

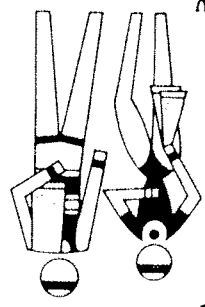
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Effects of Varied Lengths of Interval Rest Intervals on the Performance of a Novel Gross Motor Skill

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In the area of memory, forgetting can be defined as the inability to remember something. In order to ascertain whether or not forgetting has occurred, we can construct a statement based on observable behavior. This ability to remember information may be temporarily or permanently lost from memory. The trace decay theory and the interference theory are two basic theories of forgetting (Sage, 1977).

In the trace decay theory, the passage of time is thought to weaken any memory traces of previous activity to which the learner has been exposed. Schmidt (1988) stated that the reason the information is forgotten is because it's not practiced and therefore decays with time. A neurological trace is responsible for the memory of a skill or task, which becomes weaker over time. Then, when the performance of the skill is demanded at a future time, the trace is too weak to produce an efficient performance. The salience of the trace may be so weak that production of a performance is impossible. Schmidt reiterates that time is a strong influence on our power of retention. Trace decay appears to be the cause of forgetting in working memory as opposed to the interfering activity that affects long-term storage of information.

Williams, Beaver, Spence, and Rundell (1969) conducted research on remembering combinations of movements and digits and employed both combinations and digits as interfering activities. When subjects had to remember a series of six digits, success in recall decreased when the difficulty of the interfering digital manipulation task increased. However, when subjects had to remember movements, the difficulty of the digital manipulation task increased. How-

approached mastery before the rest period, and whether massed or distributed practice was employed in teaching.

Research on the question of interval rest intervals and practice distribution was reported by Irion (1966) who found that long rests are superior to short rests, and that short practice sessions between rests resulted in better scores than long practice sessions. Poulton (1966) stated that the effects of reminiscence are greater when the rest periods are longer and the number of massed trials are greater before the rest.

Eysenck (1965) contended that a series of events are established through performance. In order for this to transfer to learned behavior, a rest period is required in which these events can consolidate. Eysenck stated that reminiscence effects may be the product of reduced inhibition or a combination of consolidation and inhibition depending on ability, degree of practice and the individual.

Memory can be divided into two areas, working or short-term memory and long-term memory. Working memory is thought of as an interactive workspace before information is transferred to long-term storage. Within working memory, individuals can react to immediate situations as a part of the problem-solving and decision making process.

In teaching, a better understanding of how we learn and control motor skills is vital to a successful learning environment. A consideration for all sport pedagogists should be the recognition of the correct method of instruction culminating from research investigating a variety of teaching and learning strategies. One of these teaching and learning strategies has been to employ practice and rest periods wisely.

This study was concerned with the length of the interval rest interval and the occurrences during that rest which can influence the performance of a new skill. Both reminiscence and forgetting were examined as criteria for successful performance.

In the area of learning, the phenomenon of reminiscence can be defined as when a person returns to an activity after a rest period with improved performance. It has also been defined as the act or process of recalling past experiences without relearning the activity or task. Singer (1968) wrote that reminiscence can be attributed to a rest interval when performance increases after the rest and also, (1980), stressed that reminiscence can depend on a number of variables. These variables include the duration of the interval rest period, the type of learning technique employed, the type of subject matter, the extent to which the skill

tal manipulation tasks did not significantly affect recall of the movements. Subjects also executed movements of a lever during the intertrial rest interval. The results revealed that the lever movements interfered with the recall accuracy of movements, but not with digital recall. When more movements are demanded during the intertrial rest interval, subjects will attend to the distraction and experience more interference. Magill (1989) concluded that a distraction task that is similar to the one that a participant is attempting to remember will cause more interference than an unlike activity.

Method

Subjects who were right hand dominant and enrolled at Appalachian State University, Boone, North Carolina during the 1989-1990 academic year employed the tennis forehand groundstroke with the non-dominant hand. A basketball shooting circuit was utilized as the distraction task in order to prevent the subjects from recalling the novel gross motor skill. A video of a left-handed dominant player on the Appalachian State University men's tennis team performing a specific 5-step sequence of the tennis forehand groundstroke was utilized as a model for the 50 subjects participating in the study. An audio-tape of the 5-step sequence was also employed as a part of the model. Each subject was assigned in a stratified random sample to one of four groups which included a 5-, 10-, or 20-minute intertrial rest interval, or the control group, which did not include an intertrial rest interval. The groups were initially equated on both chronological order and performance quality. Subjects in the experimental groups were videotaped performing

Results

A panel of three judges trained in observation of the 5-step sequence of the tennis forehand groundstroke viewed each subject's tape and classified the subjects on chronological order and performance quality of the 5-step sequence. These data were recorded on a participant data card with the judges unaware as to which group each subject was assigned.

The information from the participant data cards was accumulated and a two-way analysis of variance with a 4×3 factorial design was employed to determine significant differences due to group, judge, or group by judge interaction in chronological order and performance quality scores from preconditions to postconditions of the intertrial rest interval. The results indicated no significant differences due to group, judge, or group by judge interaction on the dependent variables of chronological order or performance quality of the tennis forehand groundstroke from preconditions to postconditions of the intertrial rest interval. Statistics for the dependent variable of pre- and post chronological order scores and pre- and post performance quality scores are presented in Tables 1 and 2. The analysis of variance F 's of .10 for group differences, .02 for judge differences, and .06 for group judge interaction were all nonsignificant ($p > .05$) for pre- and post chronological scores. The analysis of variance F 's of .11 for

Discussion

5 trials pretest and 5 trials posttest for a total of 10 trials. Subjects assigned to the control group were videotaped while performing 10 trials without participating in an intertrial rest interval.

Group II, participating in the 10 minute intertrial rest interval had the greatest improvement in chronological order scores, while Group III, participating in the 20 minute intertrial rest interval had the greatest improvement in performance quality of the 5-step sequence of the tennis forehand groundstroke. Group IV, participating in no intertrial rest interval and Group I, participating in the 5 minute intertrial rest interval, demonstrated a decrease in performance quality of the 5-step sequence of the tennis forehand groundstroke.

This outcome reinforces the literature maintaining that the greatest reminiscence can occur after a longer intertrial rest interval (Irion, 1966). The contention that more reminiscence will occur with a relatively small amount of skill practice was stated by Sage (1977) when referring to the non-motor research of Ballard (1913) and poem memorization. Travis (1925) and Lamb (1954) also studied the factors which can affect reminiscence in a gross motor skill. Fox and Young (1962) concluded that the reminiscence effects of badminton skills increase positively with the length of the intertrial rest interval. The length of the intertrial rest interval employed in their study was of a 6-week and a 9-week duration. Lamb (1954) also had drawn a similar conclusion when experimenting with the acquisition of softball skills utilizing a 5-week and a 17-week intertrial rest interval. Comparisons within the phenomenon of reminiscence between this

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Table 1

Analysis of Variance for Pre and Post Chronological Order

Group, Judge and Group/Judge Interaction				
Source	Sum of Squares	D.F.	Mean Square	F
Group	0.08541	3	0.02847	0.10
Judge	0.01312	2	0.00656	0.02
GxJ	0.11618	6	0.01936	0.06
Error	41.18641	138	0.29845	
Tail Prob	0.9625		0.9783	

Table 2

Analysis of Variance for Pre- and Post Performance Quality

Group, Judge and Group/Judge Interaction				
Source	Sum of Squares	D.F.	Mean Square	F
Group	0.87305	3	0.29102	2.50
Judge	0.02529	2	0.01264	0.11
GxJ	0.03404	6	0.00567	0.05
Error	16.05051	138	0.11631	
Tail Prob	0.0619		0.8971	

investigation and those just mentioned cannot be made because of the differences in the lengths of the interval rest intervals and/or the non-motor skills utilized in the other research. However, the investigators support the contention that with a longer interval rest interval, beginners could improve their performance, similar to having a second chance, or beginning practice over again. The trend toward improved performance quality and chronological order of the 5-step sequence of the tennis forehand groundstroke with the experimental groups exhibiting the longest interval rest interval was evident. Whether this is an effect of reminiscence or a combination of consolidation and inhibition, as in Eysenck's (1965) consolidation memory theory, is still uncertain. The subjects were not aware that they would have to return to the tennis testing site and resume hitting forehand groundstrokes. This lack of information could have assisted in relieving any inhibitions in regard to the tennis task. Also, since the subjects were not filmed performing the distraction task, this may have given them an opportunity to relax.

The retroactive interference or trace decay theory discussed by Schmidt (1988) did not appear to have an effect on Group II and Group III who participated in the longest interval rest intervals. The subjects were only partially exposed to the novel motor skill by a short practice session before the distraction task was introduced.

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