It is generally assumed that a professional actor learns a role by committing the words to memory line by line or sentence by sentence. However, a pilot study indicated that this is not so. The research reported here is concerned with specifying the mental processes that professional actors employ in the course of learning theatrical scripts. Twenty-eight professional actors and 28 novices were assigned either to a gist or a rote condition. The former was designed to reveal the strategies actually used by actors to learn lengthy texts. The latter was designed to require subjects to learn text by repetition with as little contribution from semantic analysis as possible with meaningful material. All subjects were given identical six-page scenes from a realistic play. Two measures were used: elaborated recall and summarization. Analysis of elaborated recall protocols show that actors construct far more elaborations than novices, and that the great majority of these elaborations concern how the assigned character actively affects or is affected by another character. Results indicate that actors approach the learning of complex material by adopting the assigned character's perspective, and by actively asking questions in order to infer that character's plan.

Summarization results indicate that actors and novices construct different mental representations of the same text. Actors were more likely to summarize the scene as an unfolding process rather than a fixed entity. Also, they tended to ignore the temporal ordering of the text, implying the operation of a plan structure during encoding and retrieval. Furthermore, both expertise and a strategy based on elaboration appeared to encourage the drawing of inferences. This is shown by an increase in the number of subjects (as a function either of strategy or expertise) who included the unstated but implied resolution of the scene in their summaries.

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If you have ever spent an evening at the theatre witnessing a dramatic performance such as *Hamlet* or *Cyrano de Bergerac*, you have undoubtedly marveled at the fluency and apparent ease with which actors produce their lines. Audiences often are amazed at the memory skills of professional actors partly because they themselves may have experienced difficulty remembering a poem or speech they had to deliver verbatim. Yet, actors claim that they do not set out to memorize. Instead, they read the script repeatedly, thinking about the character's wants and needs. Anecdotal reports from actors indicate that during the rehearsal period, they are able to retain the exact words without having consciously memorized them line by line in a rote fashion. Apparently their expertise consists of elaborating the text in order to portray the character convincingly and this elaboration also helps to make the material memorable. This experiment was designed to investigate the nature of this process that emphasizes understanding yet yields verbatim retention.

**FROM GIST TO VERBATIM**

It has been generally presumed that verbatim memory and gist memory were either-or situations: either one used rote memorization to be able to reproduce text verbatim, or one recalled the gist at the expense of word-for-word accuracy. Is there a possibility that actors have a strategy based on gist memory that can efficiently produce verbatim results?

When the subject of an actor's verbatim retention of an entire role has been addressed at all, it has almost always been assumed that actors memorize a script by rote (e.g., Hasher & Griffin, 1978). Therefore, it is surprising that many actors do not find memorization burdensome or time consuming. One possible reason for this discrepancy could be that actors might actually use a strategy that is much more efficient than rote learning.

Is it possible to attend to the meaning of conversation and yet remember its exact wording? Two experiments have provided evidence that recognition memory for verbatim details of discourse occurring in natural settings is remarkably robust. The first study (Kintsch & Bates, 1977) showed that 48 hours after a normal classroom lecture, which contained no mention of a subsequent memory test, subjects recognized the differences between verbatim and true paraphrases of topic sentences, details, and extraneous remarks. After a 5-day delay, the students could no longer recognize verbatim topic statements or detail statements but still showed good recognition for verbatim extraneous remarks.

Another study (Keenan, MacWhinney, & Mayhew, 1977) identified the type of statement that would be recognized as being a verbatim rather than a true paraphrase after a 30-hour delay. These investigators tape recorded a research luncheon discussion at the Psychology Department of the Univer-
None of the participants had any idea they would be tested on the content of this discussion. Nevertheless, 30 hours later the participants showed significant recognition memory for the type of statements Keenan et al. described as having “high interactive value.” These statements contained wit, sarcasm, humor, personal criticism, and figures of speech, (e.g., “They’re so weird in Madagascar; they put verbs first; you can imagine what they do with their eyes”). Keenan et al. concluded that statements remembered word for word were those concerned with the intentions of the speaker, and were phrased in a colorful and interesting way.

Taken together, these two studies suggest that colorful, live, interactional conversation has a high degree of memorability. Do actors, when studying a script, embellish it in order to give it these easy-to-remember qualities?

**NATURE OF THEATRICAL SCRIPT**

A careful examination of a theatrical script reveals that it is no more than the actor's blueprint for the finished work. In a novel, the writer can present the attitudes, emotions, and motivations of a character by actually describing his or her unspoken thoughts and feelings. The playwright, however, can only present an objective view (i.e., the words the audience hears and the actions it sees). It is up to the actor to create the character's inner life so that the audience can infer the attitudes, emotions, and motivations from the performance. Only when the audience sees the facial expressions and body language, and hears the tone, emphasis, speed, and pauses (in conjunction with the words and actions themselves), can it fully understand the play. But how does the actor accomplish these things? Very little is known about the mental process involved in understanding and memorizing a role.

A search of the literature reveals only two studies concerning professional acting, a field in which the participants must retain incredibly large bodies of complex material. One study (Oliver & Ericsson, 1986) investigated the accessibility and speed of retrieval of various parts of a role after the role had been thoroughly learned and was being professionally performed in repertory. Although this study did not address the question of memorization strategy, it presented evidence on the direct accessibility of specific lines from any part of the play with minimal (one- or two-word) probes.

Indeed, there appears to be only one study that has looked at actors' ability to memorize text (Intons Peterson & Smyth, 1987). The design of this experiment did not permit the investigation of what these experts actually do in their work. That is, instead of theatrical scripts, the subjects were given short prose passages which they had to rehearse out loud, word for word as they went along. This study presented evidence on the relative effects of various factors on retention. These factors included frequency of rehearsal of individual words, organization of material, and the structure,
length, and complexity of the passage. However, the strategies the actors actually use when working on a role were not investigated. In fact, according to Intons-Peterson and Smyth, some of their subjects even commented that "...the task of learning by rote required different strategies from their standard ones" (p. 497).

**PILOT STUDY**

Prior to performing this experiment, I conducted a pilot study to investigate how professional actors go about learning roles. Nine actors gave detailed descriptions of their approach. There was complete unanimity on one point: All of the actors denied beginning with rote learning. That is, they made the point that they did not use a strategy consisting of endless repetitions of the lines to be learned with little meaningful analysis. Rather, they appeared to read the script over and over to find explanations for the words and actions of their characters, and after a sufficient amount of this work, very little conscious memorization seemed necessary: "the words just seemed to be there" (Noice, in press).

This approach appears to be opposite to the one used by a mnemonist or indeed by anyone who intentionally memorizes material. Chase and Ericsson (1982) have reported on the strategy developed by a digit-span expert, SF, who in the course of 100 training sessions developed a mnemonic system for remembering over 80 digits. To explain the superior performance of SF and other experts in different fields, Chase and Ericsson proposed a skilled-memory theory. It states that working memory capacity can be expanded by using long-term memory and enumerates the principles behind this expansion. Two types of tasks have been used in the course of testing skilled-memory theory. The first type involves a task where the goal is intentional memorization (e.g., remembering digits, Chase & Ericsson, 1982). The second type involves a task where the goal is not intentional memorization but for which expert memory is indispensable for performance of the task (e.g., performing mental calculations, Staszewski, 1988).

This experiment concerns a third type, in which the task does not involve retention of material at all, only analysis. Conversations with various New York actors indicated that they use the identical analytical approach whether the role is eventually to be performed from memory or not. That is, they use the same preparation strategy for a situation where they read the lines (radio plays, auditions, concert readings, etc.) as when they perform on stage from memory. Yet, over the course of rehearsal for a stage play, this strategy apparently leads to verbatim retention.

**PLAN RECOGNITION**

It appears that the process actors might be using during initial study of a play script parallels that of plan recognition (e.g., Schmidt, 1976; Schmidt,
Sridharan, & Goodson, 1978). That is, the actors might be trying to explain the actions of the various characters by inferring the goals they're pursuing. It should be kept in mind that in a play script, only the words and actions are explicitly stated; the reasons why the words are spoken and the actions are performed have to be supplied by the actor. It is, therefore, plausible that the initial play analysis consists of generating probable goals and sub-goals and then trying to understand the written text with respect to these inferred goals. I believe it is possible that their hierarchical organization (and the effort involved in constructing it) helps explain the retention of a large role with little or no rote learning.

Thus, it appears that the role-learning process of an actor is based on the construction of an underlying network that is colorful, interactional, life-like, and far richer and more detailed than the text itself. An extension of this reasoning would indicate that the richness of the memory representation constructed of the text can be inferred by determining the number of embellishments generated by the actor during his initial studying of the script. Three main questions were addressed by this research:

1. Can the process that actors claim allows them to retain large portions of the script without line-by-line memorization be experimentally verified and specified? If, during comprehension, actors actively ask questions and provide explanations for the actions of the characters, then many of these explanations should also be included in their recall protocols. To investigate this issue, experts and novices read the same scene from a play; they then performed an elaborated recall test during which they had to write down any actual lines they remembered, as well as any accompanying thoughts they had while studying the script. The prediction was that actors would produce a greater number and variety of explanatory-type statements than novices.

2. Will the actors' explanatory-type statements be made predominantly from the perspective of their assigned characters? It has been shown that taking on the perspective of one of the characters in a narrative has a powerful effect on the organization and retention of material (Anderson & Pichert, 1978; Black, Turner, & Bower, 1979; Owens, Bower, & Black, 1979). If actors assume the perspectives of their assigned characters, then they should be looking for those traits the characters possess that motivate them to follow particular plans and those actions the characters perform to implement those plans. Furthermore, the actors should attempt to explain why the author's words enable the characters to further their plans. Therefore, it was predicted that a greater number of statements about traits and actions from the perspective of the assigned characters would be made by actors than by novices.

3. Do the summaries of professional actors provide insight into the structure of their mental representation of the text? It seems reasonable to
assume that a professional actor who elaborates and explains the text by inferring the characters' intersecting plans, generates a representation of the text that is qualitatively different from that of a novice who has no experience in teasing out these elements from a theatrical script. Therefore, differences should be observed in the types of statements that subjects in either condition include in their summaries. There is an abundance of evidence to show that within a narrative, goal statements have a high probability of being included in a summary, have a high degree of memorability, and are usually rated as most important (Abbot, Black, & Smith, 1985; Black & Bower, 1980; Bower, 1982; Chiesi, Spilich, & Voss, 1979; Lichtenstein & Brewer, 1980; Owens et al., 1979). Because it was predicted that actors would approach the task of understanding a script by trying to identify the plan their assigned character is pursuing vis-a-vis the other characters, some of the statements included in the actors' summaries should be concerned with the emotional interactions that constitute the implementation of that plan. Novices, on the other hand, should be more apt to include restatements of scene content with very little elaboration.

Another predicted difference was that, in the brief summary statements, experts should describe actions from the perspective of one or more of the characters in the script, whereas the novices should be more apt to use an objective reporting style, simply describing how things are, as opposed to what each character is actively doing in the given situation.

An additional prediction was that actors' summaries would be hierarchically rather than sequentially organized. This prediction is in line with previous research on text comprehension, which has shown that subjects who understand a narrative as a plan to reach a goal, select goal statements for inclusion in a summary (Black & Bower, 1979; Fletcher, 1984; Kay & Black, 1986; Kintsch, 1977; Kintsch & van Dijk, 1975; Rumelhart, 1975). Therefore, if in their summaries the actors tend to ignore temporal ordering in favor of statements about plan-furthering interactions between characters, this would indicate that actors understood the actions with respect to their character's plans.

RATIONALE FOR EXPERIMENTAL DESIGN

Because the main purpose of this experiment was to learn the nature of the mental processes actors employ when working on a script, the design differed from many expert-novice experiments. My pilot data had shown that actors appear unconcerned with memorization in the course of working on the script. They feel that remembering their lines is analogous to an astronomer driving up the hill to the observatory: necessary to get the job done, but
completely incidental to the work itself. Furthermore, they reported that doing a great deal of analysis in the beginning resulted in their retention of the script without ever devoting time to line-by-line, word-by-word memorization. This appears to be a unique strategy. Is it possible that actors learn text verbatim by employing a strategy intended primarily to lead to ever-deeper understanding?

The experiment was designed to insure that it would uncover the strategies actors actually use in the initial stages of working on the script. Therefore, every effort was made to reproduce naturalistic conditions in a controlled laboratory setting. The scene was from a contemporary play and the subjects were told to employ “any strategy you think would be helpful under the circumstances as long as you work actively for the full 20 minutes.” Furthermore, actors were told to imagine that this was an actual audition. There were two reasons for this: (1) to create a natural everyday situation so that subjects would approach it seriously and not regard it as some theoretical experiment divorced from real life; and (2) to encourage the use of the mental strategy actors actually employ when first confronted with a script.

The pilot study had indicated that actors employ the same strategy from first reading to opening night, but I was particularly interested in replicating the conditions of initial study. Therefore, great care was taken to avoid introducing demand characteristics that might encourage actors to abandon their natural strategy and memorize the text line-for-line. For the sake of consistency, novices were given the same instructions (although the phrase “audition for a play” was changed to “try-out for a school play”).

It was decided not to use on-line protocols in order to avoid introducing any element that might prevent actors from employing their natural strategy. For the same reason, the text was not presented on a CRT; subjects were given printed scripts in professional format. Following a 20-minute study period, subjects were asked to recall everything they could both of the script itself and the ideas they generated while studying the script. Under this procedure the possibility exists that, even though the instructions emphasized writing down only those ideas the subject recalled from the study period, some elaborations may have been generated during recall. However, because the purpose of this experiment was to specify the nature of actors’ elaborations, determining the specific processing stage was not considered as important as avoiding any procedure that might inhibit the use of the actors’ natural strategy. (For a discussion of the use of “verbal reports as data” see Ericsson & Simon, 1980.) Having obtained this data in a naturalistic setting, future experiments can now incorporate the use of on-line thinking-aloud protocols.

Furthermore, the instructions were designed not to impose any strategy, but to let all subjects proceed as they usually would. I realized that the novices would not have a natural strategy for learning theatrical scripts, and
when they were confronted with a script to study, they would probably simply attempt to learn the material as they would any other school assignment, such as learning a poem or table of elements. Therefore, although expert and novice subjects might interpret the task differently, this differing interpretation would nevertheless reveal the nature of the actors' expertise and confirm what was hinted at in the pilot protocols. That is, actors do not approach a learning task as college students would, but have their own learning strategy, the details of which this experiment was designed to explore.

METHOD

Subjects and Design
Fifty-six subjects participated in this study, representing two levels of expertise: 28 professional actors (13 men, 15 women) and 28 undergraduate psychology students (10 men, 18 women) with no theatrical background. Thirteen of the actors were selected from among graduate students at Rutgers' Mason Gross School of the Arts majoring in theatre arts. They had had at least 4 years experience in college and had played a major part in at least three theatrical productions. These subjects were paid $7.00 each for their participation. The remaining experts were recruited from among professional actors in New York who had worked as actors for at least 4 years and ranged in age from 22-40. All of them were either currently appearing in a play or rehearsing one. Their participation was voluntary. No subject in either group was familiar with the play material used in the experiment.

Fourteen subjects served in each condition of a 2 x 2 design with two between-subjects variables. The first variable was whether the subject belonged to an expert or novice group; the second variable was whether the subject studied the script using a gist or rote strategy.

Materials
The experimental passage was a short scene for two actors from the play The Second Man by S.N. Behrman (1955). The main criterion for selecting it was that the scene be internally cohesive and, therefore, not unintelligible out of context. Furthermore, the subject matter, love, was thought to be of equal interest to novices and experts, and both groups were assumed to possess about equal amounts of knowledge on the subject.

Further considerations were that the parts of both actors be of the same approximate length (45 idea units for one character and 41 for the other), that neither part contained long speeches, and that the resolution of the scene was not explicitly stated so that it would have to be inferred. (A copy of the scene is given in the Appendix.)

The play belongs to a large general category called realism, characterized by the attempt to approximate real life on stage. The situation is one audi-
ences accept as plausible, and the characters act upon motivations the audiences accept as true to life. Two booklets were prepared. The first consisted of the scene itself preceded by instructions concerning the nature of the task. The second booklet contained a distractor task followed by an elaborated recall task. After this, there was a page instructing subjects how to perform the brief summarization task. Finally, the subjects were questioned on the methods or strategies they used to study the material.

Procedure
Experts and novices were randomly assigned to one of the two treatment conditions and were tested individually. Booklet 1 contained instructions specific to each learning condition.

**Rote Instructions.** Subjects in the rote condition (both in the novice and expert group) were told to memorize their lines. (The role of AUSTIN for male subjects and the role of KENDALL for female subjects). Furthermore, they were instructed not to "look ahead" but to keep the remaining lines covered with a supplied cardboard that was constructed so as to contain a window which only exposed one section of the script at a time. (This procedure is similar to one used by Cofer, 1941.) The subjects repeated each speech over and over until the experimenter signaled that it was time to go on to the next one.

It should be noted that these instructions prevent, as much as possible, the subject's inadvertent use of meaningful analysis, which could have taken place if the subjects had been allowed to keep going back to the beginning of the script. This procedure was designed to influence the subject to employ rote learning according to the strict Webster's Unabridged Dictionary definition, "by memory alone, without understanding or thought." Of course, 100% rote learning is not possible with meaningful material; even learning nonsense syllables may involve some additional mnemonic devices. But this procedure does put strong emphasis on learning purely by repeating.

Following a 2-minute practice session (using a fragment of a different play), subjects were instructed to cover the first page of the script with the template and proceed. Subjects' study was monitored to ensure compliance with experimenter's instruction. The experimenter kept time and adjusted the number of repetitions (adding repetitions for subjects who spoke quickly and eliminating repetitions for subjects who spoke slowly) so as to adhere to the allotted time of 20 minutes. Although subjects were told to memorize, they were not specifically told there would be a recall test.

**Gist Instructions.** Subjects were told to study the scene as if they had to audition ("try out") for the designated role, and that they would have 20 minutes to do so. They were not told to memorize, nor were they informed
that there would be a subsequent memory test. The exact instructions were as follows:

I want you to imagine that you’re auditioning for the part of Austin (Kendall) in the play The Second Man by S.N. Behrman. Please read and study the scene on the following pages and think about the character of Austin (Kendall) as if this were the first chance you had to read the script before auditioning with this scene. You’ll have exactly 20 minutes to study the material to prepare for this imaginary audition. Use any study strategy you think would be helpful under the circumstances, as long as you work actively for the full 20 minutes.

The instructions for the actors and novices were identical (except as noted under “Rationale”). (Because the gist instructions emphasized reading, studying, and concentrating on the assigned character, the subject would necessarily have to use a strategy that included attending to the meaning or gist of the scene.)

At the end of 20 minutes, subjects in all conditions were given a 2-minute distractor task, which consisted of naming plays and movies they had seen, and books they had read within the last 5 years. This specific task was chosen rather than a counting task in order to keep the process naturalistic and relevant to the actors’ and students’ interests.

All subjects then participated in an elaborated recall task. They were given sheets of papers, blank except for a line down the center and the headings, Column A and Column B. Subjects wrote any lines they recalled from the script in any order in Column A and any accompanying thoughts in Column B. No time limit was imposed, but subjects were cautioned that Column B entries must be restricted to thoughts they had during the initial 20-minute study period.

To make certain that the basic procedure was indeed clear, the experimenter summarized the main points after the subject had read the instructions. Following recall, subjects were instructed to summarize the scene in two or three sentences. Finally, subjects were asked to describe briefly the type of strategy they had employed during study. The purpose of this was to verify that subjects assigned to a given strategy had indeed used that strategy during study.

MEASURES

This study included three measures:

1. Elaboration analysis that consisted of examining the elaborated recall protocols with respect to number and type of elaborative statements. The degree of elaboration served as an indication of the depth of understanding subjects had achieved. This rationale was derived from the work of Greeno (1977).
2. Accuracy analysis that consisted of computing the number of lines of dialogue of the assigned character entered in Column A. As long as the main idea of a line was recalled, credit was given.

3. Structural analysis that consisted of examining subjects' summaries in order to infer the structural representation that subjects in different conditions had formed of the text. Of interest was whether experts and novices differed in how they represented the information in the text (e.g., hierarchically vs. linearly) and differed in what types of information they chose to include in their summaries (e.g., emotional interactions vs. static scene descriptions).

Elaborated Recall Task

Before a scoring scheme could be developed, a unit of analysis had to be decided on. Although various measures exist to assess recall of connected discourse, none has been developed for analyzing play scripts. Story grammar has been used successfully for analyzing the underlying structure of simple stories having a clear internal structure, but is not suited for the analysis of more complex stories (e.g., Mandler & Johnson, 1977; Thorndyke, 1977). It has difficulty analyzing stories in which one character says something to another who then replies, yet this is the almost invariant structure of a play script. Newman and Bruce (1984) attacked the problem in the analysis of social interactions but their measures were not transferrable to this experiment.

Play scripts differ from normal prose insofar as scripts typically contain fragmentary responses, cut speeches, and parenthetical adjectives describing the attitude of the speaker. Likewise, subjects' verbal utterances often are stated in incomplete sentence form, for example, “Jealous to be left out”, or “making contact,” or “flirty.” Therefore, rather than using a complete sentence as a unit of measurement, the idea unit (based on work done by Johnson, 1970 was chosen, because it seemed more appropriate for capturing these “cut” thoughts. Typically, the unit was a sentence, but on occasion it was a clause or a single word. The segmentation of the play script was agreed upon by two raters. It consisted on a total of 86 idea units: The role of Kendall had a total of 45 idea units and the role of Austin had a total of 41 idea units.

An additional difference between a play script and a prose passage is that the text is written as dialogue. Although all subjects read the entire scene, male subjects were told to study Austin's lines and female subjects were told to study Kendall's lines.

Scoring of Column A Utterances

Verbal utterances were divided into idea units using the same system employed for segmenting the play script. They were then scored with respect
to accuracy. Credit was given for each idea unit recalled verbatim or paraphrased. If subjects, in addition to their assigned lines, also recalled lines of the other character, these were scored separately. Any material recalled that had not been stated in the text was scored as an intrusion. Of primary interest at this point were the number and types of elaborations subjects generated. Therefore, the main purpose of the Column A entries was to serve as references for those elaborations reported in Column B.

**Coding of Column B Utterances**

The first step was to read the protocols repeatedly to detect similarities of purpose or expression. After detailed study, it became apparent that all statements fell into one or two categories: explanatory or nonexplanatory. Any statement that served to interpret the text either by exploring its underlying meaning or by embellishing it was classified as an explanatory-type statement. Conversely, any statement that was either an editorial comment or simply a restatement of the text was classified as a nonexplanatory statement.

*Explanatory Statements.* These were reexamined, resulting in the development of the following three categories: (1) characterizations, (2) interactions, and (3) externals. If an utterance served to describe one of the characters in the script, either in terms of physical characteristics or personality disposition, it was considered as belonging in the *characterization* category. If an utterance described how one character influenced or was influenced by the other character, it was scored as an *interaction*; if an utterance was concerned with technical aspects of the performance, it was considered to be an *external*.

However, even though all explanatory utterances fell into one or another of these categories, the ways in which the actors expressed the differences varied. In many cases, an actor simply gave a straightforward explanation of his elaboration as if to describe it to himself or others. However, one particular approach stood out, which resulted in the creation of a subcategory of interaction: *silent speech*. *Silent speech* is a type of elaboration not yet discussed in the cognitive literature. Here, instead of describing the nature of the interaction, the ac-

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1 In a task reported elsewhere (Noice, 1988), actors and novices participated in a cued recall test in which they were given the “other” actor’s line as a cue and then had to produce their own line. An elaborate scoring scheme was developed that classified each verbal utterance either as “true verbatim” (word-for-word accuracy), or “acceptable verbatim” (minor one-word changes, deletions, or additions). The results were: *Actors* in the gist condition recalled 42% of the script (combined true and acceptable verbatim) compared to 24% in the rote condition; *novices* in the gist condition recalled 51% of the script (combined true and acceptable verbatim) compared to 10% in the rote condition. ANOVA produced a significant interaction of expertise and strategy, $F(1, 52) = 6.46, p < .05, MS_e = .048$. This interaction reflected the fact that actors performed significantly better under the strict conditions imposed by a rote strategy than did novices.
tor actually wrote out the thought that the character would be thinking while he delivered the line as written by the author (e.g., the line is, "Are you going to marry him?" The actor elaborated by writing out his underlying thought, "Please say yes").

Nonexplanatory Statements. These were divided into two major categories: (1) editorial comments about the experiment itself, and (2) restatements of scene content without elaboration. Statements that were illegible or contained too little information to be classified were scored as ambiguous.

Reliability of Coding
All verbal utterances were coded by one judge (the experimenter). A randomly selected subset consisting of 36 protocols was scored blindly by two independent raters who had been trained using actual examples. Each rater had to score sample protocols for practice over a period of 6 weeks until the rater was proficient in the scoring scheme. The emphasis of the training was on the procedure necessary to assure accurate coding.

All of the protocols used for practice were eliminated from the set used for the actual scoring. Raters were blind with respect to the subject's condition and any disagreements were resolved by a third rater. The correspondence between the main rater and the two independent raters for these 36 protocols was calculated. There were 81 utterances classified by both judges as interactions, but only 2 classified by the main judge as an interaction and by a second judge as a characterization. There were very few disagreements, with the overwhelming majority amounting to one or two. The only exception was silent speech versus interaction, in which there were 21 disagreements; as pointed out earlier, silent speech is not a separate category but an elaborative device used by many actors to express how their character interacts with other characters or with the given situation. Thus, by definition, any verbal utterance coded as silent speech was also an interaction. Although these two categories were not mutually exclusive, they were treated as such so that the interrater agreement could be calculated for interactions phrased as silent speech versus interactions described directly. Even though these both performed the same function, the difference in phrasing was so salient that an interrater agreement of .88 was achieved. The interrater reliability for the various categories ranged from .88 for "interactions versus silent speech," to .98 for "explanatory versus nonexplanatory comments," to 1.00 for "characterizations versus externals."

Summarization Task
Scoring Procedures. The unit of analysis adopted here was the independent clause. This, rather than the idea unit, was considered appropriate because the summary scoring form required the identification of viewpoint, which could only be determined by looking at the utterances as a whole.
It was predicted that more novices would have retained a neutral perspective whereas more of the professional actors would have taken on the viewpoint of the assigned character. The following scoring procedure was created: Each main verb was analyzed grammatically by being categorized either as an action verb (transitive or intransitive) or a nonaction verb (copulative). Following this grammatical analysis, each independent clause was examined as to content. This content analysis tried to discern if the meaning of the clause involved an internal interaction between two people or dispositional properties of one or more of the characters, or a physical or mental activity. In order to determine this, the raters followed a strict series of rules:

1. Does the main verb indicate an emotional or internal state (e.g., loves, fears, confesses, doubts, reassures, etc.)? If so, look at subject and direct or indirect object to see if the interaction is explicitly stated (e.g., "KENDALL reassures AUSTIN"). If the object is not directly stated, is it unequivocally implied? [e.g., "He confesses his fears" (to her)]. If so, list the clause as a transitive or intransitive interaction.
2. If the presence of an internal state cannot be determined by the previously described analysis, then the entire predicate must be considered (e.g., "Through the sharing of their feelings a bond is created"). This particular example would be listed as an interactive state of being.
3. Physical activities and speech acts are usually easily determined by looking at the main verb. Included in this category are verbs such as meet, enter, talk, discuss, and so forth.

In addition to determining the interactions, the raters designated who performed it (same for assigned character, different for the other character in the scene, both for AUSTIN and KENDALL together, and other for characters referred to but not present).

In addition to the grammatical and content analysis just described, two questions were posed. The first one asked if there was an indication of duplication of temporal ordering of script events. Because a two- or three-sentence summary obviously does not allow for a complete chronological organization, the first sentence of the summary was examined. If it was a restatement of the opening stage directions and/or of the first line of the script, it would be an indication of temporal ordering. That is, it would indicate that the subjects' mental representation began with the first information in the script. The prediction was that more subjects who had learned the script by rote would have formed a mental representation that maintained the initial temporal ordering of the original text.

The second question examined if a learning strategy can influence the degree to which subjects draw inferences from what the text does not state directly but only implies. To answer this question, summaries were scored
for the presence of a statement indicating the subject had inferred the goal or resolution of the scene. The goal (which is not explicitly stated in the text) had been determined by asking a well-known director, writer, and professor of drama to summarize the scene and explicitly state the resolution the author had implied. In his view, the implied resolution is that Kendall and Austin are warming toward each other even though this is never stated in the text (J.W. Kirk, personal communication, September 3, 1987).

Reliability of Scoring
All of the summaries were scored by the main rater (the experimenter). A randomly selected subset consisting of 25 protocols was scored blindly by an independent rater. Interrater reliability was 1.00 for all categories except interactions versus activities, which was .94. Finally, these few disagreements were resolved by an additional independent rater.

RESULTS

Elaborated Recall Results

Elaborations. The thoughts that the subjects reported having while studying the script were first divided into idea units and then tabulated for each subject. The first major question addressed in this section was whether actors constructed more explanatory elaborations than novices while studying the same text. The comparison between explanatory and nonexplanatory comments is presented in Figure 1 (p. 440).

The main finding was the presence of a large number of elaborations produced by actors in the gist condition compared to subjects in any other experimental condition, \( t(26) = 3.47, p < .01 \). This confirmed the hypothesis that in the course of studying a play script, professional actors greatly embellish the text and construct an internal representation consisting not only of the ideas mentioned explicitly in the text but also the explanations they generate.

Further inspection of the elaborated recall data in Figure 1 shows that not only did actors in the gist condition produce the most explanatory comments, they also reported the fewest number of nonexplanatory comments, \( t(26) = 2.02, p < .05 \). These patterns of results were consistent with predictions that actors approach a text by actively trying to explain the actions. As a matter of fact, the ratio of their explanatory to nonexplanatory comments amounted to over 13:1. On the other hand, novices in the same condition did some elaborating (as would be expected of any person when confronted with a text he or she must comprehend) but also did a great deal of unelaborated reporting. The novices' ratio of explanatory to nonexplanatory comments amounted to approximately 2:1.
For each subject, difference scores between the number of explanatory and nonexplanatory statements were computed. These data were then submitted to an analysis of variance (ANOVA) with two between-subjects variables (expertise and strategy). There was a statistically significant interaction of expertise with strategy, $F(1, 52) = 5.10, p < .05$, $MS_e = 80.87$. An analysis of simple main effects indicated that use of a gist strategy increased the amount of elaboration actors engaged in, $F(1, 52) = 13.26, p < .01$, $MS_e = 80.67$, but this was not the case for novices, $F(1, 52) = 1.91, p > .05$. This offered converging evidence for the hypothesis that in the course of studying a play script, professional actors greatly embellish the text and construct an internal representation that consists not only of the ideas mentioned explicitly in the text but also those explanations they generated.

A significant main effect of strategy emerged, $F(1, 52) = 25.23, p < .001$, $MS_e = 80.87$, which understood the fact that subjects in the gist condition tended to engage in more explaining than subjects in the rote condition.

A second analysis was carried out to determine whether the results would also hold for individual subjects. For each of the four conditions, it was assessed how many of the 14 subjects had generated more explanatory than nonexplanatory comments. The results showed that every actor in the gist
condition and 10 actors in the rote condition produced more explanatory than nonexplanatory comments. However, with novices, 9 subjects in the gist condition and only 1 subject in the rote condition produced more explanatory than nonexplanatory comments. A chi-square test for independence indicated that there was a significant relationship between expertise and the production of a majority of explanatory comments, \( \chi^2(1, N=56) = 14.67, p < .01 \).

Another major area of interest was whether there were any quantitative or qualitative differences in the type of elaborations generated by actors and novices. To answer this question, the mean scores were computed for each of the three categories: interactions; characterizations, and externals plus one subcategory of interaction: silent speech. It should be noted that because silent speech does not exist by itself, but is a particular way of phrasing an interaction, all such utterances were counted as both silent speech and interaction. These data are presented in Figure 2.

As can be seen, the experts differed significantly from the novices in several respects. The most obvious difference was in the mean number of utterances classified as interactions, \( t(54) = 2.80, p < .01 \). Interactions constitute the most significant form of elaboration because they capture the essential causality in the play by analyzing how one actor affects or is affected by another, thus causing a change in the relationship or situation. An example of this type of utterance would be: "KENDALL finds this man elusive and interesting and is glad for the chance to talk to him alone."
The next category concerned *characterizations*. All subjects, on the average, produced fewer characterizations compared to interactions. That is, all subjects considerably fewer statements describing the stable dispositional properties of a character. For example, subjects were less prone to say “He is very honest” than “He wants her to tell him the truth.”

A difference that did emerge was that actors in the gist condition generated far more verbal utterances classified as *externals* than actors in the rote condition, $t(26) = 2.58, p < .05$. These utterances were concerned with technically analyzing the role in terms of wardrobe to wear, dialects to use, specific words to stress, and so forth.

One of the most interesting findings was the discovery that actors, particularly those who had studied the script using a gist strategy, frequently used the device I refer to as *silent speech*. It appears that in many cases this *silent speech* allows the actor to understand his assigned character’s plan. In one example, the lines of the text were “I’m glad you came. I was getting lonesome.” The actress elaborated by the silent speech: “I want to get to know him.” In this case, her silent speech represents the actress’ recognition of Kendall’s plan to use this chitchat to get closer to Austin.

This type of elaboration was used almost exclusively by actors, $t(54) = 2.76, p < .01$. Rarely was this device used by novices. As a matter of fact, only 1 novice of 28 used it with any consistency. Thus, it appears that the use of silent speech as an elaborative device is characteristic of an actor’s expertise when experimental conditions do not constrain its use.

**Perspective.** A primary question in this experiment was whether subjects differed with respect to adopting the perspective of the assigned character (Austin with male subjects, Kendall with female subjects). In other words, did significant differences exist between groups or conditions in terms of the number of statements generated from the point of view of the assigned character? In order to determine this, utterances were scored along another dimension: *mental or emotional activity*, or *referent*. To be listed under the former, the utterance had to have described specific mental or emotional activity by the character. To be listed under the latter, the utterance had to be a statement about the character. In other words, the former viewed the character from the inside and the latter viewed the character from the outside. An example of a statement indicating the presence of *mental or emotional activity* would be, “Kendall is surprised that she is touched emotionally by a relationship she thought was purely physical.” When this activity was present, the rater listed it as *same* (assigned character), *different* (other character), or *both*. An example of an utterance that would be classified as *referent* would be, “Kendall is witty.” These data are shown in Table 1 together with the results of the independent $t$ tests used to analyze the data.
### TABLE 1
Mean Number of Explanatory and Nonexplanatory Statements Consistent with Assigned Character's Point of View

<table>
<thead>
<tr>
<th>Category</th>
<th>Actors</th>
<th></th>
<th>Novices</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rote</td>
<td>Gist</td>
<td>Rote</td>
<td>Gist</td>
</tr>
<tr>
<td>Mental or Emotional Activity: (Who is thinking the thought or experiencing the emotion?)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Same character</td>
<td>3.6</td>
<td><strong>12.9</strong></td>
<td>0.3</td>
<td><strong>4.4</strong></td>
</tr>
<tr>
<td>Different character</td>
<td>0.3</td>
<td>0.4</td>
<td>0.2</td>
<td>0.7</td>
</tr>
<tr>
<td>Both characters</td>
<td>0</td>
<td>0.1</td>
<td>0</td>
<td>0.4</td>
</tr>
<tr>
<td>Total</td>
<td>3.9</td>
<td>13.4</td>
<td>0.5</td>
<td>5.5</td>
</tr>
<tr>
<td>Referent (Who is being talked about?)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Same character</td>
<td>1.7</td>
<td>3.5</td>
<td>0.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Different character</td>
<td>0.1</td>
<td>0.6</td>
<td>0.6</td>
<td>1.6</td>
</tr>
<tr>
<td>Both characters</td>
<td>0.4</td>
<td>0.7</td>
<td>0.1</td>
<td>0.6</td>
</tr>
<tr>
<td>Total</td>
<td>2.2</td>
<td>4.8</td>
<td>1.6</td>
<td>5.1</td>
</tr>
<tr>
<td>Others (incl. externals)</td>
<td>4.9</td>
<td>6.6</td>
<td>1.3</td>
<td>3.6</td>
</tr>
<tr>
<td>Grand Total</td>
<td>11.0</td>
<td><strong>24.0</strong></td>
<td>0.4</td>
<td><strong>14.3</strong></td>
</tr>
</tbody>
</table>

*Note. Independent t tests: *p < .01, within group comparisons; **p < .05, between gist conditions comparison.*

Significant differences between the experimental conditions were observed. Actors in the gist condition by far exceeded all other subjects in terms of the number of elaborations generated that were consistent with the perspective of the assigned character, *t*(26) = 3.52, *p < .01. Over half of their total number of statements were concerned with explaining the mental or emotional activity of the assigned character. However, novices in the gist condition did use far more perspective taking than novices in the rote condition: *t*(26) = 2.81, *p < .01. This would appear to indicate that the high degree to which actors indulge in perspective taking is due to their expertise, but nevertheless, some perspective taking is a component of the understanding process itself.

By comparing the figures for mental or emotional activities to those for referent, one can assess if subjects were likely to identify with their characters by understanding their mental or emotional states (as opposed to just talking about their characters from the outside). The ratio of actors viewing their character from the inside as opposed to talking about their character from the outside was 3.7:1 whereas with novices that ratio as 1.5:1. Furthermore, one can assess the tendency to view all the characters from the inside as opposed to the outside by comparing the combined figures for same, different, and both. This procedure yielded a ratio of 3:1 for actors as opposed to 1:1 for novices. These figures indicate that actors show a great tendency
to "get inside the character," whereas novices are equally likely to view
the character from inside or outside. Many of the actors' utterances explained
why a character made a particular remark. For example, one actress recalled
the line, "I'm glad you came." She added, "She's trying to make him feel
at ease."

For each subject, difference scores between the number of statements
describing specific mental or emotional activity by the character and state-
ments about the character were computed. These data were then submitted
to an ANOVA with two between-students factors (expertise and strategy).
There was a statistically significant interaction of expertise with strategy,
\( F(1, 52) = 3.94, p < .05, M_{SE} = 826.85 \). An analysis of simple main effects
indicated that use of a gist strategy appeared to encourage actors to view the
character from the inside for actors, \( F(1, 52) = 14.95, p < .01, M_{SE} = 26.85 \),
but not novices, \( F(1, 52) = 1.12, p > .05, M_{SE} = 26.85 \).

Significant main effects of expertise and strategy emerged: Actors pro-
duced more elaborations that focused on mental or emotional activities of
their assigned character than novices, \( F(1, 52) = 13.98, p < .001 \); also, all
subjects using a gist strategy focused more on such activities compared to
subjects using a rote strategy, \( F(1, 52) = 12.12, p < .01 \).

To determine if the results would also hold for individual subjects, a sec-
ond comparison assessed how many of the 14 subjects in each condition
adopted a particular viewpoint. It was found that every actor in the gist con-
dition and 8 actors in the rote condition generated more statements from the
point of view of the assigned character than from the point of view of the
other character. However, only 2 novices in the rote condition and 8 novices
in the gist condition identified more frequently with the assigned character
than with one of the other characters. A chi-square test was applied to the
relationship between expertise and predominantly used viewpoint and
found to be statistically significant, \( \chi^2(1, N = 56) = 10.5, p < .05 \).

**Extent of Mental Representation.** The preceding analyses were all con-
cerned with the nature of actors' and novices mental processes as revealed
by their explanatory and nonexplanatory statements. However, the design
of the experiment called first for the recall of a line, then for the thoughts
the subjects generated when considering the line. Therefore, one way to in-
vestigate the richness of the mental representation that subjects formed of
the text was to compute the total number of actual lines recalled (either ver-
batim or paraphrased) as well as the accompanying thoughts (explanatory
and/or nonexplanatory). These data are represented in Table 2 along with
the results of the significance tests on the difference between means. Even
though the instructions emphasized studying the lines of the assigned char-
acter, a few subjects recalled some lines of the other character as well.
These, plus any intrusions, were scored separately and are also represented
in Table 2.
TABLE 2
Mean Number of Lines and Accompanying Thoughts Recalled
by Actors and Novices as a Function of Strategy

<table>
<thead>
<tr>
<th>Category</th>
<th>Actors</th>
<th></th>
<th>Novices</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rate</td>
<td></td>
<td>Rate</td>
</tr>
<tr>
<td>Lines Recalled</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assigned character</td>
<td>10.07</td>
<td>15.57</td>
<td>8.21</td>
<td>20.43</td>
</tr>
<tr>
<td>Other character</td>
<td>0.79</td>
<td>1.93</td>
<td>1.29</td>
<td>6.43**</td>
</tr>
<tr>
<td>Intrusions</td>
<td>0.29</td>
<td>0.43</td>
<td>0.64</td>
<td>0.64</td>
</tr>
<tr>
<td>Total</td>
<td>11.15</td>
<td>*17.93</td>
<td>10.14</td>
<td><em>27.50</em>*</td>
</tr>
<tr>
<td>Thoughts Recalled</td>
<td>10.86</td>
<td><em>24.79</em>*</td>
<td>3.43</td>
<td>*14.30</td>
</tr>
<tr>
<td>Grand Total</td>
<td>22.01</td>
<td>*42.72</td>
<td>13.57</td>
<td>41.80*</td>
</tr>
</tbody>
</table>

Note. Independent t tests: *p < .05, within group comparisons; **p < .05, between gist conditions comparison.

The main finding was that a rote strategy produced a mental representation that was quite impoverished compared to the rich one produced by a gist strategy. Not only were fewer actual lines recalled, \( t(54) = -4.76, p < .001 \), but also fewer elaborations were generated, \( t(54) = -4.77, p < .001 \).

Of the subjects using a gist strategy, the actors generated more elaborations, \( t(26) = 2.72, p < .05 \), but recalled about the same number of lines of dialogue of the assigned character as novices \( t(26) = -1.36, p > .05 \). This pattern of results was consistent with the hypothesis that actors in the initial stages of script analysis elaborate the text by explaining the actions of their assigned characters. However, novices recalled more lines of the other character \( t(26) = 2.40, p < .05 \), so total literal recall of novices was greater, \( t(26) = 2.27, p < .05 \). There were no significant differences in the overall recall (literal recall plus elaborations) of the two groups \( t(26) = 16, p > .05 \).

Augmented Gist Condition
One possible explanation for the results obtained is that actors and novices interpreted the task differently and therefore adopted different strategies. That is, all professional actors know they don't have to memorize their lines for an audition but that a script is available. Therefore, they could put all of their emphasis on elaborating each line. On the other hand, novices would not have this knowledge and could possibly believe that, during an audition, lines had to be recited from memory. Therefore, they might have spent the allotted study time memorizing their lines. Thus, the higher number of elaborations generated by actors, and the higher number of total lines recalled from the script by novices could possibly be attributed to strategic differences rather than different study skills associated with expertise. To rule out this possibility, an additional group of novices was tested under identical conditions to those of the previous gist condition but with revised instruc-
Table 3 provides a comparison between the original actor gist, the original novice gist and the new augmented novice gist conditions. As can be seen, the pattern of recall of the two novice groups was remarkably similar; no significant effects emerged. Comparing the augmented gist condition to the actor gist condition, the number of lines recalled of the assigned character were the same, but novices recalled more lines of the other character in the script, $t(26) = 4.59, p < .001$, resulting in an overall literal recall advantage for novices, $t(26) = 2.15, p < .05$.

Therefore, it appears that the recall pattern obtained with novices and actors can't be attributed to differences in task interpretation. Regardless of instructions, novices showed little tendency to explain what the character was thinking while saying those words.

**Summarization Task Results**

**Category Types.** The total number of independent clauses was calculated for each of the following categories: emotional interactions, speech acts/physical activities, unelaborated states of being, and dispositional properties. Because the average length of the summaries varied from 3.4 sentences for novices in the gist condition to 4.5 sentences for actors in the rote condi-
LEARNING OF COMPLEX MATERIAL

TABLE 4
Mean Percentage of Summary Statements by Category Type as a Function of Group and Strategy

<table>
<thead>
<tr>
<th>Category</th>
<th>Actors</th>
<th>Novices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rate</td>
<td>Gist</td>
</tr>
<tr>
<td>Interactions</td>
<td>34.9</td>
<td>55.1</td>
</tr>
<tr>
<td>Mental or physical activities</td>
<td>58.7</td>
<td>36.7</td>
</tr>
<tr>
<td>Dispositional properties</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Unelaborated state</td>
<td>6.4</td>
<td>8.2</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

tion, mean percentages for each category were calculated. These data are shown in Table 4. The results of the independent t tests performed on these data are also summarized in Table 4.

The first question of interest was whether any quantitative or qualitative differences existed between the experimental conditions. As predicted, actors in the gist condition produced a greater percentage of sentences that described emotional interactions compared to novices, t(54) = 2.01, p < .05. Also, they produced a lower percentage of verbal utterances concerned with mental or physical activities compared to any other experimental condition, t(26) = −2.45, p < .05. This would appear to indicate a hierarchical approach by actors in the gist condition that considered physical and speech acts as less important for their purposes than psychological interactions. Subjects in all other conditions included fewer psychological interactions and more mental or physical activities when summarizing the scene. In general, subjects showed very little tendency to summarize the play script in terms of dispositional properties. Only novices who had studied the script by rote included some sentences giving a trait description. Not one of the other subjects did.

To determine whether these results would also hold for individual subjects, it was calculated how many of the 14 subjects in each condition had generated more interactions than any other type of statement. Overall, the pattern of the results resembled that of the former analysis. Whereas 11 of 14 actors in the gist condition and 8 of 14 actors in the rote condition made more statements scored as emotional interactions than any other type, only 3 of 14 novices in the gist condition and none of the novices in the rote condition showed this preference for interaction statements. To assess if these differences were significant, a chi-square test was applied to the relationship between expertise and predominant use of interactions and found to be statistically significant, χ²(1, N = 56) = 19.17, p < .01.

Furthermore, actors tended to couch their sentences in an active form (e.g., "KENDALL reassures him that his doubts are unfounded") rather than the more static form (e.g., "KENDALL is in love with STOREY") pre-
ferred by novices, particularly those in the rote condition. That is, whereas 9 of the 14 actors predominantly used transitive/intransitive verbs in the construction of interactional statements, only 2 of 14 in the rote condition did. This finding would indicate that actors are more likely to encode a play script as an unfolding process rather than a fixed entity.

Another question was whether novices were more prone to use copulative (also referred to as linking) verbs than actors. Because linking verbs by definition denote a state of being, this would be evidence for a reporting style rather than an interpretive one. As expected, summed across strategy, novices generated a greater percentage of summary sentences using linking verbs than actors did (35.6% versus 20.7%). Moreover, novices who had studied the text using a rote strategy were the most likely to summarize using linking verbs (42%). For each subject, difference scores between the number of sentences using linking verbs and transitive or intransitive verbs were computed. An independent group t test confirmed that actors and novices differed significantly in the types of verb forms they used, t(54) = 2.5, p < .05. Finally, even when actors did employ the copulative form, the state of being they described tended to be more elaborative than static. For example, one actor wrote, “MRS. FRAYNE is alternately playful and comforting to him,” whereas a novice wrote, “It appears that KENDALL is in love with STOREY.”

An examination of all statements using copulative verbs showed that novices were twice as likely as actors to summarize the scene in terms of static state descriptions (15.3% for novices vs. 7.3% for actors). Thus, novices were far more prone than actors to make summary statements like, “This is a scene about a man and a woman.”

Differences in Mental Representation. The question of whether novices and experts formed different mental representations of the text was addressed by comparing the percentage of statements dealing with emotional interactions made by each group from the perspective of assigned versus other character. The same comparison (assigned vs. other) was also carried out for the three remaining categories combined (speech acts/physical activities, unelaborated states of being, dispositional properties). These data are shown in Table 5. The reason for looking specifically at emotional interactions is that this is the only category in which the participants are actively trying to affect each other, as opposed to physical or speech acts or unelaborated states of being. For example, if the actor makes the statement, “KENDALL is reassuring the upset AUSTIN,” one immediately infers that this reassurance constitutes her goal or her intention in this emotional interaction. Statements such as, “They're in STOREY's apartment,” or “They talk about MONICA,” do not convey intentionality, and therefore constitute the other side of this dichotomy. This analysis specifically looks at the viewpoint used in those summary statements that describe how one character actively affects another as opposed to those summary statements that do not.
TABLE 5
Mean Percentage of Summary Statements Made from Perspective of Assigned Character Versus Other Character by Activity Type

<table>
<thead>
<tr>
<th>Condition</th>
<th>Emotional Interactions</th>
<th>Other Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Assigned</td>
<td>Other</td>
</tr>
<tr>
<td>Actors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rote</td>
<td>12.7</td>
<td>11.1</td>
</tr>
<tr>
<td>Gist</td>
<td>28.6</td>
<td>17.2</td>
</tr>
<tr>
<td>Novices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rote</td>
<td>14.0</td>
<td>12.0</td>
</tr>
<tr>
<td>Gist</td>
<td>8.3</td>
<td>8.3</td>
</tr>
</tbody>
</table>

It was found that actors in the gist condition generated more than twice as many emotional interaction statements from the viewpoint of their assigned character than from the viewpoint of the other character (28.6% vs. 10.2%). On the other hand, subjects in all other conditions were equally likely to write statements concerning these emotional interactions either from the perspective of their assigned character or from the perspective of the other character. For each subject, difference scores between the number of emotional interactions from the viewpoint of the assigned character as opposed to the other character in the script were computed. An independent group t test confirmed that actors and novices differed significantly in terms of how likely they were to adopt the perspective of the assigned character, \( t(26) = 2.09, p < .05 \).

Similar results were obtained when the analysis focused on individual subjects. It was found that whereas 9 of 14 actors in the gist condition and 5 of 14 actors in the rote condition summarized the scene predominantly from the viewpoint of the character they were to portray, only 2 of 14 novices in both conditions did so. A chi-square analysis revealed a significant relationship between expertise and summarization from the perspective of the assigned character, \( \chi^2(1, N = 56) = 6.63, p < .05 \).

Inferred Resolution and Temporal Ordering. Another question raised in this analysis concerned whether actors would be more likely to have inferred the resolution of the scene which had not been explicitly stated. It was found that 8 of 14 actors in the gist condition mentioned the resolution as part of their summaries, whereas only 4 of 14 actors in the rote condition did. For the novices, 4 of 14 in the gist condition and none in the rote condition included the resolution in their summaries. A chi-square analysis indicated that a significant relationship existed between expertise and the inclusion of the inferred resolution, \( \chi^2(1, N = 56) = 5.6, p < .05 \).

Of additional interest was whether subjects tended to adhere to the temporal ordering of the text when told to form a summary. If they did, this might indicate that little schema-related processing had taken place. On the
other hand, an order different from the original input could imply that hierarchical reorganization had taken place because subjects had interpreted script events as elements of a plan. It was found that only 21% of the actors in the gist condition adhered to the temporal ordering as compared to 57% each for actors and novices in the rote condition and 43% for novices in the gist condition. Although a chi-square analysis applied to the data barely missed significance, $\chi^2(1, N=56) = 3.54, p > .05$, this trend, along with the other results reported here, would appear to indicate that actors in the gist condition approach the studying of a script as a plan-recognition task and form a mental representation that is hierarchical rather than sequential. That is, because actors seem to regard analyzing the text to determine the goals of their characters to be among their most important tasks, it seems logical that their summary statements place emphasis on the goals of their character in preference to a simple “begin at the beginning” outline of the script events.

**DISCUSSION**

This experiment was designed to answer three main questions:

1. Can the process that professional actors claim allows them to retain large portions of the script without line-by-line memorization be experimentally verified and specified?
2. Is the representation actors form of the text consistent with the viewpoint of the assigned character?
3. Do the mental representations of the text constructed by actors differ from those constructed by novices?

Each question will be discussed in turn.

1. **Specification of Actors' Mental Processes.** Elaborated recall protocols exhibited a remarkable unanimity of method among professional actors. Their basic approach appears to be: explain, explain, explain. Actors, studying a script as they normally would, produced about 2.5 times as many explanatory elaborations as novices for the same text. These elaborations fell into three clearly defined categories: (a) emotional interactions among participants in the scene, with the emphasis on explanations, intentions, and goals; (b) characterization of enduring physical, mental, or emotional traits of the characters; and (c) inquiries into technical details of performance.

   Elaborations may function as a powerful retrieval cue. It appears that what actors are doing during understanding is creating causal relations between the lines they are studying and the underlying motivations. For
example, one subject reported that while analyzing the line "It's MONICA's scarf," he had the thought, "AUSTIN realized that MONICA may be unfaithful." Thus, it appears an association is formed between the actual line and the interpretive thought. As in a paired-association task, the activation of the stimulus (thought) aids the retrieval of the words. In addition, thoughts often generate emotions (the thought "I can't stand him" creates an affect state of hostility). This affect state is paired with the thought as well as the actual words, thus creating a further aid to retrieval.

Another role that these elaborations might play is to aid actors in their plan-recognition process. As this study showed, professional actors generated an immense number of explanations during the course of studying the play script. Many of these were concerned with explaining why a character said a particular line or what a character meant when he said that line. Thus, a component of a professional actor's expertise seems to consist of formulating questions about the text and then explaining them in terms of the character's overall motivation or intention in the scene. Although novices who used a gist strategy also appeared to seek some explanations, they didn't ask as many questions, and of those questions they did ask, very few were plan questions. These findings parallel those obtained by Chi, Bassok, Lewis, Reimann, and Glaser (1989) who showed that students who were successful at solving mechanics problems, explained and provided justifications for each action in an example. Similarly, Robertson and Swartz (1988) reported that during learning "the proportion of plan questions increases as expertise develops."

The internal structure of a play script may have a bearing on this plan-recognition approach. That is, whereas a prose passage usually is told from a point of view chosen by the author in order to interpret the text, a play is presented "objectively." Therefore, an actor who is going to portray one of the characters in the script first has to figure out the character's plan. Only then can the actor decide what interpretation to give a particular line. Analysis of the pilot study protocols revealed that actors consistently try to create the thought or feeling the character would have had when saying that line.

Furthermore, a great many actors actually verbalize the thought the character would be thinking while speaking the line (silent speech). This thought might be complementary, contradictory, or unrelated to the spoken line, but would influence channels of communication, such as verbal inflections, facial expressions, and body language used by the actor at that point in the script. This elaborative device was used consistently by the majority of the actors in the gist condition (10 of 14) but rarely by actors in the rote condition (only 3 of 4 used it with any consistency). Only one novice in the gist condition made extensive use of silent speech. (She also recalled more lines and generated more elaborations than any other novice.) No novice in the rote condition used it.
2. Professional Actors' Use of Perspective. Analysis of the protocols revealed that actors, studying a script as they normally would, elaborate predominantly from the viewpoint of their assigned character. That is, their embellishments are concerned with their own character's wants, needs, and goals and are only concerned with the other characters' motivations in the scene as they pertain to their own. Of course, it would seem natural for any subject to read the scene from the viewpoint of the assigned character, and both novices and actors did so. But analysis of elaborated recall comments showed that actors in the gist condition took on the viewpoint of a character other than their own only 4% of the time, whereas novices did this 20% of the time. That is, novices' comments were made from other characters' perspectives 1 time in 5, whereas actors comments of this sort occurred only 1 time in 25.

These findings would be consistent with the view that the use of perspective helps to facilitate the assimilation of incoming information to a plan schema. As a consequence of possessing prior knowledge during the reading of a text, the comprehension process itself appears to be facilitated. One of the most basic findings in the literature is that if incoming information can be linked to already existing knowledge, this newly acquired information can be recalled more easily than information for which no prior schema exists (e.g., Bransford & Johnson, 1972; Chiesi et al., 1979). Thus, schema not only aids the encoding, but also the subsequent retrieval of ideas consistent with that particular schema.

Evidence in support of this prediction was presented by Anderson and Pichert (1978) and Dellarosa and Bourne (1984). That point of view affects memory performance was also shown by Black et al. (1979). They found that sentences with a single consistent point of view were read faster, comprehended better, and recalled more accurately than sentences in which there was a change in point of view. This might explain the apparent ease of learning long roles as reported by actors in the pilot study. The elaborated recall protocols showed that actors consistently organized the material from the perspective of the assigned character. The findings of this experiment add to the growing body of evidence that a single viewpoint establishes cohesion of a text and aids comprehension and subsequent retrieval.

3. Structure of the Mental Representation. An analysis of the summarization data showed that professional actors and novices had widely differing mental representations, and that these differences appeared to mirror the differences in the mental processes used during understanding. Whereas all summaries included both text events and elaborations, actors in the gist condition included far more elaborations, particularly of the type concerned with emotional interactions of participants. Compared to subjects in the other experimental conditions, these actors generated the greatest percent-
age of statements concerning how characters in the play affected each other emotionally, and the smallest percentage of statements concerning physical or mental actions. Furthermore, novices summarized the scene by describing it statically (e.g., “There were two people in this scene”) more than twice as often as actors. To explain this distribution of statement types, it is suggested that actors’ summaries reflect their encoding processes. That is, actors try to explain why characters perform particular actions by relating them to the goals they are pursuing. A plausible hypothesis is that these goal-type statements are inserted in a plan hierarchy at a level higher than that of actions, and when asked to generate a summary, subjects include information they judge to be most important.

Furthermore, the actors showed a greater tendency to ignore the temporal ordering of the script and presented a summary from the perspective of the plans their assigned characters were pursuing. This is taken as additional indication that high-level knowledge structures (plans) were used during understanding.

Finally, that actors in the gist condition engaged in deep processing of the text, which included inference making, was demonstrated by the fact that in the gist condition, twice as many actors included the implied resolution in their summaries than novices. However, learning by sheer repetition does not appear to induce the generation of inferences, as shown by the fact that in the rote condition, none of the novices and only 29% of the actors alluded to the resolution of the scene.

Overall, my findings could also be regarded as an extension of the elaboration theory proposed by Anderson and Reder (1979). In their view, memory is a “network of interconnected propositions.” An item that exists only once in a network might be regarded as fragile and not be recalled. But if the same item appears a number of times in the network, its memorability would be greatly enhanced. Obviously, when actors elaborate a line, they are creating additional propositions for the same original idea and this activity would increase chances of retrieval.

**IMPLICATIONS FOR AN EXPERT’S MODEL**

Actors’ expertise enables them to use planning knowledge to state their relationships to the other characters in the script explicitly, and to infer the motivations for actions of their assigned characters during the initial stages of rehearsal. This notion of planning knowledge was offered by Collins, Brown, and Larkin (1978) as an explanation why some readers succeed in comprehending the actions and events portrayed in a text and others do not. In their opinion, the major function of planning knowledge is to place constraints on the number of possible ways an action can be interpreted. This
experiment offers support for the notion that in the course of comprehending a text, professional actors raise a number of questions about goals of the characters they are to portray. Answering any one of these questions imposes additional constraints on the possible solutions to the remaining questions.

The notion of planning knowledge was also proposed by Brown, Collins, and Harris (1978) to account for the similarity of the understanding process in three different problem-solving domains: story comprehension, basic math problems, and electronic circuits. Brown et al. reported that although each group had certain idiosyncracies, remarkable invariances were observed across the three domains. In their view, understanding is "an active process requiring the understander to synthesize, verify, and refine a deep structure trace or hypothesis about the underlying motives, plans and intentions that fit each separate piece of the "puzzle" into a coherent structure" (p. 137). The data reported here shows that expert performance in still another domain utilizes this general property of comprehension. Whereas planning knowledge underlies many forms of expertise, acting utilizes it to a very high degree. Actors not only formulate hypotheses about the characters' plans but also identify with their characters to determine what specific means they would use to implement those plans. More importantly, actors turn every statement into a goal statement. Because they conceive each line as an attempt to reach a goal or subgoal, they do not stop analyzing the script until they have found a reason why every single thing a character says is an attempt to bring him or her nearer to that goal. So to an actor, even a "What?" or an "Oh!" is turned into a goal or subgoal statement, and this type of statement has a high degree of memorability. This approach differs drastically from that of the professional mnemonic who emphasizes the generation of interacting images.

It appears that skilled-memory theory (Chase & Ericsson, 1982) might account for the actors' fluency in performance. For instance, by questioning how every line relates to the play in progress, the actor would appear to be encoding it in a form that facilitates its retrieval. The questioning takes time, so the early results are not dramatically different than those obtained by novices. But when the specifics of the plan are determined by the actor, sequences of actions pertaining to a common goal are combined into higher level representations. These higher level representations may be responsible for the fluency actors demonstrate during a performance. Additional investigation of how skilled-memory theory might explain actors' real-time performance seems warranted.

Furthermore, this study suggests that actors, in the course of rehearsal, construct several retrieval cues: (1) the character's overall plan; (2) the specific thought the actor thinks while using those particular words to further his or her plan; (3) the emotion (affect state) the actors feels as a result of pursuing that plan; (4) the physical movement (blocking) that results from
pursuing that plan; and (5) the literal cue line (the last words of the preceding speech). All of these, coupled with many rehearsals, lead to the fluency and accuracy with which actors speak their lines.

SUMMARY AND CONCLUSION

This study yielded three major findings. The first was that professional actors do not learn complex material by rote memorizing, but rather by elaborating the text in a manner that allows them to infer the plan behind each utterance of the character.

The second finding was that the majority of actors' elaborations were in the nature of interactions. These interactions constitute the intersecting of one character's plan with another character's and consequently causes a change in the relationship or situation. Thus, interactions make the causal relations explicit. Because this change affects a character's plan, it is personally relevant, and hence, more memorable. This finding is consistent with current work on the representation of narratives in memory (e.g., Black & Bower, 1980; Trabasso & van den Broek, 1985), which has shown that events recalled best are those forming a causal chain.

The third major finding is a consequence of the preceding ones. Because actors focus on how their assigned characters interact with others, they also adopt the perspectives from which those characters interpret the events. Subjects' protocols and summaries indicate that professional actors comprehend the storyline by evaluating all actions from the viewpoints of the assigned characters and thus represent all script events in terms of how those events affect their characters. Actors appear to use this strategy in order to create a convincing characterization; the fact that it also helps them to remember the material is simply a fortunate by-product of the procedure.

But the question remains: If simply "memorizing" a text can produce such excellent results in the early stages (as shown by novices), would not such an approach be equally efficacious for actors? Possibly so, but actors claim that their approach is necessary for lifelike character portrayal. Therefore, because they must use this analytical approach, actors appear to shun the type of unelaborated literal memorization apparently preferred by novices. Additionally, the novices' strategy might not work for memorizing scripts of over 100 pages. The tedium of memorization might make the process bog down. More importantly, it might not produce the "real-time" performance actors require.

Furthermore, it seems plausible that the actors' approach would become increasingly more efficient during rehearsal. Most of the actors' plan questions naturally occur during the early stages of script analysis and the generation of questions involved in this process is time consuming. Frase (1975) showed that students who had been told to construct questions of a text,
took twice the time compared to students who merely had to study the same text. However, question production “facilitated recall more than just studying” (p. 41). The design of my study allowed me to look at the thought processes of two populations, actors and students. When given 20 minutes to study, actors will tend to devote the time to analyzing, whereas students will tend to devote the time to memorizing. Furthermore, these differences in processes appear to be the result of actors’ expertise. Even when novices were told that they didn’t have to memorize the script, the number of their elaborations did not increase. Therefore, it appears that actors are expert analyzers, not expert memorizers, and one result of this in-depth analysis is that by struggling to uncover the underlying meaning of each line, the actual words are also retained without much deliberate effort to commit them to memory.

There is an issue here that calls for future research. Actors and many other experts (e.g., musicians) must retrieve not only the to-be-remembered material but also the manner of its presentation. This implies the retrieval of a set of parameters. For example, an actor retrieves from memory a character’s plan along with the words that implement it. The plan affects the rhythm, pace, volume, tonal quality, and emphasis with which the utterance is made. (Likewise, a pianist playing a Beethoven sonata from memory will retrieve not only the notes, but his individual phrasing for the interpretation of those notes.) The point here is that this category of task involves retrieval of a very complex data structure calling for a number of task parameters rather than exact specifications. The manner in which the actor utters the words will always be appropriate to his plan. For instance, certain words may be delivered in a harsh, cold tone: just how harsh and cold the tone will be will vary from night to night, but only within certain parameters. The tone of voice will never change to the point where it is inappropriate for the character to use in implementing the plan. Additional research seems called for to specify the mechanisms that mediate this highly complex task.

REFERENCES


APPENDIX

Scene from The Second Man by S.N. Behrman (1955)

Background
In this scene from Act II, Scene 2, Mrs. Kendall Frayne is in the apartment of Clark Storey, the writer who is her lover and whom she is supporting. The front doorbell rings.

(Kendall goes out into the hallway and returns in a moment followed by Austin Lowe. He is in evening dress. His manner with Kendall at first is embarrassed and hesitant. Gradually, however, she puts him at ease; she has that sort of manner.)

Kendall: Storey’s dressing. I’m the first one here.
Austin: Monica’s not come yet?
Kendall: No. Cigarette?
AUSTIN: Er-thanks (She lights it for him.) Thanks.
KENDALL: You and I are the only prompt ones.
AUSTIN: Yes . . .
KENDALL: Do you know what time it is?
AUSTIN: (Looking) Ten minutes past eleven.
KENDALL: I was here promptly at eleven. Storey hadn't even begun to dress.
AUSTIN: He hadn't!
KENDALL: I'm awfully glad you came. It was lonesome. (She smiles at him)
AUSTIN: I—I'm glad I found you.
KENDALL: Why do I never see you?
AUSTIN: Er—see me?
KENDALL: Storey talks about you all the time. You're one of the few people he respects. I always ask him to bring you to my house but you never come.
AUSTIN: I'm in the laboratory such a lot
KENDALL: I know. Still I do wish you'd come some time—and bring Miss Grey . . . (She notices him staring at Monica's colored scarf which is lying across a chair.) What is it?
AUSTIN: That scarf.
KENDALL: You know it?
AUSTIN: It's—it's Monica's.
KENDALL: You dined here with her—didn't you?
AUSTIN: Yes, I did.
KENDALL: Well, then—
AUSTIN: She wore it when I left with her.
KENDALL: Didn't you take her home?
AUSTIN: She told me to go home alone—to save time.
KENDALL: Well, she probably ran back to tell Storey something.
AUSTIN: (Bitterly) She probably did. It must have taken a long time because—when you came—Storey hadn't even begun to dress.
KENDALL: (After a moment) I think you can trust Storey.
AUSTIN: Can I?
KENDALL: He told me over the phone—you and Miss Grey are engaged.
AUSTIN: There's something funny about it.
KENDALL: There's something funny about most things.
AUSTIN: (Warning to her) Mrs. Frayne—
KENDALL: Call me Kendall.
AUSTIN: Thank you. I wonder—I wonder if Storey tells me everything. I mean—about Monica and himself.
KENDALL: Perhaps he doesn't know everything.
AUSTIN: You mean—perhaps he's in love with her and doesn't know it?
KENDALL: Doesn’t know it or won’t admit it—even to himself. Perhaps. *(There is a pause)*
AUSTIN: *(Abruptly)* Are you going to marry Storey?
KENDALL: I don’t know.
AUSTIN: *(Naively)* I wish you would.
KENDALL: It would solve your problem, wouldn’t it? It might complicate mine.
AUSTIN: I’m not even sure it would solve mine. I wish I hadn’t got into this.
KENDALL: *(She stops playing)* It’s comforting to know that even a scientific genius is not immune. It rather justifies a weak women—like me.
AUSTIN: Its rotten to be this way. Wondering about everything, suspecting everybody. Why should I care if Monica came back here or not? And yet—I do.
KENDALL: *(Slowly)* I care too, Austin. Isn’t it—stupid?
AUSTIN: Do you think Monica’s in love with Storey?
KENDALL: You want me to tell you she isn’t, don’t you?
AUSTIN: Sometimes she tells me she loathes him...
KENDALL: That’s bad.
AUSTIN: Do you think so?
KENDALL: Wouldn’t it be nice of people were like molecules or electrons or whatever you work with? It would be nice for you because you understand all about those things.
AUSTIN: Molecules are mysterious but they’re more predictable than Monica. They obey some sort of law.
KENDALL: *(Amused and touched by his sincerity)* I think you’re charming, Austin.