What Studies of Actors and Acting Can Tell Us About Memory and Cognitive Functioning

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ABSTRACT—***The art of acting has been defined as the ability to live truthfully under imaginary circumstances. Our many years of researching theatrical expertise have produced findings relevant to text comprehension, learning theory, cognitive aging, and expert memory. In this article, we first discuss how large amounts of dialogue, learned in a very short period, can be reproduced in real time with complete spontaneity. We then turn to abstracting the essence of acting and applying it to diverse undertakings, from discovering optimal learning strategies to promoting healthy cognitive aging. Finally, we address the implications of acting expertise on current theories of embodied cognition.***

KEYWORDS—*cognition; learning; active experiencing; aging; embodiment*

Actors report that the question they are asked most frequently is, "How do you learn all those lines?" However, actors themselves rarely consider memorization a defining skill. Rather they are concerned about giving honest, spontaneous performances, ones that focus on communicating the meanings underlying the literal words. Indeed, when actors do mention memory, it is usually within the context of forgetting the lines until they are needed to communicate the feeling of the moment. The fine British actor, Michael Caine, summed up the process:

> You must be able to stand there *not* thinking of that line. You take it off the other actor's face. Otherwise, for your next line, you're not listening and not free to respond naturally, to act spontaneously. (Caine, 1990, pp. 28–29)

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How do actors achieve this freedom to live in the present moment while speaking memorized dialogue, and what light can this process shed on human cognition? We have been investigating actors' processes for almost 20 years. That inquiry has taken place in three (sometimes overlapping) phases.

THE FIRST PHASE: LEARNING THE ROLE

We started examining actors' script-acquisition strategies by means of protocol analysis (i.e., we collected and compared actors' descriptions of their working processes during the performance of a task). Because the standard playwright's contract calls for the replacement of any actor who deviates from the script's exact wording, actors learn dialogue with a high degree of precision. Although rote repetition is widely assumed to be the strategy of choice for word-for-word retention, we found that professional actors rarely acquire their roles by rote. One actor described the process this way:

> What I don't do: I don't memorize right away. And, in fact, if I have a problem, it's in keeping myself from memorizing too soon. Most of the time I memorize by magic—and that is, I don't really memorize. There is no effort involved. There seems to be no process involved: It just happens. One day early on, I know the lines. (Noice & Noice, 1997, p. 13)

A series of further studies used empirical methodology (investigation of various learning techniques in controlled experiments) in addition to protocol analysis. These studies revealed that actors unwittingly employ most of the learning principles identified by cognitive researchers (e.g., Noice & Noice, 1997) by employing devices such as extensive elaboration (imaginative embellishment), perspective taking (adopting the perspective of one character in a narrative), self-referencing (relating material personally to oneself), self-generation (remembering one's own ideas better than ideas of others), mood congruency (matching one's mood to the emotional valence of the material),

and distinctiveness (considering details that render an item unique). Actors also determine the goal of every utterance of the character, breaking down scripts into what they call "beats" (the smallest goal-directed chunks of dialogue). These beats lay out the entire role as a causal chain. For example, one actor divided a half page of dialogue into three successive beats: "to flatter," "to draw him out," and "to allay his fears." That is, the character first flattered the other character; then, when the flattery appeared to work, she drew him out, which, in turn, allowed her to allay his fears (Noice & Noice, 1997).

Establishing this causal chain often entails generating multiple elaborations for a few words of dialogue. (A well-established cognitive concept is that additional elaboration leads to greater recall; e.g., Graesser & Clark, 1985). Here is an example from the play, *The Front* Page (Hecht & MacArthur, 1950): The mayor confronts a reporter, saying: "Don't pester me now, please" (p. 69). One actor's protocol revealed that he inferred from the use of the word *pester* that the mayor considered the reporter to be like a bothersome child, since the term is generally used with children. The rest of the sentence was processed at similar depth: The actor realized that the mayor, not wanting to alienate a potentially useful reporter, is careful to say "now," indicating that future discussions are possible. Furthermore, he softens the whole statement by adding, "please." In addition, the mayor's ego would probably make him proud of this use of alliteration, further ensuring recall of the line, "Don't pester me now, please." This procedure is repeated for every successive goal (or subgoal) of the character, so that a link is forged between almost every word or phrase and the goal that caused the character to utter it (Noice & Noice, 1997). A consistent finding in the text-comprehension literature is that goal statements are better recalled than non-goal statements (e.g., Trabasso & van den Broek, 1985). Processing the script at such depth produces a great deal of verbatim retention without rote memorization.

It is important to note that retention of the script is just the preparatory part of the actor's work. When the words have been learned, the actor must then mean them each time he or she says them, so that every performance is identical yet unique. That is, what is said remains the same, but how it is said depends on the mental, physical, and emotional interactions between the actors at every moment of the play or film. This double process was one of the aspects of acting most often mentioned in the more than 100 protocols we collected. Actors analyze the role prior to rehearsal; but during rehearsal, they try to devote all their conscious awareness to remaining in the present moment by attending to the other actors, only glancing down at the script when necessary. Eventually, they find they are "off book."

THE SECOND PHASE: TEACHING THE TECHNIQUE

One question not answered by the specification of actors' script-processing approaches was whether their rapid acquisition of dialogue was a product of their many years of experience in learning theatrical roles or was based on an explicit strategy that could be taught to nonactors. To answer this, we tried to train undergraduates in the actors' strategy (Noice & Noice, 1997). Assuming that the first part of the process (the deep processing of the script) was responsible for an actor's highly efficient memory, we taught students to elaborate on a text the way actors do by asking goal-directed questions (e.g., "Am I flirting with her when I say this?"). Consistent with previous findings, students who elaborated by questioning the underlying meaning remembered more than did controls who read the same text purely for comprehension. (Indeed, most of the early investigations of cognitive learning principles had employed read-only controls.) However, we then tried to make the conditions more stringent by having the controls deliberately memorize the same material using any strategy they had found successful in the past. If the actors' strategy still produced more retention, it would suggest that we had found an optimal means of studying verbal material. Unfortunately, the deliberate-memorization controls outperformed the students who used the actors' analytic strategy. (The memorization strategy produced 57% retention; the actors' analytic strategy, only 33%.)

After much thought, we turned to the other half of the actors' process, the one they use for rehearsal and performance. Instead of instructing the students to analyze the text, we had them read the material, imagining someone they knew who needed this information. Indeed, we specifically told them not to try to remember the words but to put all their concentration on meaning them (i.e. actively using them to gain a specific end such as warning a friend). Suddenly, the results were reversed: Meaning the words produced greater retention than memorizing them did, with 50% retention for the memorization strategy but 60% for the actors' performance strategy. This finding has been replicated repeatedly using different populations and procedures and various types of materials. We coined the term *active experiencing* (AE) to refer to this process in which participants are asked to use all physical, mental, and emotional channels to communicate the meaning of material to another person, either actually present or imagined (for a review, see Noice & Noice, 2004; for an example, see Fig. 1).

In addition to improving the speed and accuracy with which specific material can be learned, the AE principle turned out to have application to a far thornier problem: cognitive aging. Previous research (e.g., Wilson & Bennett, 2003) had shown that enhanced cognitive health and the delayed onset of Alzheimer's were observed in participants who had engaged in the performance of activities requiring mentally effortful processing. However, research on such activities generally tracked participation over many years. A number of short-term studies were also performed, but they were usually targeted to specific cognitive abilities such as being able to recognize drawings of abstract figures when they were shown in different orientations on the page (e.g., Willis, Cornelius, Blow, & Baltes, 1983). In such studies, although improvement was often found, it was limited

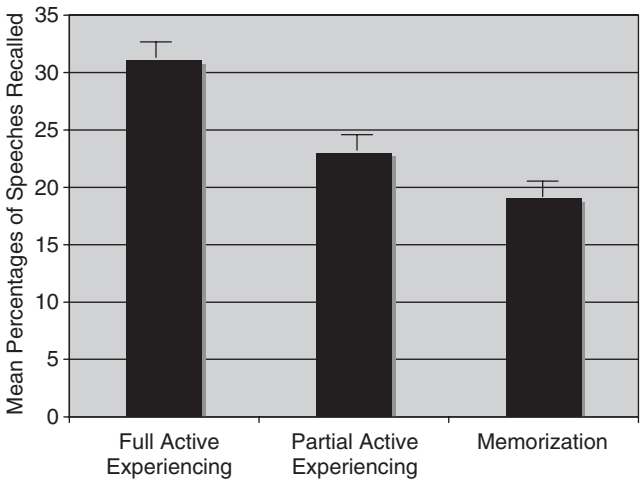

Fig. 1. Mean percentage of speeches recalled by participants using active experiencing (AE) or other strategies. Undergraduates with no acting training or experience were randomly assigned to one of three conditions: a) full AE including both motivated verbal communication and motivated movement; b) partial AE using verbal communication only; c) deliberate memorization. Participants in the first two conditions were given brief procedural coaching in AE. (Noice & Noice, 2001).

to the specific skill trained, and did not generalize to other cognitive areas.

Therefore, we performed a series of 4-week, controlled interventions, using pre- and post-testing to assess change on various cognitive tasks (e.g., word recall, problem solving) and also to assess any increase in life satisfaction. The participants (aged 65 to 90 years) were recruited through talks in senior organizations and follow-up newsletter notices. The participants in the experimental condition knew that the program would consist of some form of instruction to improve cognition; but, in order to avoid self-selection, they did not know they would be studying acting until they arrived at the first training session. The intervention contained (in a highly concentrated form) elements such as novelty, effort, and complexity, which have frequently been shown to enhance cognition in older adults (e. g., Hultsch, Hertzog, Small, & Dixon, 1999). A professional theater director presented a series of progressively more difficult exercises in which participants became cognitively, emotionally, and physically involved in the performance. Thus, if the exercise called for one participant to demand attention from another, there would be observable changes in the first participant. These might include increased sternness of facial expression, harshness of tone of voice, and aggressiveness of body language. The instructor monitored the performances to make sure that observed changes were byproducts of a participant's imaginative involvement in the dramatic situation and not the result of simply trying to imitate the outward characteristics of the behavior, a process that actors call "indicating." (Distinguishing between true involvement and indicating is a defining skill possessed by almost all professional directors and acting teachers.)

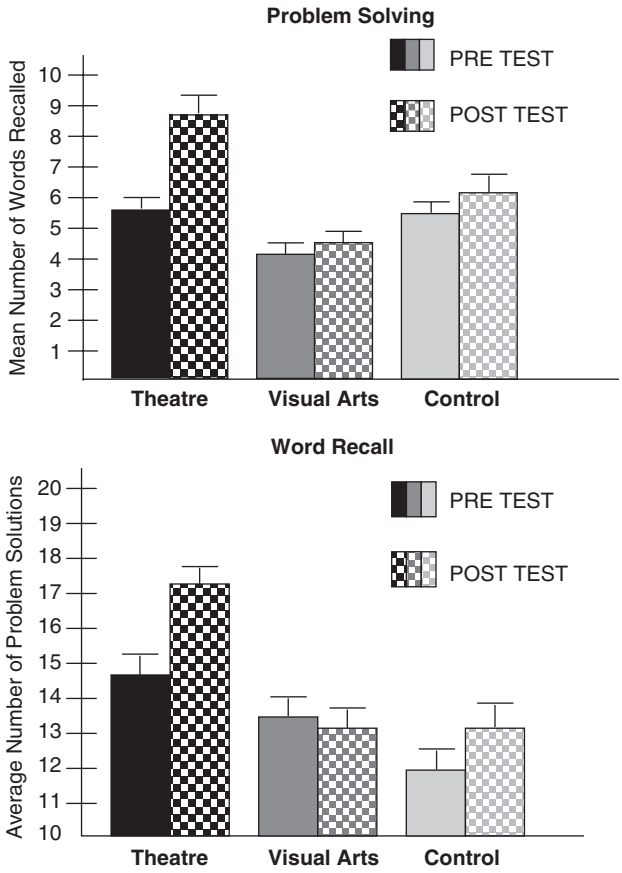

Fig. 2. Pretest and posttest results for word recall and problem-solving ability by older adults given a 4-week course in acting or art appreciation or no training (control). The acting course was devoted mainly to cognitive stimulation through the active-experiencing principle. Besides the gains in word recall and problem solving, acting training also produced a marginally significant improvement in working memory and a significant increase in perceived quality of life (Noice, Noice, & Staines, 2004). These gains persisted for 4 months without reinstatement of the training.

These interventions produced gains in multiple measures of cognitive and affective performance, even though no part of the instruction was targeted to the test instruments. That is, participants were never provided with specific strategies to improve test performance. Therefore, any improvement would appear to result from the mental stimulation inherent in the course (see Fig. 2). The results were obtained in comparison with no-treatment and alternate-intervention (art appreciation) controls (Noice, Noice, & Staines, 2004).

Some studies have provided evidence that biological mechanisms underlie the effects of behavioral interventions. Wilson and Bennett (2003) suggested that cognitive activity may help maintain the health of interconnected neural systems, and Park (2002) used imaging studies to show strong activation of certain brain areas when participants were directed to think about meaning. (This is particularly pertinent to our results because all acting, by its nature, involves the communication of meaning.)

THE THIRD PHASE: BACK TO THEORY

Implicit in the AE principle is that cognitive processing is but one element of performance. Feelings are also communicated, and both thoughts and feelings affect physiology in terms of facial expressions, vocal inflections, and quality and speed of movements. The latter aspects turned out to have some strong implications for memory theory. Since the early 1970s, dozens of experiments on subject-performed tasks (SPTs) have shown that short action phrases such as "move the cup" or "lift the pen" are better remembered when the actions are actually performed than when the phrases are studied under standard verbal-learning instructions (for a review, see Nilsson, 2000). One widely accepted theoretical explanation involves the establishment of motoric codes. (When information is encoded, many theorists believe that some sort of memory record or "code" is established, a visual code for a picture, a verbal code for a word, a motoric code for a movement.) An alternate explanation offered for the SPT phenomenon is that actually performing an action such as hitting the table increases the mental association between the action (hitting) and the agent (the one doing the hitting). However, almost all SPT experiments have used literal enactment of short action phrases. Such literal enactment virtually never occurs in theatre or film. That is, rarely would a theatrical script require an actor to walk toward the door while saying, "I'm walking toward the door." Instead, actors' movements are nonliteral. For example, a character might be asked to leave the room; he replies, "I'm perfectly happy here," while sitting down in a nearby chair. Obviously, there is no literal connection between the verbal phrase ("I'm perfectly happy here") and the action of sitting, but there is a goal-directed one: Both the statement and the physical action are attempts to defy the person who requested the character to leave. We have found that such nonliteral action during a theatre performance produces the same movement-enhanced verbal memory found in SPT experiments, including the fact that movements do not have to be repeated during testing. The latter finding would appear to cast doubt on encoding specificity as an explanation. (Encoding specificity is the theory that memory is enhanced when conditions at retrieval match those at encoding.) We have also replicated the nonliteral phenomenon in a lab with undergraduates after only a few minutes of procedural coaching (Noice & Noice, 2001).

The theoretical position that appears most consistent with our findings is that of embodied cognition (e.g., Glenberg & Kaschak, 2002). According to this view, thought, memory, and language are based on actual perceptual (i.e., motor and sensory) experience: "Knowledge is embodied to the extent that (a) it depends on activity in systems also used for perception, action, and emotion, and (b) reasoning using that knowledge (including combining information from language and action) requires use of those systems" (A.M. Glenberg, personal communication, November 21, 2005). Our data certainly fit this view. In a play, for dramatic effect, some lines of dialogue are spoken when the actors are moving about the stage, and some while actors are sitting or standing in one spot. In one experiment (Noice, Noice, & Kennedy, 2000), actors produced superior recall for dialogue originally spoken while moving, even though the movements were not duplicated at the time of testing.

To account for this in terms of embodied cognition, consider this situation: A character crosses the stage, picks up a bottle, and says, "This is how I solve my problems." Obviously, the actor has to know why the character makes that utterance because it will affect how he walks and picks up the bottle. That is, the quality of the actions will be different if the man intends to dump the contents, or throw the bottle at the other's head, or greedily take a drink. According to Glenberg's version of embodiment theory, these potential actions are called affordances (i.e., the bottle affords these different action possibilities), and the meaning of any situation is derived from the meshing of the available affordances. When such a situation is retrieved from memory, the perceptual characteristics of the experience are simulated by neuronal activity in the brain. But the manner in which the actions were originally performed necessarily constrains the meaning of the accompanying utterance. The resulting specificity of an actor's stored perceptual experience aids recall of the literal words and movements, in keeping with Glenberg's view that memory and comprehension are grounded in bodily action (e.g., Glenberg & Kaschak, 2002).

CONCLUSION

At present, we are performing an intervention with even older adults who reside in state-supported housing and have not had the advantage of higher education. This population has been shown to be at increased risk of cognitive decline (e.g., Springer, McIntosh, Winocur, & Grady, 2005). In addition, we have refined our intervention to compare two types of theater performance: dramatic and musical.

The next logical step is to investigate the neural mechanisms underlying acting. Brain-imaging studies have identified the areas implicated in such diverse tasks as performing motor movement, reacting to pleasant or unpleasant pictures, and processing meaning (e.g., Park, 2002). We are pilot testing short dramatic phrases that trained actors would tend to process with their usual AE strategy. We hypothesize that when actors and non-actors encode these phrases, the patterns of cortical activation will reveal the differences between brain mechanisms normally used for text processing and the cognitive-motoric-emotive mechanisms elicited by AE. Such a finding could add physiological support to the existing behavioral evidence that bodily action and emotional response, in addition to semantic analysis, can enhance human memory. These results could also bring us one small step closer to the scientific understanding of aesthetic experience.

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