The Journal of General Psychology, 2000, *127*(2), 145–156

Improvement Strategies in Free-Throw Shooting and Grip-Strength Tasks

ZEHRA F. PEYNİRCİOĞLU
JENNIFER L. W. THOMPSON
TERRI B. TANIELIAN
American University

ABSTRACT. Participants performed a free-throw shooting task and a grip-strength task before and after imagery, nonspecific arousal, or no instructions. Imagery improved performance in the free-throw shooting task, which is assumed to have more cognitive components than the grip-strength task. Imagery did not improve performance in the grip-strength task, which is assumed to have fewer cognitive components than the free-throw task. Nonspecific arousal, on the other hand, improved performance in the grip-strength task but not in the free-throw shooting task. Athletic experience, confidence levels, and gender were correlated with actual performance levels in both tasks, but not with improvement. Results are discussed within the transfer-appropriate processing framework.

PREPARATION FOR SPORTS EVENTS often involves extensive physical practice. Sometimes other strategies are also used to enhance performance. Among such strategies are general arousal through emotional and physical "psyching-up" and mental rehearsal. To the extent that arousal preparation involves thinking about relevant actions in a specific sport, it may be confounded with mental rehearsal (e.g., Weinberg, Gould, & Jackson, 1980), but it may also exist in a nonspecific form (e.g., Hardy, Jones, & Gould, 1996).

Mental rehearsal may also take different forms (e.g., Watkins & Peynircioğlu, 1982). First, we should note that when we talk about mental rehearsal, we are by definition referring to covert rehearsal. In sports performance, both overt and covert rehearsal can be used, simultaneously or separately, depending on the goal of the rehearsal. For instance, the actual shooting of basketballs would be overt rehearsal, whereas mentally imaging oneself shooting baskets would be covert rehearsal. We should note that, again by definition, rehearsal involves repeating

Terri B. Tanielian is now at the American Psychoanalytic Association.

Address correspondence to Zehra F. Peynircioğlu, Department of Psychology, American University, Washington, DC 20016.

or thinking about the specific actions that will be engaged in during the performance. Thus, it is specific in nature; strategies such as attentional focusing or relaxation are not rehearsal, although they are also covert or mental strategies.

In addition, rehearsal may be stimulus or memory based. Stimulus-based rehearsal involves rehearsing with the use of external prompts, such as watching someone else go through the motions and imitating, whereas memory-based rehearsal involves rehearsing material that is no longer present, such as going over the techniques in one's mind. Moreover, rehearsal may be controlled by the participant or by some external agent. For instance, participants may alternate between shooting a free throw and making a lay-up in 10 s blocks as specified by the coach (controlled by an external agent), or they may decide what to rehearse or practice on their own, such as shooting 10 free throws in a row (controlled by the participant). Finally, rehearsal may be verbal or nonverbal. In sports, participants may go over set plays, verbally describing each move (e.g., "pass to post player and set a pick for number two guard"), or they may go over these plays by running them, either mentally or on the court.

In this article, we concentrate on the effects of two strategies for improvement in sports: (a) covert rehearsal that is stimulus based, externally controlled, and nonverbal; and (b) overt and nonspecific arousal. In learning in general, there is little doubt that mental rehearsal can enhance performance (e.g., Ambler & Maples, 1977; Rundus, 1971). For instance, words that are repeated more often are more likely to be freely recalled than words that are repeated less often (Craik, 1970). In sports, there are many types of strategies used to enhance performance, such as attentional focusing, relaxation, self-talk (overt or covert), arousal preparation, imagery, and the manipulation of self-confidence (Murphy, 1990). Some correspond to mental rehearsal, others to other types of improvement strategies. Although each strategy can be used individually, sometimes they can overlap in their purposes and incorporate the specific goals of others. For instance, imagery can incorporate relaxation and attentional focusing, and arousal preparation can incorporate the use of self-talk and the manipulation of self-confidence. To date, imagery has been the most prevalent form of mental rehearsal strategy studied in the realm of sports performance (e.g., McKenzie & Howe, 1997; Whelan, Mahoney, & Meyers, 1991).

Murphy (1990) reviewed studies of mental rehearsal as well as the imagery models used in sport psychology. In general, the findings have suggested that mental rehearsal alone is better than no practice at all, but it is not as effective as physical practice by itself. Murphy pointed out, however, that many of the rehearsal studies have been limited in scope in that they have not specified the types of mental rehearsal used by the participants. In the present study, we limited mental rehearsal to imagery only. Murphy also criticized the lack of solid theoretical grounding of many studies that have looked at the effects of mental rehearsal in sports. We suggest that an extension of the transfer-appropriate processing concept is one theoretical framework that may be able to accommodate a considerable number of the empirical findings on the relationship between mental rehearsal and physical performance. In general, models like the transfer-appropriate processing framework (Bransford, Franks, Morris, & Stein, 1979; Roediger, Weldon, & Challis, 1989) emphasize the importance of the similarity or overlap between the processes in the learning and remembering of information. As Roediger et al. stated, "memory tests benefit to the extent that the operations required at test recapitulate or overlap with the encoding operations performed during prior learning" (p. 16). Thus, according to this concept, encouraging particular cognitive activities during practice similar to those processes necessary during performance (as during memory tests) can increase the effects of practice on performance (e.g., Morris, Bransford, & Franks, 1977). Indeed, many theoretical frameworks of how mental rehearsal strategies affect sports performance seem to stem from the more general transfer-appropriate processing concept. Among these are the psychoneuromuscular, attentional–arousal set, symbolic learning, and bioinformational theories (Hecker & Kaczor, 1988; Murphy, 1990). These theories attempt to explain why the use of mental rehearsal, and more specifically the use of imagery, may influence performance in sports.

Briefly, the psychoneuromuscular theory holds that during the imaging of motor acts there are minute innervations of involved muscles identical in pattern to, but weaker in magnitude than those involved in the actual performance of the task (Hecker & Kaczor, 1988). During imagery, the athlete obtains visual and kinesthetic feedback that is then used to make adjustments in motor performance. However, because the mechanism of how this feedback results in improved performance is unclear, Hecker and Kaczor suggested that the psychoneuromuscular view is best considered as a description of an important aspect of imagery rehearsal rather than an explanation of the processes involved in performance enhancement.

The attentional–arousal set theory, on the other hand, attempts to incorporate both the cognitive and physiological aspects of imagery rehearsal (Vealey, 1986). According to this view, during imagery an athlete learns to set his or her physiological arousal at an optimal level (Feltz & Landers, 1983). Such imagery may then help to bring attention to relevant task thoughts and away from irrelevant ones, while physiologically controlling arousal. Hecker and Kaczor (1988) suggested that although this view may be intuitively appealing, it has yet to be empirically tested and its mechanisms spelled out.

More pertinent to our study and to the transfer-appropriate processing framework are the bioinformational and the symbolic learning theories. Hecker and Kaczor (1988) and Murphy (1990) supported Lang's (1979) bioinformational theory that explains how mental rehearsal or imagery can enhance performance in sports. According to this theory, the image is a functionally organized, finite set of propositions stored in the brain. Production of a mental image involves the activation of a network of propositionally coded information in long-term memory. This network contains information about stimulus characteristics as well as the physiological and overt behavior responses that serve as the prototype for overt behavior. Thus, imagery instructions containing response propositions elicit more priming for physiological responses than those instructions containing only stimulus propositions. The prediction, therefore, is that imagery may be a more effective strategy for performance enhancement if the response propositions that contain the prototype are included in the image script.

According to the symbolic learning theory, originally proposed by Sackett (1934), symbolic rehearsal or representing patterns of overt movements facilitates the learning of skills in which cognitive factors are important. A task can be characterized in terms of independent dimensions, such as motor and symbolic or cognitive dimensions, and learning of tasks that have strong symbolic components are facilitated by mental practice, whereas tasks without such components show no beneficial effects (e.g., Morrissett, 1956).

Both the bioinformational and symbolic learning theories have enjoyed some support. For instance, testing the bioinformational theory, Hecker and Kaczor (1988) found greater physiological changes in response to imagery of familiar scenes that also involved directions for physiological activation, as well as no physiological changes in response to imagery of unfamiliar scenes, presumably because no prototype for an overt behavior existed for these scenes. Testing the symbolic learning theory, Ryan and Simons (1981) used two perceptual motor tasks: a stabilometer task and a dial-a-maze, or etch-a-sketch, task. As predicted, the beneficial effects of imagery were observed primarily on the dial-a-maze task, which involved more cognitive components. VanGyn, Wenger, and Gaul (1990) compared the improvement on a 40-meter sprint and a physical power test after nonspecific physical training only, imagery training only, both imagery and physical training, and no training. Physical training turned out to be the most effective for increasing power test performance, whereas imagery training produced no significant improvement in either task. Imagery and physical training together showed significant increases in both power and sprint performance. Thus, imagery facilitated transfer from training to performance only when it was used in conjunction with physical training. The symbolic learning theory would assert that imagery training alone was not beneficial for these tasks because both the sprint and power tasks were low in cognitive demand. Also, to the extent that the image script did not evoke physiological activation or direct the activation of a response prototype for the actual behaviors, according to the bioinformational theory, the effect of imagery was expected to be minimal and enhancement dependent mainly on the physical training alone.

Researchers have also looked at the effects of psyching-up strategies on sports performance. Some psyching-up strategies are, of course, confounded by other strategies, such as attentional focusing and imagery, but they do not need to be (Hardy, Jones, & Gould, 1996). The findings from studies of psyching-up strategies are not always consistent, however. For instance, Weinberg et al. (1980) found that performance was enhanced only on a strength task (isokinetic leg strength) and not on a stabilometer (balance) or a speed of arm movement task. In that study, participants reported using attentional focusing, imagery, and preparatory arousal. Thus, some of these psyching-up strategies did involve the use of mental rehearsal, but because they also involved substrategies, it was impossible to assess which one (or ones) enhanced performance on the strength task. Gould, Weinberg, and Jackson (1980) found that both preparatory arousal and imagery techniques improved strength performance compared with the control condition (no practice at all), although, in a second experiment, they found that imagery techniques had no effect.

Both the symbolic learning and bioinformational theories could probably explain the findings of no improvement with imagery in these tasks—the former by contending that in such tasks of motor strength there would be few or no cognitive components and the latter by contending that the image script did not specifically activate the prototypical response information. But neither theory can explain the improvement in the first experiment. In addition, the symbolic learning theory does not make any predictions on pure psyching-up strategies, and thus, in general, cannot explain why any strategy can improve strength tasks. The more generalized transfer-appropriate processing theory, on the other hand, would rely solely on the degree of match between what the strategy encouraged the participants to do and what the participants actually did during the task. Thus, regardless of whether the strategy is mental rehearsal or general psyching-up, the key is whether there is a good match between the actions or thoughts during preparation and during performance.

In the present study, we combined the various conditions tested in different experiments and compared the effects of a specific mental rehearsal strategy, imagery, and a single psyching-up strategy, nonspecific arousal, on two sports-related tasks (free-throw shooting and grip strength). The two strategies differed in cognitive demand as well as in specificity of preparation. The two tasks also differed in cognitive demand; one required fine coordination of motor skills, whereas the other was a gross motor task. Of interest were the differential effects of the two types of strategies on improvement in the two types of tasks. We also looked at the effects of athletic experience, confidence levels, experience with improvement strategies, and gender on improvement as a function of type of strategy and type of task.

Method

Participants

A total of 120 students from American University participated in this experiment. Half were women and half were men; the average age was 20.7 years. They participated in the experiment for extra credit toward psychology courses, or for fun.

Materials, Design, and Procedure

Performance was measured on two tasks: free-throw shooting and grip strength. Free-throw shooting was the predominantly fine motor skill that required high cognitive demand. Participants had to concentrate on such factors as the position of their bodies; the height, distance, and size of the basket; wrist action; and how much strength was needed. We used a child's rubber basketball, approximately 22 cm in diameter, and a hoop large enough for the basketball mounted 2.70 m away from the participant at a height of 1.82 m. Performance was measured using the number of shots made out of 12 attempts. The second task, grip strength, was the predominantly gross motor task requiring less cognitive demand. By and large, participants had to concentrate simply on gathering their strength. Performance was measured using a hand dynamometer. An increase in the number of shots made or kilograms of pressure squeezed after a given manipulation determined improvement in performance.

For both tasks, there were three strategy conditions: (a) the control condition, in which no manipulation occurred; (b) the psyching-up or nonspecific arousal instructions condition; and (c) the mental rehearsal or the imagery instructions condition. The nonspecific arousal preparation involved physical activity such as running around, pumping fists, and self-talk directions such as telling themselves that they "could," they "were the greatest," and so on, though without any reference to the task at hand. Thus, the instructions were the same for both tasks. Imagery involved the guided experience of a specific image through a script that evoked response propositions for the overt behavior being tested. For the free-throw shooting task, this included instructions such as "visualize the arc of the ball as it leaves your hands and swishes through the basket." For the grip-strength task, this included instructions such as "feel the muscles in your arms become stronger." The two tasks and three strategy conditions were counterbalanced across six groups of participants with an equal number of women and men in each group.

All participants performed both the free-throw shooting and the grip-strength tasks, one group getting the free-throw shooting task first and the grip-strength task second, and the other group vice versa. For both tasks, first a baseline measure was taken. Participants shot 12 free throws and gripped the hand dynamometer once with each hand. They also gave confidence ratings on the anticipated success of their performance. For the free-throw shooting task, the confidence ratings were given after the 3rd, 6th, and 9th shots. For the grip-strength task the confidence ratings were given only once, before the first grip. Then each participant was given one strategy to use to improve his or her performance. Thus, one group was guided through an imagery script, another group was given nonspecific arousal instructions, and the third group, the control group, was simply given an arithmetic task to keep them occupied for the same amount of time that the two other strategies took. The purpose of including this group was to look at the effects of practice alone.

All participants were in the same strategy condition for both tasks. That is, if a participant was assigned to the imagery group for the free-throw shooting task, then he or she was assigned to the imagery group for the grip-strength task as well. After each strategy, the participants performed the task once more, again giving confidence ratings for their anticipated success in the free-throw shooting task and for whether they would improve in the grip-strength task.

Before the experiment started, participants completed a questionnaire specifying their athletic experience as well as whether they had ever been in situations involving imagery or other rehearsal strategies. In addition, after the experiment, those participants in the imagery condition filled out a questionnaire specifying their imagery experience. Individual imagery ability was assessed using a shortened version of the Questionnaire Upon Mental Imagery (QMI), a 35-item self-report measure of imagery ability (Sheehan, 1967).

Results

The scores of all participants for the free-throw shooting and grip-strength tasks under the imagery, arousal, and control conditions are reported in Table 1. Improvement was defined as the increase in the number of free throws made or kilograms squeezed. It should be noted at this point that there were no significant differences in baseline performances between the three groups for either the free-throw shooting task or the grip-strength task, Fs(2, 117) = 1.97 and 0.24, ps > .10, *MSE*s = 0.03 and 106.53, respectively. In addition, as can be seen from the results of the control group, there were no significant effects of practice on either task, ts(39) = 0.99 and 0.04, ps > .10, for the free-throw shooting and grip-strength tasks, respectively. Thus, any improvement in performance was not attributable to simple practice. Also, because there was no main effect of task order, we collapsed the six groups into three groups based on the strategy used.

Looking at each task separately and comparing improvement in performance in the two strategy conditions with that in the control condition, we found that, in the free-throw shooting task (the task with the higher cognitive demand), there

TABLE 1
Mean Percentages of Shots Made and Kilograms Squeezed

	Strategy					
	Imagery		Arousal		Control	
Task	Before	After	Before	After	Before	After
Free-throw shooting	21	35	27	33	28	31
Grip strength	33.2	33.4	34.3	35.8	32.8	32.8

was improvement after the imagery manipulation, $t(39) = 4.66$, $p < .01$, but not after the arousal manipulation, $t(39) = 1.95$, $p > .05$ (although it did reach marginal significance, $p = .06$), and the interaction between the two strategy conditions was significant, $F(1, 78) = 4.14$, $p < .05$, $MSE = 0.02$. Indeed, the interaction between strategy conditions was also significant when the control condition was added to the analysis as a third group, $F(2, 117) = 4.55$, $p < .05$, $MSE = 0.02$. Thus, on the higher cognitive demand task, imagery enhanced performance, whereas nonspecific arousal enhanced grip strength but not free-throw shooting.

In the grip-strength task (the task with the lower cognitive demand), on the other hand, there was improvement after the nonspecific arousal manipulation, $t(39) = 3.82$, $p < .01$, but not after the imagery manipulation, $t(39) = 0.34$, $p > .10$, and the interaction between the two mental strategy conditions approached significance, $F(1, 78) = 3.09$, $p = .08$, $MSE = 5.32$. Again, the interaction between the strategy conditions also approached significance when the control condition was added to the analysis as a third group, $F(2, 117) = 2.79$, $p = .07$, $MSE = 4.74$. Thus, on the lower cognitive demand task, nonspecific arousal enhanced performance, and imagery did not. Also, looking at the results from the perspective of the different strategy conditions, we can see that imagery enhanced free-throw shooting but not grip strength, whereas nonspecific arousal enhanced grip strength but not free-throw shooting.

In the grip-strength task, we should also note that, overall, there was a main effect for hand dominance; over 82.5% of participants squeezed greater weight with their dominant hand than with their other hand. Regarding improvement scores, however, there was no significant difference between improvement in the dominant hand and improvement in the nondominant hand, $t(119) = 0.24$, $p > .10$. In fact, this finding held regardless of the type of mental strategy used, all ps > .40. Thus, the effects of the strategies were roughly the same for both hands.

Analysis of the confidence ratings indicated an overall increase in ratings from pre-manipulation (2.8) to post-manipulation (3.2) on a scale of 0 to 5 (in fact, over 90% of the participants had higher post-manipulation ratings). In addition, overall confidence ratings were correlated positively with free-throw accuracy, $r = .48$, $t(118) = 5.94$, and grip-strength performance, $r = .28$, $t(118) = 3.17$, both ps < .01. With respect to improvement, however, there was no correlation between confidence ratings and grip strength, $r = -.06$, $t(118) = 0.65$, $p > .10$, and even a slight negative correlation between confidence ratings and free-throw shooting, $r = -.20$, $t(118) = 2.22$, $p < .05$. Thus, it appears that confidence ratings predicted performance and that participants felt more confident the second time around. Confidence ratings were either not correlated or negatively correlated with improvement, however. The surprising negative correlation could possibly be explained by the suggestion that because participants rated their confidence continually in free-throw shooting, a series of made baskets could have led to higher confidence levels, and regression to the mean in the next set of shots could have led to the observed negative correlation.

Participants had rated their athletic experience and rehearsal experience, as well. Their responses were categorized in such a way that each participant was given an athletic or rehearsal experience rating between 1 (no experience) and 4 (extensive experience). The average athletic experience ratings were 2.55 in the imagery group, 2.75 in the arousal group, and 2.58 in the control group. The average rehearsal experience ratings were 2.35 in the imagery group, 2.68 in the arousal group, and 2.00 in the control group. Not surprisingly, athletic experience was positively correlated with task performance on both free-throw shooting, $r = .21$, $t(118) = 2.33$, $p < .05$, and grip-strength, $r = .22$, $t(118) = 2.45$, $p < .01$. However, athletic experience was not correlated with an improvement in performance on either task, $rs = .09$ and $.06$, $t(118) = 0.98$ and 0.65, $ps > .10$, for the free-throw shooting and the grip-strength tasks, respectively. Thus, previous exposure to sports made no difference in improvement in these two sports-related tasks.

Although there were no differences in participants' athletic experience among the three groups, $F(2, 117) = 0.57$, $p > .10$, $MSE = 0.48$, there was a difference in rehearsal experience among the groups, $F(2, 117) = 4.45$, $p < .05$, $MSE = 4.56$. For the most part, this finding was attributable to a difference between the control group and the nonspecific arousal group, $t(79) = 3.04$, $p < .01$. Interestingly, there was a correlation between athletic experience and rehearsal experience; the higher ratings of athletic experience were typically accompanied by a higher level of experience with imagery, $r = .59$, $t(118) = 7.94$, $p < .01$. Rehearsal experience was positively correlated with grip-strength performance, $r = .24$, $t(118) = 2.69$, $p < .01$, but was only marginally correlated with free-throw shooting performance, $r = .15$, $t(118) = 1.65$, $p < .10$. Given that we had not asked participants about the kinds of rehearsal experience they had had, we cannot make too much of these results. With respect to imagery ability, on the other hand, the average overall rating, obtained only for participants in the imagery condition, was 2.48 out of a possible 7 on the QMI scale, and individual imagery ability was not correlated with improvement in the free-throw shooting task, $r = .05$, $t(38) = 0.31$, or in the grip-strength task, $r = .16$, $t(38) = 0.99$, both $ps > .10$.

We also looked at the relationship between gender and task performance in the various conditions. There was an overall effect of gender; men performed better than women. However, the men also had more athletic experience than the women, $F(1, 118) = 4.59$, $p < .05$, $MSE = 0.80$, which might explain why they performed better. They made more baskets and squeezed more kilograms than did the women, $F(1, 118) = 37.41$, $p < .01$, $MSE = 0.26$, for the free-throw shooting task, and $F(1, 118) = 190.98$, $p < .01$, $MSE = 40.57$, for the grip-strength task during the baseline performance; and $F(1, 118) = 16.79$, $p < .01$, $MSE = 0.28$, for the free-throw shooting task, and $F(1, 118) = 169.35$, $p < .01$, $MSE = 43.57$, for the grip-strength task, after the manipulations. In neither task, however, was there a difference in improvement between men and women, $F(1, 118) = 2.42$, $p > .10$, $MSE = 0.02$, for the free-throw shooting task, and $F(1, 118) = 0.51$, $p > .10$, $MSE = 4.91$, for the grip-strength task. Thus, akin to the hand dominance results, one group did perform better than the other, but no differences emerged in terms of improvement on those tasks.

Discussion

In this study, we looked at the effects of two different strategies on two different sports-related tasks. More specifically, we asked participants to attempt free throws or do a grip-strength task both before and after engaging in either mental imagery or nonspecific arousal. We found that mental imagery significantly enhanced only the free-throw shooting performance, whereas nonspecific arousal significantly enhanced only the grip-strength performance. In addition, overall, although general performance was influenced by athletic experience, rehearsal experience, hand dominance, gender, and confidence, improvement in performance was not.

According to the bioinformational view (e.g., Lang, 1979), as long as the prototypical response propositions are primed, there should be an enhancement in performance. In the mental imagery condition, we asked participants to go through the exact motions of their future actions in their minds; that is, we primed the responses. However, only free-throw shooting improved. One might speculate that perhaps this result occurred because shooting a basketball was a more familiar task with better defined and specific response prototypes, whereas gripping a hand dynamometer was a relatively unfamiliar task with only ill-defined response prototypes in long-term memory. Somewhat more problematic for the bioinformational view was that nonspecific arousal enhanced performance in the grip-strength task. Perhaps the nonspecific arousal instructions we gave happened to match and prime the response propositions for this task. In a performance of pure strength and not much strategy, the response propositions are presumably not as finely defined as in a free-throw shooting task, and getting the participants alert, confident, strong, and focused appeared to work better in this pure strength task. Thus, at least some, but not all, of our findings can be explained within the framework of the bioinformational theory.

According to the symbolic learning theory (e.g., Sackett, 1934), on the other hand, rehearsal involving representation of overt patterns should enhance performance only in tasks that are high in cognitive demand. Because the free-throw shooting task was the task assumed to have high cognitive demand and the grip-strength task was not, the finding that imagery enhanced only the free-throw shooting performance is quite consistent with the predictions from this theory. The symbolic learning theory does not address, however, the effects of nonspecific arousal strategies per se and why participants should improve particularly in grip-strength performance.

A combination of these two theories would closely resemble the overarching framework of transfer-appropriate processing (Bransford et al., 1979) and fare more successfully than either of the theories alone. Imagery enhanced free-throw shooting but not the grip-strength task because the former included more elements that could be successfully imaged and there was more detail. Thus, there was more of a match and on a greater number of elements between the covert actions prescribed in the imagery instructions and the overt actions in the actual performance in the free-throw shooting task. In fact, it appears that imaging did not help in the grip-strength task at all, presumably because (a) participants used actions that were different in actual performance from those prescribed in the imagery script, thus making the match minimal; or (b) there were not many imageable elements to the action anyway, so that even if those few matched, the benefit was not observable, compared with the no-match or control condition. Nonspecific arousal, on the other hand, enhanced the grip-strength performance because in this gross motor task, general hyping up—presumably getting the adrenaline level to increase and physiologically priming the muscles—provided a better match with the actual response of squeezing the dynamometer than thinking passively about the action. It did not enhance the free-throw shooting performance, at least not to the same extent as it enhanced grip-strength performance, because the match between the actions engaged in during arousal (e.g., running around, pumping fists) did not much resemble or match those engaged in while actually performing the task.

In sum, it appears that engaging in mental rehearsal or other strategies does enhance sports performance, but it is important to choose the right strategy for any given sport. In our study, covert imagery enhanced the free-throw shooting task but not the grip-strength task, and overt and nonspecific arousal enhanced the grip-strength task but not the free-throw shooting task. Thus, an elaborate cognitive mental strategy such as imagery, which breaks down thinking into steps and analyzes the upcoming responses, should enhance performance in sports in which coordination of numerous fine and specific skills is required, but not performance in sports in which success depends on focusing on just one gross motor skill. For the latter type of sports, a better type of strategy appears to be one, such as overt and nonspecific arousal, in which the primary objective is to gather up strength, focus, and concentration, without having to pay much attention to cognitive aspects.

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Manuscript received August 13, 1998
Revision accepted for publication December 9, 1998