TRAINING TECHNIQUES FOR PEAK
PERFORMANCES IN SWIMMING

A thesis submitted in partial satisfaction of the
requirements for the degree of Master of Arts in
Physical Education

by

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June, 1974
The thesis of Joel Martin Barr is approved:

Committee Chairman

California State University, Northridge
May, 1974
DEDICATION

To Mr. Pete Accardy; coach, teacher, and good friend.
TABLE OF CONTENTS

Page

LIST OF TABLES ........................................ vii

ABSTRACT ........................................ viii

Chapter

I. INTRODUCTION .................................... 1
   Statement of the Problem .......................... 1
   Hypothesis ........................................ 1
   Assumptions ...................................... 2
   Delimitations .................................... 2
   Limitations ....................................... 2
   Importance of the Study ......................... 3
   Definition of Terms ................................

II. REVIEW OF THE RELATED LITERATURE ........... 6
   The Meaning and Purpose of Tapering and Peaking ................................ 6
   When Does the Peaking Period Occur .......... 8
   Psychological Aspects of the Peaking ........ 9
   What Is the Peaking Process .................... 10
   Summary .......................................... 12

III. PROCEDURES .................................... 14
   Development of the Questionnaire ............. 14
   Sampling Procedure .............................. 15
   The Packet ...................................... 16
   Treatment of the Data ........................... 16
   Analyzing the Data .............................. 16
   Summary .......................................... 16
## IV. PRESENTATION AND INTERPRETATION OF FINDINGS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response to Questionnaire</td>
<td>18</td>
</tr>
<tr>
<td>Section I--Personal Background Data</td>
<td>19</td>
</tr>
<tr>
<td>Section II--The Peaking Process</td>
<td>22</td>
</tr>
<tr>
<td>Section III--Psychological Considerations</td>
<td>32</td>
</tr>
<tr>
<td>Section IV--Direct Comments by the Respondents that are Unique to the Questions Provided in the Questionnaire</td>
<td>39</td>
</tr>
<tr>
<td>Summary</td>
<td>40</td>
</tr>
</tbody>
</table>

## V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUMMARY</td>
<td>41</td>
</tr>
<tr>
<td>Section I</td>
<td>43</td>
</tr>
<tr>
<td>Section II</td>
<td>44</td>
</tr>
<tr>
<td>Section III</td>
<td>45</td>
</tr>
<tr>
<td>Section IV</td>
<td>47</td>
</tr>
<tr>
<td>CONCLUSIONS</td>
<td>47</td>
</tr>
<tr>
<td>RECOMMENDATIONS</td>
<td>47</td>
</tr>
<tr>
<td>Survey Research Method</td>
<td>48</td>
</tr>
<tr>
<td>Recommendations for Future Research</td>
<td>48</td>
</tr>
</tbody>
</table>

## BIBLIOGRAPHY

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
</tr>
</tbody>
</table>

## APPENDICES

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. EXPLANATORY LETTER</td>
<td>52</td>
</tr>
<tr>
<td>B. QUESTIONNAIRE</td>
<td>53</td>
</tr>
<tr>
<td>C. RESPONSES TO QUESTION 17</td>
<td>51</td>
</tr>
</tbody>
</table>
# List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Years of Coaching Experience</td>
<td>19</td>
</tr>
<tr>
<td>2. The Peaking Period</td>
<td>22</td>
</tr>
<tr>
<td>3. Parameters Upon Which Coaches Base Their Tapering Process</td>
<td>23</td>
</tr>
<tr>
<td>4. Psychological and Physiological Contributions to a Peak Performance</td>
<td>33</td>
</tr>
<tr>
<td>5. Psychological and Physiological Benefits of Shaving</td>
<td>34</td>
</tr>
</tbody>
</table>
ABSTRACT

TRAINING TECHNIQUES FOR PEAK
PERFORMANCES IN SWIMMING

by

Joel Martin Barr

Master of Arts in Physical Education

June, 1974

This study was designed to determine the specific techniques utilized by "successful" swimming coaches to aid their swimmers in attaining peak performances in a championship meet.

The questions utilized in the questionnaire were the result of a review of the related literature, personal interviews with coaches, and the personal observations and concern of the investigator as a high school and college swimming coach.

A packet which included an explanatory letter, questionnaire, and a self-addressed, stamped envelope, was mailed to each of the top ten coaches in the College Division and the top ten coaches in the University Division of the National Collegiate Athletic Association. Sixteen of the twenty-one (one extra due to a tie for 10th place)
in the University Division) coaches contacted returned the questionnaire for a 76.1 percent return.

Each response was tabulated and identified with one of four sections of concern. The four sections were: (1) personal background data of the coaches; (2) the peaking process; (3) psychological considerations; and (4) direct comments by the respondents that are unique to the questions provided by the questionnaire. Examination of the data suggested that the majority of respondents used general and individualized training techniques to prepare their swimmers for a peak performance.

Based on the findings of this study it was concluded that although there was general agreement as to central tendencies in coaching techniques, there was a wide diversity in specific training techniques utilized by "successful" swimming coaches to aid their swimmers in attaining peak performances in a championship meet.
CHAPTER I

INTRODUCTION

An understanding of the training techniques involved in attaining a peak or maximum performance in competitive swimming is important to a swimming coach. It was the belief of the investigator, that if the various techniques of "successful" swimming coaches were synthesized, the information obtained would serve a useful purpose in helping all swimming coaches to improve their training programs.

Statement of the Problem

The problem for this study was to determine the specific techniques utilized by "successful" swimming coaches to aid their swimmers in attaining peak performances in a championship meet.

Hypothesis

This study was designed to test the following hypothesis: that there is a diversity in training techniques utilized by "successful" swimming coaches in preparing their swimmers for a peak performance.
Assumptions

To conduct the study it was necessary to make the following assumptions: (1) that all respondents to the survey answered each question candidly; (2) that the respondents are aware of their own peaking techniques; (3) that the questions used provided enough information to properly evaluate peaking techniques; and (4) that the data from the responding coaches would provide an insight into training techniques for peak performances.

Delimitations

This study was concerned only with the training techniques used to obtain a peak performance in a championship swimming meet.

A select group of the top ten coaches in the College Division, and the top ten coaches in the University Division of the National Collegiate Athletic Association's 1974 Championship Meets were chosen.

Limitations

The limitations of this study were as follows: (1) the validity of the "questionnaire" survey used as a research instrument; (2) the limited number and simplification of the questions asked in order to facilitate a greater response from those coaches surveyed; (3) the human factor in the interpretation of questions and responses by the investigator may have produced a bias; (4) the "success" of
a coach may not have been dependent upon his knowledge of peaking techniques; and (5) extraneous variables may have affected the coaches responses to the questionnaire.

**Importance of the Study**

The importance of this study was indicated by the apparent lack of information concerning specific techniques involved in preparation for peak performances in swimming.

The investigator believed that the results of this study would give swimming coaches additional information needed to prepare their swimmers, and would increase the probability of attainment of a peak performance in a championship meet.

The information synthesized in this study would provide for the development of a meaningful and productive experience for both coaches and swimmers.

This study was designed as an exploratory endeavor which could be used as a guide for future investigations.

**Definition of Terms**

For the purpose of this study, the terms listed below were defined as follows:

- **Distance Swimmers**—swimmers who swim events over 200 yards.
- **Drop**—an improvement in the time a swimmer performs his event.
Freestyle--a crawl stroke in which the swimmer is in the prone position in the water, using alternate overarm movements.

Individual Medley--an event or relay swim that necessitates the following four strokes: backstroke, breaststroke, butterfly stroke, and freestyle (which can be the crawl or any other legal stroke).

Interval Training--a method of training that consists of swimming a series of repeat swims at selected distances with a controlled amount of rest between efforts.

National Collegiate Athletic Association (N.C.A.A.) Championship Meets--the two final N.C.A.A. meets of the swimming season which are used to decide the top teams and top swimmers and divers in the College and University Divisions (each division holds its own separate meet, although some College Division swimmers qualify and compete at the University Division meet).

Peak Performance--a performance that results in a reduction in a swimmer's best previous time that season.

Repeat Swims--a series of repetitions of a selected number of yards utilized as a training technique.

Sprinters--freestyle swimmers who swim events from 50 through 200 yards.

Stroke Specialists--swimmers who swim events other than crawl (freestyle). This includes backstroke, breaststroke, and butterfly stroke.
"Successful" Coach--a coach whose swimmers place in the top ten of the College Division or the University Division N.C.A.A. Championship Meets.

Taper--"The period of training in which the body is allowed to recover all its strength after months of hard work and the mind is refreshed and directed solely towards the big swim." (10:82).
CHAPTER II

REVIEW OF THE RELATED LITERATURE

The purpose of this study was to determine the specific techniques utilized by "successful" swimming coaches to aid their swimmers in attaining peak performances in a championship meet. This chapter was concerned with the related literature in the area of peak performances in swimming.

The review of literature was divided into four major area: (1) the meaning and purpose of tapering and peaking; (2) when the peaking period occurs; (3) psychological aspects of peaking; and (4) what is the peaking process.

The Meaning and Purpose of Tapering and Peaking

The meaning and purpose of the tapering and peaking process was presented in the literature by various coaches.

Five general purposes of the tapering period were illustrated by Dr. Councilman (3:264) of Indiana University:

1. To permit the swimmer to be completely rested for the big meets.
2. To sharpen up on stroke mechanics, starts, and turns.
3. To work on pace and speed.
4. To do enough training so as not to lose any conditioning gained in the previous phase.
5. To prepare the swimmers psychologically for the big competition.

Rick Rowland (9:27) of the University of California, Santa Barbara made the following comments:

peaking is a term used by swimmers and coaches to refer to the process of getting swimmers ready, prepared, rested, tapered, or pointed for the "Big" effort of the swim season. The swimmer is given maximum physical and psychological preparation during a given period so that he may hit his best possible time of the season in a specific meet or meets. (9:6).

The meaning of the tapering period is given by Still in his book:

Reaching a peak is closely associated with what is commonly known as tapering. "Taper"--is the period in which the body is allowed to recover all its strength after months of hard work, and the mind is refreshed and directed solely towards the big swim. (10:82).

Armbruster (2:222) stated that when the peaking period arrives, the swimmer is ready for specialized training at his particular race. He explained that by weeks of continued training throughout the season the relaxation, efficiency, pace, and timing of the swimmer have been improved. At the peaking period, the swimmer should experience sensations of power, speed, relative freedom from fatigue, and an effortlessness in breathing.

A unique aspect of swimming that sets it apart from other sports is the act of shaving the body when competing in a championship meet. Gambril (5:69) a former California State University, Long Beach coach stated that shaving must be considered a big part of peaking, and should not be
discounted by coaches or swimmers. He discovered that a swimmer could improve his time by up to one second per hundred yards swum.

When Does the Peaking Period Occur

Investigation of the literature suggested that there were various hypotheses on timing for the peaking period. Tapering can take anywhere from ten days to two weeks, according to Gambril. (5:68). He stated that the time period was based upon individual differences among his swimmers. The more mileage a swimmer has behind him, the less actual rest he will probably need. The ten days to two weeks refers to the time before the championship meet.

Armbruster (2:222) stated that the peaking period begins two weeks before the championship meet.

The idea was expressed by Still (10:82-5), that the amount of time given to the taper varies from about one to three weeks. This was dependent upon the individual swimmer's past experimentation in peaking. He stated that any swimmer who had worked conscientiously should taper for at least two weeks. If, however, a swimmer has missed many training sessions and has not done the work that should have been done, then a taper of two to three days should be enough. This theory contradicts Mr. Gambril.

Dr. Counsilman (3:271) indicated that a taper of ten days to two weeks is the proper tapering period. He
illustrated that the tapering schedule of some Olympic champions, who were coached by various coaches varied in time from seven days to three weeks, according to the individual swimmer's needs.

The difference between the tapering for distance men, individual medley swimmers, and sprinters has been mentioned by Rowland (9:6), but he did not specify what those differences were. However, Still (10:82-5) gave a general rule that could be utilized. He stated that sprinters, although they will not have done the volume of work of a distance swimmer, need a longer taper, because they are normally high strung individuals, who need to be as "sharp as a pin" to produce the best performances.

Psychological Aspects of Peaking

This research was concerned with the physical training techniques involved in swimming. However, the importance of psychological aspects of the peaking process cannot be overlooked. Still (10:82-5) believes that "all of the swimmer's training, thoughts, and aims should be directed toward his event." He states that "it is a valuable incentive for the swimmer to set himself a particular time for his event which he feels sure, if attained, will realize his particular aim."

"Rest, confidence, and a good mental attitude," according to Gambril (5:68-9), "are big components of peaking upon which the swimmer must use, and upon which
the coach must rely." He stated that the coach must work positively with his swimmers, and that they must believe that they are going to do well. He emphasized the psychological lift that the shaving aspect has on the peak performance.

In a book on psychological concepts, Frost (4:219-20) stated that the peak performance is the essential combination of both physical and mental preparation. He summed up his ideas in the following words: The peak performance is

the product of the right combination of a number of things: careful planning, superb physical conditioning, genuine motivation, perfection of techniques, knowledge of tactics and strategy, high morale, mental preparation, belief in the worthiness of the effort, a sharing of enthusiasm, concentration on the accomplishment of the task at hand, and confidence that with the supreme effort it can be done, all combine to call out the full resources of the swimmer and to produce a performance or performances that approach the limits of the swimmers real potential.

Counsilman (3:275) stated that "one of the main concerns during the tapering period is to prepare the swimmers psychologically, and to give them enough rest." He states that swimmers who are prepared physically but not psychologically will not perform up to their maximum potential.

What Is the Peaking Process

Dr. Counsilman (3:264-5) illustrated a general plan of changing the normal training routine to tapering:
1. To reduce the total distance from that swum during the previous phase and to do fewer repeat swims.

2. To decrease the relative amount of kicking and pulling.

3. To increase the interval or rest between repeat swims and to increase the speed of the repeats.

Counselman advocated a "variable taper." This involves an alternation between hard days, moderate days, and easy days. This method will accomplish the following: hard days will maintain conditioning, easy days will permit rest, and moderate days will provide some conditioning and rest.

Rowland (9:27) stated that there are many ways to peak a swimmer, and that there is no single way that is best. He stated that the individual differences between the swimmers should dictate the process utilized by the coach.

Gambril (5:68-9) stated that there is no exact way to taper. He indicated that he has never tapered two years in exactly the same way, nor have his work-outs been the same. He believes in tapering according to individual needs. As a general procedure, he usually trained the middle distance swimmers on short rest work, with a much lighter than usual overall work load. The stroke specialists and sprinters usually repeated broken swims (for example taking a 400 yard swim and making the swimmers swim, for instance four 100's, or a 200 and two 100's,
et cetera, on specific times), trying to record fast times with easy efforts. He indicated that he has had good success by resting swimmers up to the point where one might think they would lose conditioning. Mr. Gambril stated that some swimmers swim in an unbelievably bad manner the last few days of tapering, but the coach should not panic, but let the swimmers rest.

In order to approximate the work which will have to be done at the championship meet, Armbruster (2:222) gave his swimmers time trials of their individual events. These were repeated a number of times so that the swimmer will realize what demands may be made of him during his race.

Summary

This chapter reviewed the related literature directly pertaining to the area of peak performances in swimming. The review of literature was divided into broad categories that covered the following:

(1) The meaning and purpose of tapering and peaking. This section identified various general characteristics associated with the peaking and tapering processes, which aided in the understanding of their purpose and importance.

(2) When does the peaking period occur. This literature indicated various times when individual coaches began their tapering periods. There was no specific agreement as to when the process should begin.
(3) Psychological aspects of peaking. It was indicated that a combination of psychological and physical preparation was needed in the attainment of a peak performance.

(4) What is the peaking process. Various coaches described their peaking processes. It was indicated that there was no agreement as to one specific method.
CHAPTER III

PROCEDURES

The purpose of this investigation was to determine the specific techniques utilized by "successful" swimming coaches to aid their swimmers in attaining peak performances in a championship meet. This chapter presents the procedures utilized in the construction of the questionnaire and the process involved in conducting the study. The areas of investigation were: (1) development of the questionnaire; (2) the sampling process, the packet, treatment of the data; and (3) the method for analyzing the data.

Development of the Questionnaire

The selection of the techniques to be examined in the study were determined from the review of the related literature, personal interviews with coaches, and the personal observations and concern of the investigator as a high school and college swimming coach.

After the initial questions to be used in the questionnaire were formulated, they were sent to a panel of judges for critical evaluation. The panel was composed of members of the faculty at California State University, Northridge chosen either for their knowledge of competitive
swimming or their knowledge in compiling a questionnaire of the type that was to be utilized in this investigation.

The revised questionnaire, resulting from comments and suggestions from the panel of judges, was presented to a group of professors and graduate students in a colloquium at California State University, Northridge. The comments resulting from this meeting were also utilized in the refinement of the instrument.

In order to gain the maximum amount of information from the respondents, the survey questionnaire was divided into four sections. Section I dealt with the coaches' personal background data. Section II was designed to determine when the individual coaches started their peaking period, and what techniques they utilized. Section III investigated the psychological considerations associated with the peaking process, including the aspect of shaving. Section IV provided space for the respondent to comment directly about his techniques that were unique to the questions provided in the questionnaire.

Sampling Procedure

The top ten schools from the National Collegiate Athletic Association College Division, and the top ten schools from the University Division were selected by their standings in the 1974 National Championships. Twenty-one coaches were selected due to a tie for tenth place in the university division. Each coach was mailed a packet
containing a letter of introduction, a questionnaire, and a self-addressed, stamped envelope. (Appendices A and B.)

The Packet

The packet included the letter of introduction, the questionnaire, and the self-addressed stamped envelope. These items were included to ensure a clear understanding of the importance of the study and to facilitate the return of the questionnaire.

Treatment of the Data

The information received from each of the coaches was recorded on large score cards designed to tabulate all returns and explanations as they were gathered. The data received in this study were presented in a variety of ways due to the open ended nature of many questions. When possible, the data were presented in the form of frequency of response, percentages, means, and comparison of coaches' answers.

Analyzing the Data

A sixty percent return of the questionnaires was needed in order to indicate an acceptable return to provide a basis for valid conclusions and recommendations.

Summary

This chapter has presented the following procedures necessary to conduct the study: (1) the design and content
of the instrument required to gather information for this study, (2) an overview of the procedures utilized in the selection and refinement of the questionnaire, (3) the methods used for the selection of the subjects to be used in the study, (4) the distribution and the collection of the questionnaire, and finally (5) the presentation of the data and the procedures used to analyze the data.
CHAPTER IV

PRESENTATION AND INTERPRETATION

OF FINDINGS

The purpose of this study was to determine the specific techniques utilized by "successful" swimming coaches to aid their swimmers in attaining performances in a championship meet. This chapter presents, discusses and interprets the findings of this study.

Response to Questionnaire

On May 1, 1974, the collection of data was terminated. Of the twenty-one questionnaires that were distributed, sixteen responded. This yielded a 76.1 percent return which exceeded the pre set sixty percent level determining an acceptable return, as indicated in Chapter III.

Because some of the respondents failed to complete all of the questions, the percentages and numbers used were based upon the number of respondents answering each question. Due to the open ended nature of many questions, the method of analysis of responses varied from question to question. The section on the survey questionnaire in Chapter III explained the grouping of the questions into four parts. This format was used in the presentation and discussion of the findings of this study.
Section I--Personal Background Data

Question 1. How long have you been coaching? How long at the college or university level?

Total number of responses: 16

TABLE 1
YEARS OF COACHING EXPERIENCE

<table>
<thead>
<tr>
<th>Intervals of Years</th>
<th>General Coaching</th>
<th>College or Univ. Coaching</th>
</tr>
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<tbody>
<tr>
<td>0 - 5</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>6 - 10</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>11 - 15</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>16 - 20</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>21 - 25</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>26 - 30</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

N = 16

Discussion. The purpose of this question was to determine the amount of general coaching and the amount of college or university coaching experience the respondents had in the field of swimming.

The investigator felt that it was important to know how much experience each coach has had.

Table 1 shows the breakdown of years of general coaching and the years of college or university coaching.
The mean number of the years of general coaching was 16.3 years and the mean number of years of college or university coaching was 10.4 years. The mean of the combined total of all coaching experience was 13.4 years.

Question 2. Do you train your swimmers for a peak performance at a Championship (Conference and/or National) Meet? Yes, No, or Other (Please explain).

Total number of responses: 16.
Responses: Yes . . . . . 15 (94%)
            No . . . . . 0 (0%)
            Other . . . . 1 (6%)

Discussion. The purpose of this question was to determine if the respondents train their swimmers with the intent of having them attain a peak performance at a championship meet.

Fifteen coaches (94%) indicated that they do train their swimmers for a peak performance. One (6%) response indicated that this varies depending upon the ability of the team. This data tended to indicate that successful coaches include training for a peak performance as a part of a swimming training program.

Question 3. How would you evaluate your peaking process throughout the years? Highly Successful, Successful, Moderately Successful, or Unsuccessful.
Discussion. The purpose of this question was to determine by self-evaluation, how successful the respondents felt that their process of peaking swimmers had been throughout their coaching careers.

The results revealed that nine (56%) coaches indicated that their methods have been highly successful, and the remaining seven (44%) indicated that their methods have been successful. When tabulated as a unit, 100 percent of the coaches have had either successful or highly successful results from their peaking processes.

Summary. Questions one, two, and three indicated that the mean of overall coaching experience was 13.4 years, that 94 percent of the coaches train their swimmers for a peak performance at a championship meet, and that 100 percent of the coaches have had "successful" or "highly successful" (as defined by themselves) results from their peaking processes throughout their careers.
Section II--The Peaking Process

Question 4. How far in advance of the Championship Meet do you start to prepare for a peak performance as a team?

Total number of responses: 14
Total number of responses giving specific time: 13

TABLE 2
THE PEAKING PERIOD

<table>
<thead>
<tr>
<th>Number of Respondents</th>
<th>Time Peaking Period Begins Before the Championship Meet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 1/2 week</td>
</tr>
<tr>
<td>1</td>
<td>10 - 14 days</td>
</tr>
<tr>
<td>1</td>
<td>12 - 14 days</td>
</tr>
<tr>
<td>1</td>
<td>2 - 2 1/2 weeks</td>
</tr>
<tr>
<td>2</td>
<td>2 1/2 weeks</td>
</tr>
<tr>
<td>1</td>
<td>2 - 3 weeks</td>
</tr>
<tr>
<td>5</td>
<td>3 weeks</td>
</tr>
<tr>
<td>1</td>
<td>3 - 4 weeks</td>
</tr>
</tbody>
</table>

Discussion. The purpose of this question was to determine if there was one particular period of time that was most favorable to begin the peaking process. The review of literature indicated that there was no specific period of time, and that most coaches acted according to their own needs.
This investigation gives further indication that there is no one exact period of time that is best. However, Table 2 indicates that 76 percent of those responding began their peaking process between two to four weeks prior to the championship meet.

Question 5. Do you taper your team according to: stroke, distance, individual, or other?

Total number of responses: 16

TABLE 3
PARAMETERS UPON WHICH COACHES BASE THEIR TAPERING PROCESS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>No. of Coaches</th>
<th>Percentage of Coaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
<td>1</td>
<td>6%</td>
</tr>
<tr>
<td>Distance</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Individual</td>
<td>5</td>
<td>31%</td>
</tr>
<tr>
<td>All</td>
<td>10</td>
<td>63%</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

N = 16

Discussion. The purpose of this question was to determine if there was one particular parameter that the coach keyed on to carry out the tapering process.

The results indicated, as can be seen in Table 3, that ten (63%) of the coaches consider all of the
parameters, and five (31%) consider the individual swimmer as a basis for training.

These percentages indicate a need to take all of the parameters into consideration when tapering a team. When each parameter was analyzed by percentages, it became apparent that it is the individual swimmer that must be considered in the tapering process. Each swimmer specializes in a specific stroke, and distance, therefore it appeared that he should be tapered according to his particular needs.

**Question 6.** When tapering, do you increase the time spent on stroke mechanics, starts, and turns, over time spent during the regular dual meet season? Yes, No, or Other (Please explain).

Total number of responses: 16

Responses: Yes . . . . 15 (94%)

No . . . . 1 (6%)

Other . . . . 0 (0%)

**Discussion.** The purpose of this question was to determine if the coaches changed their emphasis during the tapering period from regular dual meet season training to workouts designed to improve all around techniques.

The results indicated that fifteen (94%) of the respondents changed their training techniques to improve the probability of attaining a peak performance.
Question 7. When preparing for a Championship Meet, do you encourage your swimmers to repeat at: 100% effort, 75% effort, 50% effort, or Other (Please Explain).

Total number of responses: 15

Responses: 100% . . . .  3 (20%)
          75% . . . .  1 (7%)
          50% . . . .  1 (7%)
          Other . . .  4 (26%)
          All . . . .  6 (40%)

The responses were varied, therefore a presentation of the separate answers was necessary.

Responses regarding the 100% effort were as follows: two of the respondents indicated 100% without remarks; one with the notation, "If possible."

Responses regarding 75% and 50% effort were without remarks.

Responses regarding "Other" were as follows: two of the respondents indicated 90%; the other two comments were:

We try to swim fast but relaxed, with very few 100% efforts, then only on 25's.

Swim loose and fast on any timed series. No all out sprints, except for a few 25's that are a fine edge from 100%.

Responses regarding "All" were the most numerous. Each response was reported separately:

100% effort on pace and broken swims; 75% on endurance work.
100% effort early in taper; 75% later on concentrating on form; and 50% the last few days, concentrating on form.

100% effort for 15% of the time; 75% effort for 25% of the time; and 50% effort for 60% of the time.

Some of each.

We do some work at all percentages.

Discussion. The purpose of this question was to determine the degree of effort at which swimmers are asked to train during the peaking process.

The review of literature yielded only vague generalizations as to the amount of effort desired on repeats during the tapering period. The responses to this question indicated that there is no one particular degree of effort that is recommended during this period. As in many of the previous questions, the individuality of coaching techniques is revealed by the varied responses. This gave added emphasis to the indication that a coach would have trained his swimmers according to what has worked best for his team, and not train by following a standardized method of training.

Question 8. When preparing for a Championship Meet, do you drop the yardage swum each week? Yes or No. If the answer is yes, by what percentage do you drop the yardage?
Total number of responses: 16

Responses: Yes . . . . . 14 (88%)
            No . . . . . 1 (6%)
            Other . . . . 1 (6%)

The results indicated that fourteen (88%) of the coaches do drop the yardage swum each week during tapering. The "Other" answer stated that the coach determined if there is to be a drop or not by the needs of each individual swimmer.

The responses to the second section of the question varied greatly. One made no comment; the other responses were as follows:

- 10% to 20% but not every day, it varies from day to day.
- 15% to 20% a week for 3 weeks
- 20%
- 20% to 80%
- 25% the 1st week; 25% for the next 4 days; 25% for the last 3 to 5 days.
- 25% to 30%
- 30%
- 30%
- 33%--3 weeks before the meet; another 33%--2 weeks before.
- 40%
- Varies depending upon the week, individual, et cetera.
- No exact amount, depends upon performance.
From 10,000 to 12,000 yards down to 4,000 yards over a 2 1/2 week period.

Gradual drop from 9,000 to 2,000 yards 12 to 14 days before the meet.

Discussion. The purpose of this question was to determine if the coaches decrease the amount of yardage swum as a training technique during tapering; and if so, by what percentage did they drop the yardage per week.

The responses indicated that there were numerous theories on the decreasing of yardage swum during tapering. The one singular overall agreement that was indicated was that fourteen (88%) coaches did drop the yardage swum. The varied answers as to the percentage of yardage dropped gave further indication that coaching techniques relating to the peaking process were greatly varied and quite individualized from coach to coach.

Question 13. Do you attempt to peak your swimmers more than once a season? If yes, how many times can your swimmers successfully peak during the season? Two times, three times, Other.

Total number of responses: 16
Responses: Yes . . . . . 4 (25%)
No . . . . . 12 (75%)

The responses to the second part of the question were varied. Comments to the four yes answers included: three who indicated three shaves without comment; and
"2 or 3, we had some swim well at conference; better at N.C.A.A.; and better still at A.A.U. [Amateur Athletic Union]." There were three comments to no answers, which were:

Although they only peak once swimmers can hold the same times from one championship meet to the other, provided they are close enough together. Thus a peak for the first meet will yield only slightly better times than the second peak does a week or so later.

Swimmers can peak successfully more than once although my team doesn't do it.

As many times as they can do it psychologically.

**Discussion.** The purpose of this question was to determine how many times per season, the coaches attempted to peak their swimmers, and how many times per season a swimmer could successfully peak.

Twelve (75%) coaches stated that they did not attempt to peak their swimmers more than once during a season. The responses to the second part of the question again indicated the individual preferences of the coaches, which indicated no specific agreement as to how many times swimmers can successfully peak per season.

**Question 15.** When tapering, in preparation for a peak performance, do you increase rest? Yes or no; Swim fewer repeats? Yes or no. If not would you briefly explain your tapering procedures?
Total number of responses: 16
Responses to increase rest: Yes . . . 15 (94%)
No . . . 1 (6%)
Responses to fewer repeats: Yes . . . 16 (100%)

Discussion. The purpose of this question was to determine if coaches increased rest, and gave the swimmers fewer repeats to swim during the tapering period.

The responses indicated that fifteen (94%) coaches do increase rest, and sixteen (100%) indicated that they do have their swimmers swim fewer repeats. The one coach who gave a negative response stated that he utilized both sprinting and some regular repeat swims.

This data corresponded with the information found in the review of literature.

Question 16. Over the years that you have coached, have you found that peak performances in successive years by the same individual swimmers are more readily attained by using the same techniques, or has it been more successful to alter them?

Total number of responses: 16
Responses: Same . . . . 10 (63%)
Alter . . . . 4 (25%)
Other . . . . 2 (12%)
Comments to the questions were as follows:

Whatever works best for the individual.

Each year is different--a little bit.

Comments from the respondents indicating "Other" were as follows:

We make slight adjustments based upon our knowledge and their input.

I do not record tapering because I change workouts due to the way the swimmers feel each day. It is too tempting to do the exact same thing you did the year before just because it worked well. The swimmers are different and the workouts are different so I feel the taper has to be an individual thing.

Discussion. The purpose of this question was to determine if coaches utilized the same techniques year after year for the same swimmer, or did they alter their techniques. The investigator was interested in determining if a swimmer could be trained in the same manner every year and reach a peak performance with those techniques.

Ten (63%) coaches indicated that they did utilize the same techniques. Four (25%) altered their techniques, and two (12%) utilized other or varied techniques according to their individual needs.

Summary. Questions four, five, six, seven, eight, thirteen, fifteen, and sixteen indicated that there was no one time agreed upon concerning when the peaking process began. However, 76 percent of the coaches began this period two to four weeks prior to the championship meet.
This data also suggested that three parameters should have been taken into account during the tapering period. The parameters were: the stroke swum; the distance swum; and most of all the individual swimmer. There was no agreement among coaches as to a specific degree of effort that should have been assigned to the swimmers on repeat swims during this period. Seventy-five percent of the coaches did not attempt more than one peak performance for their swimmers per season. Ninety-four percent of the respondents indicated that they increased the amount of rest during tapering; and one hundred percent had their swimmers swim fewer repeats while tapering. It was indicated that sixty-three percent of the coaches have utilized the same peaking techniques on the same swimmers in successive years.

Although generalized techniques were agreed upon, there were no specific techniques that were indicated.

Section III--Psychological Considerations

Question 9. To what degree do you feel the follow-parameters contribute to a successful peak performance? Psychological and physiological.

Total number of responses: 15
TABLE 4

PSYCHOLOGICAL AND PHYSIOLOGICAL CONTRIBUTIONS TO A PEAK PERFORMANCE

<table>
<thead>
<tr>
<th>Number of Responses</th>
<th>Percentage: Psychological</th>
<th>Percentage: Physiological</th>
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<tr>
<td>1</td>
<td>100%</td>
<td>0%</td>
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</tr>
<tr>
<td>1</td>
<td>25</td>
<td>75</td>
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</table>

N = 15

Discussion. The purpose of this question was to determine to what degree successful coaches believed psychological and/or physiological parameters contribute to a peak performance.

The responses indicate that six (40%) coaches indicated that the peak performance is fifty percent psychological and fifty percent physiological. Four (27%) coaches indicated that psychological parameters outweighed
physiological parameters, and five (33%) stated that physiological parameters outweighed the psychological parameters.

The data as shown in Table 4 indicated that varied opinions existed as to what are the controlling parameters which yield a peak performance. The way a coach feels about the relative degree of either parameter could have a direct bearing upon how he trains his swimmers during the peaking process.

**Question 10.** To what degree do you feel that shaving aids the swimmer psychologically and or physiologically?

Total number of responses: 15

**TABLE 5**

<table>
<thead>
<tr>
<th>Number of Responses</th>
<th>Percentage: Psychological</th>
<th>Percentage: Physiological</th>
</tr>
</thead>
<tbody>
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<tr>
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<td>20</td>
<td>80</td>
</tr>
</tbody>
</table>

\[N = 15\]
Discussion. The purpose of this question was to determine to what degree the swimmer benefits psychologically and/or physiologically from shaving his body.

The responses in Table 5 indicate that eight (53%) coaches felt that the result of shaving is fifty percent psychological and fifty percent physiological. Six (40%) coaches felt that the result is more psychological than physiological, and only one coach (7%) felt that it is more physiological than psychological.

**Question 11.** In your experience, on what shave do swimmers take the largest drop? On the 1st, 2nd, or 3rd shave of the season, or other.

Total number of responses: 16
Responses to 1st shave: 16 (100%)

Discussion. The purpose of this question was to determine on what shave do swimmers take the largest drop in time.

One hundred percent of the coaches indicated that the first shave is the best shave. Three coaches specified that their swimmers only shave once per season.

The data corresponded with the literature which usually mentioned only one shave per season.

**Question 12.** If you desire to do so, how much time prior to the Championship Meet do you feel a swimmer can shave for a regular season dual meet, and then reshave
in order to have a peak performance in the Championship Meet?

Total number of responses: 15

The responses to the question varied greatly. One made no comment. The responses are:

3-4 weeks
4-6 weeks
6 weeks
Difficult to determine. We haven't tried it. I'd say for peak results on an entire team--approximately 6 weeks minimum.
8-10 weeks
8-10 weeks
2 months
At least 3 months

We don't believe in 2 shaves, but we have used a 4 to 5 week early shave.

We would not shave for a meet. If necessary we will shave for a conference to make the standard, we don't feel successive shaving is practical or conducive to optimum championship meet performance.

As many times as the swimmer believes he can, since it is psychological.

Depends upon the individual, some don't swim well on the 1st shave but do well in 2 weeks--others don't feel the 2nd shave and lose the backside of their races.

Don't know.

Don't desire to do this.
Discussion. The purpose of this question was to determine if coaches have their swimmers shave during the regular season, and then later reshave for the championship meet and attain a peak performance.

The responses varied from three weeks to three months with many diversified ideas in between these periods of time.

The results indicated another area of vast disagreement among coaches. Although nine (60%) coaches indicated that more than one shave is possible, there is a general lack of a specific agreement in this area of concern.

Question 14. Do you prepare your swimmers psychologically for a peak performance at a Championship Meet? If yes, what do you do to prepare them?

Total number of responses:
Responses: Yes . . . . 16 (100%)

The responses to this question were varied, but they indicated three areas of interest: (1) planning; (2) pep talks; and (3) self confidence. Some of the responses overlapped into more than one area.

Responses in the "planning" area were as follows:

Early in the season, team and individual goals are set. Training and communication throughout the season are directed towards individual goals. Team goals are set early and emphasized as the championships approach. Team effort and psychology are extremely important to peak performance at the collegiate level.
Acquaint the swimmers with all situations they are likely to encounter.

We cover knowledge of opposition, building confidence, and the importance of performance to team success.

Reduce yardage, raise spirit, talk with them.

The entire season, propaganda wise, is pointed at the big meet.

We look, and talk ahead.

Responses in the "pep talk" area were:

Pride talks, confidence talks, spirit talks.

Pep talks.

Talk, go over old results.

Discuss race, pace, feel for the water

Hold team meetings, and one on one meetings

Responses to "self confidence" were:

We have 'I believe day.' We hand out team T-shirts with slogans on the back. We have meetings, listen to motivational talks, different swimmers tell what they do to get ready. We review past great performances, talk of opponents, everything positive, general peer pressure type motivation.

Swimmers must believe that if they have worked hard, when they rest, they will go fast.

Do a great deal of encouraging to build self-confidence, stress self-confidence.

Discussion. The purpose of this question was to determine if coaches prepared their swimmers psychologically for a peak performance, and if they did how was it accomplished.
The results indicated a one hundred percent affirmative response. The coaches emphasized three main areas: (1) planning; (2) pep talks; and (3) self confidence. These areas combined formed the basic indications of how coaches attempted to aid their swimmers psychologically. It was indicated that psychological preparation was a very personal (coach to swimmer; and swimmer to coach) experience.

Summary. Questions nine, ten, eleven, twelve, and fourteen indicate that although it was generally known that the psychological aspect of swimming is recognized as important, there were varied specific theories that were expounded upon by the respondents. The coaches indicated a belief in shaving as a method of reaching a peak performance, and that a swimmer could shave more than once a season and still achieve a peak performance in a Championship Meet.

Section IV--Direct Comments by the Respondents that are Unique to the Questions Provided in the Questionnaire

Question 17. Do you have anything to add to this survey that may aid the investigator in identifying peaking techniques and/or philosophy?
Total number of responses: 2

Due to an insufficient number of responses, no conclusions could be drawn from this question. The responses to this question were presented in Appendix C.

Summary

This chapter has presented and discussed the data collected. The first section dealt with the coaches' personal background data; the second section determined when the coaches started their peaking period and what techniques they utilized; the third section involved the psychological considerations associated with the peaking process, including the aspect of shaving; and the fourth and final section provided space for the respondent to comment directly about his techniques that were unique to the questions provided in the questionnaire.
CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Due to the apparent lack of knowledge in the area of competitive swimming techniques, this study was designed to determine the specific techniques utilized by "successful" swimming coaches to aid their swimmers in attaining peak performances in a championship meet.

This chapter summarizes the study, presents the conclusions which the findings indicate, and offers recommendations for further study.

SUMMARY

In order for a coach to qualify as a subject in this study, his team had to be among the top ten finalists in the 1974 College Division, or among the top ten in the University Division of the National Collegiate Athletic Association's annual championship meets.

A total of twenty-one (one extra due to a tie for tenth place in the University Division) coaches were mailed a questionnaire on April 19, 1974.

The questions utilized in the questionnaire were the result of a review of the related literature, personal
interviews with coaches, and personal observation and concern as a high school and college coach. The questionnaire was refined by a panel of judges for critical comments and suggestions. Comments resulting from a colloquium presentation at California State University, Northridge were also utilized in the refinement of the instrument.

The questionnaire was devised to answer questions in four basic areas of interest. The first section dealt with personal background data. The second section determined when the individual coaches started their peaking period and what techniques they utilized. The third section involved the psychological considerations associated with the peaking process, including the aspect of shaving. The fourth and final section provided space for the respondent to comment directly toward his techniques that were unique to the questions provided in the questionnaire.

Each prospective respondent was mailed a packet containing a letter of introduction describing the purpose of the study, a questionnaire, and a self-addressed, stamped envelope for returning the questionnaire. The survey procedures resulted in a 76.1 percent return of the twenty-one possible responses, which exceeded the preset sixty percent level determining an acceptable return, as indicated in Chapter III.

The information received on the returned questionnaires was recorded on large score cards designed to
tabulate all returns as they were gathered. The data received was presented in a number of ways due to the open-ended nature of many questions. The analysis consisted of the following information: the frequency of responses, mean numbers of responses, percentages of responses, and a comparison of coaches' answers.

Based on the responses received and within the limitations of the study, a summary of the major findings within each section of the questionnaire is presented below.

Section I--Personal Background Data

(1) The mean of the years of general coaching of the respondents was 16.3 years.

(2) The mean of the years of college or university coaching was 10.4 years.

(3) The mean of the sum total of combined coaching experience was 13.4 years.

(4) A very high percentage (94%) of coaches indicated that they do train their swimmers with the intention of them attaining a peak performance in a championship meet.

(5) One hundred percent of the coaches evaluated their peaking process throughout the years as being successful or highly successful.
Section II--The Peaking Period

(1) The results of this study indicated that there was no agreement upon the exact period of time that is best for the peaking period to begin. However, seventy-six percent of those responding indicated that the process should begin between two to four weeks prior to the championship meet.

(2) Of the responding coaches, sixty-three percent indicated that they taper their teams according to the stroke, the distance, and to the individual. Thirty-one percent indicated that the individual is the major controlling factor in determining the tapering process.

(3) A very high percentage (94%) of those responding change their training emphasis from dual meet season yardage workouts to tapering workouts with an emphasis on stroke mechanics, starts, and turns.

(4) There was no agreement among the coaches as to the degree of effort that coaches should assign their swimmers to exert on repeat swims during the tapering period. The answers revealed a wide diversity of opinions and indicated individualized preferences.

(5) When preparing for a championship meet, eighty-eight percent of the coaches drop the yardage swum each week. There was no agreement upon an exact amount of yardage that should be dropped to attain a peak performance. The answers were again quite varied.
(6) Seventy-five percent of the respondents did not attempt to peak their swimmers more than once during the season. The twenty-five percent of the coaches who did attempt more than one peak per season did not agree upon the amount of times that swimmers can successfully peak. Answers varied from two peaks to as many peaks as the swimmer can handle psychologically. The individual coaches' preferences indicated that peaking should be an individual matter.

(7) During the tapering period, ninety-four percent of the respondents increase the amount of rest given their swimmers during workouts. However, no specific amount of rest was indicated.

(8) During the tapering period, one hundred percent of the respondents have their teams swim fewer repeats during workouts than during the regular season training. However, no specific number of repeats was indicated.

(9) A majority (63%) of coaches indicated that over the years that they have coached, they have found that peak performances in successive years by the same individual swimmers are more readily attained by using the same techniques every year.

Section III--Psychological Considerations

(1) The responses regarding the degree that psychological and physiological parameters contribute to a peak performance indicated that forty percent of the coaches
indicated that a fifty-fifty balance existed; thirty-three percent indicated that it was more physiological than psychological; and twenty-six percent of the coaches indicated that it was more psychological than physiological.

(2) The data indicated that fifty-three percent of the coaches stated that the result of shaving is fifty percent psychological and fifty percent physiological. At the same time, forty percent of the respondents stated that the result was more psychological than physiological. The remaining seven percent stated that it was more physiologically beneficial.

(3) Total agreement (100%) was reached by the respondents by their indication that swimmers take the largest drop in time on the first shave of the season.

(4) A variety of answers ranging from three weeks to three months comprised the responses to the question of how much time prior to the championship meet can a swimmer shave for a regular season dual meet, and then reshave in order to have a peak performance in the championship meet. This range indicated very little agreement in this area.

(5) Total agreement (100%) was reached by the respondents when they indicated that every coach prepares his swimmers psychologically for a peak performance at a championship meet. A variety of answers were given as to the actual psychological preparation, but emphasis was placed on three areas of interest. The coaches indicated
a stressing of planning; pep talks; and a general attempt to raise the swimmer's self confidence as an aid to attaining a peak performance.

Section IV--Direct Comments by the Respondents that are Unique to the Questions Provided in the Questionnaire

Due to an insufficient number of responses, no conclusions could be drawn from this question. The comments were presented in Appendix C.

CONCLUSIONS

On the basis of the findings, and within the limitations of the study, it was concluded that although there was general agreement as to central tendencies in coaching techniques there was a wide diversity in specific training techniques utilized by "successful" swimming coaches to aid their swimmers in attaining peak performances in a championship meet.

RECOMMENDATIONS

The recommendations resulting from this study are presented in two sections. The first section considers recommendations related to the problems of this survey and the survey research method. The second section considers recommendations relative to future research in the area of peak performances in swimming.
Survey Research Method

Problem areas encountered while conducting this survey were the basis for the following recommendations:

(1) That although necessary and informative, the open-ended type questions utilized in parts of the questionnaire made it difficult in some cases to statistically evaluate the responses.

(2) That a follow up procedure should have been utilized.

(3) Numerous other questionnaires should have been designed and distributed, each one utilizing information from the preceding questionnaire to help make each revised edition. This could have, in the investigator's belief, yielded more in depth knowledge.

Recommendations for Future Research

(1) That studies similar in design and content be conducted at all levels of competitive swimming. A comparison of responses with this study and between the new studies could be valuable.

(2) That an attempt be made to design and conduct a study that will bring together the world-wide body of knowledge of competitive swimming.

(3) That studies be designed and conducted to measure and evaluate the physiological changes that take place in the swimmer during the peaking period.
(4) That a valid tool be developed to accurately measure the psychological aspects of swimming.

(5) That a study be conducted by comparing the best peak performances of the swimmers who trained under the coaches question in this study. This could determine whose peaking techniques were the most successful, which would be indicated by the greatest number of peaks and the highest peak performances.
BIBLIOGRAPHY


9. Rowland, Rick. "Peaking For the Championship Season." Swimming World and Junior Swimmer, 7:6, 27,

APPENDICES
APPENDIX A
EXPLANATORY LETTER

April 19, 1974

Dear Coach:

I am a candidate for the Master of Arts Degree in Physical Education at California State University, Northridge.

I am attempting to identify and synthesize the training techniques involved in attaining a peak performance in a championship swimming meet.

My research involves surveying the top 10 College Division and the top 10 University Division swimming coaches in the National Collegiate Athletic Association. All replies will remain in the strictest of confidence and no reference will be made to any individual or institution. All information will be reported as group data.

Your response is most critical to the outcome of this study. I am enclosing my questionnaire (approximately 15 minutes answering time) and would appreciate your honest and prompt opinions. Please return the questionnaire in the self-addressed stamped envelope prior to May 1, 1974.

Thank you for your cooperation and professional interest in this study.

Sincerely,

Joel Barr
Swimming Coach
Canyon High School
19300 W. Nadal St.
Canyon Country, Ca. 91351
APPENDIX B

QUESTIONNAIRE

California State University, Northridge

PEAK PERFORMANCES IN SWIMMING

Average Answering Time: 15 minutes

Directions: Please reply carefully and honestly to all questions and statements. Indicate your response in words or if appropriate by placing an (X) in the space you choose. If you answer in the space marked "other" please feel free to write in your preference.

Definition: Peak Performance—a performance that results in a drop in a swimmer's best previous time that season.

Please check ___ if you would like a copy of the results.

1. How long have you been coaching? __________ How long at the college or university level? ______

2. Do you train your swimmers for a peak performance at a Championship (Conference and/or National) Meet? Yes ___ No ___ Other (Please explain) ___

3. How would you evaluate your peaking process throughout the years?
   ___ Highly Successful
   ___ Successful
   ___ Moderately Successful
   ___ Unsuccessful

4. How far in advance of the Championship Meet do you start to prepare for a peak performance as a team? ___

5. Do you taper your team according to:
   ___ Stroke
   ___ Distance
   ___ Individual
   ___ Other (Please explain) ___

53
6. When tapering, do you increase the time spent on stroke mechanics, starts, and turns, over time spent during the regular dual meet season?
   ___ Yes
   ___ No
   ___ Other (Please explain)

7. When preparing for a Championship Meet, do you encourage your swimmers to repeat at:
   ___ 100% effort
   ___ 75% effort
   ___ 50% effort
   ___ Other (Please explain)

8. When preparing for a Championship Meet, do you drop the yardage swum each week?
   ___ Yes
   ___ No
   If your answer is yes, by what percentage do you drop the yardage?

9. To what degree do you feel the following parameters contribute to a successful peak performance?
   ___ Psychological
   ___ Physiological
   ___ If you believe that both are of equal importance or have other parameters, please explain.

10. To what degree do you feel that shaving aids the swimmer?
    ___ Psychologically
    ___ Physiologically

11. In your experience, on what shave do swimmers take the largest drop:
    ___ The 1st shave of the season
    ___ The 2nd shave of the season
    ___ The 3rd shave of the season
    ___ Other (Please explain)

12. If you desire to do so, how much time prior to the Championship Meet do you feel a swimmer can shave for a regular season dual meet, and then reshave in order to have a peak performance in the Championship Meet?
13. Do you attempt to peak your swimmers more than once a season?
   ___ Yes
   ___ No

   If yes, how many times can your swimmers successfully peak during a season?
   ___ Two
   ___ Three
   ___ Other (Please explain)

14. Do you prepare your swimmers psychologically for a peak performance at a Championship Meet?
   ___ Yes
   ___ No

   If yes, what do you do to prepare them?

15. When tapering, in preparation for a peak performance, a) Do you increase rest?
   ___ Yes
   ___ No

   b) Swim fewer repeats?
      ___ Yes
      ___ No

   If not, would you briefly explain your tapering procedures.

16. Over the years that you have coached, have you found that peak performances in successive years by the same individual swimmers are more readily attained by using the same techniques, or has it been more successful to alter them?
   ___ Same
   ___ Alter
   ___ Other (Please explain)

17. Do you have anything to add to this survey that may aid the investigator in identifying peaking techniques and/or philosophy? Please use the reverse side of this sheet.

   THANK YOU VERY MUCH
APPENDIX C

RESPONSES TO QUESTION 17

Question: Do you have anything to add to this survey that may aid the investigator in identifying peaking techniques and/or philosophy?

The responses are as follows:

In order to have a successful taper, it is necessary to work the swimmers hard during the season. A danger arises when the swimmer becomes overly torn down, in which case an extremely long taper is necessary in order to produce peak times, and many times a coach is unable or unwilling to recognize the swimmers exhaustion.

There is also a danger in sprinting the swimmers all out during the taper since this does not contribute to the resting of the muscles.

I have the swimmers do broken swims at race pace (200's generally) in order to develop the sense of swimming pace at the end of the season.

So much depends on the individual you have to be able to know and read them or you will never get a good performance off of a peak.

The purpose of this question was to aid the investigator in identifying peaking techniques and/or philosophies of peaking that were not brought out by the review of literature, personal knowledge, or the previous questions in this study.

Although the number of responses was small, the statements aided in the understanding of the peaking process. Unlike other sports such as football and basketball where coaches in the past have revealed their general training techniques, swimming coaches appeared to be more secretive and protective of their techniques.