
THE PROCEDURAL ANALYSIS OF OFFENDING AND ITS RELEVANCE FOR SITUATIONAL PREVENTION

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Abstract: *Successful situational crime prevention measures tend to be characterized by their crime-specific approach, and by their considerable knowledge about how the crime in question was committed. Beyond these general prescriptions for approaching the tasks of crime analysis and crime control, however, little further guidance is available. This paper borrows a concept from cognitive science—the notion of the script—to examine the crime-commission process in more detail. By drawing attention to the way that events and episodes unfold, the script concept offers a useful analytic tool for looking at behavioral routines in the service of rational, purposive, goal-oriented action. A script-theoretic approach provides a way of generating, organizing and systematizing knowledge about the procedural aspects and procedural requirements of crime commission. It has the potential for eliciting more crime-specific, detailed and comprehensive offenders' accounts of crime commission, for extending analysis to all the stages of the crime-commission sequence and, hence, for helping to enhance situational crime prevention policies by drawing attention to a fuller range of possible intervention points. As to theory, the script concept enables one aspect of the rational choice perspective on criminal behavior—the unfolding of criminal events—to be developed further, and captures something of the routinized quality, yet flexibly responsive nature of criminal decision making.*

INTRODUCTION

Recent decades have seen a significant change in approaches to crime control. It has been increasingly recognized that the preoccupation of

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traditional criminology with the etiology of offender motivation has led to neglect of the role played by the current environment in influencing criminal behavior (Cloward, 1959; Gibbons, 1971; Sutherland and Cressey, 1978). The call for "situational" as well as "genetic" accounts (Gibbons, 1971) involves, in fact, two sets of distinctions: that between proximal and distal influences on criminal behavior; and that between accounts of criminality, whether distal or proximal, and criminal events (Clarke and Cornish, 1985; Gottfredson and Hirschi, 1990).

The theoretical problems of interfacing and integration posed by the development of these various accounts have yet to be resolved, and will not be tackled here. But the disparate shifts of attention to which they have given rise—from initial causes to maintaining conditions; from distal to proximal; from criminal motivation to criminal intention; from causes to control; and from criminality to crime—can all be attributed to a growing appreciation of the relevance of situational variables to any coherent and comprehensive explanation of criminal behavior and crime events. At the meta-theoretical level, both learning theory and rational choice perspectives have suggested more appropriately dynamic and interactional "theories of action" (Cornish, 1993b) by means of which the contingent, situational nature of criminal behavior can be better captured. And at the micro-sociological level of analysis, interactional approaches have emphasized the importance of the *Immediate* circumstances within which criminal activities take place. In doing so, they have highlighted the dependency of criminal events upon convergences between motivated offenders and situational opportunities for crime (Cohen and Felson, 1979; Brantingham and Brantingham, 1984).

Such concerns are by no means purely academic. It is true that the role of opportunities is still thought to be theoretically uninteresting in the context of offender etiology, and, hence, irrelevant to the sorts of crime-control policies favored by traditional criminological theory. The preoccupation of politicians and practitioners alike remains that of identifying, catching and punishing offenders, rather than that of dealing with crime (Wilkins, 1976). But the difficulties of preventing criminality, and the eclipse of rehabilitation as the strategy of choice, have provided a small window of opportunity for strategies which focus on the proximal causes and situational control of criminal events.

THE SITUATIONAL APPROACH

Situational crime prevention has, of course, a long history in criminology (e.g., Jeffery, 1971; Mayhew et al., 1976; Clarke, 1992), and its practical utility, if not its relevance to criminological theory, has been widely recognized (Roshier, 1989; Gottfredson and Hirschi, 1990). The attraction of such measures lies in their apparent simplicity and practicality. Instead of trying to change criminal motivation or offender self-control—both of which are regarded by traditional criminologists as deep-seated behavioral tendencies, and neither of which has responded conspicuously well to intervention by the criminal justice system—situational crime prevention attempts only to regulate their active expression by way of criminal behavior. Correct identification of the goals of criminal activity is, of course, required, but that is the extent of the situationist's interest in criminality. Offenders do not have to be identified before they can be dealt with. Instead, situational approaches have the ability to constrain the criminal actions of us all. This combination of modest aims with wide reach makes situational prevention an attractive option.

Requirements of the Situational Approach

Situational crime prevention, then, involves the development of techniques to prevent, constrain or disrupt criminal activity. Characteristically, these techniques use a variety of environmental manipulations to alter the risks, efforts, and rewards of offending, and the methods are rapidly developing in number, range and sophistication (cf. Clarke, 1992). Such intervention relies upon two important requirements:

- (1) the need to be crime-specific (Cornish and Clarke, 1987, 1989);
and
- (2) a familiarity with the procedural aspects—that is, the details-of crime commission in relation to specific crimes.

In a general way, the importance of these requirements is well recognized. But when it comes to applying them to the task of crime analysis and crime control, little further guidance apart from these prescriptions is available to the researcher or to the designer of situational measures. In practice, of course, the conditions governing the emergence and definition of crime problems often suggest an appropriate level of specificity. Thus, where repeated crimes of a particular type occur within a particular location (Matthews, 1992; Poyner, 1992), or where a series of similar

crimes involving similar locations or targets are committed (Hunter and Jeffery, 1992; Sloan-Howitt and Kelling, 1992). the need to be crime-specific is dictated by the presenting problem. Again, although detailed accounts of the crime-commission process are often not available, they are often not necessary. Restricting access to the crime setting or hardening targets often provides all that is required for satisfactory crime prevention.

Decision-making frameworks offer a useful way of capturing and explicating action at the micro-sociological level, since they enable the situational variables influencing action and action sequences to be readily specified. But while research on offender perceptions and decision making (Brantingham and Brantingham, 1978, 1984, 1993b; Bennett and Wright, 1984; Clarke and Cornish, 1985) and on rational choice and routine activity perspectives (Cornish and Clarke, 1986; Clarke and Felson, 1993) has produced a conceptual framework for the situational analysis of crime, situational prevention studies have often proceeded quite successfully without much reference to these theoretical niceties.

There are, however, a number of reasons why it might be useful to provide a more detailed theoretical context for, and specification of, the two above-mentioned requirements of the situational approach:

- (1) Most obvious—now that the range of situational measures is so great (see Clarke, 1992, for classifications of techniques; and Ekblom, 1994, for an attempt at a comprehensive classification of preventive action)—is the need to relate such measures systematically to possible intervention points throughout the crime-commission process.
- (2) Since—notwithstanding the beneficial discipline imposed by local crime problems upon crime-specific thinking—demands to tackle crime are often couched in the most general of terms, some way of addressing the issue of levels of specificity and how they might relate to each other is required.
- (3) A conceptual framework within which to elaborate the whole decision process of crime commission is required, one that will encourage the detailed specification of the actors; contexts, elements and sequences of action which together make up a specific criminal activity.
- (4) Studies of criminal decision making for the purposes of situational crime prevention could benefit from modes of eliciting information which encourage appropriately crime-specific reports and detailed accounts of the crime-commission process.

(5) The Importance to criminological theory of a detailed understanding of the crime-commission process has yet to be fully appreciated. We need to know more about the crime-commission process because:

(a) Crimes form linkages among themselves.

(b) These linkages may form and grow in part because of the act of crime commission itself.

(c) Crimes form routines, and routines constitute an integral part of lifestyles.

(6) Lastly, there may be some payoffs in relation to our understanding of the nature of offender decision making and of its implications for the rational choice perspective.

It is to all these issues that this paper addresses itself.

DECISIONS IN THE CRIME-COMMISSION PROCESS

Crimes are events with a specific location in place and time. But the crime event itself is only one among many events which occur within the crime-commission process. It is both the outcome of a sequence of decisions and itself a part of an ongoing process which has an aftermath—one which may include further crimes and their sequelae. It is for this reason, therefore, that simple (Gottfredson and Hirschi, 1090) and "mindless" though many crimes may appear, theoretical and practical benefit may be gained from a clearer identification of the goals of crimes, and a closer attention to their crime-commission processes.

The tendency to oversimplify the crime-commission process can be put down to a number of reasons. A confusion between impulsivity and opportunism—particularly in relation to crimes involving an important element of surprise—means that the role of prior knowledge and "pattern planning" (Feeney, 1986), or the use of "templates" (Brantingham and Brantingham, 1984), is often overlooked. Again, the routinization and speed of crime commission may both impede self-report by the offender and evade analysis by the researcher. More generally, procedural aspects of crime commission are often hard to unscramble from the surrounding "noise." Offender lifestyles involve multitasking: activities like hanging out, partying, hustling, and driving around looking for action also serve to put them in the way of, considering, and making initial preparations to take advantage of, a range of criminal opportunities available. Much may be going on, but little of the activity is either visible to, or understood by, the onlooker. Under these circumstances, the job of identifying specific

crime-commission processes becomes difficult because of the intermingling of, and sharing of common initial pathways between, separate preparatory activities. The time scales involved may also make it difficult to trace the process as, for example, criminal opportunities casually noted on one occasion are exploited at a later date (Walsh, 1986), or as a variety of preliminary activities spanning days or weeks are carried out.

Task-switching also complicates the issue. The unfolding of a crime involves a variety of sequential dependencies within and between elements of the action. Crimes are pushed along or impeded by situational contingencies—situated motives; opportunities In terms of settings, victims and targets: the presence of co-offenders: and facilitators, such as guns and cars. Each, several, or all of these may have to be present if the action is to be carried forward at that time. Such contingencies expose the crime-commission process to continual interruption in the light of prevailing opportunities or degree of preparedness.

Lastly, even when much is known about a particular type of crime, certain stages in the crime-commission process may be somewhat better articulated than others. For example, a complex crime such as professional car theft may involve a series of elements, such as THEFT; CONCEALMENT; DISGUISE; MARKETING; and DISPOSAL. Professional experience and preoccupations may dictate, for example, that more attention will be paid to stages which offer practical professional payoffs within the context of a criminal justice agency's function. In the case of the police, the emphasis upon detection may mean that more attention is paid to the issues of disguise and identification of the stolen vehicles (the process of "ringing," as it is termed) than to the systematic collation of information that might be relevant to the situational prevention of car thefts (Cornish, 1993a).

ANALYZING ACTION

One way of approaching the problem of gathering and organizing information about crime commission is to make use of theories and concepts in cognitive science (see Gardner, 1985, for a stimulating overview of this new field), which address a similar issue: the production and understanding of sequences of events or actions. For the purposes of the present discussion, the usefulness of such "production theories" is in their conceptual approach, rather than in any specific models or mechanisms that they develop.

One such theory is ACT (Adaptive Control of Thought), developed by Anderson (1983) as a computer-based model of how cognitions produce action. According to ACT theory (see Hill, 1990:168-173. for a brief discussion), the ability to carry out skilled action correctly is the outcome of a learning process, known as "proceduralization," whereby declarative knowledge ("knowing that") obtained from a variety of sources is transformed through practice into the production rules which make up procedural knowledge (or "knowing how"). Knowledge undergoing proceduralization initially consists of "...many small units, each accomplishing a specific step in the overall production" (Hill. 1990:170). If these steps regularly occur together, they come to form larger composite units. "The two processes of proceduralization and composition work together to get from declarative knowledge to smooth, integrated procedural productions. They are therefore grouped together under a single name: *knowledge compilation*" (Ibid.). Once action is under procedural control, it may be carried out relatively automatically, and the original declarative knowledge may be less readily called to mind.

The primary value of such an analysis lies in its approach to the study of action sequences. As Hill (1990) comments, such frameworks provide useful sources of new ideas, conceptualizations, and analogies. So far as crime commission is concerned, the analysis, like that of the rational choice perspective in criminology, draws attention to its procedural aspects: the fact that the activity is goal-oriented; that it consists of a sequence of steps or sub-goals; that the separate elements in the sequence form themselves into a procedure which can be carried out without much thought; and that the activity requires both knowledge and the experience gained by practice for its successful performance. Viewed in this light, the apparent simplicity of criminal behavior may be a function of its routinized production, which serves to conceal important features of its organization, sequencing and acquisition.

CRIMES AS SCRIPTS

The dramaturgical theme is continued in a second contribution from cognitive science: the script concept, developed in the context of a computer simulation of the human cognitive structures and processes involved in understanding text (cf. Abelson, 1976. 1981; Schank and Abelson, 1977; and Fayol and Monteil, 1988, for a review). Scripts are members of a family of hypothesized knowledge structures, or schemata,

considered to organize our knowledge of people and events. Such schemata are held to guide our understanding of others' behavior, and our own actions. The script is a special type of schema, known as an "event" schema, since it organizes our knowledge about how to understand and enact commonplace behavioral processes or routines. More recently, as "memory organization packets," scripts have also featured as basic units in a theory about how knowledge of complex events is organized in, and retrieved from, memory (Schank. 1982: Riesbeck and Schank, 1989).

Schank and Abelson (1977) suggest that our knowledge of procedures has a specific nature and form, rather akin to a theatrical script. A favorite example of one such sequence is the "restaurant script," which organizes our knowledge about what to do in a restaurant: enter; wait to be seated; get the menu; order; eat; get the check; pay; and exit. The script concept is part of a larger theory about the organization of semantic memory, and scripts themselves exemplify just one level of a complex theory about mental representations which also addresses other important knowledge structures—such as plans, goals and themes—involved in intentional action (See Cornish, 1993a).

Nisbett and Ross neatly summarize the conceptual flavor of scripts and their dual ancestries in cognitive social psychology and cognitive science:

...scripts generally are event sequences extended over time, and the relationships have a distinctly causal flavor, that is. early events in the sequence produce or at least "enable" the occurrence of later events. A script can be compared to a cartoon strip with two or more captioned "scenes," each of which summarizes some basic actions that can be executed in a range of possible manners and contexts (for instance, the "restaurant script" with its "entering," "ordering," "eating," and "exiting" scenes). Alternatively, a script can be represented as a computer program with a set of tracks, variables, relationships, operations, subroutines, loops, and the like, which are "instantiated" with particular values for any particular application of the script (1980:34).

As Gioia and Poole (1984:455) comment, script and schema theories have been used by their originators mainly for the purpose of studying how people come to understand textual and verbal descriptions of events (cf. Mandler, 1984). rather than as a means of studying the use of scripts in ongoing behavior. Nor, leaving the issue of their psychological reality aside, has their methodological utility as a means of structuring approaches to the description of real event sequences been exploited. But, as Lalljee and Abelson (1983:72) point out: "It would be surprising if the

processes involved in understanding stories do not have similarities with the processes involved in understanding everyday social behaviour"—or, one might add, in producing it.

By drawing attention to the way that events and episodes unfold, however, the script concept offers a useful analytic tool for looking at behavioral routines in the service of rational, purposive, goal-oriented action. Moreover, their emphasis upon "...concrete explanations about specific actions in specific domains" (Hewstone, 1989:103) fits in particularly well with the crime-specific orientation to be found in rational choice and allied approaches to crime control. Thus, as noted above, scripts can be divided up into scenes involving smaller units of action, or plans required to achieve major sub-goals. Indeed, the term "scene," in everyday parlance, suggests episode, location, background, and plan of action all at the same time. Scripts also have roles associated with them; require props, such as setting "furniture" and facilitators; and take place in a variety of specified locations.

Lastly, the script concept can operate at different levels of abstraction. For example, as used by Schank and Abelson (1977), the original restaurant script is quite general: it provides a knowledge structure appropriate for handling procedures in restaurants. But the general script subsumes specific *tracks*—the fast food *track*, the cafeteria *track*, the plusher up-market *tracks*—which organize knowledge about the various kinds of restaurants, and enable the individual to deal with differences in procedures in specific circumstances. In this way, families of conceptually related scripts can be linked hierarchically, from the most specific instances to more inclusive and more abstract categories of script. Figure 1 summarizes some of the terminology associated with script analysis, and indicates the various levels of generality at which the script concept can operate. In the following discussion, the generic term "script" will be used to refer to procedural sequences regardless of level of abstraction. Where specific levels of abstraction are being discussed, nomenclature will be italicized (e.g., *universal script*, *metascript*, *protoscript*, *script*, *track*).

Figure 1: Terminology

GENERIC TERM: Script

LEVELS: Universal Script, Metascript, Protoscript, Script, Track

COMPONENTS: Scenes, Paths, Actions, Roles, Props. Locations

(After: Schank and Abelson. 1977)

THE PROCEDURAL ANALYSIS OF CRIME COMMISSION

With the advent of situational crime prevention, the need for detailed crime-commission information has become more widely recognized (cf. Clarke and Felson, 1993, for some recent discussions). Such information is becoming available for burglary (Walsh, 1980; Bennett and Wright, 1984; Rengert and Wasilchick, 1985, 1989; and Cromwell et al., 1991), robbery (Lejeune, 1977; Walsh, 1986), and some other violent crimes (Campbell and Gibbs, 1986; Felson, 1993). But for many crimes, information is only available on selected aspects of the process, and designers of situational crime prevention measures have therefore had to work with fragmentary information. As a consequence, they have tended to focus upon those points in the crime-commission process, such as target selection, which appeared to offer the greatest potential for fruitful intervention.

A script-theoretic approach offers a way of generating, organizing and systematizing knowledge about the *procedural aspects* and *procedural requirements* of crime commission. It has the potential to provide more appropriately crime-specific accounts of crime commission, and to extend this analysis to all the stages of the crime-commission sequence. It achieves this in two ways: first, by providing a way of eliciting offenders' subjective accounts of crime commission (i.e., "offender-based offense scripts"); and, second, by providing a framework for constructing more comprehensive and objective accounts of crime commission synthesized from offenders' accounts and other sources of information. This knowledge can then be used to enhance situational crime prevention policies by drawing attention to a fuller range of possible intervention points.

Developing A Procedural Framework

One useful device for helping to develop fuller scripts may be provided by the notion of the *universal script*. Recently, Leddo and Abelson (1986:118) have suggested, following Schank's (1982) discussion of the role played by script-like knowledge structures in memory, that scripts can be "...abstracted into a set of generalized scenes, which are indeed similar in function regardless of the script they come from." Such *universal scripts*, consisting of scenes arranged into a sequential order which further the overall action, offer standardized guidelines for constructing scripts at the *track*-level, whatever the state of knowledge about the offense in

question. Both Ekblom (1991) and Johnson et al. (1993) have drawn attention to the need to view crime-commission episodes in terms of a series of logistical steps. Figure 2 maps Ekblom's own illustration—a schematic plan of a subway mugging—onto the *universal script*.

Figure 2: A Robbery Script

PROTOSCRIPT: ROBBERY
SCRIPT: ROBBERY FROM PERSON
TRACK: "SUBWAY MUGGING"

SCRIPT SCENES/FUNCTIONS	SCRIPT ACTIONS
PREPARATION	Meet and agree on hunting ground
ENTRY	Entry into underground system
PRE-CONDITION	Travel to hunting ground
PRE-CONDITION	Waiting/circulating at hunting ground
INSTRUMENTAL PRE-CONDITION	Selecting victim and circumstance
INSTRUMENTAL INITIATION	Closing-in/preparation
INSTRUMENTAL ACTUALIZATION	Striking at victim
INSTRUMENTAL ACTUALIZATION	Pressing home attack
DOING	Take money, jewelry, etc.
POST-CONDITION	Escape from scene
EXIT	Exit from system

(After: Leddo and Abelson, 1986; and Ekblom, 1991)

Preparations, often made outside the crime setting, are followed by entry to the setting, and the awaiting, or establishment, of conditions under which the crime in question can be committed. Various instrumental actions then occur, to be followed by the consummately activities which comprise the main action. Actions associated with the aftermath of the

main action then follow and, lastly, the players exit from the crime scene. (Further scenes, involving the disposal of jewelry and credit cards, have been omitted for the present purposes.) The procedural framework offered by *universal* scripts thus supplies a useful way of approaching the task of modeling crime commission in more detail. Figure 2 also draws attention to the existence of successively more crime-specific levels of analysis—for example, from theft of property (*metascript* level), through robbery (*protoscript*) and robbery from the person (*script*), to an individual *track* such as subway mugging. In doing so, Figure 2 suggests that research or situational measures, which are guided by generic rather than specific offense scripts, may fail to elicit or make best use of offenders' perceptions.

Figure 3: Using Existing Data

PROTOSCRIPT: AUTO THEFT
SCRIPT: TEMPORARY USE
TRACK: "TRANSPORT"

SCENE / FUNCTION	SCRIPT ACTION
PREPARATION	Get screwdriver (p.49) Get scaffold tube (p.50) Select (2) co-offenders (p.29)
ENTRY	Go to public car-park (pp.46-47)
INSTRUMENTAL PRE-CONDITION	Reject alarmed cars (p.50) Choose older Cortina (pp.47-48)
INSTRUMENTAL INITIATION	Force lock with screwdriver (p.49) Enter vehicle
INSTRUMENTAL ACTUALIZATION	Break off trim (p.50) "Scaff" ignition barrel (p.50) Remove ignition and steering lock (p.50) Activate starter switch (p.50)
DOING	Drive away and use vehicle (p.30)
POST-CONDITION	Abandon by next day (p.30)

(Data from: Light, Nee and Ingham, 1993)

The degree of standardization provided by the *universal script* also facilitates the organization, discussion and comparison of decision making information within and between research projects. Figure 3 makes a preliminary attempt to cast information about a particular type of crime—in this case, a form of auto theft (Light et al., 1993)—into a rudimentary script format, using existing data. The procedural framework offered by the *universal script* enables the particular form or *track* of car theft under scrutiny—that concerned with temporary use for transport purposes—to be quite closely specified. However, gaps in information and problems in the way it was reported make it difficult to allocate the procedural data unambiguously to particular tracks (Cornish, 1993a). As can be seen, this *track* can be viewed as one of a family of related "temporary user" (or "joyriding") crimes with similar but distinguishable motives and methods. This *script* family can, in turn, be subsumed under the broader category of auto theft (the *protoscript*).

As with the previous example, the advantage of using a general procedural framework to make sense of the data, rather than "extracting" a plan from the data themselves, is that it explicitly encourages the investigator to consider all aspects of the crime-commission process, not just those suggested by offenders' reports or by a consideration of the specific offense and its likely sequence. By interrogating the data in this way, omissions, such as missing information about preparations or aspects of the offense's aftermath, are much more likely to be identified.

Preventing and Disrupting Crime Commission

"Natural" sources of crime-commission failures—especially those caused by failures of planning (see Leddo and Abelson, 1986)—can also be investigated by means of this procedural framework. Figure 4, for example, provides a list of possible script breakdowns during the course of trying to steal a fast car for performance driving. (Later scenes, such as "driving to performance area" and "performing," have been omitted from the figure.) The general framework provides a useful guide for undertaking systematic studies of attempts and aborted crimes (see Ekblom, 1992:73, for some hilarious examples in relation to post office robberies). It may also help to throw light upon the extent to which offenders use standing decisions to enter and abort scripts, or to change direction within scripts (one aspect of displacement). Such studies may also provide additional confirmation of what works in crime prevention, and about the impact of

"in-depth" situational prevention (see below)—that is, the cumulative effects of preventive efforts at different points in the crime-commission process.

Figure 4: Some Ways of Failing

PROTOSCRIPT: AUTO THEFT
SCRIPT: TEMPORARY USE
TRACK: "PERFORMANCE DRIVING"

SCENE/FUNCTION	SCRIPT ACTION	FAILURE EXPLANATION
PREPARATION	Gather tools	Forgot scaffold tube
ENTRY	Enter parking lot	Parking lot closed
PRE-CONDITION	Loiter unobtrusively	Noticed by security
INSTRUMENTAL PRE-CONDITION	Select vehicle	No Vauxhall Astra GTEs
INSTRUMENTAL INITIATION	Approach vehicle	Driver returns
INSTRUMENTAL ACTUALIZATION	Break into vehicle	Vehicle impregnable
DOING	Take vehicle	Vehicle immobilized
POST-CONDITION	Reverse out of bay	Crash into wall
EXIT	Leave parking lot	Gates closed for night

(After: Leddo and Abelson, 1986)

More importantly, however, the procedural analysis enables the systematic mapping of situational measures onto the crime-commission process, especially where much is already known about the script in question and about the likely points of difficulty and failure for offenders. The many situational measures recorded and classified by Clarke (1002), for example, can be precisely located at their respective intervention points

within any crime-commission process (see Figure 5). Such an exercise can be useful both in suggesting new uses for existing measures and in pinpointing where new applications are required, and might be developed. (It is interesting to note that specific categories of criminal offense—conspiracy, going equipped, aiding and abetting, etc.—also address particular aspects of crime commission, and can therefore also be mapped onto the crime-commission process.)

Figure 5: Intervention Points for Situational Measures

PROTOSCRIPT: VANDALISM
SCRIPT: GRAFFITI WRITING
TRACK: "TAG WRITING"

SCENE/FUNCTION	SCRIPT ACTION	SITUATIONAL CONTROL
PREPARATION	Buy spray-can Find good setting	Sales regulation City paint-out program
ENTRY	Enter setting	Access control Entry/exit screening
PRE-CONDITION	Loiter	Surveillance
INSTRUMENTAL PRE-CONDITION	Select target	Remove target
INSTRUMENTAL INITIATION	Approach target	Surveillance
INSTRUMENTAL ACTUALIZATION	Reach target	Protective screens Legal target provided
DOING	Spray graffiti	Graffiti-resistant paint
POST-CONDITION	Get away quietly	Moisture-activated alarm
EXIT	Leave setting	Entry/exit screening
DOING (later)	"Getting up"	Rapid cleaning

(After: Leddo and Abelson, 1986; Clarke, 1992)

In order to prevent or disrupt crime commission, of course, we need to have identified the script correctly: Is it a joyrider script or an exporting car script? Is the rape script a humiliation script or a violent revenge script? Situational crime prevention has always had an interest in correctly identifying motivation and purpose. Motivation may be treated as "given" in the sense that no attempt is made to modify it. But this does not mean that the nature of motivation (in terms of its direction and strength), as opposed to its origins or development, are unimportant (see also Ekblom, 1994). A complete understanding of the crime-commission act and its goals is often necessary before the motivation can be fully understood. The crime-specific approach is therefore a motive-specific one, and procedural analysis can render such motives more clearly.

Eliciting Accounts of Crime Commission

Since offenders' accounts of crime commission take a narrative form, it would seem likely that script theory—which deals with the cognitive structures by means of which our knowledge of event sequences is organized and enacted—could offer some help in eliciting, as well as analyzing, such accounts. As might be expected from disciplines with a healthy and long-standing commercial interest in the empirical study of action (Lazarsfeld, 1972), those involved in studying organizational behavior (Gioia and Poole, 1984), and marketing (Leigh and Rethans, 1983, 1984) have shown the most interest in scripts. Both theory and associated research methods have been used as a basis for eliciting information about the procedures involved in buying (Leigh and Rethans, 1984): selling (Leigh and McGraw, 1989; Leong, Busch and John, 1989); and complaining (Martin, 1991). Research has looked at overall processes of selling; at parts of the process, such as the initial sales call; at the negotiation phase of the buying process: at differences between the initial buy situation and the "re-buy" one; and at differences between novices and experts. (Only in the area of police officers' expertise [Dwyer et al., 1990] has the concept been used in criminology for purposes similar to those in marketing and consumer research.)

Free-form techniques borrowed from cognitive psychology (Bower et al., 1979) are often used to elicit from respondents detailed individual scripts of highly specified behaviors. Script "norms" are then constructed, and the outcome is "...a group script which describes the 'basic action language*' and specifies the normative sequence in which these actions

should occur" (Leigh and Rethans. 1984:24). Free elicitation may be best suited to the development of an initial understanding of offenders' scripts, too, although for the purposes of situational crime prevention a more directed approach involving active probing may be required if complete procedural accounts are to be obtained. Since effective prompting involves a detailed knowledge of the crime in question, a certain amount of bootstrapping seems inevitable at this stage.

Issues of sampling and representativeness will also need to be more fully recognized and tackled when eliciting accounts of crime commission. Apart from varying in level of specificity (see below), scripts vary in the degree of expertise which they exhibit (Carroll and Weaver. 1986; Leong et al.. 1989; Martin, 1991; Cornish, 1993a). The implications of this for the collection of data relevant to situational measures need to be addressed. As mentioned earlier, value may also be gained from deliberately trying to elicit instances of attempted, aborted, and failed crime-commission scripts (Hough, 1987) from offenders, and of changes of plan, as additional ways of identifying problematic aspects of crime commission and successful prevention strategies.

The orientation toward narrative provided by the script concept promises to improve the "fit" between the type of data that are sought and the method by which they are elicited. The use of a procedural framework, such as that provided by the *universal script*, offers some preliminary guidelines for eliciting accounts of crime commission. The adoption of interviewing techniques which address crime commission at the appropriate level of specificity, and which require offenders to recall specific instances of the crime in question (Ekblom. 1991) when making their reports, are also likely to prove helpful, as are the use of concurrent verbal protocols (Carroll and Weaver. 1986; Carroll and Johnson, 1990), where these can be obtained (see also Woods, 1993). Even where hypothetical criminal activity is being investigated, vigorous attempts should be made to select stimulus materials and settings which evoke accounts at the *track* level of specificity. Investigations of hypothetical action tendencies, however, do not afford evidence of the richness of detail, improvisation and mistakes that attention to actual instances provides.

SELECTING THE APPROPRIATE LEVEL OF ANALYSIS

Whether eliciting accounts from offenders, or collecting and analyzing crime-commission data from other sources, the issue of what constitutes

an "appropriate level" of specificity arises. For situational crime prevention purposes, procedural analysis should probably use a "bottom-up" strategy, beginning with a specific instance of a specific crime, and uncovering the detail of its crime-commission process. The features of this initial instance will tend to play a crucial role in defining the characteristics of the track category that develops, as further similar instances are collected, analyzed and grouped in terms of crime-commission features that they have in common with the initial instance. (Technically, *tracks* may be thought of as "fuzzy sets." whose defining instances are "prototypes" [Fiske and Taylor, 1984].) Such a track: will represent, therefore, the first and least abstract level of generalization in terms of categories of script.

Distinguishing Tracks

As to what constitutes a distinguishable track, which features emerge as defining ones may well depend upon the crime-commission instance or problem that is the starting point. The most that can be said at present is that crime-commission *tracks* should be defined and classified by characteristics salient to situational crime prevention. Procedural analysis will clarify the range of features that need to be taken into account but, at the least, a consideration of the choice-structuring properties of particular crimes (Cornish and Clarke, 1987, 1989) may provide some guidance. These properties constitute the unique blend of features which distinguish one criminal activity from another in terms of its goals, targets, victims, locations, risks, payoffs, and various complementary offender requirements such as motives, expertise, special knowledge, resources, co-offenders, and so on. Since choice-structuring properties have been used at various levels of specificity to allow the drawing of distinctions within a broad offense grouping (e.g., as between different types of theft involving cash: Cornish and Clarke, 1987). or between closely related forms of crime (e.g., types of burglary, or illegal substance abuse), they are clearly relevant to the sorts of distinctions made at *track* and *script* level during the course of the procedural analysis of crime commission.

In the preceding diagrams, for example, a number of such properties have served as a basis for classifying the criminal activities in question both horizontally, as different *tracks* belonging to the same *script* "family," and vertically, as members of higher-order categories or script levels (Riesbeck and Schank, 1989). Thus, criteria have been used to distinguish between tracks of the same script (the different motives for joyriding, or

the various locations for robbery from the person); between *scripts* (temporary vehicle use vs. permanent auto theft; robbery from the person vs. commercial robbery), or between *protoscripts* (robbing people vs. stealing cars vs. damaging property). The features now being used by analysts of crime trends as a basis for classifying crimes are also beginning to reflect the basic requirements of procedural analysis and situational prevention for greater crime-specificity. The British Crime Survey for 1992 (Mayhew et al., 1993), for example, analyzes crimes of violence using a typology of seven sub-categories. Although the major organizing feature is crime location, the typology also takes some account of offender relationship to victim, and motive. Such developments suggest starting points for a more detailed procedural analysis of violent crimes, and illustrate the relevance of crime surveys to situational prevention (Mayhew et al., 1993:103-105).

Interesting though these developments are, however, it is essential to maintain a distinction between taxonomic and heuristic applications of the script concept. The importance given to hierarchies of abstraction, and to the identification of grounds for making distinctions, is not to provide "better" ways of classifying crimes (Farr and Gibbons, 1990). It is primarily intended to draw attention to the dangers of premature abstraction and generalization, and to pitch the procedural analysis of crime commission at the appropriate level of specificity for situational prevention. Its aim, then, is a methodological one: to emphasize the need to be crime-specific, to suggest what this might entail, and to provide some simple conceptual tools for the purpose.

The Scope for General Situational Measures

The potential cost-effectiveness of crime prevention strategies that can address crime *genera* rather than crime *species* make it tempting to pursue generalization to ever-higher levels of abstraction. But until much more is known about crime commission, one should proceed with caution. This does not, of course, rule out all generalization. Some generalization across *tracks*—as between different *tracks* of the temporary car theft *script*, for example (Figures 3 and 4)—may be possible. But generalization at even this level of specificity may ignore features of the individual tracks, such as type of vehicle targeted (Clarke and Harris, 1992), which may have important differential implications both for the detailed procedures of crime commission and for the design of situational prevention. Higher-order clustering of criminal activities, especially when achieved on the

basis of only one or two distinguishing characteristics—and these often on the basis of armchair speculation—always runs the risk both of mistakenly grouping activities together and of ignoring salient differences. Indeed, given the sheer number of variables involved in crime commission, and the speed at which techniques change and criminal activities evolve, even the grouping of instances into tracks will inevitably be tentative, and may be of limited practical value.

Once more is known about crime commission, generalization across *scripts* or *protoscripts* may be fruitful for crime prevention purposes, especially where instrumental scenes and their associated activities, such as the theft of a car, the breaking into premises, or use of the same location, are shared. To say otherwise would be to deny the wider prevention potential of some situational measures, and the possibility of "diffusion of benefits" (cf. Clarke, 1992:25-27)—that is, the generation, on occasion, of broader consequential or even seemingly adventitious benefits of such interventions. But the windfall nature of these bonuses, and the fact that they generally occur as the result of more crime-specific interventions, suggests that they may be difficult to realize by design. If this is so, then it may be premature to aim at identifying broader techniques to deal with whole "families" of crimes.

THE NATURE OF CRIME-COMMISSION SCRIPTS

Up to this point in the discussion, the script concept has been exploited mainly for its role in offering a more systematic approach to the procedural analysis of crime commission and of the elicitation of offenders' accounts. As such, the concept forms one aspect of a wider commitment to the development (Ekblom, 1988) and exploitation (Tremblay and Rochon, 1991; U.K. Audit Commission, 1993) of information (including information about *modus operandi*!) for criminal investigation and crime-control purposes.

Practical utility apart, however, the script concept may also have a more general contribution to make as a sensitizing concept. Script theory itself exploits the script metaphor when it uses it to illustrate the nature of the cognitive structures and processes underlying our understanding and enactment of action sequences. While it would be unwise to become too preoccupied with alleged architectures and mechanisms of human cognition, the way that the script concept has been developed by cognitive scientists can offer useful ways of thinking about how knowledge of crime

commission might be organized and used by offenders, and might sensitize the researcher to features of the process that would otherwise be overlooked. As Fiske and Taylor (1984:302) comment: "In explaining a process model to the computer, one explains it to oneself."

The remainder of this paper is concerned with ways in which the script concept can throw light upon the evolutionary, adaptive, and innovatory aspects of crime commission.

Special Attributes of Crime-Commission Scripts

In the study of crime commission, it is important to be able to find ways of characterizing the nature and development of criminal expertise in terms that recognize two important features:

- (1) the increasing routinization of decision making; and
- (2) the continuing scope for improvisation and innovation.

Viewing crime commission in terms of the development of knowledge structures, such as scripts, provides one way of accounting for and exploring these and related features, such as the transfer of expertise across crimes, and the consequent development of links of various sorts between them.

As Abelson (1981) points out, the fact that scripts can be characterized as routinized plans does not mean that they are necessarily rigid, stereotyped sequences of actions. Scripts are not chains of serially dependent scenes carried out in an invariant order. Discussions of schemata have always recognized their dual aspect: as Neisser (1976) points out, perceiving (and other actions) is directed by anticipatory schemata, but not controlled by them. Schemata provide such anticipations, and the environment confirms or modifies them as the action proceeds (cf. Brantingham and Brantingham, 1984, for a similar view of "templates"). In the case of event schemata, like scripts, their ability to direct action sequences effectively and routinely is a result of the development of accurate expectancies. But, by the same token, changes in the environment will cause the schemata themselves to elaborate and change.

There are two features of crime-commission scripts which add to this inherent flexibility. The first is that, while most scripts are carried out by means of consensual activities of their casts, offense scripts tend to be "personal" ones (Schank and Abelson, 1977:62)-that is, scripts in which other members of the cast may be reluctant or unwitting participants. The second feature follows from the first: offense scripts, unlike (say) restau-

rant scripts, do not operate in a facilitating environment, but in a hostile one. This means that successive instantiations of an offense script will tend to vary in terms of cast, props, and locations. At best, a particular production may "run" for a limited period in one location, where it may take the form of multiple victimization (Trickett et al., 1992). or of a "crime wave" of offenses of a particular type in a number of similar locations (Tremblay, 1986).

These features of most offense scripts ensure that the routinization which develops will be complex and able to handle multiple contingencies. While the scripts of beginning or occasional offenders are likely to be relatively poorly articulated (Cornish, 1993a). those of experienced offenders are likely to be structured in ways which allow for the choice of rapid alternative responses in reaction to the range of unwanted but foreseeable contingencies specific to the crime-commission track in question. The transactional nature of violent encounters suggests that scripts involving the instrumental use of violence, for example, may call for a range of strategies and clear rules for their selection and use (Block, 1977; Luckenbill, 1980). Since criminal activity is not encouraged, overcoming obstacles to crime commission is the major task that such scripts have to handle. Indeed, Schank and Abelson (1977:55; Abelson, 1981) consider this to be the major way in which all scripts grow.

As Riesbeck and Schank (1989:5) observe, scripts are a cognitive resource, and existing scripts may get adapted in a variety of ways. Typical elaborations of basic scripts may involve the development of new techniques, short-cuts or alternative pathways through individual scenes in a script, as well as the addition, modification, discarding or re-ordering of scenes within the crime-commission process. (The availability of well-elaborated scripts to the offender will, of course, be likely to affect the probability of various types of "displacement.") Well-rehearsed scripts may come to be activated by a variety of rules. As Abelson (1981:718) points out: "The relevant conditions for action rules might include cost, effort, mood, incentive, legitimacy, and so on..." Thus, "triggers" for scripts may relate both to personal circumstances and to situational factors, such as the presence of experienced co-offenders, attractive targets, or sudden opportunities. Some triggers may cause elements of the action to be re-ordered, abbreviated, carried out in parallel or omitted. And where decisions to enter or abort a script are made frequently on similar grounds, they may become routinized as standing decisions or policies. The distinction between scripts and the conditions for their initial and continued

activation preserves the notion of criminal decision making as a multi-stage sequential process (Cornish and Clarke. 1986).

The routinization of crime-commission procedures, the ways in which the process is activated and de-activated, the operation of standing decisions, and the difficulty of identifying when some stages are in progress (e.g., preparation: entry: preconditions, and some instrumental preconditions), help to explain why crimes may often look more simple or impulsive than, in fact, they are. At the same time, the ability of crime-commission procedures to respond to experience by elaboration suggests why flexibility, variation and evolution are also features of criminal activity.

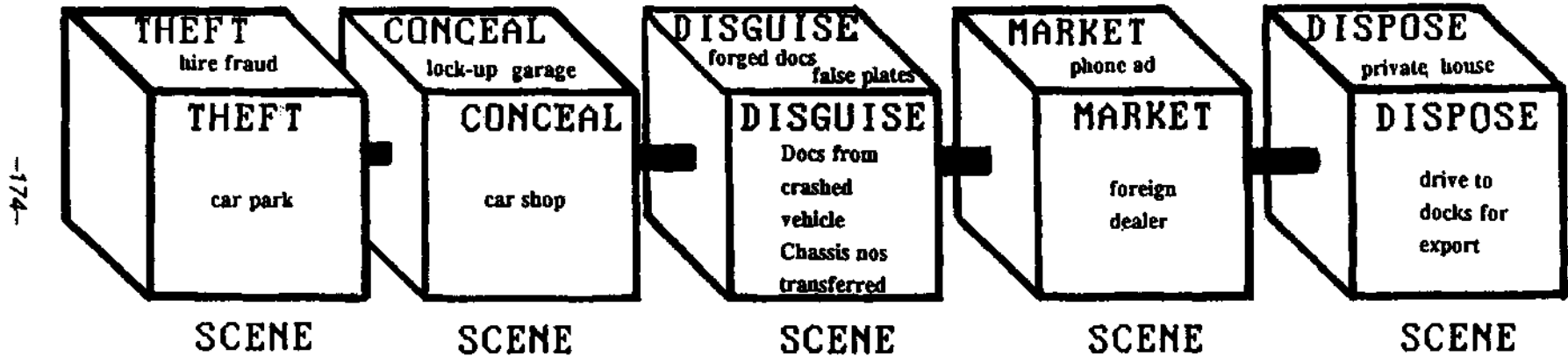
The Script Permutator

A simple three-dimensional model of a typical crime-commission script may make these twin features of routinization and flexibility clearer. The professional auto-theft offense known as "ringing"—the theft and disguise of automobiles for eventual resale—provides a useful illustration (Cornish, 1993a). Ringing has the further advantage for the present purpose of being a complex crime that is complicated in its execution and often demanding in its logistical requirements. One way of looking at such crimes is to regard them as composite scripts that can be disaggregated into a series of linked and "nested" scripts, which function as scenes do in simpler crime scripts.

In ringing, the crime-commission sequence has at least five separate scenes—THEFT: CONCEALMENT: DISGUISE: MARKETING: and DISPOSAL—the PREPARATION scene is not illustrated), each of which requires procedural analysis as a script in its own right (cf. Figures 3 or 4, above, for some examples of the sorts of crime-commission activity involved in the THEFT scene). Typically, there are many potential ways of playing the scenes that make up the overall plot of the action, and the various combinations of the alternative scenes provide a number of crime-commission routes to the same outcome.

In Figure 6, the possibility of these alternative pathways, composed of alternative scenes in different combinations, is outlined using a simple "script permutator." Each cube represents an individual scene in the overall ringing *script*, while different facets of each cube offer alternative methods of carrying out the action particular to each scene. (Because of

Figure 6: The Script Permutator



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technical constraints, only two scene variants can be illustrated in the current diagram.) Rotation and realignment of one or more cubes with respect to the other(s) offer a number of different pathways to the outcome. Although only two such routes are shown aligned, no less than 2^5 , or 32, combinations are theoretically possible using the two variants provided for each scene—and many more variants are, in practice, likely to be available. Insofar as the individual scenes of this complex crime can themselves be regarded as scripts nested within a larger composite script, similar permutations of their procedures are also possible.

The various potential crime-commission pathways generated by the permutator can be regarded as different *tracks* of the *script* family. However, the very different look of the offense when different scene permutations are employed provides an illustration of the difficulties of deciding when scripts are similar enough to be grouped as *tracks* of the same script, or when it is useful to do so. As when playing slot machines, not all combinations generated are winning ones. The notion of routinization can be expressed in terms of the few tried-and-tested combinations which become the major *tracks* of the script. The idea of flexibility is conveyed by the possibility that other permutations may emerge in response to particular circumstances.

Thus, by indicating the inherently dynamic quality of scripts, the "script permutator" (or "scene permutator," in the case of simple crimes or component scripts) offers a heuristic device for stimulating thinking about the range of possible, feasible, and actual procedural variations and innovations—both those that might arise spontaneously, and those that might be anticipated to occur in response to situational measures. Indeed, well-constructed script permutators which summarize the state of crime-commission knowledge about specific crimes may offer useful adjuncts to thinking about, and planning for, the types of "displacement" that might be anticipated as the result of particular situational strategies. A preliminary attempt to look at some of the issues of adaptation and innovation is presented below

Adaptation and Innovation in Crime Commission

Scripts are simply a way of highlighting the procedural aspects of crimes. In doing so, they emphasize the *form* of crime as a dynamic, sequential, contingent, improvised activity, and the *content* of specific crimes, considered as activities with particular requirements in terms of actions, casts, props, and spatio-temporal locations. The ability of the

script concept to draw attention to such features of crimes suggests that it may have a useful role to play in "...understanding the patterns formed by the rich complexities of criminal events" (Brantingham and Brantingham, 1993b:259).

The routinized nature, yet inherent flexibility of crime-commission scripts, and the procedural requirements of specific crimes, together have implications for thinking about the patterning of criminal activity, especially within local areas. Particular offense scripts generate procedural demands on local resources in terms of: casts (offenders, and victims and their associated targets); props (facilitators such as cars and guns); and locations (for preparation, hunting, concealment, and disposal). Frequent repetition of the type of offense, whether by the same individuals or different ones, is of itself likely to lead to some overlapping of activities in space and time, and to some sharing of required resources. However, the extent of this overlap will be a function of the procedural requirements of the specific offense, the characteristics of the offenders, and the quality of the environment as a source of victims and targets. Where many different types of offenses are committed within an area, this will increase the intensity and variety of procedural demands, and further sharing of resources is likely. Because receiving, marketing, the laundering of goods and money, the provision of information, obtaining secure premises and meeting places, furnishing entertainment, mechanical and documentary services, and recruiting of co-offenders are essential elements of many crimes, such services may provide or create potential points of intersection for many offense scripts.

The procedural analysis of crimes can therefore also clarify the local resource implications of criminal activities, and draw attention to scenes or "nodes" which, for a while at least, provide locations for crucial stages in the action of one or more offense scripts. The same location may often provide targets for a variety of different crimes: Eck and Spelman's (1992) shipyard parking lots, for example, offered opportunities for different sorts of car crime, and, in general, parking lots often feature as scenes of other offenses such as robbing, raping and trafficking. Unlike the nodes connected with non-criminal routine activities (Brantingham and Brantingham, 1984). those featuring in offense scripts may have more limited lives. While scripts are routinized plans, then, they will not necessarily produce spatio-temporally routine behaviors. Locations for particular scenes, for example, may shift rapidly in response to policing and other crime-control measures, though those in which the activity is

more covert or less consummately may have a longer lifetime. Thus, entertainment venues that allow under-age drinking or substance abuse, or settings that are rich in targets but poorly defended (such as station parking lots), may quickly attract surveillance and crime-control efforts, while institutional settings for abuse, or pubs and bars that are haunts of known criminals, may survive over long periods of time.

Since it is the varied procedural requirements of different offenses which interact with situational resources to produce the patterns of criminal activity characteristic of particular times and places, it may be helpful to discuss a further contribution to this process: the tendency of crime-commission scripts to evolve and adapt in ways that cause their procedural requirements to change.

Script Elaboration

Variation and elaboration of crime-commission procedures within scripts usually involve either the extension of one or more scenes in the script, or the addition of extra ones. The outcomes range from changes which merely modify the script without altering its essential goals to those which may redirect it in more fundamental ways. These forms of growth and change are important since they illustrate the beneficial effects of practice, the diffusion of innovation, and the conditions under which links between scripts are made more likely.

Maximizing Likelihood of Goal Achievement

As offenders become more experienced and as specific offenses are committed by more people, elaboration occurs in a variety of ways as the result of: performance and practice; rehearsing and flaw-hunting (Walsh, 1986); neutralizing the risks: overcoming the obstacles and barriers encountered while offending; and debriefing and sharing accounts of failures with others. Skills such as learning to deal with anticipatory anxiety more effectively, using violence instrumentally, leaving no forensic evidence, securing escape routes, dumping stolen vehicles in inconspicuous places, and disposing of goods and bodies carefully, all provide examples of actions aimed at maximizing likelihood of goal achievement. Sometimes, as Ekblom (1991:34-35) points out, crime prevention features such as posters warning subway passengers against pickpockets can be exploited by offenders, who watch out for passengers to check for their wallets as they read the message.

Maximizing Payoffs

Sometimes scenes may be extended, as when stolen vehicles used for joyriding are not simply abandoned but set on fire as well. This extension of the disposal scene may have been borrowed from other crimes (armed robbery or terrorism), where it is used to destroy forensic evidence. Once reported, however, such innovations become available to other crimes, and may become dissociated from their original function. In the case of joyriding in performance cars, for example, it may be adopted more to augment the excitement of the activity than from any concern about leaving clues.

Multiplying Payoffs

Extensions to scenes, or the addition of scenes to existing scripts, can also provide a wider variety of motivational payoffs. Recent British examples of elaboration to the "performance driving" *track* of the joyriding script include the mounting of local exhibitions of driving prowess before invited audiences on public housing estates (enhancement of local reputation); the deliberate provoking of police pursuit (competitive driving); and the location and sequential ramming of multiple police vehicles (revenge). The last-mentioned innovation was achieved through the monitoring of police plans and dispositions using a radio scanner [*The Guardian*, November 13th, 1993, p.6). This development has already been termed, "ram-racing," and provides a good example of technological crossover, it being likely that the scanner was originally purchased for defensive purposes in connection with other crimes. It also suggests the circumstances—unlawful possession and use of a powerful, heavy vehicle (a Range Rover) late at night; the presence of co-offenders; the abuse of illegal substances; the initiation and abandonment of police pursuit by vehicle and helicopter; the presence of radio monitoring equipment; and excitement, fear and resentment engendered by the chase—under which novel forms of offending may emerge.

Distinctions between multiplying and maximizing payoffs are sometimes difficult to make, and are best viewed as a function of differences in motivation, and in degree of elaboration of the action. Multiplying of payoffs tends to involve the addition of new, discrete scenes and activities and the development of distinctively new motivational goals—and may,

indeed, present one way of mediating the sorts of links between scripts which will now be discussed.

Script Concatenation

The forms of adaptation and innovation discussed above elaborate existing scripts without necessarily changing them in major ways. A second form of innovation concerns how linkages develop between previously unrelated activities to form new scripts. The activity of offending itself, as it is repeated and as it evolves and changes, also creates the conditions for the development of a variety of linkages between scripts. Figure 6, for example, suggests numerous contingent relationships with other crimes which may develop via shared interfaces of one sort or another. Thus, intermediate scenes and activities, such as the CONCEAL and DISGUISE stages, may be carried out in locations shared by other teams of ringers, or by other criminal enterprises with similar requirements; hunting grounds for vehicles to be ringed may also feature in other types of auto theft script; and marketing outlets (bars and pubs, the classified advertisements) for one crime product may serve equally well for another. And just as the first scene of the "ringing" script may simultaneously be the end-point of a joyriding one, so the ringing script itself may become simply one scene in a larger or different enterprise—as where a vehicle is "ringed" and supplied for the purposes of another crime.

As a result of all these processes, closely or more loosely coupled aggregations of activities may develop, involving further forms of interaction, intersection, and interfacing: end-to-end (as in auto theft and robbery); up-and-down (as in the vertical integration of drugs markets); and side-by-side (as in "hot spots"). These are somewhat similar to the forms of theoretical integration mentioned by Hirschi (1979) in another context. A better knowledge of local patterns of crime (U.K. Audit Commission, 1993), together with more detailed knowledge of their procedural aspects and requirements, might enable such linkages—some of which may be responsible for "multiplier effects" (Brantingham and Brantingham, 1993a)—to be more readily established between crimes.

Fortuitous Links

Abelson (1981:52) has commented on the importance of distractions as a feature of performative scripts likely to bring about innovation: "Distractions are unexpected states or actions which initiate new goals for

the actor, carrying him temporarily or permanently out of the script." New scripts with more complex goals may be formed in the future as the result of chance opportunities, especially where there is a co-offender able to identify and exploit them. Thus, on a particular occasion, an offender engaged in one crime may encounter the opportunity to perform another, such as a rape committed during the course of a burglary (Scully, 1090:141-142), or the opportunity to hold up a gas station during a joyride. This activity may then become incorporated into a new script as an optional path, or a favored subscript loop or subplot. As such, it resembles enhancement through multiplying payoffs, the difference being that in this case two scripts are linked together.

The acquisition of equipment, facilitators and goods (such as cars, guns, credit cards, stolen documents) for, or during the course of, one crime may encourage experimentation with new scripts. This provides a further, more serendipitous, example of how such linkages may develop between scripts.

Sideways Contingent Links

Sometimes, as the result of committing one crime, it may become necessary to commit another. Although the evidence for this is sparse, it is likely that many gas-station drive-aways (Brodsky et al., 1981) are committed by people in stolen cars who need to fill up their tanks. Some of these contingent linkages may be better understood when considered as mediated by situationally generated motivational pressures deriving from lifestyles.

Synergistic Links

New scripts sometimes develop when two or more forms of existing criminal activity are integrated in a way that creates or facilitates new criminal opportunities, or that allows existing opportunities to be exploited in new ways. The move of some offenders from "phone-phreaking" to computer hacking in the 1980s (Hafner and Markoff, 1993) exemplifies how skill in using the telephone system covertly and without cost became an important component in the exploration and penetration of national and international computer networks and centers. Another particularly telling example is provided by Tremblay's (1986) study of short-lived credit-card bank fraud which took place in Montreal and Toronto, and its

dependence on what the author terms "functional tie-ins or links between different criminal practices" (Tremblay, 1986:234).

Downward Contingent Links

The outcome of many of the above processes of script concatenation is sometimes the development of new, complex crimes. Complex crimes usually involve the contingent linking of a number of separate—or, at least, separable—criminal activities within a composite script. (These activities are often listed as separate charges.) While some complex crimes are assembled from collections of individual ones, others (for example, ringing) are better regarded as scaled-up versions of simple ones. The complexity in terms of contingent structure is often matched by heavy logistical requirements. Different scenes of a complex crime are often performed by different people, so that the script makes many demands in terms of props, cast, and locations: meeting-places for exchange of information, conspiracy and preparation; guns and getaway vehicles; premises for concealing and disguising stolen goods and vehicles; and "fences" for the disposal of stolen property.

Much script elaboration and concatenation probably takes place within a local context and as the result of local knowledge. But criminal activity is also influenced by more general sources of information about new techniques, other crime-commission scripts, or new criminal opportunities. That is to say, crime-commission methods are communicated as procedures; and this, as well as personal experience of actual performance, plays an important role in innovation. The study of innovation and change in crime commission is an important and under-researched one (cf. Tremblay, 1986) and requires a close attention to, and documentation of, the sources of change, their mode of influence, the changes to which they give rise, and the short- and long-term impact upon patterns of crime commission. This is again an area of research where much might be learned from communications theory literature on the diffusion of innovation (e.g., Rogers, 1983) and on the mechanisms through which it occurs. The emphasis of innovation diffusion theory upon the role of communication channels also raises concerns about the media and its role in the presentation of crime as entertainment—whether in the form of documentary, news, drama, or phone-in crimebusters programs—apt to promote the diffusion of new methods. Consumer and marketing research studies (e.g., Mahajan et al., 1990) pay special attention to the

role played by individuals, acting as innovators, innovation communicators, or imitators, in this process.

CRIMINAL ACTIVITY AT THE LOCAL LEVEL

Given that crime is patterned—as Brantingham and Brantingham (1984, 1993b) point out—it is tempting to try to devise ways of describing and explaining the standing patterns of criminal activity characteristic of a particular area in terms of the procedural requirements involved. As we have seen, crime-commission activities develop, overlap and interact with each other as a result of their joint exploitation of local opportunities and resources. The product of such interactions could be seen as helping to determine both the local crime infrastructure and the dynamics of its patterns of criminal activities. A procedural analysis of local crimes could therefore be expected to assist in the clearer identification of illegal opportunities (Cloward, 1959; Cullen, 1984) and of the local resourcing of crime.

Criminal activities, of course, become routinized in particular forms only for limited periods: although the script may not change, the particular production may have quite a limited run. It may be thought, then, that any relationships between requirements and resources would be too temporary and fugitive to be of much significance. It may also be objected that the procedures of different criminal activities vary greatly in terms of their temporal and spatial extensions, and that the commission of some crimes involves activities which are by no means confined to the local area, but are deliberately spread out over wide areas of space and long intervals of time. The spatial mapping of scenes in the commission of a serial murder (see Rossmo, 1993, for a detailed example) illustrates the fact that the degree of "localization" of the activities will be a function of the crime and its procedural aspects, of the availability of targets, of local crime-relevant resources, of offender competences and limitations, and of crime-control activity.

There is some truth in both these sets of objections. But it remains the case that much crime is still committed locally: that this involves the reuse of locations and (sometimes) victims or targets: and that even in the case of crimes the procedures of which involve some scenes set in distant locations, many other scenes—and other requirements such as cast and props—may involve local settings. The procedural analysis of crimes offers a way of investigating these issues more thoroughly, and the prospect of

providing additional information relevant to proactive place-oriented (Sherman, 1992), and problem-oriented policing (Goldstein, 1990), and to focused police crackdowns on specific offenses, such as drug dealing at the neighborhood level (Kleiman and Smith, 1990).

Lastly, three further aspects of the relationship between the procedural aspects of offending and its local manifestations will be discussed.

Casting Requirements and Casting Constraints

As mentioned earlier, offenses have unique blends of choice-structuring properties (Cornish and Clarke, 1987, 1989) which distinguish one criminal activity from another. These properties, in turn, generate a variety of requirements in terms of suitable offenders. Such choice-structuring properties have the effect, then, of closely specifying both offenses and the offenders willing and able to commit them. The choice-structuring properties of crimes operate at various levels to provide necessary and sufficient script requirements for casting. For potential offenders, the choice-structuring properties of crimes translate into motives, needs, skills, preferences, and values which may influence their choice of:

- one crime over another with similar goals;
- particular methods of crime commission;
- particular categories of targets or victims; and
- undertaking the crime in question on a particular occasion.

The concept of choice-structuring properties therefore supplies the interface between offense scripts and offender repertoires.

The procedural requirements of specific crimes represent an important subset of choice-structuring properties: the script demanded by the crime has to be one that the available actors can realize. Local patterns of crime may be especially influenced by the fact that the procedural requirements of particular crimes also serve as casting requirements for a successful production. Where there is a large local pool of suitable and available offenders, casting will easily be able to match scripts to players who possess the appropriate skills, abilities and motives. For complex crimes, this may mean matching offenders to specialist activities within acts and scenes. Where settings are "undermanned" (Wicker, 1979), however—that is, under-supplied with persons, male or female, to fill the roles available within the setting in question—the criteria for recruitment to particular roles may be affected. For example, in the case of behavior settings such as small schools, local dramatic societies and the like, recruiters will have

two choices: to call upon the same people more frequently to perform particular roles; or to pay less attention to the demands, or choice-structuring properties, of the task in question, and more to the availability of people who can at least "fill in" a variety of roles as required. Central casting, or the criminal equivalent, may often have to be approached. Telling examples of involuntary recruitment are found in the impromptu involvement of friends as unwitting accomplices (Feeney, 1986).

Certain criminal roles, such as mentoring (Toby, 1962), may take on a special significance in undermanned behavior settings. This will require some teaching of scripts and roles within scripts, in order to increase the numbers of co-offenders and to see that script activities are properly resourced. Co-offending provides the conditions for mentoring (cf. Light et al., 1993, in relation to auto theft), and offers opportunities for specializing that may reduce the demands required of any one participant. This means that to some extent involvement can be tailored to co-offenders' strengths and weaknesses. It is here that the preliminary work of Reiss (1988; Reiss and Farrington, 1991) on co-offending and, more recently, Tremblay's (1993) detailed discussion of factors affecting the availability of suitable co-offenders, seem likely to add considerably to our understanding of the conditions that dictate local patterns of crime.

The exigencies of casting and the need for co-offenders also seem likely to clarify the patterns of generalism (or, more accurately, diversification) and specialism to be found in the careers of individual offenders. Generalism and specialism relate, that is, not only to characteristics of offenders, such as their skills and preferences, or to long-term changes in communications and policing (Gabon 1990), but also to opportunities, including selection by others to play roles in offense scripts. Versatility is partly a response to the demands of local criminal activities.

Procedural Knowledge Stores

It is tempting to view the procedural knowledge which underpins the complex and shifting pattern of criminal activity within a locality as providing it with a sort of ghostly internal structure which shapes and reveals local patterns of crime. Such a view rightly draws attention to issues of connectivity among crimes: to interaction, intersection and interfacing. It offers a way of thinking about standing patterns of inter-linked criminal activities in an area, and relating these to the interplay between procedural requirements and local resources. It suggests, as

Brantingham and Brantingham (1984) do, that spatio-temporal dynamics of crime have an underlying structure. One way of exposing this structure is to view it as an expression of the procedural knowledge currently in use to inform criminal activity in the area. In procedural-knowledge terms, hot spots have meaning as intersection points for many different scripts, and, hence, afford settings for a range of scenes in different offending scripts. Such places have a more general function, too, by offering from stock, as it were, a wide variety of casts, props and locations suitable for the acting-out of many scenes from different potential plots.

To put it another way, hot spots may be thought of as representing important nodes in networks of procedural knowledge, which may also bind together other shared and crucial components, such as casts, crime-specific locations, props, and so on. Networks, of course, are usually thought of as existing to communicate between people, who form criminal networks of various sorts (knowledge, acquaintanceship, kinship), not as being lattices of potential knowledge; for although criminal activity requires knowledge, this is created and maintained by people. But there is a sense in which the structure of this knowledge, which is immanent in the patterns it sustains, has an independent, if potential, life. If so, then the question becomes that of how such knowledge, which generates, maintains and renews linkages between the casts, scenes, activities, and locations of different forms of crime, can be represented. Figure 6, for example, provides the beginnings of such a schematic "crimogram" to reveal the molecular structure of local crime.

Crimes and Lifestyles

To the extent that crime is generated and sustained by shared facilities, shared casts, and shared services, then the local infrastructure of crime—as indicated by the various networks of criminal activities mentioned above—and its susceptibility to disruption, also deserve systematic attention from crime prevention research. But as well as being embedded in local patterns of crime, offending is also embedded in longer action sequences, whether these are considered as characteristics of offenders' behavior or as standing patterns of activities in areas. Scripts are located and operate within behavioral routines, lifestyles, and life courses. The earlier discussion of how scripts are triggered suggested that potentiation is achieved both via the presentation of opportunities and via motivation generated by offenders' lifestyles. The characteristic hunter-gatherer.

foraging or partying lifestyle of many offenders (S hover and Honaker. 1992) suggests that scripts are usually activated by motives generated out of the situational demands of these larger routines as offenders live off the land of their local territories.

A better understanding of the day-to-day routines of individual offenders' lives would, of course, be useful for surveillance or rehabilitative purposes. But it also suggests that, as in the case of offense scripts, it may be possible to develop typical spatially and temporally located lifestyle scripts within which offenses and other incivilities can be contextualized. The extension of the script concept to include lifestyles would enable a number of further crime-control issues to be discussed more systematically. First, it would sensitize criminologists to the need to study how scripts are embedded in lifestyles, and the forms of mutual interaction and support existing between lifestyles and scripts. Second, it would recognize the fact that certain lifestyles—those, for example, of New Age travellers, gypsies, squatters, canal and river boat dwellers, vagrants, homeless people—are subjected to surveillance and regulation, and suggest the need to explore and make more explicit the crime-control rationales for this differential attention. Third, it might help to place the aims of public-order policing more clearly within a situational crime prevention context (Veno and Veno, 1993). Lastly, better information about the typical behavioral routines and lifestyles available and operating in particular areas, might enable criminologists to develop clearer ideas about their procedural requirements, and more focused and comprehensive strategies for disrupting or regulating them. As with the Investigation of crime commission (Johnson et al., 1993), the need to study lifestyles suggests an important role for ethnography.

PROCEDURAL ANALYSIS AND THE RATIONAL CHOICE PERSPECTIVE

In its original field of application, the script concept was designed specifically to clarify issues relating to the understanding and production of action sequences. In criminology, decision making and rational choice models have long been used as a way of capturing and explicating these processes. In the present context, the script concept has been used to develop one aspect of the rational choice perspective on criminal behavior—the unfolding of criminal events—somewhat further.

Scripts provide a way of conceptualizing and analyzing the crime-commission process which is consistent with, but fuller than, current theorizing (for example, Brantingham and Brantingham, 1984; Clarke and Cornish, 1985). In particular, the script concept expresses the routinized quality, yet flexibly responsive nature, of criminal decision making. In practice, the script schema encourages investigation at the level of crime-specificity most useful for situational analyses and situational prevention measures, offers a helpful procedural framework within which to explore the details of crime commission, and suggests methods of eliciting offenders' accounts which are consistent with their narrative nature.

The use of procedural analysis for situational crime prevention purposes has some similarities to the activity of investigative "profiling" (Canter, 1994). Both require a comprehensive understanding of the crime-commission process in terms of its procedural requirements: in the case of situational prevention, to identify potential intervention points; and in the case of profiling, to focus investigatory activities on all aspects of the modus operandi. Both may exploit knowledge of other choice-structuring properties of crimes: in the case of situational prevention, as a means of tentatively identifying potential groups of perpetrators in order to target situational measures cost-effectively and avoid technological overkill; and in the case of profiling, to guide the search for suspects. Where they differ is in the level of specificity at which they operate, since profiling has been characteristically used in the investigation of serial crimes—that is, where a group of offenses are linked not only by their similarities, but, more importantly, by their having been committed by the same perpetrator(s). Although it is the individualized aspects of profiling—such as the concentration upon quite detailed procedural features of specific crimes, the mapping of the perpetrator's "career," and the hunt for a specific offender—that have caught the media's attention, it is interesting to note how the investigation of numbers of such cases has also furthered the procedural analysis of serial murder considered as a script with a variety of different tracks.

An important feature of scripts is the range of crime-commission competences and degrees of expertness that they can be used to study. For many situational prevention purposes, however, the crime-commission methods that provide especially useful data will be the ones that have evolved into stable, relatively well-elaborated and effective methods—standing patterns of action-in-situations which commonly lead to crime events. Disrupting these scripts, by designing situational measures for as

many intervention-points as possible (see Figure 5, above) can also be expected to hinder less effective ones. This use of scripts reflects the distinctive approach to crime control of situational prevention, which is event-centered, present-oriented and, in consequence, concerned to gather detailed information about the proximal circumstances leading to the production of crime events. Rational choice and other decision-making frameworks are both compatible with these orientations and particularly well-suited to realizing them. In this context, the script concept simply offers a useful way of generating and framing more detailed sequential accounts of the interactions among the various elements which lead to criminal outcomes.

When the rational choice decision-making perspective is being used as a heuristic device to aid thinking about the development and disruption of crime events, rather than as providing an accurate account of offenders' decision processes, its utility has to be judged by its fruitfulness rather than by its psychological reality. The fact that such approaches may seem retrospectively to rationalize, intellectualize and otherwise overestimate the cognitive abilities of offenders and the cognitive complexity or "planfulness" of offending may be beside the point. Nevertheless, thinking of crime commission in terms of scripts also enables these tangential objections to be addressed more satisfactorily. To the objection that the rational choice perspective is too cognitive and too deliberative, scripts suggest knowledge structures which are both cognitive and designed to "run off" routinized plans quickly. To the objection that much criminal behavior is simple and impulsive, a script-theoretic approach suggests that it may often only look that way because it is embedded in other ongoing behaviors, so that the crime-commission stages, and their extension over space and time, are difficult to disentangle. These features provide the procedural analysis of crime with its own special problems, raising questions about how the action is to be traced, partitioned off and studied. Indeed, it may sometimes be necessary to direct situational crime prevention to the disruption of criminal lifestyles as well as individual crimes.

. Lastly, to the objection that the rational choice perspective is only appropriate for certain types of offenses (e.g., economically motivated ones), the script concept suggests that type of motivation may be an inappropriate criterion upon which to base judgments about the likely quality of crime-commission procedures. Many crime-commission scripts require or permit the use of instrumental violence under certain circumstances or during certain scenes. Many allegedly "expressive" crimes may

be carefully executed throughout, save perhaps for the performance of the consummately act itself. And even those forms of dispute-related violence (Felson, 1003), which appear to arise suddenly from trivial beginnings and rapidly get out of hand, may benefit from a script-theoretic approach. This may draw attention to procedural aspects of the crime (including segments of the script which may lie outside the setting for the violent transaction itself), and to features of cast, props, and setting which might otherwise be overlooked. Indeed, although offenders undoubtedly sometimes act rashly and crimes are sometimes poorly executed, perhaps there should be a moratorium upon calling classes of either crimes or offenders "irrational," "mindless," or "impulsive" in advance of a much better knowledge of motives, goals, crime-commission procedures, and ratios of failed to successful crimes than we have at present.

The theoretical arguments in favor of event schemas are quite compelling. But it is as a metaphor rather than a mechanism that the script concept is offered here. Since its use parallels that of concepts such as the "template" developed by other theorists for similar purposes (cf. Brantingham and Brantingham, 1984, 1993b; Johnson et al., 1993), however, it may be worth pointing to some of the similarities and differences between them. As to the similarities, both are cognitive concepts, and both imply reliance upon the operations of knowledge structures, or schemata. Both are proposed to account for the acquisition, development and routinization of expertise, and both are situationally oriented in that they assume, stress and articulate the importance of a detailed understanding of the environment and of person-environment transactions.

Before assuming that either can be assimilated into the other, however, it would be as well to recognize that the concepts arise by separate routes out of particular theoretical preoccupations. In keeping with its origins in the geography of crime, the template—while intended to incorporate cue sequences—has the distinctively spatial emphasis of a perceptual schema designed to assist the micro-spatial analysis of crimes and crime patterns. In keeping with its origins in the rational choice decision-making perspective, the script, on the other hand, operates mainly as an event schema, which provides a micro-temporal or procedural dimension to crime commission. Just as the development of decision-making models benefits from the borrowing of concepts and models from studies of artificial intelligence, so, in a similar way, does the development of a pattern theory of crime, which is based on the models and metaphors provided by connectionists' recent network models of pattern recognition (Bechtel and Abrahamsen,

1991). It might be helpful to explore more fully the differences which may result from such distinctions, and the respective implications of these cognitive models and mechanisms for an understanding of crime and criminal behavior.

Whatever their convergences and divergences, however, considered merely as sensitizing concepts both draw attention to important spatio-temporal aspects of crime commission, and both emphasize the need for a much more detailed understanding of the "how," "where," and "when" of crime. For as Neisser (1976:184) points out, in order to control behavior, the controllers have to understand the environment at least as well as the controllees, and preferably better.



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