data are denoted by PO #number (for pre Jessica's Law interviews) or #letter (for post Jessica's Law interviews) for POs and SVP #focus group number for parolees.

Parole's Technological Regime

As outlined in our legal background, GPS surveillance technologies were introduced into the parole process as an element in two evolving histories—the history of technologically oriented corrections, and the history of definitional changes related to the sexual offender as an element of public imagination. In California, as in several other U.S. states, Jessica's Law and its technological restrictions were introduced via a ballot proposition, on the basis of public debate that emphasized traditional images of violent and predatory sexual offenders, on the one hand, and a high-performance, high-security technological solution on the other. The law, then, mandated the deployment of GPS technologies in order to provide law enforcement and

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correctional authorities with tools that could potentially increase control over parolees, making infractions and parole violations more evident. The envisioned users of these systems, both in law enforcement and in the paroled population, were given little choice over whether to use the technology; indeed, California's Jessica's Law passed before the feasibility study commissioned by the California Department of Corrections and Rehabilitation was completed.[3] Yet it was these groups who had to negotiate how the technology was used and to attempt to fulfill its stated purpose of greater control and increased public safety.

Introductions of technological systems into institutions are commonly followed by substantial changes in the nature of work these systems are meant to support (Orlikowski, 1996, 2000). Barley (1986) has argued that institutional change arises due to slippages between the institutional template of expected outcomes and the exigencies of social life and that such slippages are exacerbated by the introduction of new technologies. Building on our prior studies of changes in work practices of POs (Shklovski et al., 2009) and in daily lives of the parolees (Troshynski et al., 2008) we go on to explore a series of themes that emerge out of our analysis of the data from our study. We consider what happens when location information is transformed from something that is socially constructed and situationally meaningful into a technologically tradable object. We also identify sites of contest, new forms of compliance, the systematic responses to changes imposed legally and through technological means, and the rebalancing of the dynamics of relating between POs and parolees as institutional actors.

We focus particularly on themes that emerged from the data that specifically relate to the experience of both POs and parolees with their particular technologies and contexts of use. We will consider three related issues that were of concern to all our participants. The first is the role that location traces can play in the process of parole management, and the work that must be undertaken to make them useful and intelligible. The second is the way that GPS as a form of surveillance renders everyday space, movement, and practice legible including conflicts that arise around the multiple legibilities of space in an institutional context. The third is how the technology provides an occasion for the renegotiation of institutional roles and relationships within the parole system as a whole. Following that, we step back to explore a set of issues that more broadly tie these experiences to the sociomaterial context of technologically motivated institutional change and the effect such change has on the daily lives of relevant actors.

The Meaning of Location

The very concept of GPS as a relevant and useful technology for managing paroled sexual offenders was predicated on the central idea that location information was relevant to this task. The significance of spatiotemporal location was two-fold. The first was that parole conditions for sexual offenders were formulated in such a way as to place a series of limitations on the movements of the parolees, both case-specific (with respect to victims, for example) and general (in terms of sites such as parks, schools, and libraries). The second was that the movements of the parolees were expected to provide POs with important information about the lifestyle and actions of the parolee. Not only did the GPS provide information about the sorts of places where the parolee went, but also deviations from known patterns could now be considered early signals of recidivism. For these reasons GPS and the traces of movement it provided were seen as being relevant and useful to POs managing sex offender parolee caseloads. POs could now ascribe meaning to the movements of parolees they supervised (Nellis, 2012).

In our study, we observed that the meaning of presence in particular locations and at particular times was a point of contest for parolees and for POs overseeing their movements. Further, participants acknowledged changes in their work routine due to the addition of GPS. Previously, POs had time to devote personal attention to the parolee and the community where they lived and worked. Now, parole work seemed to revolve around the output of the GPS units, thus paying significantly more attention to parolees' transgressions through movement highlighted by location data. The accuracy of these measurements and, by extension, the accuracy of accounting for perceived transgressions, depended on a myriad of requisites: the accuracy of data collected by the physical unit attached to the parolee's ankle as well as the ease and accuracy of data processed and interpreted by the system and the POs. However, the GPS devices employed in the system continued to have problems with precise pinpointing of location—a challenge common for GPS in urban environments, especially when movement occurred indoors in places such as malls or large apartment buildings. This lack of precision directly affected both POs and their work as well as parolees and their lives with the units, further altering the way they dealt with uncertainty: "If you don't know what that building is, a preschool, porn shop, etc. Unless you know what that is, all it means is he's in that building or walking by it. . . . You have to know your area" (PO #C). POs mitigated the lack of precision by ensuring an ongoing familiarity with the physical areas commonly represented on each parolee's movement maps.

Correspondingly, parolees expressed confusion and uncertainty about their physical movements even when their presence in particular locations was entirely legitimate. This worry was further exacerbated because occasional issues in data representation and GPS satellite connection problems could result in faulty location tracks. Typically, parolees discovered the existence of these technological mishaps when their POs took action to investigate the technologically fabricated transgressions in an attempt to match the physical reality of location with its digital representations: "One time they had me going outside past curfew, which I did not do, and the PO came over and measured the

[3]Our study was connected to this feasibility study.

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house and discovered that I wasn't outside" (SVP #3). Similar to Harper's detectives (Harper, 1991), POs in this study resisted revealing the extent and limits of the technology as a way to retain the temporary advantage over parolees for whom this technology might seem more than it actually is; yet it was precisely through these sorts of efforts to produce the correspondence between the physical world and its electronic representations that these limits became visible to parolees.

These limits underscored the relationship between technology and everyday space. In the course of life on parole, the ability for parolees to be somewhere became contingent on being able to account for their presence and to prove the legitimacy of that presence (Troshynski et al., 2008). As POs monitored the output of the GPS for spatial transgressions, checking whether their parolees were someplace they were not supposed to be, they began to identify locations as "right" and "wrong," using local knowledge to interpret the meaning of presence as mundane or troubling: "You get to understand the pattern. You learn if a location has an issue" (PO #C). Most locations of course, did not have "issues" intrinsic to the physical space, but acquired these through inference of potential for unlawful activity. Such inferences were dependent on the subjective interpretation of the possibilities a location could offer, often resulting in misinterpretations of intent. These misinterpretations then resulted in POs and the parolees having to renegotiate the meaning location traces might have had. One participant reported a typical example: "The PO laid into me. I was going to my chiropractor, which was right across the street from a pub, which has a clover, and they made a connection to the Aryan brotherhood" (SVP #6). The question of the interpretability of space, then, was not purely an issue for the PO; it was also an issue for parolees, for whom presence became a kind of performance.

Not all locations were obviously right or wrong simply based on the physical context that could enable what POs identified as potential transgressions of various kinds. Locations could change their context and nature situationally, as, for example, when a middle school class took a field trip to the mall during school hours. In such a situation the presence of a parolee in the mall at that time could be interpreted as an innocent coincidence or a premeditated move that could lead to a reoffense. POs often explained that despite their efforts, local knowledge and physical investigations of locations was not enough to discern suspicious behavior. A PO commented: "If you are not familiar with the parolee, if you're not reviewing those GPS tracks on a day-to-day basis, you're not going to know that he went to a particular area that was out of his way" (PO #3). In other words, it is the pattern of locations over time that mattered, and the relationship between particular parolees and the spaces through which they moved. The challenge for POs was not simply to learn about locations on the map, but, through them, to learn about the parolees who made up their caseload. They were continuously engaging in practices of interpretation that went beyond simply ensuring a familiarity with the details of their city.

Although deviations from routine became objects of particular scrutiny, they naturally occurred in the course of everyday life. From time to time, and for a range of legitimate and mundane reasons, parolees would visit locations that were not part of their habitual routes. POs understood this and thus could not rely on learned routines of the parolees to immediately act on suspicious movement. Locations could be explicitly prohibited by virtue of being within the required distance of a school or a park, but the majority of places were neither and their meaning took work to discern: "When I bring the screen up and it shows me the map, I look at it and if I see that the points are in an area of the county that the parolee really doesn't have a reason to be there; I mean he may have a legitimate reason to be there" (PO #3). POs worked very hard at estimating potential for behavioral lapses and even intent to commit a transgression from data about presence in a particular location. To augment the data provided by the GPS, POs conducted digital tracking, physical visits, and relied on their local knowledge of the area.

Yet the reality of the information often required POs to solicit input from the parolees to help make sense of the data: "I was reviewing tracks one time and it showed this guy in an apartment building. Well it showed me an address, I drove by, I saw this apartment building. So not knowing where he was in the apartment building, I have no more investigative tools here unless I just stake it out, so what I do is I go to the parolee and I go, 'What were you doing here at the corner of First and Eighth?' " (PO #1). The parolees were acutely aware that their input was a relevant piece of the sense-making puzzle that POs were solving. They also realized how the need to discern intent from location data structured the way their POs conducted their work: "They know your patterns as they track you, and they know when you're out of your pattern, so they know when you're out of your normal cycle. When you get out of your pattern, they ask what he's doing. It puts the suspicion into them" (SVP #6). This understanding structured the daily decisions that parolees made about their physical movements. Where some carefully replicated their daily patterns of movement, at times even going so far as to notify their POs in advance of an impending change, others insisted on producing as much variation as possible. In both cases parolees often actively manipulated what the POs might see through the GPS trace.

The constant involvement with GPS traces and the amount of work required for their interpretation often took away from other types of activities, like active in-person surveillance of the same parolees. While one could argue that GPS provided the relevant active surveillance, none of the agents seemed to feel that way. The abstraction of location as points on the map made parolee behavior insufficiently legible: "It'll show you little blue dots where they're at. But that's not where they're at. They can be anywhere from . . . I've measured 30-50 feet away from there" (PO #1). For POs, active surveillance was different because of the thick content it delivered, where, with the GPS, they were literally several minutes "behind" when actively tracking someone on the screen.

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With the introduction of GPS technology, then, the interpretation of location-information became central to parole work, taking away from the more rehabilitative goals of ensuring reintegration into society postincarceration. This change in preexisting functions of the institution of parole was evident to POs and parolees. In fact, many parolees expressed uncertainty and frustration about the changes, aware of the shift not only in the requirements of their movements, but also in the content of the interactions between POs and parolees. The close interpretation of digital information displaced more substantive interactions between the offenders and their POs. One parolee commented: "Before I would check in with them and with how I'm doing. Now, it's more of a what are you doing? Where are you at?" (SVP #3). The irony here of course was that this was potentially antithetical to, or at least occurred in tension with, the original goals of the program. The GPS was implemented in order to provide POs with information that would better enable them to predict and prevent potential reoffenses. Where the original intent of the parole system hinged on helping offenders to reintegrate into society and assessing potential for reoffense through monitoring the process of reintegration, the introduction of the GPS now made physical movement and location central to the identification of a potential for transgression.

The issue here was not that the GPS reports were inaccurate in comparison to the forms of information that the POs had before. Rather, although POs reported they found the location information useful, they emphatically noted that knowing where someone was did not mean knowing what they were doing there, emphasizing again the importance of being able to put this information in context to interpret it: "GPS will tell us where they were but it's not going to tell us what they were doing while they were there" (PO #A). POs were acutely aware of this conflating of location and action and much of their work throughout the course of their day was geared toward gaining enough information to get closer to discerning action. They looked at tracks, conducted inquiries with their parolees, drove around and did their "legwork" to help infer actual behavior from location information: "If you are going to put people on GPS . . . the only way to do that is by actually going in there and looking at the information. So it's labor intensive. It takes time to do that.. . . You're going to have to do some legwork, you're going to have to do follow-up. You're going to have to do some investigation" (PO #3).

In every interview, POs expressed the same sentiment as a cautionary tale about the capabilities of the GPS device. Knowing where the parolees were did not equate to knowing what they were doing even with all the legwork and the extra mitigation activities. Such disconnect between the meanings of location and the reality of action was immediately evident to parolees as well. They could violate some of their parole conditions simply through presence in "wrong" places rather than action. So, just as POs placed considerable emphasis on issues of interpretation, parolees also took care to point out repeatedly that only their mobility in space—not their actions—were constrained by the device: "If you are going to do anything, it only shows where you're at, not what you're doing" (SVP #3).

It is not only the information recorded but also the device itself that is bound up in this process. GPS was also seen as a physical reminder to the wearer of their parolee status and past offenses. Through becoming a kind of continuous reminder to the parolees of their criminalities and the punishment it entailed, the device was often seen by the parolees as a weak attempt to prevent the wearer from committing future crimes: "It is like tying a string on your finger and reminds you that you can't commit a crime" (SVP #7). Both POs and their parolees openly acknowledged that GPS could not physically prevent parolees from committing a crime. While the device worked in constraining the spatial movement of those that actually intended to comply with parole conditions and could potentially discourage the parolees from premeditated crimes, it could not prevent the actual crimes from happening. The onus of prevention then fell on the POs who were somehow expected to predict the possibility of new offenses from the spatiotemporal location information that the system provided. In contrast, for the parolees, the concept of reoffense—performing the very action they saw the GPS device as expressly intended to prevent—could be interpreted as the ultimate act to take back their agency and will. Thus the presence of the device and its dehumanizing effect could make reoffending not only a situational or even a predatory fulfillment of some sexual desire, but also the ultimate act of defiance.

Legibility of Space, Movement, and Work Practices

Parolees and the legibility of space and movement. Overall, parolee mobility was already explicitly constrained through both parole conditions (i.e., lack of monetary resources, employment, and public transportation) and social conditions (i.e., ex-convict status equals less social support, difficulty in finding housing, education, health care). But for the parolees in our study, as a group, mobility was further restricted. For example, parole conditions imposed on parolees included substantial spatial prohibitions that divided physical space into abstract distances like "2,000 feet as the crow flies" or abstract boundaries like "2,000 feet away from a school or a park." The GPS device strapped to the parolee's ankle acted as an implicit reminder of these mobility boundaries but provided no explicit support for navigating these boundaries in the course of traversing physical space. The difficulty in navigating physical space and abstract boundaries often resulted in unintended violations: "I was in violation the other day. I was sleeping in a motel with my girlfriend and I was too close to a school. I didn't even know it" (SVP #3). In an attempt to remain compliant, some parolees, especially those who were transient, developed ways of making abstract boundaries imposed onto physical space legible. They used tools available to them, such as physical maps and crude measurement instruments, given the frequent absence of access to digital

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technologies, as one parolee demonstrated: "I put a circle on the map and I can't sleep where it is at" (SVP #5).

The same boundaries and prohibitions that parolees navigated in physical space became legible to their POs through the use of GPS, which provided particular automatic measurements and detection capabilities decreed by law and built in by the system designers. POs, once notified of a potential boundary violation by the system, had to make a judgment whether or not to enforce the violation or simply to notify the parolee of their mistakes. Parolees, in turn, were viscerally aware that GPS increased the visibility of their movements to their POs, making them legible at a distance: "They say we want to know where you are at, then we can go back to the track of where you went" (SVP #5).

The legibility of parolees movements to their POs produced through the GPS device was delayed due to its technological implementation, whereas data about parolees' movements were retroactively made legible. This fact further reduced the potential of the GPS to limit behavior while also decreasing any disciplining effects that the physical GPS device may have had on parolees once they became aware of this limitation. Many clearly understood that the function of the device was, in fact, retroactive: "It helped them to pinpoint exactly where you are, retroactively. But it doesn't prevent anything. They can only retroactively track you, prosecute you" (SVP #3). This was exacerbated by the apparent technical failures of the GPS that made the retroactive and faulty nature of the devices readily legible to the parolees: "The minute I got this thing, then I started getting calls about why are you out of state, how come you're messing with it? But that's not the case; they're not all that good technologically" (SVP #3).

The introduction of the GPS shifted the gaze of POs from a focus on reintegration work to mobility and locatedness, distancing POs from their charges while simultaneously giving them an intimate involuntary knowledge of parolees everyday lives as merely places and movement. This was a kind of intrusion at a distance that Nellis called "cold intimacy" (Nellis, 2012). Similarly, conversations between parolees and POs shifted to discussions of the nature of parolee mobility as the thing that POs could "reliably see." March and Simon (1958) refer to the concept of the "uncertainty absorber"—the abstract information is meant to represent concrete realities yet more interactions with abstract information lead to less contact with concrete reality or more effort to concretize reality that is already the past. POs ability to see their parolee's tracks, and equate that to their behavior, took precedent over other important aspects of the PO/parolee relationship like finding and securing housing, work, maintaining relationships with family, friends, and past colleagues, etc. This was an acute shift from the focus on the future to a focus on the past—a kind of retroactive accounting of life rather than proactive assistance with moving on.

POs and the legibility of work practices. Despite the occasional technological failures and limitations of the system, however, parolees were clearly disciplined by the device, adjusting their daily movements and activities, but they were not the only ones. We have argued elsewhere that the device disciplined POs as well (Shklovski et al., 2009). Once again, the disciplining occurred through different kinds of legibility acquired due to the implementation of the GPS. The GPS increased the amount of data POs had to process in order to evaluate each parolee's behavior. The uncertainties involved in in-situ interpretation of the location information forced POs to keep meticulous records of their interpretations of these data, resulting in more paperwork: "[Now] I am behind on note taking all the time. I've got to — at the end of the night I've got to go back and fill in where I've been and what I've done" (PO #3).

This creation of a record of the physical movements of the POs themselves, of the particulars of their daily work-practice, and of the decisions made in the course of parole work was done for two reasons. The first was to demonstrate substantial changes in the practices occasioned by the adoption of the GPS due to the sheer amount of work it took to supervise with it. The second was to mitigate the fact that for POs the GPS made their own work practices more legible to their superiors by making the movements of their parolees retroactively visible to anyone with access, thereby heightening their own visibility and expectations in the public eye.

Technological innovation in organizations is often based on external or management expectations of how technologization should affect or change work. Such expectations tend to be substantially different from real changes in work practices that actually occur (Zuboff, 1988). In our case, external expectations associated with GPS simplifying parolee monitoring and streamlining PO practices did not come to fruition. Instead, the inclusion of GPS as a tool for community management of parolees actually resulted in increased workloads. POs in our study meticulously documented and made legible the sheer volume of work required precisely because of this indeterminacy—where the reality of implementation was so radically different from initial expectations of its outcomes.

Receiving and interpreting information from the system required time and forced a range of actions to aid in interpretation: "Once you get the equipment and once you start to learn, you know, how to use it as a tool, then it becomes time consuming because if you're going to have them on GPS and you're going to be looking at where they're going and what they're doing, you have to learn as the agent, to identify whether this is suspicious activity" (PO #3). Not only did understanding and interpreting information take time and training, but the technical failures of GPS were making it more difficult to maintain control over parolees. The constant documentation of the work necessary to monitor and address GPS traces, then, was an attempt to describe the changing nature of parole work, making evident alterations in PO work practices.

With the raw data of parolee movement available for retrospective review, POs felt more exposed and visible to their superiors, who wanted positive outcomes: "We don't

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want an error rate. They're looking over my shoulder, you know. I can feel them and I don't want an error rate" (PO #J). Despite increased access to data, however, those who were not intimately familiar with the physical geography of parolees' movements and their daily practices could misinterpret such GPS sociotemporal mobility data all too easily. POs then relied on extensive note-taking and paperwork to mitigate this increased legibility, creating a detailed record of the results of their decision making, legwork, and interactions with their parolees: "I have to make a record of it, that I knew there was a problem, a discrepancy. I'll have to let them know that I was aware of it" (PO #I).

Decisions to broadly implement expensive technological systems in government institutions such as the criminal justice system are often related to politicized needs, even to the extent, as in the case of California Jessica's Law, of being placed before the voting public. The GPS implementation in California raised expectations of the general public for greater control of parolees and lower reoffense rates. These expectations were, in turn, communicated by the criminal justice system to the institution of parole, putting pressure on the POs. POs stress and anxiety culminated in a scenario several recounted as the major reason why they invested time into detailed descriptions of their work performance in relation to the GPS. That is, if something was to happen and a parolee was to reoffend: "They're going to be going through my notes with a fine tooth comb to determine whether or not I did my job properly. And that's kind of difficult to put your reputation on the line; . . . it's very difficult when you're dealing with a tool that I just don't have 100% faith in" (PO #2).

Kling and Iacono (1988) have argued that public discourse about technological advance is based on marketing scenarios which are often more fictional than not. The original implementation of GPS in parole work was driven both by the governmental frame of increased control and safety and by the organizational discourse within the department of corrections of increased productivity coupled with a reduction in uncertainty as ways to gain more efficiency. That the effects of the actual implementation of the GPS technology did not fit these frames was clear to both POs and their parolees. Yet POs engaged in efforts to make the device work and to fit the outcomes within the prescribed frame of increased control and decreased uncertainty: "The stress level is higher in the sex offender unit because it is the hot unit in the public's eye. You want to make sure you're doing a good job, have the right conditions of parole imposed, the conditions are being obeyed" (PO #A).

Neither POs nor the parolees had control over becoming more legible in their movements or in the work practices they conducted, yet both attempted to exert at times seemingly superficial control over these processes. Parolees managed the legibility of their movements by changing the way they navigated physical spaces, and preempted closer investigations of their movements by becoming more predictable and consistent. POs manage their increased legibility through greater amounts of paperwork documenting their decision making and the care with which they attended to the demands of the technology. These attempts to regain control over their work and life practices resulted in a reconfiguration of their institutional roles.

Institutional Roles and Relationships

Adoption of the GPS for tracking sexual offenders had resulted in parolees becoming human sensors that collected time-space data of their own movement. The state had also augmented laws ensuring that parolees were required to become the caretakers of the physical devices. Upon release from incarceration each parolee was physically plugged into the system as POs explained the individual conditions of parole and attached the GPS device to the parolee's ankle. At the same time, POs read the relevant portions of the penal code to the parolees and explained the variety of parole conditions, making clear that the purpose of the device was to ensure that the parolees were constantly watched. In doing so, POs made clear that parolees' transgressions would not go unnoticed. As one PO explained: "When I put GPS on them, I said', This is a plus and a minus. If you're doing something wrong, I'm going to know that you're doing something wrong. You know, that you're in areas you're not supposed to be in. But it will also help you because it will tell me if someone says you're in an area, I'll be able to say, "No, you weren't in that area" (PO #1). POs used their expected knowledge of parolees' movements to emphasize the power inherent both in the all-seeing eye of the system and in the kind of protective function that the certainty of the parolees' location would enable for the PO. Like Harper's (1991) detectives and criminals, POs at times intentionally exaggerated the capabilities of the GPS as a way to gain some temporary advantages in controlling parolee behavior.

Throughout this initial interaction, two points were made clear to the parolees: that they were to be constantly watched and that they had no recourse to better their condition beyond compliance. In the process of introducing the system to their parolees, POs often explained why GPS surveillance had become a requirement, making the particular institutional identity the parolees had been assigned explicit: "As far as why this is happening, I tell them this is what the people of the State of California voted into effect. This is what they want. Explain that the people of California are afraid of them" (PO #C). Not only were the parolees assigned the role of the watched, but also they were assigned a specific classification of a "sexually violent predator" (SVP) and explicitly marked with the physical device on their ankle. As discussed previously, although the definition of SVP in the State of California became relatively broad as it was redefined by Jessica's Law, parolees were acutely aware that in the public eye this denomination was generally connected with one particular type of crime—that of a predatory child molester. These issues of identity were confounded by the reality of the net-widening effects of Jessica's Law and many parolees commented that the GPS had

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became, "The mark of Cain that's put on somebody" (SVP #6) precisely because the vast majority were not guilty of the particular crime automatically ascribed to them by the public.

The GPS unit in use in the State of California at the time of the study was a relatively bulky unit physically attached to the ankle of the parolee. It was fragile and ultimately quite visible to onlookers. The presence of the device then made parolees identifiable to the public around them in uncomfortable ways, marked out as the worst nightmare of every parent, regardless of the crime they may have actually committed. The process of adjustment and integration to this newly assigned classification of "sexually violent predator" for many parolees resulted in explicit changes of behavior even when these changes were in direct conflict with the way they saw themselves: "Even if you're not a child molester, I'm not, but, when I'm out at the grocery store I look out for them [children]. If I'm in the bathroom and a kid comes in, I leave" (SVP #4).

Being assigned the classification of SVP carried with it many complicated legal and practical implications.[4] The institution of parole put a number of conditions on parolees upon release from prison with which they had to comply in order to avoid further incarceration. Given the sheer complexity of the parole conditions for sexual offenders, parolees realized they were violating them nearly constantly and that it was impossible not to: "I counted the other day. I have 56 conditions to my parole. I was shopping at Target and realized that I was breaking some. There are kids around, alcohol, other stuff. So, technically, I was in violation" (SVP #4).

This combination of issues experienced by parolees—too many parole conditions, the physical fragility of the device, the uncertainty around their institutional position and role—impacted daily work practices of their POs as well. For example, although POs did not have to wear the GPS devices themselves, they were constantly confronted with the physical shortcomings and failures of these devices: ". . .every day there is something that comes up on that report that I've got to check into; either a charging problem, a tamper problem, a unit not working or something like that and so now I've got to get in touch with the parolee or whatever and follow up on that problem" (PO #1). As parolees contended with the physical aspects of the device, their enforced lack of knowledge about its purpose resulted in a reliance on POs to help interpret its function. In effect, POs became the troubleshooters for their parolees and were required to become instantly available 24 hours a day: "We're required to give our phone numbers to parolees. Sometimes that unit can just vibrate or beep on its own. Sometimes we get a call from [GPS Vendor] that says you have a bracelet issue, or your parolee might just call because he's unsure about what he can or cannot do" (PO #B).

This reliance on the POs and the ability of parolees to contact the PO at any time undermined the hierarchical organization of power and control that the GPS was originally intended to uphold. Although parolees felt controlled by the device, they did not attribute that control to the POs outright, in some cases even explicitly reinterpreting that relationship: "We have a device that cost 1,500 dollars, agents that get paid a lot of money, and they are watching us and are at our beck and call. I see them as service providers" (SVP #7). While POs had near constant access to the parolees' location in time and space, the parolees developed a good idea of what POs did know (where they had been) and did not know (what they were doing). Ironically, PO responses to anomalies in parolee readouts made POs more predictable to the parolees, limiting the panoptic effect of the system solely to physical movement.

Parolees also relied on each other to identify ways of coping with the device and to learn about its capabilities and limitations: "You can see how others cope and you can get advice and give advice" (SVP #7). As few parolees had a clear idea of how the devices worked at the outset, they shared the knowledge and insights they gained over time, relating this information to others as they encountered each other in mandatory group therapy sessions. Many sexual offenders committed small acts of disobedience, pushing the device and thus learning its limits and its function: "Some of us who have tested the waters and know that this thing can last for up to 24 hours" (SVP #4). In this way parolees slowly reconfigured the limits and demands of their position by adjusting their behavior to account for device limitations and to accommodate and take advantage of the changing nature of the PO work.

Echoing Barley's observations in his study of radiologists, here too the PO and parole patterns of interaction were predicated on preexisting hierarchical structures and legitimated by the POs authority of expertise and power to dispense judgment and punishment (Barley, 1986, 1990). For POs this dominance was encoded by the direction in which information about parolee movement and the resulting transgressions flowed. Yet parolees became a key component of the sense-making puzzle presented by the GPS, thus altering dominant patterns in subtle ways. Parolees at times resisted the particular institutional identity forced upon them by the legislation and then underscored via the GPS device. In the course of the adjustment to the demands and pressures triggered by the deployment of the GPS, PO and parolee interactions resulted in a curious flattening of the hierarchical structure of the institution of parole through negotiations of the materiality of the devices and their technological faults.

Discussion

Questions of privacy and surveillance in and around location-based technologies are common concerns and

[4]During post Jessica's Law focus groups, we observed a great deal of consternation as many parolees described behaviors that challenged this definition, primarily because they did not see themselves validly identified to be a "sexually violent predator" having served their sentence without this classification, and resented the social stigma attached.

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topics of public discussion. Clearly, the case of paroled sexual offenders tracked with GPS brings these concerns to the fore. However, our goal in examining this topic has not been simply to examine a case of high-tech surveillance. Rather, we believe that a broader range of questions surrounding the institutional embeddings of information and technology are salient here. In particular, these are questions that arise when space, spatiality, and mobility become tradable objects of attention. In this section we want to examine a series of broader concerns that our study raises.

Institutional Legibility

Surveillance can be seen as a way to increase legibility of people's behavior through collection of particular types of information about them. In our study, the question of legibility emerged as a concern in several different forms. Legibility here implies two things—first, a rendering visible of something that was previously invisible, and second, the achievement of conformance to some interpretive scheme. The case we have discussed here introduces several concerns with legibility, including the legibility of parolee's movements to POs, the legibility of the spaces through which they move to different audiences, and the legibility of the POs work to their own institutional structures.

Questions of the legibility in institutional contexts have long been examined through the use of information systems. Mobile technologies have the potential to extend these systems of legibility to the spatial organization of the everyday world and peoples' movements within it. At the same time, personal mobile devices are increasingly breaching the spaces under direct institutional control, challenging the expected legibility of movement and action within these spaces (Thomson, 2012). The history of debates around cartographic representations (Wood, 1992), the introduction and consequences of contemporary spatial representations (Curry, 2005), and the nature of participation in and through geographical information systems (Dunn, 2007) all point to the importance of the development of interpretive schemes for understanding everyday space. What each of these studies emphasizes is, first, the importance of recognizing the debate and contests of legitimacy around competing representational schemes, and, second, the nature of these representational schemes as structures of action.

In this light, there are several questions we might ask about the efforts towards legibility that we find at work in our case. A concern with legibility immediately raises the question, "Legible to whom?" and "Legible under what circumstances?" Aspects of these questions—the problematic legibility of urban space, for example, and the nature of institutional accountability for POs—have arisen in the accounts we have offered earlier. Competing spatial representations and competing technologies render space legible in different ways to different parties. To the extent that technologies of spatial legibility enact spatialities, we see multiple "spaces" emerge, a challenge to any institutional incorporation of the spatial.

Feldman and March (1981) discuss the drive to collect and collate information in organizational processes, drawing attention to the fairly loose connection between information gathering and decision-making processes; they argue that information might be thought of here less as an instrumental basis for decision processes and more as a symbolic shield from lurking uncertainty. Similarly, Miller (2003) notes that representational schemes deployed in this way have a tendency to become ends in themselves, driving rather than documenting institutional processes. Thus, symbolic considerations become re-instrumentalized and elements of the process that are not captured by the representation are obscured or displaced. In a sense, this is what Buckland meant in his seminal piece when he argued that "information systems can deal *directly* only with information-as-thing" (Buckland, 1991, p. 358), storing only representations of knowledge and process symbolically, necessarily reducing complexity and requiring a reinterpretation upon retrieval. The way POs attempt to recover an understanding of parolee's actions as potentially "suspicious activity" from a record of coordinates of their spatiotemporal movement speaks to just this sort of substitution.

Evolving Context

As information technology is incorporated into institutional processes, we need to pay attention too to the way that broader cultural practices shape the understanding and interpretation of those technologies. For instance, as smartphones have become increasingly prevalent tools for everyday personal use, the expectations placed upon corporate mobile communication technologies—generally thought of as portable e-mail machines—have changed (Mazmanian, 2013). In our case we see some significant consequences of the evolving contexts of mobile technology deployment, which in this particular case means changes both in the familiarity of technology and in the groups with whom it is deployed.

The tracking technology deployed by the parole system in our study is based on GPS. While GPS was originally a military technology, it has become increasingly familiar to consumers through its incorporation into cars and mobile phones. What was once a high-end and relatively exclusive technology is now deployed in millions of inexpensive consumer devices. As such, the nature and limitations of GPS technology have become increasingly familiar to consumers, including the difficulties of maintaining an adequate satellite lock indoors, the problems of reestablishing a lock once it has been lost, the potential for erroneous readings, and the presence of GPS "shadows" in dense urban areas. Simultaneously, as the context of GPS deployment for monitoring of paroled sexual offenders has moved from a feasibility study to a legislative mandate, the population of parolees who are tagged with GPS units has changed significantly, as has their attitude towards, first, their status as "sexually violent predators" and, second, the technology that they carry in consequence of their status.

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The combination of these two considerations has, as we have reported, resulted in a considerable shift in the way that GPS technology intervenes in the relationship between the PO and the parolee.

More broadly, we can regard this as an example of the consequences of the migration of digital technologies beyond the workplaces in which they have traditionally been deployed. As information technologies have become more familiar parts of the landscape outside of the office, as tools for personal information management, education, entertainment, and communication, the contexts in which they are understood change. Twenty years ago, a discussion of videoconferencing would focus on business meetings (e.g., Egido, 1988); today, it would focus on grandparents and grandkids or other family communication (e.g., Ames, Go, Kaye, & Spasojevic, 2010). As a focus of analysis, mobile technologies are a moving target.

Surveillance and Locatedness

One aspect of this moving context is the evolving commercial arena of location-based services, principally those deployed on smartphones. Whether free-standing or integrated into larger platforms like Facebook, these technologies are the focus of widespread concern about surveillance in everyday space, and are often seen as extensions of a broader pattern whereby everyday surveillance is accepted as part and parcel of contemporary life (Gates, 2011; Molz, 2006).

In the correctional context, the fact of surveillance is no surprise. What is perhaps more significant here, particularly with respect to potential implications for other contexts, is that what we see at work is a substitution of one form of surveillance for another—electronic tracking for visual surveillance—and at the same time an expansion of the surveillance regime in which the POs are themselves subject to a form of surveillance in a much more direct manner than before.

For the parolees, the nature of surveillance changes in two ways. First, the GPS technology allows for a temporal extension of surveillance, such that every moment and every location becomes, potentially, subject to accountability. The second is that the engagement with the parole authorities within which this surveillance is embedded has also changed, as the focus of surveillance by authorities has shifted from one oriented towards rehabilitation to one oriented primarily towards detecting infractions and guarding against recidivism (at least from the perspective of the POs). To an extent, as we have seen, momentary or temporary breaking of inclusion or exclusion barriers may turn into moments of negotiation between the parolee and the PO about interpretations of space and movement, and so the absolutism of the electronic record is not directly translated into an equally absolute judgment of compliance (Nellis, 2012). Nonetheless, the very fact of the electronic trail changes the work of the POs by introducing for them a new responsibility for accounting for parolees' movements, and this in turn recontextualizes the surveillance of those movements. Even within the context of a formal program of surveillance we find a need to understand the situational specifics of the encounter and the role that surveillance plays for all the parties involved. More broadly, we see this as further underscoring the need to be able to set particular accounts of surveillance within larger and evolving institutional relations.

Conclusion

Scholars in the social sciences and humanities in recent years have attempted to revisit the question of the relationship between the social and material worlds, understanding them as thoroughly entangled rather than complementary and separate spheres of concerns. One particular aspect of a sociomaterial reading of institutional relations and processes is the opportunity associated with emerging mobile and location-based technologies to make movement in the physical world into a resource. While this has been an obvious concern for, say, organizations in the business of logistics, from freight companies to the military, the widespread deployment of new mobile data infrastructures allows location, as a technologically tradeable object, to become an element in a wide range of social and institutional processes. Many questions arise around these developments, including concerns over personal privacy (Nissenbaum, 2010), questions of location representation (Wood, 1992), considerations of spatial stratification (Graham, 2005), and the commodification of location as an aspect of social interaction (Shklovski et al., 2009).

In this paper, we have used one particular case of location-based technology—the case of paroled sex offenders tracked by GPS as a condition of their parole—as a lens through which to examine some of these questions. In particular, we have been concerned with the reconfiguration of institutional roles and power dynamics that followed the introduction of the technology. It is not that GPS technology has made location into a consideration for the institution of parole where it was not before. Rather, the emergence of new kinds of information objects—digital GPS-based location reports—has allowed location to be incorporated into institutional processes in new ways.

In particular, we have identified the way that the presence of digital location traces creates new forms of institutional accountability for POs, facilitates a shift in the understood relation between location and action, and necessitates new models of interpretation and sense making in practice. Further, we have identified the care of the physical electronic objects themselves as a new concern for both parolees and POs in a technologically monitored regime.

Our interest in this particular case is not motivated by a suggestion that digital technologies create for all of us a regime similar to that of parolee surveillance, nor by a suggestion that mobile phones and similar technologies should be analogized to the GPS ankle bracelets worn by paroled offenders. Instead, we suggest that the formulation of

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location as a technologically tradeable object does not simply make the everyday world transparently legible to electronic systems but rather engenders new and transformed social relations in the places where those objects travel. A digital trace does not simply represent a place of human presence, but transforms the nature of that place for the purpose of social interaction—not just the social interaction in that place, but the social interaction around that place, about that place, and oriented to that place. Schegloff's (1971) discussion of the formulation of place as a conversational resource highlights the relationship between place-saying and the social relations that obtain among members of the scene. We too find that, when we examine digital records of location, we might think of these as moments of place-saying as a social activity. Further, we find that these are, to coin a phrase, moving targets; that is, within the very presence of locational technologies, independent of specific moments of use, there are evolving understandings of what it means to be in a place and what it means to be digitally recorded as present (Satchell & Dourish, 2009).

This case, then, provides a useful perspective on three issues of ongoing interest in information science.

The first is location. The rise of mobile, location-aware technologies has marked a significant transformation of technological infrastructure and experience in the last 10 years. Increasingly, organizations and institutions that have provided online information are doing so in ways that take advantage of location as a component of their service delivery. At the same time, new forms of location-based services are becoming significant aspects of people's daily experience, especially through the provision of smartphones as a computational platform. The study presented here reflects on the notion of "location" at work in these cases, and examines the processes by which alignment is actively maintained between location as a geometric, technological report and location as a human-relevant understanding. As location-based services continue to develop, turning analytic attention to the explicit process by which these two are maintained in alignment, and the moments and consequences of slippage, will continue to be of importance.

The second relevant issue is surveillance and privacy as its attendant concern. One reason for selecting this field engagement was the fact that the tracking of parolees has been ruled, as a matter of judicial concern, not to be an invasion of privacy. However, what we find at work is absolutely a concern with the ways that the availability of information, the presentation of information, the orientation towards information, and the interpretation of information remain of paramount concern in the ongoing social interaction not just between parolees and POs, but between POs and their colleagues, between parolees and members of the public, and so on. What this suggests, analytically, is an approach to examining the issues of surveillance and privacy that focuses on the range of social interactions that are sustained by and enacted around different forms of information, data sets, and digital representations. What forms of social interaction manifest as surveillance or privacy in this-or-that setting, and what sorts of social relations can we tease apart within the broad space of surveillance and privacy as topics?

The third issue is sociomateriality as a topic of information science concern. We are interested in turning to the details of specific sociomaterial entanglements and the examination of how, as practical matters for those engaged with digital information systems, the material manifests itself in the social world and the social is founded on the material. The specific material considerations here include particular forms of mediation associated with GPS technologies, such as the forms of error and the problems of implementation in one particular place or another. This study highlights the need for a more nuanced examination of the sorts of materiality at work, which requires an engagement with the specific material considerations in different technological and representational systems (Dourish & Mazmanian, 2011).

Institutions, of course, have always had their spatial components. While locative technologies are new to the scene, the considerations that they make visible are not themselves novel. However, the rise of locative technologies and the appearance of location as a technologized element of institutional information landscapes bring with them some new considerations for information systems analysis. The case of location-based technocorrections highlights politics, pragmatics, and power as aspects of institutional response to these technologies. We anticipate that these issues will only grow in significance.

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Appendix: Interview Guides

General Interview guide for Parole Officers and Administrators

Please note that the interview protocol for parole officers presented here is a general guide due to the semi-structured nature of these interviews where interviewee concerns and situations drove the conversation with the guide providing a structure to the discussion.

1. What role did you play in the development and implementation of the HRSO GPS project?
2. In thinking about the HRSP GPS project, what are some of the general issues that you see?
3. What are some of the main issues facing individual parole agents and the department in being able to effectively supervise high-risk sex offender parolees?
4. What have been the primary challenges in implementing this program effectively?
5. What were some of the original expectations for what this GPS system can do, and have those changed at all?
6. What do you think are reasonable expectations to have for a parole agent supervising a GPS caseload?
7. What are some of the top priorities for improvement of the program?
8. What would you have changed about the implementation of the program? What three top things would you have changed to make implementation more effective?
9. In your opinion, what would success for this program look like?

Focus group guide for GPS-Monitored Parolees

1. How does the GPS monitor work?
2. Think back to the first day that you received your GPS unit.
   a. What was your initial reaction?
   b. Has your opinion about being on GPS changed?
   c. Why?
3. How did the parole agent explain the operation of the GPS system to you?
4. What do you see as some positive aspects, for parolees, of the GPS program?
   a. Why?
   b. Can you give us an example?
5. What do you see as some negative aspects of the GPS program?
   a. Why?
   b. Can you give us an example?
6. What concerns, if any, do you have about wearing your GPS unit?
   a. Why?
7. Does it make a difference to have technology monitoring you instead of person?
8. Has being monitored by GPS changed your behavior in any way?
9. Has being monitored by GPS changed your relationship with your parole agent in any way?
10. Has wearing the GPS unit changed the way that you relate to people you know? Strangers? In what way(s)?
11. Does the GPS monitor make you feel safer, or more vulnerable?
12. Do you think the GPS monitor makes society safer or more vulnerable?
13. How would/will your life be different if/when the GPS unit is removed?
14. Finally, can you think of anything that we missed? Is there anything that anyone would like to add to the discussion?

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