

**THE EFFECTS OF AN EARLY MORNING TRAINING  
SESSION ON COMPETITIVE SWIMMING  
PERFORMANCE IN A TIME TRIAL THE SAME DAY**

**BY**

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THE EFFECTS OF AN EARLY MORNING TRAINING  
SESSION ON COMPETITIVE SWIMMING PER-  
FORMANCE IN A TIME TRIAL THE  
SAME DAY

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A Research Paper

Presented to

the Graduate Council of  
Austin Peay State University

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Arts  
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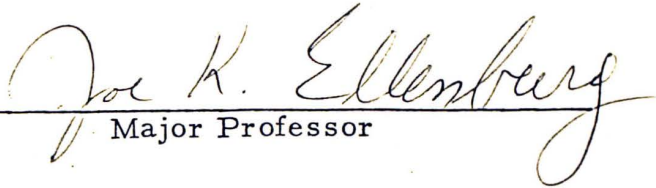
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Ernest Dale Baggett

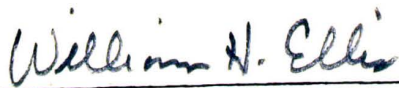
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To the Graduate Council:

I am submitting herewith a Research Paper written by Ernest Dale Baggett entitled "The Effects of an Early Morning Training Session on Competitive Swimming Performance in a Time Trial the Same Day." I recommend that it be accepted in partial fulfillment of the requirement for the degree of Master of Arts in Education, with a major in Health and Physical Education.

  
Major Professor

Accepted for the  
Graduate Council:

  
Dean of the Graduate School

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## Chapter I

### The Problem and Definitions of Terms

#### Introduction

Training techniques in competitive swimming generally follow the trends set by the training methods of outstanding athletes and successful coaches of the time. As coaches of swimmers have tried new methods of training, the more successful have been retained and the less successful have been discarded. Thus, training methods have progressed by the trial and error method.

Recently, there has been a trend toward extensive training on days of a swim meet. The writer of this paper is concerned with how this training affects a swimmer's performance in a swim meet that day.

#### Statement of the Problem

What is the effect of an early morning training session on a swimmer's performance in a time trial the same day?

#### Hypotheses

Based on experience and observation as a swimming coach, a former competitive swimmer, and the review of literature, the following hypotheses concerning performance appear warranted.

H 1: Swimmers will not achieve as many best times after the workout.

- H 2: Swimmers will achieve more best times after warmup only.
- H 3: The "A" level competitor will be less affected than the "B" level competitor.
- H 4: Middle-distance swimmers will be less affected than sprint swimmers.
- H 5: Younger age-group swimmers will be more affected by the workout than the older age group swimmer.
- H 6: The female swimmers will be less affected by the workout than the male swimmers.

### Purpose of the Study

The purpose of this study is to give the swimming coach some idea of the effects of training on the day of a swim meet.

Swimming today is one of the most competitive amateur sports in the United States. The majority of swim teams work out at least two times a day, six days a week. Some swim teams in the summer season swim as many as three workouts per day, six days a week. This practice has probably led to training on the days of a swim meet. A swimming workout can be generally defined as a workout of more than 3,500 yards in a 1-1/2 hour time period.

In Amateur Athletic Union (A.A.U.) swimming, most meets are three days in duration. This usually means a swimmer can lose three to five days of training because of a swim meet, unless he or she trains at the meet.



Some coaches feel that if the swim meet is not a championship meet it is not worth missing a workout just to swim in the meet. They train at the meet, regardless of how it affects the performance of their swimmers.

There are also a number of coaches who feel that a swimmer should experience some success in every meet. These coaches generally feel that a positive performance in a swim meet helps the athlete to work harder in workouts. This coach generally does not train at meets, because he feels that training at a meet would have a negative effect on a swimmer's performance.

The purpose of this study is to determine how a normal training session at a meet actually affects performance at a meet.

### Definition of Terms

Sprint Swimmer: Swimmer who competes in 50 and 100 yard events.

Middle Distance Swimmer: Swimmer who competes in 100 and 200 yard events.

Distance Swimmer: Swimmer who competes in 500 yard and 1,650 yard Freestyle.

Best Time: The best time achieved in either set of time trials.

"A" Swimmer: For the purpose of this study, an "A" swimmer is a swimmer that has achieved the National A.A.U. time standard for the 100 yard freestyle in his or her age group.

Training Session: A 1-1/2 hour swim workout of at least 3,500 yards.

"A" Time: Time standards set by the National A.A.U. for all age group swimmers.



"B" Swimmer: For the purpose of this study, a "B" swimmer is a swimmer who has not achieved the National A.A.U. time standard for the 100 yard freestyle in his or her age group.

A.A.U.: Amateur Athletic Union of the United States.

## Chapter II

### Review of the Literature

Except for opinions based on empirical observations, little is known regarding the effects of early morning training on performance in a meet the same day. Forbes Carille, one of the world's most prominent swimming coaches, writing in Swimming Technique, stated that "most of the training that is being done is based on empirical, trial and error approach, which essentially is, 'I tried it and it seems to work,' therefore it's good."<sup>1</sup>

This report is primarily concerned with the influence of large amount of exercise (enough to cause considerable fatigue) on the speed of swimming. The researcher of this report could not find any literature or research that directly related to this study, probably because training the day of a meet is relatively new in swimming.

Although there were no studies that dealt with the amount of work involved in this study, there were some studies that dealt with light and moderate warm-up. In a study by Simon and Muido, using times in a 50 meter swim as the criteria, each concluded that general body warm-up exercises were quite effective in improving swimming performance.<sup>2</sup> De Vries, using as a criterion a 100 yard swimming

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<sup>1</sup>Stuart Citrin, "Training too Hard?," The Freestyle, End of Summer, 1976.

<sup>2</sup>Simon & Muido, "Influence of Body Temperature on Performance in Swimming," Research Quarterly, Vol. 32, No. 3, pp. 156-62, 1961.

performance, found that warming up with the stroke swam improved performance, while warming up with a different stroke decreased performance, with no relationship to how much work was done.<sup>3</sup>

The type of workout used in this experiment and by most coaches today is called interval training. It was developed by Woldemar Gerschler, a track coach in the 1930's, who coached Rudolph Harbig.<sup>4</sup> Interval training consists of swimming a series of repeat swims at a given distance with a controlled amount of rest between efforts. As with any training method, swimmers should train hard enough in most practice sessions in order to finish a workout with an acute feeling of fatigue.

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<sup>3</sup>C. De Vries, "Effects of Various Warm-Up Procedures on 100 yard Times in Competitive Swimming," Research Quarterly, Vol. 30, pp. 11-20, 1959.

<sup>4</sup>James Counsilman, The Science of Swimming, New Jersey, Prentice-Hall, Inc., p. 209, 1968.

## Chapter III

### Methods and Procedures

#### Subjects

The subjects of this experiment were 18 swimmers of the Clarksville Swim Association. The subjects' ages ranged from 11 to 17 years of age. There were eight female participants and ten male participants. Eight of the swimmers had achieved their "A" time standard in the 100 yard freestyle. Ten of the subjects were "B" level competitors. All the swimmers were on the senior team of the Clarksville Swim Association and have been competing in A.A.U. swimming for at least two years. Each swimmer was capable of swimming a 4000 yard workout in less than one and a half hours.

#### Facilities and Equipment

Swimming was done at the Austin Peay State University Pool in Clarksville, Tennessee. The Austin Peay pool is a five lane 25 yard pool. Non-turbulent lane lines were used during the time trials. Timing was done with stop watches calibrated to a tenth of a second. The water temperature during the experiment ranged between 80 degrees and 82 degrees F.

#### Experimental Design

The one group pretest-posttest design was used in this experiment, because of the small number of subjects available for the study.



A pretest-posttest design incorporates testing subjects at the beginning of an experiment to check performance, before the variable is introduced. The posttest is given after the variable is administered to the subjects to test how the variable affected the student.

Each test was administered twice to insure reliability. A pretest-posttest was administered in the early mid-season training phase. The other pretest-posttest was done in the late mid-season training phase.

The pretest consisted of having the swimmers do a warm-up swim only. The warm-up swim was as follows:

400 yard swim

200 yard kick (using a kickboard)

200 yard pull (using a pullbuoy)

The subjects were then given a 20 minute rest period. After the rest period, the swimmers were timed for a 100 yard freestyle swim.

The posttest consisted of the subjects doing the identical warm-up that was used in the pretest. This was followed by a workout that should cause considerable fatigue. The following was the workout given after the warm-up:

Five 200 yard swims on 3 minute intervals

Ten 100 yard kicks on 2 minute intervals

Twenty 50 yard swims on 1 minute intervals

After the workout, the swimmers were given a 20 minute rest period, and then were timed for the 100 yard freestyle.

### Evaluation

The method of evaluation was a comparison of the swimmer's time in the pretest to his/her time in the posttest. A difference of five-tenths of a second was considered significant. The t-test for non-independent or correlated means was used to analyze the difference between the paired scores.

## Chapter IV

### Analysis of Results

In comparing the first two time trials (Table 1), the results were mixed with no significant difference between the two sets of times. The mean time of the swims after the warm-up swim only were 67.8 seconds, compared to the mean time of the swims after the workout of 68.2 seconds. The .4 of a second was less than the 5 tenths of a second needed to be considered significant. Individually, in the first two trials, nine swimmers had better times after the warm-up; only six of the subjects did better times after the hard workout. There were three swimmers who did not show a significant difference between the two trials (less than 5 tenths of a second difference).

In comparing the second set of trials, the swimmers did considerably better after doing the warm-up swim. The mean time of the swims after the warm-up only was 65.8 seconds, compared to the mean time of the swims after the workout of 66.8 seconds. Individually, in the second set of time trials, twelve swimmers did better after the warm-up swim; only one swimmer did better after the workout. There were five swimmers who did not show a significant difference between the two trials.

In comparing both sets of trials, the swimmers did significantly better times after doing the warm-up only in 58 percent of the swims.

In 19 percent of the swims, the subjects did significantly better times after the workout. In 22 percent of the swims, there was no significant difference in the time trials.

In comparing the "A" level competitor to the "B" level competitor, there was very little difference on how they were affected by the workout. The "A" swimmers achieved their best time 56 percent of the time after the warm-up, compared to the "B" swimmers who achieved their best time after a warm-up 60 percent of the time. The female competitors had 56 percent of their best times after only doing a warm-up. The male athletes had 60 percent of their best times after doing the warm-up only.

In comparing the younger age group swimmers to the older age group swimmers, the older age group swimmers had 68 percent of their best times after they did only the warm-up. The middle-distance swimmers had 50 percent of their best times after the warm-up. The sprint swimmers produced 62.5 percent of their best times after doing the warm-up only.

A t-test for nonindependent samples was used to compare the means from the same group under two different experimental conditions. A t-ratio of 2.50 was computed for the difference of the two means. The 2.50 value was significant at the .05 level of probability.



TABLE I  
INDIVIDUAL RESULTS OF TIME TRIALS

Subject	Sex	Age	Level of Competition	Type of Swimmer	Time Trial No. 1 (Warm- up Only)	Time Trial No. 2 (Workout)	Time Trial No. 3 (Warm- up Only)	Time Trial No. 4 (Workout)
1	M	17	A	MD	54.8	54.1	52.5	52.8
2	F	14	A	MD	63.1	61.6	62.3	63.2
3	M	16	B	MD	62.8	61.5	59.7	61.6
4	M	14	A	MD	61.0	62.5	59.6	61.6
5	F	16	A	SP	60.7	61.9	60.5	61.4
6	M	14	A	MD	62.0	61.7	60.0	61.4
7	M	16	B	SP	63.8	65.5	63.0	64.2
8	M	16	B	SP	66.0	67.9	64.2	64.6
9	F	14	B	MD	67.8	67.7	66.4	67.2
10	F	14	B	SP	67.8	71.9	65.8	68.6
11	M	15	B	SP	79.0	80.3	75.9	76.6
12	F	12	B	SP	72.5	70.3	68.4	72.2
13	F	11	B	SP	77.4	75.9	73.5	71.0
14	F	12	A	SP	75.0	76.3	75.8	75.3
15	M	11	A	SP	64.5	63.4	62.8	64.8
16	F	12	B	SP	79.5	79.3	74.4	75.6
17	M	11	B	SP	78.0	78.6	74.3	74.7
18	M	12	A	SP	66.0	68.2	65.8	66.0
Mean					67.8	68.2	65.8	66.8

## Chapter V

### Summary and Conclusions

The purpose of this study was to determine the effect of a large amount of work on performance in a time trial the same day. The results indicated (significant at the .05 level) that a workout before a time trial has a detrimental effect on performance in the 100 yard freestyle. This indicates that coaches who give workouts on days of meets are sacrificing performance for conditioning in those meets.

Within the limitations imposed by the design of this study and the small number of subjects, the following conclusions were also drawn:

1. The "A" level competitor will be affected to the same extent as the "B" level competitor.
2. The female and the male athlete will be affected the same by a workout.
3. Younger age-group swimmers will be affected less than the older age group swimmers.
4. Middle-distance swimmers will perform better after a workout than sprint swimmers.

The researcher of this paper recommends that further investigation be done in this area to confirm or refute these conclusions. Also, further investigation will expand the scientific base which can be used to improve the sport of competitive swimming.

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