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The Content and Effect of "Psyching-Up" Strategies in Weight Lifters

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An experiment was designed to investigate the nature and impact of cognitive "psyching" strategies employed by competitive weight lifters on an analogue strength task. At an Olympic-style weight-lifting meet, volunteer subjects were randomly assigned to either an experimental or a control group. After baseline assessment of strength, experimental subjects were asked to use their favorite psyching strategy as a means of improving their performance on a final strength test. Control subjects were urged to strive toward improving their performance but were not instructed to psych themselves up. To minimize the effects of spontaneous (unrequested) psyching, control subjects were asked to engage in a distracting cognitive task during the preperformance interval. Results indicated that subjects who had been asked to psych themselves showed greater improvements in strength than did control subjects. Post experimental interviews suggested that four basic psyching strategies had been employed: (1) statements bearing on self-efficacy, (2) control of attention, (3) preparatory arousal, and (4) imagery techniques. Focus of attention was the most popular strategy. Implications of this study are briefly discussed.

Research on the parameters of athletic skills and competition is rapidly assuming a place of prominence and priority in the field of psychology. Somewhat belatedly, psychological researchers have begun to apply their skills to the analysis and refinement of sport performance. The recency of this research is somewhat offset, however, by its apparent popularity. Within a period of just a few years there have been several volumes devoted to the psychology of sport (cf. Fisher, 1976; Harris, 1973; Landers, Harris, & Christina, 1975; Martens, 1975; Morgan, 1972a; Smith, 1970; Vanek & Cratty, 1970).

One of several emerging research emphases appears to involve cognitive skills that may affect an athlete's performance. For example, there is

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both correlational and experimental evidence corroborating the hypothesis that patterns of thought and imagery may influence athletic performance (e.g., Corbin, 1972; Mahoney, 1978; Mahoney & Avener, 1977; Morgan, 1972b; Richardson, 1967a,b; Suinn, 1972a,b, 1976, 1977). This evidence is still very preliminary, however, and the role of specific cognitive skills in sports remains to be clearly elucidated. At the present time, investigators appear to be devoting their research attention to (a) identification of sport-relevant cognitive skills, (b) evaluation of the influence of those skills, and (c) examination of methods that can facilitate the development and refinement of those skills in athletes.

The present study was addressed to two of the above concerns. Specifically, a study was designed to explore the nature and impact of cognitive skills employed by weight lifters during competition. The relevance of this research was suggested by prior reports that weight lifters often employ "psyching-up" strategies during competition (e.g., Genov, 1970; Mahoney, 1978). These reports have come primarily from interviews with weight lifters and there have been no previous attempts to examine either the content or the effects of these strategies. In the present study, competitive weight lifters were randomly assigned to either an experimental or a control group. After baseline assessment of strength, experimental subjects were asked to use their favorite psyching strategy as a means of improving their performance on a final strength test. Control subjects were urged to strive toward improving their performance but were not instructed to psych themselves up. To minimize the effects of spontaneous (unrequested) psyching, control subjects were asked to engage in a distracting cognitive task during the preperformance interval. To assess compliance with instructions and content of cognitive preparation, a postexperimental interview was conducted.

METHOD

Subjects

Thirty male weight lifters were recruited from among participants in an Olympic-style weight-lifting meet that was held in a southern Pennsylvania town. Ages ranged from 12 to 48 years with a mean of 23.4 and a standard deviation of 8.0. The average prior competitive experience of subjects was participation in two to three meets. Random assignment of subjects to the experimental conditions resulted in an N of 16 for the experimental group and an N of 14 for the control group.

Apparatus

A Lafayette pneumatic hand dynamometer #76502 was used to secure an index of strength in the dominant hand. Interviews were taped with a portable tape recorder. A wristwatch was used to time 30- and 10-second intervals.

Procedure

The overall experimental design was a three-trial sequence followed by a postexperimental interview. Subjects in the two groups were treated identically on the first two trials. Trial 1 involved an assessment of their performance without any cognitive skill intervention. On trial 2, all subjects were asked to count backward by sevens from a four-digit number. This enabled measurement of the effects of simple distraction. Prior to the third and final trial, experimental subjects were asked to psych themselves up. Control subjects, on the other hand, were simply instructed to perform another backward counting task.

The experimenter was a 22-year-old male graduate student in clinical psychology who both recruited participants and administered the experimental conditions. He introduced himself and invited each subject's participation with the following standardized interview format: "Hello. My name is _____. I am conducting a study with _____. Would you be willing to participate in a brief exercise that measures your hand strength?" If they agreed, the experimenter gave them a consent form. After reading and signing the consent form, each subject was randomly assigned to either a control group or an experimental group on the basis of a random numbers table. Subjects were then escorted to an experimental room. At this time, data on the subjects' age, weight, and prior competitive experience were collected and the experimental session began. Memorized instructions were presented to each subject.

Experimental Group. "I am going to ask you to perform a strength-related task. In front of you is a hand dynamometer. It is an instrument that measures hand strength. Let me demonstrate how it works. You get a comfortable grip with the dynamometer in your dominant hand. Your arm should be extended down along your side. [This position prevented subjects from watching the dial during their performance.] Then you exert a slow, increasing application of force. For example, here is my attempt and my score is 30 kilograms. [The experimenter gave a demonstration in which the dynamometer was squeezed lightly to a standard score of 30 kilograms. The instrument was then reset to zero, handed to the subject, and the experimenter continued.] I am going to ask you to perform the task three times. Please exert your best effort on each trial. Between trials you will receive a brief rest period. At the end of the rest period I will instruct you to repeat the task.

"O.K., pick up the dynamometer. Get a comfortable grip and when I say "Go," begin. O.K., ready, set, go. Let's see what your score is. [Subject hands the dynamometer to the experimenter. The score is recorded, the instrument reset, and handed back to the subject.] O.K., for the next 30 seconds I want you to count backwards, quickly and out loud, by sevens beginning at 1,911. Begin counting. [The experimenter faced the subject and timed him during all rest periods.]

"O.K., it is time to try this again. In 10 seconds, I will ask you to compress the dynamometer. However, for now, continue to count backwards by sevens.

"O.K., it is time. Try to do better than you did before. When I say "Go," begin. O.K., ready, set, go. Let's see what your score is. [Subject gives the dynamometer to the experimenter. The score is recorded, the instrument reset, and handed back to the subject.]

"O.K., now you can rest for a bit. While you are resting, though, I want you to prepare yourself for the third trial. In particular, I want you to think about ways of psyching yourself up for your best effort. You may already have some methods you use to obtain your maximum strength. Do whatever you think will help you to surpass your first and second scores and to achieve your best effort. I will give you some time now to think about how you will psych yourself up. Do not actually psych yourself until I tell you. O.K., take some time now to think about it.

"O.K., it is about time you try this again. In 10 seconds I will ask you to compress the dynamometer. Try to do better than you did before. Begin using your psyching-up strategy now.

"O.K., when I say "Go," begin. Ready, set, go. Let's see what your score is. [Subject gives the dynamometer to the experimenter and the score is recorded.]"

Control Group. The same instructions and procedures were used for the control group until the third trial. At that time, they were instructed as follows:

"O.K., this is your last attempt. In 10 seconds, I will ask you to compress the dynamometer. After that I will ask you a few brief questions. However, for now continue counting backwards by sixes.

"O.K., it is time. Try to do better than you did before. When I say "Go," begin. O.K., ready, set, go. Let's see what your score is. [Subject hands the dynamometer to the experimenter, the score is recorded, and the instrument reset.]"

Following completion of the final task, each subject was asked the following questions: (1) Did you use a psyching-up strategy on any of the three trials? If the subject answered "No," question 2 was deleted. If the response was "Yes," then the subject was asked "On which trials?" and was then asked to describe his strategy. (2) What is your typical way of psyching-up?

These questions concluded the experimental session. Subjects were informed of their scores and any questions pertaining to the general nature of the experimental task were answered at this time. For validity purposes, subjects were asked not to discuss the study with anyone until after it was completed. A sign-up sheet was made available to participants who wished to receive copies of the study. Subjects were then thanked for their time and cooperation.

RESULTS

An experimental subject and a control group subject were eliminated from the study. One reported a hand injury that had hampered his experimental performance, and the other subject reported that he had had previous contact with the experimenter's adviser and felt that he knew the nature of the study. He had also conducted similar experiments with hand dynamometers. After conducting four experimental sessions, a room change was made due to frequent outside interruptions. Three of the first four subjects were members of the control group.

Behrens-Fisher t tests, using the adjusted df' (Welch, 1947), were nonsignificant for all preintervention variables. Thus groups appeared homogeneous with regard to age, weight, and prior competitive experience. Additionally, there were no significant differences between groups at each trial. The results of the between-groups t tests are presented in Table I. Descriptive data, for all variables, are presented in Table II. Additionally, mean group performance scores on each trial are represented in Figure 1.

Dependent t tests were performed to examine within-group changes between trial 2 and trial 3 (i.e., after the experimental manipulation). Significant differences were obtained for the experimental group, $t = -2.57$, $df = 14$, $p < .05$. No significant differences were found for the control group. These t test results are presented in Table III.

Given the sizable between-groups differences on change scores (trial 3 minus trial 2), $t' = 2.93$, $df' = 24.87$, $p < .05$, and the within-group t test results, a post hoc analysis of covariance was performed to investigate between-groups differences on trial 3. Specifically, the analysis of variance of performance at trial 3, by group, with performance at trial 2 as the covariate was assessed. Thus, partialing out trial 2 performance, the analysis provided for a more sensitive test for between-groups differences at trial 3 than the t test. As Table IV indicates, the covariate was indeed sig-

Table I. Behrens-Fisher t Test Results for Experimental and Control Groups on All Variables

Variable	t' Value	df'[a]
Weight	1.87	25.94
Age	.67	22.95
Experience	−.18	25.84
Trial 1	.34	19.70
Trial 2	.19	20.66
Trial 3	1.33	20.46
Total score	1.17	20.52
Change 1 (trial 2 minus trial 1)	−.17	21.68
Change 2 (trial 3 minus trial 2)	2.93[b]	24.87
Performance	−.90	18.05

[a] $df' = \dfrac{(n_1-1)(n_2-1)}{C^2(n_1-1)+(1-C)^2(n_2-1)}$, where $C = \dfrac{S_1^2/n_1}{S_1^2/n_1 + S_2^2/n_2}$.

[b] $p < .05$.

Table II. Descriptive Information for Experimental and Control Groups

Group	Weight	Age	Experience[a]	Trial 1 (Kg)	Trial 2 (Kg)	Trial 3 (Kg)	Total score (Kg)	Change 1 (Kg)	Change 2 (Kg)	Performance
Experimental										
M	178.933	24.333	2.333	52.133	51.467	54.933	422.308	−.667	3.467	2.313
SD	39.987	7.218	.816	7.501	9.039	8.866	98.987	9.256	5.232	.368
N	15	15	15	15	15	15	15	15	15	15
Control										
M	153.154	22.769	2.385	50.846	50.654	49.192	372.273	−.192	−1.462	2.477
SD	32.820	8.555	.650	11.886	13.330	13.263	108.889	4.828	3.614	.502
N	13	13	13	13	13	13	11	13	13	11

[a] 1 = first meet, 2 = second to fifth meets, 3 = six or more meets.

nificant, $F(1,25) = 134.486$, $p < .001$. Likewise, the analysis of covariance revealed a significant main effect for groups, $F(1,25) = 8.499$, $p < .01$. The magnitude of this change is reflected in Figure 2, which shows the intergroup difference in change scores. The mean performance scores for the experimental group at change 1 and change 2 were −.667 and 3.457, respectively. The control group's scores were −.192 and −1.462. These results suggest that there was a significant group performance difference between subjects who employed a psyching-up strategy and subjects who were distracted.

The postexperimental questionnaire corroborated the success of the manipulation in that all subjects in the experimental group reported that they used a psyching strategy. Moreover, 10 out of 15 said that they used it on trial 3. One subject reported employing the strategy on all trials, while another said he psyched up on trials 2 and 3. Due to experimenter error, responses to the question "On which trial?" are not available for five experimental group members. With two exceptions, control group members reported that they had not used a psyching strategy during the experimental session. One subject said he psyched up on trial 3, while the other reported psyching on trials 2 and 3. Thus the manipulation was apparently successful.

Given the relatively small sample size and its exploratory format, no statistical analysis was employed to evaluate responses to the postexperimental questionnaire. Subjects' self-reported psyching strategies were classified, however, and an independent rater was enlisted to assess the reliability of this classification. Since most subjects reported using more than one psyching strategy, reliability between raters was conservatively estimated by requiring that both raters be in exact agreement on the self-reported components of each subject's psyching strategy. Two subjects gave self-reports that were independently judged as unclassifiable by both raters. For the remaining 13 subjects, interrater agreement was 92.3%. These psyching-up strategies appeared to range across the following four categories: (1) statements of self-efficacy and personal ability, (2) attentional focus, (3) preparatory arousal, and (4) imagery. Fifty-four percent of the weight lifters reported using a combination of these strategies. Attentional focus was the most popular technique, having been employed by 61.5% of

Table III. Within-Group *t* Tests at Trial 2 and Trial 3

					Difference			
Group	Variable	*N*	*X* (Kg)	*SD*	*X*	*SD*	*t* value	*df*
Experimental	Trial 2	15	51.4667	9.039	−3.4667	5.232	−2.57[a]	14
	Trial 3		54.9333	8.866				
Control	Trial 2	13	50.6538	13.330	1.4615	3.614	1.46	12
	Trial 3		49.1923	13.263				

[a] $p < .05$.

Table IV. Results of the Analysis of Covariance on Trial 3 Performance with Trial 2 as the Covariate

Source	*df*	*MS*	*F*
Covariates, trial 2	1	2754.592	134.486[a]
Main effects group	1	174.086	8.499[b]
Error	25	20.482	

[a] $p < .001$.
[b] $p < .01$.

subjects. Self-efficacy strategies were used by 34.6% of the subjects and exemplified by statements such as "I told myself that I could do it." Attentional focus is illustrated in one subject's focus on "concentrating on having those muscles react better." Preparatory arousal strategies were intended to "get yourself excited, get your blood moving, squeeze down with all your might, and get mad and give it one big surge with all your might." Finally, the use of imagery was exemplified by the subject who said. "I pictured myself, first of all, doing it. I pictured myself squeezing it and pulling every ounce of strength that I had in my body into that one wrist. I just concentrated as hard as I could on that one... just on my hand and making it close no matter what. I just tried to close my hand." This example illustrates the use of several strategies. It is interesting to note that in prior studies involving cognitive strategies with athletes, researchers have reported an association of superior performance with the type of mental imagery and/or the controllability of the image (Mahoney & Avener, 1977; Corbin, 1972). Analyses of the relative frequency or effects of these various psyching strategies were not feasible with the present experimental design.

DISCUSSION

This study was a brief and exploratory attempt to examine the nature and effects of psyching-up strategies in athletic performance. Within the constraints of the sample, task, and methodology employed, some tentative conclusions seem warranted. First, it appears that psyching-up instructions did influence experimental performance. The group of weight lifters who were told to use a psyching-up strategy showed greater improvement on the hand dynamometer task than did the group who received distraction instructions. This must be contrasted with the absence of significant group differences prior to the experimental manipulation. The cognitive distraction task did not appear to affect performance. Although the control group

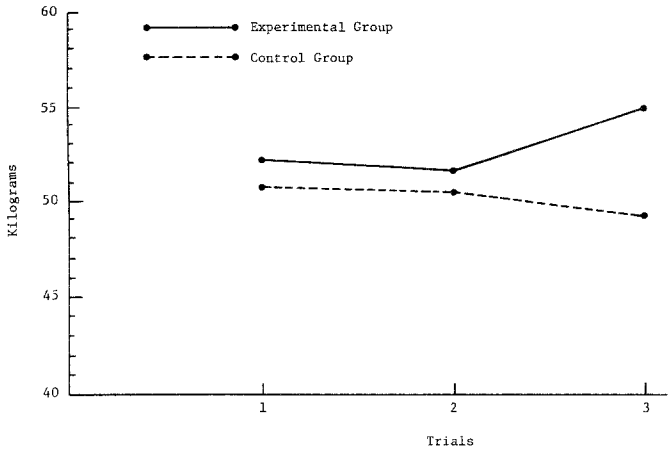

Fig. 1. Groups' mean performance on trials.

manipulation was intended to minimize extraneous influences, it did not address some aspects of subject expectancy and possible experimenter bias.

The present results would appear to corroborate the contention that cognitive processes may influence athletic performances involving strength. These findings merit replication and refinement, however. The four strategies suggested by postexperimental interview might, for example, constitute independent variables that could be manipulated—singly or in com-

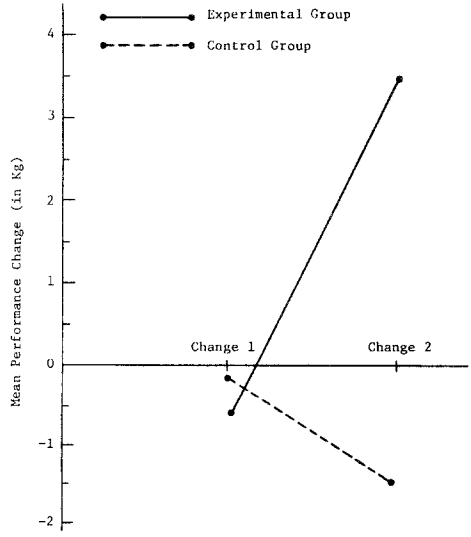

Fig. 2. Groups' mean performance change scores.

bination—in an experimental analysis of psyching techniques. With the recent growth in popularity of skills analyses in sport psychology, the contribution of these and other cognitive strategies will, it is hoped, be elucidated.

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