Overseeing organizations: configuring action and its environment

ABSTRACT

Despite the widespread deployment of CCTV through most major cities and towns in great Britain, and the importance of surveillance to contemporary debates within the social sciences, there remains relatively little detailed research concerned with the practical use of these technologies in the workplace. In this paper, we examine how personnel in the operation rooms in London Underground use CCTV and related equipment to identify problems and events and to develop a co-ordinated response. In particular, we consider how personnel configure scenes to make sense of and interpret the conduct of the travelling public in organizationally relevant ways, and how they shape the ways in which both passengers and staff see and respond to each others’ actions. In addressing how personnel constitute the sense and significance of CCTV images, we reflect on the development of information processing systems which are designed to automatically detect conduct and events.

KEYWORDS: Work; interaction; organizations; technology; surveillance; transport

INTRODUCTION

Over the past decade or so we have witnessed the widespread deployment of CCTV (Closed Circuit Television Equipment) throughout many public areas in cities and towns in Britain. The deployment of these technologies has been accompanied by the further development of a particular form of workplace, namely the operation centre; a workplace that Suchman (1993) has aptly characterized as a centre of co-ordination. Sociologically, these developments have been seen as a critical element in the process of the rationalization of modern industrial society; a disturbing realization of Bentham’s Panopticon as surveillance pervades and orders our lives. As Webster (1995) has cogently argued, ‘routine surveillance is a prerequisite of effective social organization. . . . organization and observation are
Siamese twins which have grown together with the development of the modern world’. Given the pervasiveness of CCTV, it is hardly surprising that a relatively basic technology has been appropriated as part of a larger debate concerning the socio-political processes of post-modernity, and yet, save for a small but important corpus of studies (see for example Norris and Armstrong 1999; Norris, Moran and Armstrong 1998; Borzeix 1995; Nardi 1995) less attention has been paid to how such systems are used within the practicalities of everyday work in organizational settings. When we do examine these systems in action we find that the technology is used to undertake a whole range of activities only some of which might reasonably be described as surveillance.

In this paper we wish to explore a relatively specific case in which CCTV and related systems are used to examine the conduct of people in public settings and provide resources to the management of human traffic and order. The cases in question are the station operation centres on London Underground. In particular, we examine how personnel within the operation centres, in the course of their daily work, identify events and problems and develop a co-ordinated response involving both staff and passengers. The paper is concerned with the ways in which station supervisors use CCTV to make sense of conduct and interaction within the station, and how they transform the ways in which both passengers and staff see and respond to each others’ actions. In examining the practical use of CCTV, the paper considers the design and deployment of system support for incident recognition, and reflects on a relatively neglected issue within the sociology of work; the significance of the local environment to the intelligibility and co-ordination of organizational conduct.

With widespread deployment of surveillance technology, in particular CCTV equipment, it is increasingly recognized that personnel within operation centres are unable to monitor all the information which is provided through the various systems. It is suggested for example that operators in such domains suffer from ‘cognitive overload’ and will inevitably fail to notice important events and problems. In this light, there has been a growing interest in developing information processing systems which monitor real time data from CCTV cameras and automatically recognize particular events. One such system, known as MIPSA (Modular Integrated Passenger Surveillance Architecture, see Velastin, et al. 1994) is currently being developed as part of a pan-European project entitled PRISMATICA (Pro-active Integrated Systems for Security Management by Technological, Institutional and Communication Assistance). The project involves many of the major urban transport operators in Europe, including London Underground, the RATP Paris, ATM in Milan and STIB in Brussels. In functional terms, MIPSA is a ‘box’ that can be added to a control room environment to provide: a concentration of data from various sub systems; image processing to enable a range of events to be detected; and interconnections to conventional control or operation room systems. It is argued that MIPSA will automatically recognize events such as overcrowding,
passenger incidents, physical attacks and the like and automatically inform operators. As part of PRISMATICA we are undertaking extensive video-based field research in operation rooms and public spaces within London Underground, the RATP Paris, STIB Brussels and various related organizations such as the British Transport Police. This paper forms part of the PRISMATICA project and is concerned with exploring the practical, situated use of CCTV in operation centres and implications for the design and deployment of system support.

It is worthwhile raising a couple of additional issues. Despite the contribution of Goffman (1963) and others (for example, see Joseph 1998; Lee and Watson 1993), conduct and interaction in public places has remained a relatively neglected area of sociological interest in recent years. In part, one suspects that unlike discourse and talk, behaviour in public has proved somewhat intractable analytic domain. Part of our own interest in the operation centres of London Underground derived in part from a methodological recommendation raised by Sacks (1992) in one of his early lectures. That is: find an occupation or category of people who have a specialized or professional interest in the topic and examine how they address the particular area and issues in question as part of their daily practical activities. Staff in the operation centres of London Underground offer such an opportunity and the possibility of investigating how an occupation relies upon specialized ways of identifying, discriminating and engendering conduct so as to maintain the traffic of people through complex physical environments. In this light, it should be mentioned that the materials discussed here also bear upon the growing interest in language, discourse and talk in organizations (see, for example, Boden 1994; Drew and Heritage 1992; Edwards and Potter 1992; Keenoy, et al. 1997; Silverman 1997; Sarangi and Roberts 2000). Despite the substantial contribution of this research, it is surprising perhaps that the embodied and material aspects of organizational conduct and interaction have remained relatively unexplored save for some important exceptions (see, for example, Goodwin and Goodwin 1996; Streeck 1996; Whalen 1995). Indeed the very emergence of workplace studies derives in part from an attempt to take objects and artefacts, tools and technologies seriously; that is, in the ways in which they feature in the production, intelligibility and coordination of practical organizational conduct. In this paper, we would like to show how the production of talk and its recognition is dependent upon the participants’ abilities to shape and hear the talk with regard to occasioned and recognizable features of the local environment. We would also like to consider how talk and interaction features in the organization and transformation of that environment. In this way the paper is concerned with the embedded and embeddable character of action in the environment.

The paper begins by discussing how personnel within the setting, the station operation rooms on London Underground, constitute the geography of events and incidents within the domain and how these are
configured with regard to local organizational interests and contingencies. We then focus on the identification and management of a particular problem, namely overcrowding. The analysis considers how personnel see and perceive overcrowding with regard to the practicalities of their daily work and the circumstances at hand, and the ways in which they develop a co-ordinated response: a response which entails configuring how passengers and staff make sense of each others conduct and their immediate environment.

OPERATION ROOMS AND ORGANIZATIONAL GEOGRAPHERS

Each major station on London Underground houses an area which is known as the operation room or ‘ops room’ for short. It is normally staffed by one of the station supervisors who is responsible for overseeing the day operation of the station and with developing a co-ordinated response to problems and emergencies. At any one time there will be up to thirty additional staff out and about on the station, mostly station staff who are responsible for dealing, when necessary, with passengers on platforms, at the barriers in the foyer, and the main entrance gates to the station. The operation room is normally located in the entrance foyer to the station and includes a large window which overlooks the barriers, the top of the escalators, the ticket machines, and the ticket office.

This visual panorama is enhanced by a series of monitors, normally eight, embedded within a console, which provide views of various locations around the station. The supervisor is able to select particular views from the numerous cameras, up to one hundred or so, based in different locations around the station. The supervisor also has access to ‘omni-scan’ cameras in a number of locations which allow him or her to focus in on particular areas. An additional monitor in the operation room provides information concerning the running times and location of particular trains on specific lines. The operation room also houses various communications equipment including conventional telephones and direct lines to line control rooms, a fully duplex radio which allows all staff in the station to speak to each other and overhear both parties to all conversations, and a public address system which allows the supervisor to deliver announcements mainly to passengers in any area within the station. Additional equipment includes alarms, switches to automatically open or close the barriers, for example in the case of an evacuation, and in some cases switches to illuminate ‘no entry’ signs at the entrances to the station. It should be added that the station operation room is part of a broader network of control centres. These include the Line Control Rooms, the London Underground Network Control Control Centre and the British Transport Police Operation Centre.

For ease, we will focus on a particular station namely the operation room at Victoria. Victoria is one of the busiest stations on London Underground.
It includes the Victoria, and the Circle and District Lines and interconnects with the major overland railway station. It handles approximately 120,000 passengers a day. Like other major underground stations it suffers characteristic difficulties, perhaps the most important of which is severe overcrowding in the morning and evening rush hours. Other routine problems include buskers, ticket touts, pickpockets, and passenger incidents. More unusual, but none the less routine problems also include evacuations, ‘one unders’ (people falling on the track) and problems with the signalling equipment.

In contrast to the conventional view of surveillance and monitoring, supervisors are highly selective in what they look for, at and when. There is an organizational geography to the station; routine problems and difficulties arise in particular locations, at certain times of the day, week, or even year. Operators configure the CCTV screens to enable them to use particular cameras to see specific areas at particular times of day; areas where routine problems and difficulties are likely to arise. For example, at Victoria overcrowding occurs during the morning rush hour on the Victoria northbound platform, and in turn this affects the build up of passengers on certain escalators, interconnecting passageways and ticket barriers. The supervisor will select and maintain particular views to oversee these domains, and then by early afternoon reconfigure the monitors to cover a different combination of domains. Later in the evening touts will attempt to trade in tickets and it is not unusual for supervisors to select views of

PLATE I: The station operation room in Victoria Station
particular areas of the foyer and entrance passageways where the trade will be plied. Buskers ordinarily use particular locations, such as the bottom of an escalator, or along interconnecting passageways, so once again we find operators selecting and keeping an eye on those areas. Identifying next trains, keeping an eye out for pick pockets, watching out for drug trafficking, and in general knowing where all such things occur, where those things should be dealt with, all provide supervisors with highly motivated and organized ways of configuring and viewing the station. Moreover, in many cases, it is not simply selecting a single view which is appropriate, but combining a number of related views that is critical, enabling the supervisor to track the progress of particular problems and difficulties.

One additional aspect to this organizational geography is worth mentioning. Supervisors are not only familiar with where particular problems are likely to arise, but are able to use the CCTV equipment to discover problems and events which are occurring beyond the scope of the camera. For example, supervisors are well aware that buskers, pickpockets, touts and the like know where the cameras are located and if they have any sense at all will undertake their activities beyond the range of the camera. In consequence supervisors rely on what they can see to interpret what is happening in the world beyond. For instance, a curve in the movement of passengers as they walk along a straight platform will suggest there is an obstacle in their path, and if they see people occasionally putting their hand out, they will know that someone is begging or busking. Similarly, if they see passengers entering a passageway but few arriving on the platform, or a crowd at the bottom of an escalator with no one leaving at the top, then they will reason that some sort of passenger ‘incident’ has arisen in between. Supervisors therefore have a sense of the routine organization of conduct in particular domains, and draw upon that practical knowledge to see and identify problems and difficulties.

The practical geography of events therefore provides an important resource in overseeing the station and in selecting a relevant and useful set of views at some particular moment. The supervisors’ ability to configure a relevant set of views and to see and manage events, using CCTV, is entirely dependent upon their practical knowledge and familiarity with the station; its passageways, tunnels, escalators, equipment, facilities and the like. The images, and in particular the conduct which arises within the myriad of domains, are intelligible by virtue of the supervisor’s understanding of the local environment both within and beyond the image(s) viewed on the screens. Consequently, without a relatively simple understanding of which passageways connect to which platform, how people traverse particular areas, what obstacles arise in specific locations, or why people tend to gather at particular locations on a platform, the CCTV images are of little practical, organizational use. We will return to this issue later in the paper.
RECOGNIZING OVERCROWDING

In a number of major stations on London Underground overcrowding is a severe problem, in particular during the weekday morning and evening ‘peaks’ or rush hours (roughly 8.00 to 9.30 am and 5.00 to 6.30 pm). Overcrowding is a particular problem for stations which interconnect with major overland rail stations such as Victoria, Liverpool Street, and King’s Cross which serve the major dormitory towns of South East England. Overcrowding not only causes discomfort and irritation to passengers and reduces the free flow of traffic through the station but also leads to particular dangers. For example escalators can become severely congested and unless passengers are able to exit quickly from the foot of the moving stairs then the pressure of people above can lead to individuals tripping. More serious still, overcrowding on platforms can place passengers standing near the edge of the platform in some danger as the pressure from behind pushes them forward. Indeed, overcrowding has led some new lines such as the Jubilee Line extension to include glass platform edge doors so that there is no danger of passengers inadvertently being pushed on to the line. At Victoria for example, the entrance to the northbound platform of the Victoria Line is positioned at one end of the platform, from where passengers disperse rather slowly causing severe overcrowding during the morning rush hour on what is one of the busiest platforms on the network.

Station staff, and in particular the supervisor in the operation room look for overcrowding throughout the morning and evening rush hours. Aside from removing any obstacles and encouraging passengers to disperse along the full length of the platform, the principal strategy is to reduce the number of passengers in particular areas of the station. This is done in one of two ways and is known as ‘station control’. Initially supervisors ask station assistants to ‘close the (ticket) barriers’ to stop passengers descending to the platforms. However, if foyers are also becoming busy, the supervisors then ask staff to ‘close the entrance gates’ so that passengers queue outside the station (actually within the mainline station) until numbers are reduced underground. In many cases both solutions are implemented until trains clear passengers from the platforms. It is important to add that it is station policy that in neither case are the actual barriers or gates physically shut since passengers still have to leave the station.

In terms of areas where additional technological support may be required, overcrowding would seem to be a relatively simple and straightforward problem to address especially when placed alongside more seemingly complex behavioural events such as physical attacks. There has been a long-standing interest amongst engineers to develop image processing systems to be able to recognize overcrowding and to discriminate various degrees of density of crowds. As part of the PRISMATICA project, overcrowding is one of the principle events that the MIPSA system can be configured to automatically identify. With regard to a station such as Victoria, where it is crucial for supervisors and others to know when particular areas
such as platforms, foyers and passageways are overcrowded or becoming so, reliable image recognition systems would appear to provide an important resource in the identification and management of a routine problem.

The identification and the management of overcrowding is not, however, as unproblematic as one might imagine, and even these seemingly unambiguous events might pose quite serious problems for those developing image recognition systems. There is clearly a subtle distinction between ‘crowding’ and ‘overcrowding’, and it may be the case that ‘overcrowding’ cannot, for organizationally relevant purposes, be defined in terms of the density of people gathered in a particular area.

For example, a supervisor will look at a monitor showing the northbound Victoria Line platform during the morning peak and find that it looks busy. However, he will only shut the barriers, to stop people descending to the platform if it looks as if there is a build up of passengers in the foyer near the escalators which feed the platform below. Or for example, consider the following fragment. We join the action during the morning ‘peak’ in the operation room at Victoria. There have been delays on the Circle and District Line and these are leading to the successive build up of passengers on the platform. In the case in hand, the supervisor finishes a phone conversation and then glances at a series of the monitors.

**Fragment 1**

SS: ((finishes phone call))
(3.4) ((glances at various monitors))
SS: erm::: (1.2) Station Control for the west and er::: (0.6) keep (th)em outside the station again please
(14: 00)
SS: Ladies and gentlemen we apologise for keeping you outside the station↑ (0.8) (and ____ ) outside
(1.2, . . . . .) west (0.4) westbound platforms:
SA: (northbound to Base)
SS: (this is to) prevent overcrowding on our westbound platform (0.6) and (0.3) on our:: (0.3) ticket hall areas:
(0.8)
SS: Once this clears: we’ll be letting you through.

The supervisor turns and looks at the traffic monitor on his right, listing the train on the Circle and District Line and their projected arrival times at the station (Plate II.1). He then glances at the screen showing the westbound platform (Plate II.2), the screen showing the foyer (Plate II.3) which feeds that Circle and District Line platforms, and once again, glances back at the westbound platform. The supervisor then initiates a series of actions to reduce the number of passengers reaching the platform, and in turn the number of passengers arriving at the ticket barriers. He requests passengers to be held at the ticket barriers, and the entrance gates to the station to be closed. As the subsequent announcement reveals, his actions are designed to avoid overcrowding on the westbound platform on the Circle and District Lines.

The supervisor makes a practical assessment of overcrowding and implements a course of action to reduce the number of passengers arriving on the platform. The assessment is not based simply on seeing that the platform is crowded – it is crowded most of the time during the morning rush hour – but rather with regard to interweaving distinct domains within the station: the foyer and the platform. The supervisor sees what is happening within the foyer with regard to the number of passengers waiting on the platform; just as seeing people crowded on the platform recasts the significance of the number of people within the foyer. The supervisor configures an arrangement of scenes from the CCTV monitors with which to assess the number of people within the station, and in particular to decide whether the station and the platforms in question are becoming overcrowded. The relevant scenes are configured with regard to the routine patterns of navigation through the station undertaken by passengers and in particular their movement from entrance gates, through the foyer, to the platform. Whether the station or particular areas are, or are becoming overcrowded, therefore involves interrelating various scenes. It is not simply based upon the fact that there may be significant number of people waiting on the platform.

The present cases involve other considerations. Seeing or envisaging whether the platform is overcrowded also depends upon the flow of traffic into the station. Trains rapidly transport passengers from platforms so that in judging whether an area is overcrowded, or will become overcrowded, depends in part on how quickly/how short a time passengers are likely to be on their way. The supervisor glances at the traffic monitor in order to see when the next train(s) will arrive and, given what he knows about the build up of passengers in various locations, whether the vehicles will have a significant impact on reducing the amount of passengers. The CCTV images therefore are examined with regard to the imminent arrival of
trains on particular platforms. It is not simply the density of passengers in particular locales occurring there and then, but rather the predictable pattern of events over the next few minutes.

In configuring and considering an assortment of potentially interrelated scenes therefore, the supervisor is prospectively oriented. He considers the state of play in various potentially interdependent domains, and how various events, such as passenger navigation and pace and train movement, will transform the scenes in question. In implementing station control by closing the ticket barriers and the entrance gates to the station, the supervisor is not responding to ‘overcrowding’ here and now, rather he is envisaging what might happen and undertaking remedial action before problems actually arise. The simple automatic detection of an image which shows a crowded platform would be largely irrelevant, and in many cases too late to deal with the problems before they actually arise.

The assessment and perception of passengers and their activities in a particular location therefore derives from interweaving images of a variety of domains. The perception of a densely ‘overcrowded’ platform, derives from not simply seeing a substantial number of people waiting for a train, but juxtaposing that view with other scenes, and in particular envisaging how actions elsewhere will affect the particular scene in question. Indeed, whilst cameras provide successive views of a particular platform, it is relatively difficult for the supervisor to judge the actual density of waiting passengers, once it is quite busy. Juxtaposing scenes of what is happening elsewhere, provides ways of envisaging what could happen. This prospective orientation also takes into account what it will take to clear passengers and juxtaposes the arrival of more passengers with the timing of trains to transport them. The ‘reading’ or ‘interpretation’ of a particular image therefore, where an image of an ‘overcrowded’ platform may seem ‘obvious’, is dependent upon the supervisor’s ability to invoke a complex configuration of scenes, actions and events, and to envisage just what it might take for it to become dangerous. In sum, a single scene or image without the knowledge of what is happening elsewhere, or the ability to envisage what could be about to happen, cannot provide the necessary resources to enable supervisors to recognize ‘overcrowding’ and initiate an organizationally relevant solution.

DIFFERENTIAL PERSPECTIVES IN ASSESSING SCENES

Many of the problems and difficulties managed by supervisors in the operation room are discovered, in the first instance, by staff located elsewhere in the station. As we have suggested, the use of the CCTV system is largely focused around a small number of organizationally relevant problems and events, and that staff are sensitive to the restricted and distorted access they have to the world beyond. They differentiate their own perspective from the perspective of others, in particular, those within scenes that are within
range of camera(s) but still inaccessible to them in certain ways. Staff are positioned in certain locations throughout the station where particular problems are likely to emerge; the supervisor relies upon the abilities of his colleagues, to see, hear and even smell, for example in the case of fires, problems and events which may be potentially visible, but inaccessible to him within the confines of the control room. Staff rely on each other, just as we, the passengers, rely upon staff to inspect the environment for organizationally relevant problems and events.

It might be helpful to consider a relatively straightforward instance which raises one or two interesting issues concerning the ways staff may observe the environment around them. A station assistant calls in on the radio. He is based at the headwall of the westbound Circle Line platform where there are difficulties with signalling. A train is being held in the station and the platform is becoming crowded. The assistant has to be joined by a supervisor before he can help guide the train(s) through the red signal; a practice splendidly known as ‘applying the rule’. The supervisor in the operation room receives a call over the radio and assumes it concerns the anticipated arrival of his colleague and assures the assistant that he is on his way. It transpires that there is a rather different reason for the call.

\begin{quote}
\textit{Fragment 2}
\end{quote}

\begin{quote}
SA: (Three two) to Base\textsuperscript{↑} \\
(1.2)
\end{quote}

\begin{quote}
SS: Yes er\textsubscript{rm}:: (0.4) the supervisor’s coming \textsubscript{now}.
(1.2)
\end{quote}
SA: Thanks Michael could you just keep an eye on the west-bound for us? We might need (to/some) erm: (0.4) station control if it goes on much longer: . (1.2)

SS: Alright then. (1.0)

SA: (Thank you)

As the supervisor receives the call, on the word ‘Base’, he turns and looks at the monitor showing the platform where the assistant is standing (Plate III.1). As he replies he returns to the activity in which he was engaged prior to the call; reading the incident reports on the desk (Plate III.2). He does not treat the scene on the monitor as warranting any further investigation or action. It is not for example seen as overcrowded. The assistant’s next sentence engenders a series of glances by the supervisor. As the word ‘eye’ is uttered, he turns back to the platform monitor (Plate III.3) and then, just at the end of the word ‘westbound’ turns from the platform to the traffic information monitor. As the assistant begins to suggest a potential course of action, projected within ‘we might need’, the supervisor turns from the traffic information monitor, to monitor covering the foyer and ticket barriers (Plate III.4); that is, the domain in which ‘station control’ would have to be implemented if overcrowding were a potential problem. On the completion of the suggestion, on the word ‘longer’, he looks out of the window across the main foyer.

The assistant’s request engenders a series of actions by the supervisor. He inspects a range of scenes and glances at the traffic monitor. The supervisor’s scrutiny of the various monitors provides a resource both to determine the severity of the problem and whether intervention is necessary, either now or in the near future. A minute or so later, the supervisor
glances back at the platform and the foyer and requests station control from staff at the ticket barriers.

The request reflects the asymmetrical access that the two participants have with regard to both the immediate problem and the various environments, and to upcoming events and the possibilities for intervention. It displays an orientation, not simply to the operator’s ability to inspect various scenes and to determine the (potential) arrival time of subsequent trains, but also the supervisor’s ability to produce a reasoned assessment of the situation and for him to initiate/implement, if necessary, station control. In other words, it is sensitive to the supervisor’s ability to place what the assistant can see and what he the supervisor knows from his standpoint, within a framework of potentially relevant scenes and events (including the number of passengers passing through the foyer and the like). It is not, however, that the assistant’s perspective on the scene is necessarily inappropriate, premature, or, more generally, to be treated as a view which is inferior to the perspective from the operation room. Indeed, as we have seen the assistant’s request engenders close inspection of various scenes (and information sources) and leads to the implementation of station control. It is recognized by the supervisor that his view does not necessarily correspond to the view from the ground, and that he may not be in a position to see how ‘bad things’ are on the platform.

Supervisors in the operation room therefore orient to the distinct and potentially more ‘objective’ status of a witness: the perspective of the participant within the scene (see Sacks 1972). Despite their own seemingly overarching view of the scene, of say even a platform, they are observed to attribute to those actually within the scene the distinct insights and ways of seeing only possible from such a vantage point and may, for example, defer to the participant’s sense of the action taking place. In the realm of CCTV therefore, the distinction between the local and mediated views of scenes, between supervisor and participant, is a distinction which features in making practical judgments and assessments of particular scenes, and in evaluating one’s own view and perception of the immediate environment and the behaviour which arises therein. It is not the case that the view from the operation room necessarily serves as the final arbitration as to what is happening and what should be done. We can begin to see how participants differentiate access to scenes and draw on that differentiation to attribute and determine the insight and reliability of the other’s perspective.

CREATING DISTRIBUTED CO-ORDINATION

Many of the problems and events with which supervisors deal involve action by staff positioned in various locations throughout the station. The radio is used, for example, to contact staff to stop passengers from passing through ticket barriers, to eject buskers, to warn unruly teenagers, or to encourage
passengers to leave the station as quickly as possible. The management of these problems and events often involves action by passengers whether simply rearranging where they stand on the platform or radically altering their travel arrangements. Passengers have to be encouraged to behave in particular ways and if staff fail to gain the co-operation of their ‘customers’, as sometimes happens, these difficulties can become exacerbated and lead to actual danger. The critical resource in encouraging passengers to undertake a particular course of action is the public address system which allows supervisors to selectively deliver announcements to various areas of the station and even in the concourse beyond.

Consider the following example. We join the action as the supervisor has asked staff to hold passengers both outside the station and behind the ticket barriers in the entrance foyer for the Circle and District Lines. A few moments later, he delivers a lengthy announcement. He apologizes, provides an account for the delay and goes on to recommend a particular course of action for some passengers. He then receives a call from one of the station assistants at the barriers:

Fragment 3

((over the public address system))

SS: Ladies and gentlemen apologies for keeping you outside the station and getting onto the west bound platform.

SS: to:

SS: to stop the over crowding on out ticket halls and on the west bound platform.

SS: Passengers for the eastbound may go through.

((receives call over the radio))

SS: Yeh Peter try not to say that becos’ everyone trying to get through gates, er that are going down to the eastbound.

SS: Anyway you can let them through on the barriers.

SS: Let them through on the barriers, over

SS: Let the whole lot through thankyou

The apology and explanation provide passengers with information concerning why they are being held behind the gates and barriers. The announcement provides passengers with ways of seeing and interpreting,
in an organizationally and situationally appropriate way, the conduct of their fellow passengers, the queues both before and behind them, the action of staff, and other features of the immediate environment. It is also concerned with engendering particular forms of action and conduct from passengers. For example, it encourages passengers to queue in an orderly fashion, to not use alternative routes to the platform; to know that this is a temporary and ordered state of affairs. In particular, the announcement provides passengers with the resources with which to make sense of the actions of the staff who are holding them behind the barriers and gates, and to respond to the actions of staff in sequentially and organizationally appropriate ways. However, the announcements are not simply concerned with providing passengers with information, as for example in keeping people up to date, rather they provide ways of seeing and responding to the actions of staff. Coupled with instructions to staff, they create and deploy the sequential arrangements through which staff and passengers are able to make sense of each other’s conduct and co-ordinate their actions with each other.

The force and relevance of announcements to engender particular patterns of conduct from passengers is powerfully revealed a few moments later in the same fragment. In this case however, the supervisor’s recommendation, undermines the staffs’ ability to co-ordinate their actions with passengers. The announcement differentiates categories of passenger with ‘Passengers for the eastbound may go through.’ The suggestion is preceded by a brief glance at the eastbound platform where traffic remains routine and congestion low. Eight seconds later, as the supervisor prepares to make a further announcement one of station staff on the ticket barriers calls in on the radio commenting ‘Yeh Peter (0.2) try not to say that becos’ (everyone) trying to get through gates: (. ) er that are going down to the eastbound’. As the assistant calls, the supervisor turns and looks at the monitor covering the Circle Line foyer and ticket barriers. The call reveals, by the ways in which the station assistant treats the situation, the difficulties that arise from holding the passengers behind the ticket barriers and entrance gates. The announcement’s recommendation, however reasonable, serves to undermine the staffs’ ability to preserve some semblance of order, not just for those legitimately passing through, but for other passengers who may not have necessarily heard or understood the announcement, and simply see movement through the gates and barriers. It is interesting to note that the supervisor’s solution to the problem, that he is now witnessing for himself (by looking at the monitors) is to recommend that they ‘let them all through’. The instruction, which is given over the radio, and initially a response to the assistant’s request, is then re-stated as a generalized instruction. The generalized instruction nicely differentiates, for all those listening and based at the barriers, that they can now let the passengers through. A few seconds later the instruction is reiterated and transformed to suggest that the ‘whole lot can go through’, i.e. even those being held at the gates outside. It is designed to
be heard and acted upon not just by the assistant who made the call, but also by all those staff implicated by the original instruction.

On occasions, the systematic interweaving of conduct, by supervisors can come together in immediate and interesting ways. Consider the following example. A few moments before, the supervisor requests station control due to congestion on the northbound Victoria Line platform and the down escalators. In the intervening moments the supervisor has been distracted by a radio call concerning a safety check and matters have become increasingly severe in the foyer. The telephone then rings and as he turns to take the call, the supervisor momentarily glances at the foyer (see Plate IV.1). He forgets the call and immediately makes a ‘public’ announcement (see Plate IV.2). Both staff and passengers in the foyer hear the intervention.

**Fragment 4**

SS: Er: Buddy still (hold) on this. Station control station control (0.2) Remain behind the barriers please. Remain behind the barriers this is for the platform.

SS: Yeah ladies and gentlemen we’re asking you to please remain behind the barriers just for a little while, (.) this is due to overcrowding on all Victoria Line platforms: (.) as soon as the platform areas become less crowded staff on the gate line will allow you (.) thankyou.

The supervisor’s ‘announcement’ involves a number of distinct, but interrelated actions designed for different recipients. The first part is addressed, initially to Buddy, one of the station assistants and then more generally to staff at the ticket barriers. It is designed to display the urgency of the instruction, and in particular to have staff implement a course of action, which in part is failing to occur; passengers are forcing their way through the barriers to go to the escalators and on to the platform. The
insistence to ‘still hold on this’ and the repetition of the instruction, can be heard by staff to be sensitive to the (visible) behaviour of passengers there and then; an utterance which rests upon the ability of both the staff present at the scene and the supervisor to see and be concerned about what is happening at this precise moment. It gains its force, its sequential import, by virtue of the relevant participants’ common access to a scene of potentially problematic activities. The utterance is shaped retrospectively and is both a comment on what is happening and an attempt to implement a course of action to transform the unfolding series of events.

The successful implementation of station control, however, rests upon the staff’s ability to gain the co-operation of passengers. The second part of the announcement is designed for passengers and to encourage them to co-operate with the actions of staff in their attempt to hold people behind the barriers. In the course of the announcement, the supervisor sees that passengers are still attempting to force their way through the barriers, resisting the attempts of staff to have them wait and queue in an orderly fashion. The announcement is shaped with regard to the behaviour of passengers, in particular those who continue to try to force their ways through barriers. The repeated and emphasized ‘Remain... behind the barriers’ is not simply a general instruction to all the passengers but designed in particular for those who are resisting the staff’s attempts to have them stand back and queue. It emerges interactionally, with regard to ways in which certain passengers are failing to respond to the actions of staff in the sequentially appropriate manner. The announcement, and in particular the repeated instruction, gains its sense and significance by virtue of the ways in which both passengers and staff hear it with regard to behaviour, at this moment, of particular passengers.

We can see therefore how the supervisor attempts to secure co-ordinated action between staff and passengers through a single announcement; an announcement which is designed to shape both how staff and passengers see and respond to each others’ conduct. The supervisor uses the public address system to collapse distinct actions, ordinarily delivered through different media, into a particular activity which simultaneously incorporates instructions for both staff and passengers. The initial single announcement differentiates the categories of personnel and passenger and fashions the ways in which participants see and interpret each others’ conduct provides instructions as to how they should act and respond. Within it, we also see how supervisors, in the course of looking at various scenes, can attempt to engender distinct, sequentially relevant activities, from distinct categories of people, which allow the participants themselves to recognize each others’ conduct in particular ways, and to produce interdependent, yet sequentially and organizationally appropriate activities. In a sense therefore, the supervisor deploys double-edged sequentiality; providing resources to enable both staff and passengers to systematically co-ordinate their conduct towards each other.
DISCUSSION

The character of work in operation centres in London Underground stands in marked contrast to the conventional idea of surveillance found in some contemporary research in the social and cognitive sciences. The operation rooms provide a panorama of the complex physical and organizational environment within which it exists: CCTV and other information systems provide access to conduct and events which arise throughout this domain. The supervisors oversee conduct and events in the domain, they discover and identify problems when they emerge, and develop organizationally relevant and accountable solutions. Unlike the conventional idea of surveillance, their conduct infrequently involves generalized ‘monitoring’ of the domain, rather CCTV and other information sources are the means by which they identify and manage a relatively circumscribed set of routine problems and events. To a large extent supervisors are not concerned with identifying particular individuals, but rather with detecting actions and events which might disrupt the ordinary flow of passengers and traffic through the station. The routine problems and events which arise, and in particular the ordinary and conventional ways in which they manage those difficulties, inform the very ways in which they look at and use the images on the screen; their perception of the world through CCTV is inseparable from their organizationally relevant and accountable practices for dealing with particular problems and events. Noticing and identifying particular problems derives from the routine ways in which such events are responded to and managed in an appropriate organizational manner.

The use of CCTV in London Underground throws into relief the relationship between social action and its immediate environment; a relationship which has received relatively little attention within sociology, surprisingly perhaps given the growing interest in social interaction, language and like. In the materials at hand, we can begin to see how the environment in which action occurs is critical to the ways in which both participants and others, for example those viewing the domain, make sense of and recognize that action. The patterns of movement – walking, standing, queuing, waiting, gesturing, even speaking – are recognizable by virtue of the ability to see and interweave action and immediate and occasioned environment in which it occurs. The environments provide a resource for the recognition of social action, just as the action informs the ways we see and make sense of the environment including the actions of others. CCTV is interesting in this regard since it provides supervisors with ways of configuring the environment to perceive, even ‘read’, action in organizationally relevant and situationally appropriate ways. So for example a collection of seemingly independent views of a complex domain are momentarily interconnected to determine whether a platform is overcrowded or to recognize that someone is trying to force their way through the barriers. The technology provides ways of configuring scenes of action which do not
necessarily correspond to the participants’ perspective. Rather through CCTV supervisors are able to ‘recontextualize’ action; to place conduct within a framework of action which is relevant to the management of the (overall) environment. The perspective of the participants, however, whether as passengers or staff, remains a critical resource in the discovery, identification and management of problems and difficulties.

In overseeing the domain, staff are not disinterested observers monitoring the environment, but rather are actively engaged in shaping how others see each others’ behaviour and the environment in which it occurs. Supervisors provide staff with not only instructions but the ability to see potential problems and difficulties to enable solutions to be ‘put in place’ in situationally appropriate ways. In particular they provide staff with ways of seeing the conduct of passengers and in seeing passengers’ conduct in particular ways, they implement organizationally appropriate solutions. These solutions depend on the co-operation of passengers, and, in particular, the ability of passengers themselves to see and make immediate sense of the actions of staff in organizationally relevant ways. Through public announcements supervisors enable individual passengers to respond to these with sequentially appropriate actions which reciprocates the actions of staff and their fellow passengers in a relevant and timely fashion. Supervisors deploy a social and interactional organization, they configure the environment of others for others, and, in particular shape how people interpret the scene, including the conduct of others, and co-ordinate their actions in an orderly and organizationally appropriate manner. These practices entail using CCTV to have participants themselves actively constitute and organize the environment in particular ways from within that scene.

The design and deployment of image recognition systems to support work and co-ordination in the operation centres of London Underground raises some interesting sociological and technical issues. Even if we take a seemingly unambiguous problem such as ‘overcrowding’, we find no necessary correspondence between the density in mass of passengers and its operational definition; indeed its organizational and practical characterization has more to do with the practical management of the free flow of passengers rather than the number of people walking or standing in the station. The picture becomes more complex still, not just when we consider that the recognition of overcrowding may depend on the inter-relationship of a series of ‘interconnected’ images and related information sources such as traffic patterns, but also on a supervisor prospectively envisaging overcrowding rather than simply reacting to it when it arises. The perception and intelligibility of the scenes, or rather the images of those scenes, involves practical situated reasoning which relies upon the operator’s ability to determine the scene with regard to an array of contingently relevant matters and concerns (the timing of the next train, the flow of passengers, the time of day, the stage at which problems have been dealt with, etc). In part therefore, image recognition systems touch on an issue which has been central to debate within the social and cognitive sciences for
many years, namely whether it is empirically fruitful or analytically legitimate to develop ‘reasonable’ descriptions of action by virtue of its visual and physical characteristics. Whilst such assumptions have been subject to sustained and powerful criticism for more than century, at least in the social sciences, they remain an important element of practical theorizing and the design and development of new technologies.

(Date accepted: February 2002)  

Christian Heath  
Pau Luff  
and  
Marcus Sanchez Svensson  
King’s College, London

ACKNOWLEDGMENTS

We would like to thank personnel on London Underground who generously provided us with access for fieldwork and video-recording and continue to suffer our endless queries and questions. An earlier version of this paper was presented at the International Conference on Discourse and Organizations, University of Mannheim, March 2001. We are very grateful for the generous comments and suggestions from participants at the conference and from Hubert Knoblauch, Jon Hindmarsh, Dirk vom Lehn, David Silverman, Sergion Velastin and Graham Button for their extensive support with the issues and materials discussed here. The project of which this paper is part is funded under the CEC IST 5th Framework Programme DG VII. Details of the project, entitled PRIMATICA, can be found on the website:- http: //www.prismatica.com

BIBLIOGRAPHY