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Scripts as Determinants of Purposeful Behavior in Organizations

ROBERT G. LORD
University of Akron
MARY C. KERNAN
Kent State University

This paper focuses on the role cognitive scripts, a unique type of knowledge schema, play in generating purposive behaviors in organizations. Three separate but complementary areas of research (Scheme Theory, Control Theory, and Goal Setting Theory) clarify the processes that link script-type structures to purposeful behavior. Finally, implications and extensions of this comprehensive framework based on previously identified content, structure, and process issues are considered.

This article focuses on a problem with obvious applied and theoretical relevance: the explanation of workers' behavior in familiar situations. [On the surface, it may appear that applying this script approach should be limited to well-structured or programmable situations, but this is overly restrictive. The degree of structure may depend as much on the development of workers' cognitive systems as on characteristics of the situation. Hence, situations may become more structured with increased familiarity and the development of script-based structures and processes. Familiarity, therefore, is the major determinant of the domain to which this model of behavior applies.] It builds on work by European researchers interested in "action theory" (Frese & Sabini, 1985) and is a logical extension of recent work that applies cognitive scripts to understanding cognitions in organizations (Gioia & Manz, 1985; Gioia & Poole, 1984). This prior work has emphasized the role of cognitive systems in explaining the *input of information* by focusing on issues such as "understanding how people understand" in organizations (Gioia & Poole, 1984) and explaining vicarious learning (Gioia & Manz, 1985). Although the argument presented here also relies heavily on an information processing perspective, the emphasis is on showing how cognitive systems guide the *output of purposeful behavior*.

The same cognitive structures that are used to interpret, organize, and store incoming information also can be used to guide the output of purposeful behavior. The result is a more dynamic and comprehensive framework for understanding behavior; it shows how environmentally based inputs like feedback on performance level or obstacles to performance are integrated with the same cognitive systems that control performance and the output of task-related behavior. This approach directly addresses a fundamental and general psychological problem—linking cognitions and behavior in a dynamic system. The resulting framework incorporates four separate but complementary lines of research (script, scheme, control, and goal setting theories). Also,

it has direct implications for several applied issues, as it offers new insights concerning behavior and strategy selection, learning, training, motivation, job design, and implicit coordination in multiperson tasks. To link cognitions and behavior, one must simultaneously describe the content of cognitive systems, specify their underlying structure, and show how specific processes can use this content and structure to produce behavior.

Properties of Scripts and Information Processing

Scripts are cognitive knowledge structures held in memory that describe the appropriate sequencing of events in conventional or familiar situations (Abelson, 1981; Gioia & Poole, 1984; Schank & Abelson, 1977). Scripts are a unique type of knowledge structure because they serve a dual purpose: They not only help one interpret the behavior of others, but they also aid in generating behavior (Abelson, 1981; Gioia & Manz, 1985). Thus, they guide the planning and execution of familiar or repetitive activities (Bower, Black, & Turner, 1979). Common scripts probably exist for a number of goal-related organizational activities such as conducting meetings, dictating letters, performing familiar work tasks, and interacting with other employees. For *strong scripts* there is substantial agreement regarding events contained within a script and ways to parse events into meaningful subgroupings (i.e., consensual "breakpoints" exist). For *weak scripts*, however, script content and the grouping of events are quite variable and fewer consensual breakpoints exist (Abelson, 1981). Scripts, particularly strong scripts, have several important properties.

First, strong scripts usually are related to the goals of individual actors; they organize information around goals and can be evoked by informing observers about the goals of actors (Foti & Lord, in press; Lichtenstein & Brewer, 1980). In several studies of both written and videotaped stimulus information, Lichtenstein and Brewer (1980) found that observers could agree on inferred goal structures for common events and organized information around goal-related plans. Similarly, Foti and Lord (in press) found that informing observers about the goals of board members elicited the use of scripts to organize and recall information concerning behavior and events.

Second, as noted by Abelson (1981), scripts often incorporate *multiple paths to goals*. This feature is particularly important for explaining flexibility or adaptability of behavior. If one means to a needed end is temporarily blocked or infeasible, alternative means can be easily followed.

Third, in scripts, goal- and path-related content are organized in a hierarchical *means-end structure*. That is, lower-level goals are means by which higher-level goals are achieved, and this hierarchical organization structures both memory and behaviors. Work on memory suggests a "top-down" search for goal-related information in which lower-level goals are accessed through paths involving higher-level goals (Lichtenstein & Brewer, 1980) and information is lost from the bottom up; that is, lower-level information is forgotten first (Brewer & Dupree, 1983). In addition, higher-level goals explain *why* lower-level actions are performed (Graesser, Robertson, Lovelace, & Swinehart, 1980). Thus, the hierarchical structure inherent in goal-related material helps individuals interpret, organize, and recall information.

Another factor related to hierarchical organization is the "*in-order-to*" relation (Lichtenstein & Brewer, 1980). These relationships link lower-level goals such as doing well on work tasks with higher-level goals like getting a raise, when the lower-level activity is performed in-order-to accomplish the higher-level activity. This in-order-to relation is crucial for organizing strong scripts because it segments events into superordinate and subordinate relations that are fundamental to hierarchical organization.

Fourth, scripts often have clear *temporal structures*, based on in-order-to relations. Higher-level goals cannot be accomplished before necessary

lower-level goals are completed. Such a hierarchical structure is indicated by Lichtenstein and Brewer's (1980) finding that events presented in the proper sequential order were almost always recalled in that order; however, misordered stimulus material was very often recalled in a different but sequentially correct order. In other words, misordered subordinate in-order-to activities were reordered by individuals to precede the appropriate superordinate goal.

Fifth, script structures are *easily elaborated upon* to incorporate new experiences (Abelson, 1981; Bower et al., 1979). Graesser, Gordon, and Sawyer (1979) call this phenomenon "tagging," a process by which new information is explicitly encoded and tagged into a generic script structure.

These five properties of scripts are drawn from studies investigating the role scripts play in structuring memory for events. However, they also can be used to develop models for generating behavior.

Scripts and Behavior

Eckblad's Scheme Theory

Eckblad (1981), one of the European "action theorists," developed an explicit model showing how *schemes* can be used to produce complex behavior. His use of "scheme" resembles the script construct described above, though it differs substantially from the use of "schema" (or schemes) used by American researchers to refer to various types of knowledge structures (see for example, Lord & Foti, 1986). It seems reasonable to view Eckblad's theory as describing how scripts operate to produce behavior. For the sake of clarity, Eckblad's term "scheme," is used when discussing his work, while the term "script," reflects the present authors' elaborations of his model based on the previously discussed research.

According to Eckblad, schemes represent relatively autonomous, organized sequences of behavior. These cognitive structures can be arranged into hierarchies involving larger or smaller units that are used to produce a desired outcome. A graphic representation of a means-end structure patterned after Eckblad (p. 26) is presented in Figure 1.

In Figure 1, open circles represent the initial state of a scheme and closed circles represent the end (final) state. Each pair of open and closed circles is a separate, autonomous scheme; as shown in Figure 1, more elementary schemes are embedded in more complex schemes. Final states serve as goals for each scheme and for all subordinate schemes; therefore, this model represents goal-subgoal hierarchies and means-end chains. For each scheme, the need for action is identified by an initial test and the consequences of following specific paths ("internal operations," in Eckblad's terms) are compared to final states of schemes to assess goal attainment. Thus, schemes incorporate feedback at multiple levels as direct guides to behavior. At lower levels of goal hierarchies, it is expected that feedback comes directly from the task; at higher levels it may involve interpersonal communications or social comparisons as well.

When schemes are integrated into hierarchical or chain-like cognitive structures, the initial test in each unit may not be necessary since the need for action is indicated by the results of higher-level (or earlier) schemes. In such situations, the open circles can be conceptualized better as choice points at which relevant information can be accessed when necessary. For example, information on in-order-to relations and obstacles related to paths would be available at this level of a scheme (Bower et al., 1979). Such information could aid in the choice of paths, but a conscious choice process can be bypassed when well-learned scripts are applied automatically to familiar tasks and no obstacles are encountered.

The multiple paths in schemes are important since, when coupled with feedback, they permit flexibility in behavior. When obstacles exist for preferred paths, people may simply switch to alternative paths; for example, when the word processor breaks down, manuscripts are typed on typewriters. Also, when paths consistently

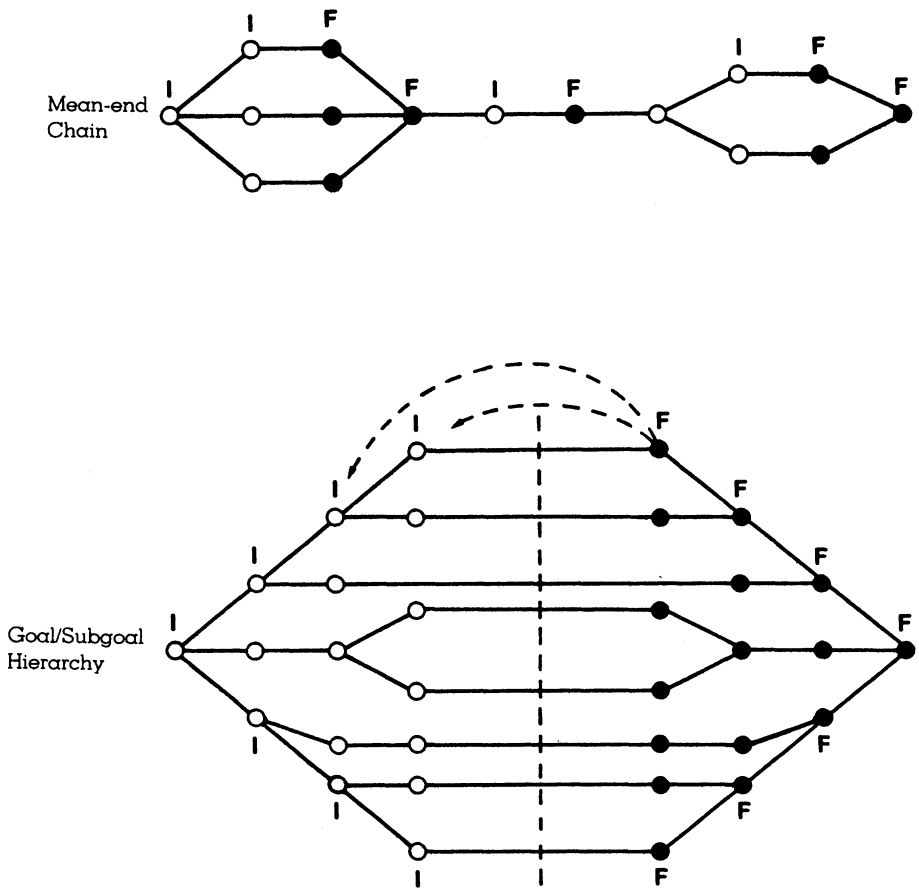

Figure 1. Schemes showing the paths from initial states (I) to final (F) goals.

produce errors (unexpected outcomes), alternative paths may be tried. Obstacles and errors tend to be remembered particularly well (Bower et al., 1979), so scripts provide a cognitive structure that facilitates learning about a task as well as flexibility in behavior.

In Eckblad's model, performing a task corresponds to left-to-right movement along a particular path; hence, activities are ordered by the structure of schemes. Such a process simplifies complex behaviors in two ways. First, a complex task may become merely a series of simpler tasks that are performed sequentially and are integrated automatically by a script-type structure. In other words, relatively stable substructures may be linked together in a chainlike fashion, being executed at different times and in a relatively autonomous fashion (see the upper portion of Figure 1). For example, typical routines for beginning and ending a work day probably would be organized in a chainlike fashion (e.g., hanging up coat, checking mail, getting coffee, chatting with co-workers, cleaning off desk, checking appointment calendar, planning work schedule). For the more efficient workers, these chains integrate planning and organizational activities with other common activities. Although each task by itself is relatively simple

and familiar, all are components of more complex work roles organized and simplified by such chainlike structures.

Second, where true hierarchies exist (see the lower portion of Figure 1) when several levels of simpler schemes are nested within more complex schemes, lower-level schemes may be executed without conscious attention. Thus, at lower levels, the choice of behavior and the comparison of task feedback to standards occurs automatically, and major discrepancies may be required to trigger conscious attention and explicit evaluations of proper paths to goals. Moreover, such discrepancies may be evaluated only within the narrow context of the particular micro-level scheme involved, rather than requiring evaluations of all higher-level structures. [See March & Simon (1958, pp. 136–171) or Cyert and March (1963) for an application of such local perspective to organizational theory or Newell and Simon (1972) to see how they are involved in problem solving activities.]

In short, what Eckblad's (1981) scheme theory describes are richly elaborated cognitive goal/subgoal structures involving multiple paths and many test points at which feedback is compared to standards. They can help explain purposeful behaviors which are both predictable and flexible and they can be enacted with minimal cognitive strain because prior knowledge and guidance by feedback substitutes for an explicit and detailed analysis of each part of the complex task. An important contribution of Eckblad's theory is that it conceptualizes schemes at all levels as being autonomous units which can be applied independently when addressing new tasks. These cognitive "building blocks" can be decoupled from existing schemes and reassembled to produce appropriate behaviors in novel situations. Such recombinations may represent an important form of learning.

Control Theory

Eckblad's (1981) scheme theory and control theory (Carver & Scheier, 1981, 1982; Lord & Hanges, in press; Powers, 1973) emphasize slightly different aspects of the same process. While scheme theory emphasizes how individuals attain desired goals by focusing on the enactment of scripts, it does not deal explicitly with feedback processes. Control theory, on the other hand, addresses feedback processes by emphasizing the interdependence of goals *and* feedback and by focusing on the key role of goal/feedback discrepancies in triggering attention, affect (Locke, 1976), and motivation (Campion & Lord, 1982; Lord & Hanges, in press).

Control theory explains how individuals use information to achieve or maintain some desired state or goal (Carver & Scheier, 1981, 1982). It is a dynamic theory which links goals, performance feedback, and behavioral responses over time. A key aspect of control theory is the comparison of goals to feedback and the response to detected discrepancies. Campion and Lord (1982), Kernan and Lord (in press), and Matsui, Okada, and Inoshita (1983) found that the amount of increase in performance or effort after feedback depends on the size and consistency of goal/feedback discrepancies.

Though most of the empirical research on control theory applies to situations with single, unitary goals and single feedback loops, theoretical work recognizes that behavioral standards or goals exist at many levels of abstraction and can be hierarchically arranged through a series of interconnected feedback loops (Carver & Scheier, 1981; Powers, 1973). As one moves down such hierarchies, goals become more specific and concrete. Similar to scheme theory, all lower- or subordinate-level goals operate in service of superordinate levels. Thus, the means to reduce goal/feedback discrepancies at higher levels become the goals of the next-lower level control loop.

The relation between Eckblad's scheme theory and the goal hierarchies of control theory can be seen more clearly by returning to Figure 1. If the lower portion of Figure 1 is folded along the vertical dotted line and rotated 90 degrees, the result (shown in Figure 2) is much like the goal/subgoal hierarchies discussed by control

theorists. However, now each goal is matched with initial states and paths from initial states to goals, as implied by scheme theory. Therefore, schemes (and scripts) are more elaborate and contain information about things other than the goal/subgoal relations suggested by control theorists. Thus, additional information on initial states and paths is necessary to see precisely how goal/subgoal hierarchies can be translated into behaviors.

Given a higher-level goal and an initial state matched to it by an associated scheme, one searches for a mapping from the initial state to the goal. This route may be a single path or a means-end chain which, for the sake of simplicity, are not differentiated in Figure 2. If no feasible direct path is found, one may find an appropriate subgoal, examine its initial state, and find a behavior that maps inital states into subgoals. This procedure may be iterated several times before appropriate paths are discovered. Though iterations merely repeat the same search procedure at a lower lever, they do so at a more concrete level where presumably paths can be found more easily. Also, subgoals may center on obstacles for achieving higher-level goals, so that once they are satisfied, known paths to higher-level goals can be implemented. For example, if one's task is to reconcile a current budget with proposed budget cuts, experienced managers already may have a network of goals and subgoals relevant to this task (see Figure 2). Upper levels in this hierarchy represent different strategies, while lower levels represent more concrete behaviors performed in-order-to accomplish higher-level goals.

This suggests that fairly complex behaviors involve two processes that are performed on script-type structures. First, one moves down the hierarchy to find paths to goals or subgoals. This activity may be largely *cognitive*, involving the interplay between knowledge about the momen-

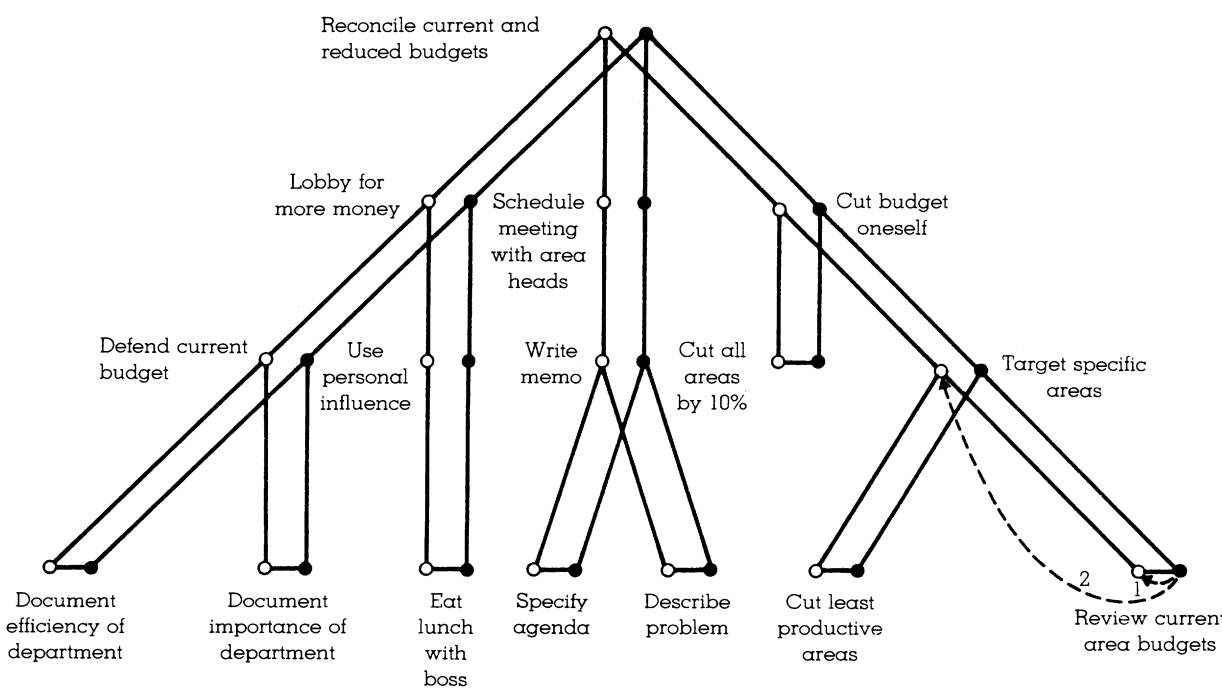

Figure 2. Script for responding to a proposed budget cut.

tary task environment and one's already learned task script. It is not likely that the search will be comprehensive. Instead, it will be narrowed quickly to either the most familiar subgoals and paths or to areas that seem to fit best with current conditions. Second, when a potential link between initial conditions and associated goals is found, one begins moving up the hierarchy producing task-relevant *behavior* and evaluating the adequacy of resulting outcomes by comparing task or social feedback to appropriate subgoals and goals.

Two contributions from control theory help specify the processes involved in moving up a hierarchy. First is the notion that behavior is guided by *comparing feedback to goals*. When paths fail to produce expected outcomes (i.e., discrepancies exist), one may return to prior choice points (as shown by the dotted loops in Figures 1 and 2), initially repeating the same behaviors while monitoring their execution more carefully. Returning to the previous example, a manager pursuing the right-most track in Figure 2, but making insufficient cuts, may reexamine budgets for additional expenditures that can be cut (loop 1 in Figure 2); however, if discrepancies still persist (enough expenditures cannot be cut easily), the decision to target only specific areas for cuts may be reexamined (loop 2).

In this model, then, behavior is guided by feedback and is based on an action-first strategy, much like Connolly's (1980) description of decision making. Such a model is cognitively simpler and uses less information than more cognitively demanding choice models, such as VIE theory. Returning to Figure 2, a VIE choice model would require that the three upper-level alternative strategies be compared explicitly, whereas the script-based model would use the most salient strategy, only considering others if feedback indicated this strategy was unsuccessful. Thus, because it is a cognitively simpler process, a script-based model may be more appropriate for explaining how problem solving occurs within routine and familiar situations.

The second contribution from control theory involves explaining *attention allocation*. Conscious attention usually is directed at upper levels in the goal hierarchy, and discrepancies at these levels are easily noticed and reported, and are likely to produce controlled processing. For well-learned activities executed in familiar situations, movement down hierarchies searching for appropriate paths and movement back up in terms of generating behaviors may be largely automatic. Only when large or unexpected discrepancies occur, will attention shift to lower levels and more conscious monitoring of behaviors and evaluation of antecedent choices will occur. The dotted loops in Figures 1 and 2 probably involve a shift toward more controlled processes produced by feedback showing deficient performance. This process explains how regularity (automatic processing) and flexibility (controlled processing to remove large or persistent discrepancies) in behavior can coexist, since they involve the operation of two different modes of cognitive processing within the same knowledge system. It also suggests when learning will occur at lower levels of scripts, since learning usually will occur only when attention and controlled processing are involved (Shiffrin & Schneider, 1977).

The present authors suggest that script structures and goal-related feedback form control systems that monitor task-related progress, direct attention, and facilitate learning. This guidance by feedback permits the *typical* use of narrowly focused and relatively automatic cognitive processes when behavior is produced. Sufficiently discrepant feedback alters the nature of cognitive processes, making them less automatic and often broadens the focus by causing a reconsideration of higher-level choices in scripts.

Goal Setting

The empirical, applied focus of recent work on goal setting (Locke, Shaw, Saari, & Latham, 1981) complements the largely theoretical work on scheme and control theories. Research in both

laboratory and applied settings shows that difficult and specific goals produce higher performance levels than easy or nonspecific "do your best" types of goals as long as they are accepted by subordinates. Moreover, goals also require performance feedback to be effective (Bandura & Cervone, 1983; Becker, 1978; Erez, 1977; Locke et al., 1981; Reber & Wallin, 1984). Such feedback should be matched in specificity to the goals themselves, and it must be accurately perceived, credible, and accepted by workers (Ilgen, Fisher, & Taylor, 1979; Taylor, Fisher, & Ilgen, 1984).

The process by which goals and feedback interact to improve performance has not been given much attention, although Locke and his colleagues (1981) implicated cognitive processes as key mediating factors. Scheme theory and control theory when combined, provide more specific and detailed models of the cognitive processes that may be involved in goal setting.

Both scheme theory and control theory posit a hierarchy or chain of goals and subgoals, while goals in the typical goal setting study generally are unitary and are at one level, focusing on outcomes of a simple experimental or work task. This type of goal (i.e., performing at a specific level) is equivalent to the uppermost level in Figure 2. Part of what occurs when goals are set can be understood by focusing on the details of goal hierarchies. If workers who are assigned difficult goals pursue different, more effective strategies, this can be equated with choosing alternative branch points or paths at upper levels in the hierarchy. Different task behaviors that are instrumental for implementing a particular strategy then may correspond to outputs from lower hierarchical levels. If workers either already know or can learn quickly the levels of performance associated with different paths, then scripts should provide a good model of how different goal levels can affect strategy and behavioral choice.

Script theories also help explain the benefits of assigned versus participative goal setting because they imply that participation could occur at multiple levels. Typical studies of participative goal setting only focus on upper-level goals (i.e., performing at specific quantitative levels) and have produced few consistent effects on task performance (Locke et al., 1981). Participation in determining activities related to lower levels of scripts, such as *how* tasks should be executed (i.e., task strategies), generally has been ignored. However, participating in strategy selection may be more crucial for motivation and feelings of satisfaction. Interestingly, Hacker (1985, p. 274) reported that workers who were given more discretion on sequencing work steps and choosing means to ends (strategies) reported greater job satisfaction, less fatigue, and less satiation. Also, Earley and Kanfer (1985) found that individuals who participated in setting a performance goal *and* strategy development performed better and were more satisfied than those who participated in goal setting only. Future work should investigate the effect of participation at the multiple levels suggested by work on script theory and control theory.

The dynamic processes stressed by control theory also can help explain established goal setting effects. First, since control theory emphasizes the comparison of feedback to goals, the need for both goals and feedback is obvious if control systems are to function properly. If either component is lacking, discrepancies cannot be accurately detected and no discrepancy reducing response will be initiated. Further, for optimal control or learning, feedback should occur at each level in the hierarchy or it should at least be available if sought by workers (Ashford & Cummings, 1983). Second, control theory clearly focuses on reducing discrepancy as the key factor that directs attention and triggers appropriate behaviors. Thus, difficult goals are more effective than easy goals because more frequently they will produce discrepancies (Campion & Lord, 1982). Discrepancies, then, should be accompanied by an explicit search through relevant scripts for more efficient strategies or behaviors. Since discrepancies focus attention and scripts provide a cognitive structure within which relevant information can be easily incorporated,

learning about appropriate behaviors or strategies should be highly efficient. Such conscious monitoring and learning about actions relevant to scripts would increase mental workload or strain in the short-run, but in the long-run it may produce a more elaborate and better organized script structure capable of producing higher levels of performance that can be used repeatedly in similar situations.

Implications and Applications to Other Areas

The implications of a script-based model of behavior are both theoretical and practical. They can be conveniently organized around the content, structure, and process issues identified at the outset of this paper.

Since scripts provide efficient hierarchical and temporal structures for summarizing what has been learned about a task, either from past experience or from observing others, they can be applied to training new employees. Also, the goal-related content inherent in scripts provides organization and makes information meaningful; this, in turn, facilitates learning in initial stages of task performance. Once scripts are well-developed and learning is stabilized, consistent information related to a task can be encoded generically, while inconsistent or novel information can be encoded specifically and tagged into an existing script structure. Specifying the structure and content of scripts should help clarify the information individuals actually use and the organizing or sequencing of activities that underlies task behavior. Because strong scripts contain explicit information on the appropriate sequencing of various task behaviors, they may aid practitioners in developing more effective training programs.

Work by Ruhle, Matern, and Skell (1980 as cited in Hacker, 1985) showed the impact on performance of training pertinent to lower levels of scripts. Their experiments indicated apprentices in a variety of occupations who received explicit training in abstract, general rules for organizing, and planning steps in the work process, showed superior performance and less fatigue than did other similar training groups who did not receive this general instruction on script development.

A second issue related to learning concerns changes in the content and structure of scripts as one becomes more experienced. Compared to novices, experts should have a greater repertoire of more thoroughly developed scripts for many work activities. Experts also may have more efficiently organized cognitive systems (Lurigio & Carroll, 1985). Comparing the scripts of experts and novices should be an efficient way to learn about the content and organization of information that defines skill in a particular work role. Moreover, teaching novices the scripts of experts may be an effective way to train them. Interestingly, the existence of multiple and well-developed cognitive systems for guiding work activities may change the nature of work tasks for employees. Compared to novices, the same task should be more structured, more controllable, less fatiguing, less cognitively demanding, and less stressful for experts because their cognitive systems for managing work activities are more refined. This implies that researchers concerned with redesigning jobs should integrate information on task characteristics with the worker's level of script development, since these two factors *jointly* would determine the degree of challenge or the degree of enrichment of a job.

Scripts represent possible behaviors in terms of paths for reaching goals or subgoals. This information can clarify the processes involved in producing task behaviors, an element that is missing in existing goal setting theory. More frequently used behaviors should have stronger associations with relevant goals or subgoals, implying that they would be accessed more quickly when goals were activated. Hence, heuristic choice processes based on availability (Tversky & Kahneman, 1973) could substitute for more explicit and cognitively demanding choice processes involving expectancy and valence assessments. However, if familiar actions do not produce expected outcomes (i.e., goal or subgoal attainment), then this would trigger conscious attention, and more

explicit choice processes may be used. Thus, discrepant feedback may change the nature of underlying cognitive processes in addition to changing overt work behaviors.

An important theoretical issue that scripts and related theories can clarify is how automatic or controlled processes are involved in executing task behaviors. As discussed previously, applying scripts to task behavior explains how strategy choice, behavior, and the sequencing of behaviors can be accomplished using automatic processes, while explicit attention and controlled processes are reserved primarily for large or persistent discrepancies. Thus, the inherent structure in scripts coupled with automatic processing can explain much of the observed regularity in organizational behaviors. However, since the nature of cognitive processes and behavioral choice mechanisms can change based on feedback, behavior is certainly flexible over time rather than rigid. Hence, a script-based model of behavior does not imply that behavior is mechanically produced.

Also, focusing on scripts and related theories provides a richer perspective about goals than focusing on prior applied theories. In scripts, goals are conceptualized as cognitive structures involving multiple levels in a hierarchy; they are not simply the outcome of a single task. Multilevel goals seem much more characteristic of the complexities involved in many real-world tasks. The idea of goals as cognitive structures easily could be extended to incorporate goals with multiple dimensions or the multiple goals associated with the different requirements of many work roles. For example, cognitions related to independent work activities may be loosely organized into weak scripts. In addition, scripts may be applied to complex multi-person tasks where activities are interdependent. For instance, if common scripts exist among workers, then coordination inherent in script structures may suffice to integrate these activities. Without scripts, however, explicit plans must be devised which may be a less efficient procedure for coordinating tasks.

Finally, the perspective on feedback processes afforded by script-related theories is more developed, since in the model in this paper feedback is viewed as operating at multiple levels, spanning many potential sources and time frames. The script theory when integrated with control theory implies that tests exist at each level of scripts. Tests compare feedback to goals, integrating these two determinants of behavior and providing an organized and efficient way to use environmental information while a task is performed.

Limitations and Future Research Issues

A script-based model of behavior has limitations. The model proposed here can be applied to purposive behavior, behavior that at least is directed partially toward attaining either a conscious goal or a series of goals. It does not explain behaviors that are not linked to conscious goals or those that are produced *solely* by automatic processes. Also, the model is limited to familiar situations, those in which subgoals, paths, and relevant environmental information are known. This narrow focus was chosen because of the present authors' interest in integrating cognitive systems and behavior.

However, there are three ways (and possibly more) that this focus can be broadened by linkages with other less-structured cognitive systems. First, one should recognize that scripts are part of larger cognitive systems called meta- or proto-scripts (Gioia & Poole, 1984), in which similar but distinct scripts are grouped. These scripts are appropriate to slightly different contexts. Meta-scripts may be important in generalizing scripts from familiar to unfamiliar situations. Eckblad's argument that schemes are autonomous cognitive units that can be reassembled as a means of responding to unfamiliar situations could help generalize the ideas developed here for less familiar situations.

Second, since tasks performed in social situations like work organizations may require the

contributions of several different people, paths at lower levels of scripts could index people who have particular skills or resources rather than task-related behaviors. Thus, at this level, scripts may be linked with task-related aspects of implicit personality theories.

Third, though the hierarchical structure of scripts has been emphasized, scripts with a chainlike structure that links relatively independent activities are important also. An illustration of such chains is provided in Figure 1 and an example is provided in the discussion of Eckblad's work, but this type of script should be examined in much more detail. It is expected that producing highly complex activities involves a mix of chainlike and hierarchically organized scripts.

Perhaps the most serious limitation is the lack of research about script-based models of behavior: Much of what has been proposed in this paper needs empirical support. Future research should attempt to verify the content, structure, and processes described in this paper by using data from *actual workers*. Cognitively oriented methodologies that have been applied to scripts could be used to identify the content and structure of job-relevant cognitive systems. In addition, since people can focus their attention on script properties when producing behavior (although they may not always do so naturally), it is believed that carefully developed introspective or self-report methodologies (see Ericsson & Simon, 1980; Taylor & Fiske, 1981) could be used to verify the five distinct components of strong scripts proposed here.

Examining the process-related suggestions in this paper would require investigating workers performing job-related activities. Here, process tracing methodologies (see Schweiger, Anderson, & Locke, 1985, for a recent example) could be used to gather descriptive evidence about the processes suggested in this paper, and simulations based on descriptive information could be developed to examine the internal logic of complex models such as the one depicted in Figure 2.

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Mary C. Kernan (Ph.D., University of Akron) is Assistant Professor of Administrative Sciences, Graduate School of Management, Kent State University.

Robert G. Lord (Ph.D., Carnegie-Mellon University) is a Professor of Industrial/Organizational Psychology, University of Akron. Correspondence regarding this article may be sent to him at: Department of Psychology, University of Akron, Akron, OH 44325.

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