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THE UNIVERSITY OF MANITOBA

A GOAL-SETTING SELF-MANAGEMENT PACKAGE TO IMPROVE
THE PRACTICE PERFORMANCE OF GYMNASTS ON THE BEAM

BY

KAREN L. WOLKO

SUBMITTED TO
THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE
MASTER OF PHYSICAL EDUCATION

FACULTY OF PHYSICAL EDUCATION AND RECREATION STUDIES

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A thesis submitted to the Faculty of Graduate Studies of
the University of Manitoba in partial fulfillment of the requirements
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Abstract

The purpose of this study was to examine the effects of a goal-setting self-management package on the frequency of gymnasts' beam skills in practice. Subjects were 5 female competitive gymnasts, 10-13 years of age. Three different conditions were employed on an alternating basis for 8 weeks, with an initial baseline condition (standard coaching) lasting for 3 weeks. The 3 conditions consisted of standard coaching only, a public coach-assigned goal-setting condition, and a private self goal-setting condition. The results showed an increase in the gymnasts' skill frequency in all 3 conditions following the introduction of the treatment conditions; self goal-setting was the most effective treatment condition overall; and social validation results indicated that subjects preferred both goal-setting conditions over the baseline condition.

TABLE OF CONTENTS

Chapter

Abstract	ii
Table of Contents	iii
I. INTRODUCTION	1
Statement of the Problem	5
Definition of Terms	5
Delimitations	8
Limitations	9
Significance of Study	9
II. REVIEW OF LITERATURE	11
Applied Behavioral analysis	11
Effective Behavioral Coaching	12
Self-Management Techniques	13
Self-Management Related Studies	15
Goal-Setting	16
Goal-Setting Training	22
Self-Set and Assigned Goal-Setting	25
Feedback and Displayed Results	29
Rewards	32

III.	METHODS AND PROCEDURES	35
	Subjects	35
	Setting	36
	Materials	36
	Recording Sheet	36
	Reward List	37
	Data Recording Procedures	37
	Observers	37
	Reliability	37
	Dependent Variables	39
	Controlled Variable	40
	Procedures	41
	Baseline	41
	Treatment 1	44
	Treatment 2	46
	Experimental Design	49
	Social Validation	51
	Evaluation of Results	52
IV.	RESULTS AND DISCUSSION	54
	Reliability Evaluations	54
	Intervention Effects	54
	Social Validation	68
	Discussion	71

V. SUMMARY AND CONCLUSIONS	85
Conclusions	86
Recommendations	87
Practical Implications	88
REFERENCES	89
APPENDICES	96
Consent Form	97
Recording Sheet and graphs	98
Beam skills	101
Baseline Example	105
Treatment 1 Example	107
Treatment 2 Example	109
Graphs With Goals	111
Social Validation Questionnaire	121
Reward List	127

LIST OF TABLES

Table 1:	Inter-Observer Reliability Data	55
Table 2:	Mean Frequency of Skills	58
Table 3:	Condition Effectiveness	65
Table 4:	Percentage of Reached Goals	67

Figure 1:	Frequency of Skills (S1)	59
Figure 2:	Frequency of Skills (S2)	60
Figure 3:	Frequency of Skills (S3)	61
Figure 4:	Frequency of Skills (S4)	62
Figure 5:	Frequency of Skills (S5)	63

CHAPTER 1

Introduction

For more than thirty years behavioral scientists have developed and investigated behavior modification techniques. The research provides a solid foundation for supplying behavioral principles for today's society (Martin and Pear, 1988). Presently, applications of these techniques in coaching are seen with increasing frequency. Martin and Lumsden (1987) identified five general categories in which research in behavioral coaching has been published: 1) skill development; 2) motivation for practice and endurance training; 3) transfer of practice performance of skilled athletes to competition; 4) decreasing problem behaviors; and 5) coaches as behavior modifiers. The present study examined the area of motivation of practice performance.

Martin and Lumsden (1987) stated that a motivation problem is commonly found in competitive individual sports (eg., gymnastics, swimming, skating). The practice to competition ratios of these sports are such that young athletes may spend many hours in repetitive practice to prepare for the occasional competition. To be skillful and successful, considerable time must be spent in repetitive (and sometimes boring) activities. For example, competitive gymnasts may

practice nine hours a week from September to May, and may compete only three or four times the entire season. Practice time may consist of learning new skills, but the majority of time is spent on practicing many repetitions of already learned skills to perfect and maintain them.

Within the competitive sport of gymnastics the balance beam event in particular presents difficulties for both coach and athlete. This apparatus offers a very small repertoire of skills. The skills must be already learned so that they can be safely attempted on the beam. As a result, gymnasts often become bored repeating the same skills over and over at each practice. The gymnasts often engage in several off-task time wasters. These may include talking to other gymnasts, standing or sitting while the coach is busy helping another gymnast, or taking their time in practicing a skill. As a consequence, the frequency of practice skills is often very low and the effort and concentration put into them is not always optimal. Martin and Lumsden (1987) have suggested a general motivational system that appears to have widespread applicability to a number of different sport settings including gymnastics. The components include setting specific performance goals, behavior recording, displaying the results, rewarding goal attainment, and providing frequent and immediate feedback concerning the behavior recorded.

An additional problem which occurs during beam practice that results in a low frequency of attempted skills, involves the use of practice time. The amount of practice time allowed for each gymnastic event is very short, usually about 30-40 minutes. This certainly does not allow time for socializing or for waiting for the next coach instruction to be given. Often the coach will be busy correcting or spotting another gymnast. Therefore, the gymnast has to wait until the coach is free in order to receive the next practice instruction. In addition, competitive gymnasts each have their own individual workouts and work at different rates. When the gymnast returns to the coach for the next instruction, it is difficult for the coach to remember the gymnast's last skill assigned, which makes it hard to give the next instruction. If gymnasts were able to work more independently, then the frequency of skills attempted might increase. McKenzie and Rushall (1974) used program boards with swimmers to solve this type of a problem. Each swimmer's individual workout (consisting of a list of work units) was listed. As soon as a swimmer completed a work unit, there was a clear stimulus to perform the next set. This allowed the swimmers to continue with repetitive activities on an independent basis.

Another reason for the low frequency of beam skills is that the gymnasts tend to ignore the high beams and stand in line at the low beams. The low beams should only be used for the more

difficult skills or if all the other beams are being used. If the gymnasts were made aware of the number of skills that should be done in their 40 minute beam practice in order to improve, then they would realize that they could not afford to waste time waiting for the low beams when the high beams are available. One possible solution to this problem would be to set practice goals consisting of a specified number of repetitions to be performed by the gymnasts. Athletes in individual sports could benefit from a self-recording system to monitor performance in order to evaluate their performance against a set goal (McKenzie and Rushall, 1974). Athletes could also benefit from a reward system to further motivate their skill performance (Carron, 1984).

Goal-setting, self-recording, graphically displaying the results so that improvements can easily be seen, and using a reward system contingent upon goal attainment, could help an athlete improve and maintain their performance (Martin and Lumsden, 1987).

Statement of the Problem

The purpose of this study was to examine the motivational effects of a treatment package involving either self goal-setting or coach goal-setting, self-recording, a graphical display of the results with or without coach feedback, and a reward system to increase practice performance of gymnasts on the balance beam event.

Definition of Terms

Attempted Skill

An attempted skill is an identifiable skill performed by a gymnast on the beam, which may or may not result in the gymnast falling from the beam after the skill has been performed.

Balance Beam

The balance beam is a gymnastic apparatus that female gymnasts perform on. It is 16 feet in length, 4 inches wide, and in competition it may be up to 4 feet in height.

Baseline

The baseline phase is the experimental condition in which the behavior is assessed to determine it's level prior to the introduction of the treatment package (Martin and Pear, 1988).

Coach-Subject Interaction

A coach-subject interaction occurs when the coach gives a verbal statement or question to the gymnast while she is on the beam.

Completed Skill

A completed skill is an identifiable skill performed by the gymnast on the beam, which results in the gymnast remaining on the beam after the skill has been performed.

Feedback

Feedback consists of the information generated about a response that is used to modify the next response (Siedentop, 1976).

Intervention

The intervention phase is the experimental condition in which the treatment package is introduced to bring about a desired behavior change (Martin and Pear, 1988).

Positive Coach-Subject Interaction

A positive coach-subject interaction is a positive verbal statement given to the gymnast immediately following performance of a skill by the gymnast (positive feedback). The positive verbal statement is often accompanied by a positive gesture such as a smile. It is delivered while the gymnast is on the beam.

Negative Coach-Subject Interaction

A negative coach-subject interaction is a negative verbal statement given to the gymnast immediately following the performance of a skill by the gymnast (negative feedback). It is negative in that the coach is not satisfied with the performance of the skill. It is delivered while the gymnast is on the beam.

Neutral Coach-Subject Interaction

A neutral coach-subject interaction is a verbal statement or question given to the gymnast regardless of whether the gymnast has just performed a skill. It is delivered while the gymnast is on the beam.

Incompleted Skill

A incompleted skill is a skill performed by the gymnast on the beam, which either results in a fall or is executed quite poorly.

Reward

A reward system as used in the present study, consists of fun gymnastic-related activities that the gymnast has an opportunity for, if she reaches either the coach-set or self-set practice goals.

Self-Management

Self-management consists of processes related to changing or maintaining one's own behavior. These can include any

combination of self-observation, self-recording, self-evaluation, or self-reinforcement (Browder and Shapiro, 1985).

Self-Monitoring

Self-monitoring consists of assessing or recording one's own behavior.

Spotting

Spotting a gymnast consists of the coach physically helping the gymnast through a skill.

Standard Coaching

Standard coaching refers to the procedures most commonly used by the gymnastic coach. These include verbal instructions, correctional feedback, praise, encouragement, reprimands, and spotting.

Delimitations

1. The study was limited to a sample of five female gymnasts ranging in age from 10-13 years.
2. The study was limited to a comparison of the relative impact of two intervention "packages" and standard coaching procedures.
3. The study was limited to an eleven week pre-competitive training period.
4. The study was limited to the balance beam event.

Limitations

1. The study was limited by the social evaluation influence produced by the presence of observers.
2. The results of the study were limited to the sample under investigation.
3. The social validity information was limited by the honesty and sincerity of the subjects.

Significance of the Study

The motivation problem commonly found in individual sports occurs with young competitive gymnasts. There is a need to motivate the gymnasts to practice more effectively and make use of the practice time allotted. Since the balance beam event requires a large number of skill repetitions to be executed, it poses a major problem in gymnasts making effective use of their practice time. Inefficient practice leads to a low frequency of skills being practiced and poor competition performance. There is a need to motivate the gymnasts to make effective use of their practice time on the balance beam event. The techniques recommended by Martin and Lumsden (1987) could be the solution necessary to increase skill frequency. The techniques are: setting specific performance goals, recording behavior, displaying the results, providing immediate feedback of the results, and rewarding goal attainment.

The results of the present study extend the behavior modification literature, since very little research has been done on self-regulation procedures in sport. Also, there has been no research reported on self-management studies in a gymnastic setting. There is controversy in the literature as to whether self-regulation procedures should be kept private or made public. The present study tested the effectiveness of both private and public self-regulation procedures.

The research comparing the effects of externally selected and self-selected goal-setting occurs most often in organizational settings and is controversial. There is a need to extend this research to sport settings. This study investigated the effectiveness of assigned and self goal-setting in a gymnastic environment. To date there has been no research reported on goal-setting in a gymnastic environment.

The present study extends the use of single-subject designs to sport settings as suggested by Wollman (1986). Specifically, this study attempted to demonstrate the efficacy of the multielement baseline design as a research tool for examining athletic environments.

If a goal-setting self-management package is effective with gymnasts, it will benefit the gymnast and the coach as well as parents who spend the time and money in sending their child to gym class.

CHAPTER 2

Review of Literature

The literature most pertinent to this study involves two basic topics: applied behavioral analysis in the area of coaching and self-management techniques including goal-setting, feedback, and a reward system. The goal-setting area was thoroughly examined because goal-setting was the basis for the present study. The goal-setting area itself consists of many topics. Only those topics which directly relate to the present study were presented. These topics include: an introduction to goal-setting; a review on the types of settings in which goal-setting techniques have been used; a report on the findings of goal-setting research; reasons for its' potential effectiveness as a motivator; the effects of goal-setting in sport; goal-setting training; and finally, participative and assigned goal-setting.

Applied Behavioral Analysis

Applied behavioral analysis is the process of applying sometimes tentative principles of behaviors and simultaneously evaluating whether or not any changes noted are indeed attributable to the process of application (Baer, Wolf, & Risley, 1968). Applied behavioral analysis is a self-examining, self-evaluating, discovery-oriented research procedure for studying

behavior. Applied behavioral research is constrained to examining behaviors which are socially important rather than convenient for study. These behaviors are studied in their usual social settings rather than in a laboratory.

Effective Behavioral Coaching

Martin and Lumsden (1987) discussed important characteristics of effective behavioral coaching. Goals for athletes are identified in terms of specific behavior and results that can be accurately measured. These measures are used to evaluate the effectiveness of specific coaching techniques. Coaches are encouraged to use specific behavior modification procedures which have been effective and experimentally demonstrated in numerous studies. The distinction between developing new behavior and maintaining (or motivating) existing behavior is recognized. Athletes are encouraged to record and chart their performance and to compete and improve against their own previous performance rather than against others. Coaches are encouraged to frequently record, self-evaluate, and continually improve their own coaching behaviors as well. Finally, behavioral coaching emphasizes the need for including the views of the athlete in evaluating goals, the acceptability of coaching procedures used to achieve those goals, and the desirability of the results obtained.

Self-Management Techniques

In many sports it is necessary for the athlete to work on their own for periods of time, especially when a task involves many repetitions of skills. Athlete-managed contingencies may help to improve and maintain performance. Self-management procedures could be used by the athlete to enhance his or her behavior change (Browder & Shapiro, 1985). The procedures may involve any combination of self-observation, goal-setting, self-recording, self-evaluation, or self-reinforcement. Goal-setting involves establishing a standard of performance, either by the experimenter alone, or by the experimenter in conjunction with the client, or by the client alone. Once a goal is established, performance is usually self-evaluated, or compared to the pre-set standard, and positively self-reinforced if the criterion is reached.

According to Locke and Latham (1985) there is demonstrated effectiveness of self-regulatory procedures for improving problem behavior in clinical situations and for improving performance in non-sport areas. The evidence of self-regulatory procedures has been demonstrated mainly on academic behavior, classroom participation, classroom behavior of teachers, in basic laboratory research and in clinical behavior therapy. There is a need for specific research concerning the

applicability of these procedures as interventions for sport problems. One such area is practice behavior.

There is controversy in the literature as to whether self-regulation should be private or made public. Kirschenbaum (1984) stated that to maintain and improve performance, athletes need to specify performance goals and follow self-regulatory procedures which are directed by their goals. Kirschenbaum stressed the personal (private) nature of self-regulation, by stating that effective performance in any sport is a solitary endeavor. Bandura (1976) also stated that self-regulation is a private process under complete control of the individual.

In contrast to the two preceding authors, Hayes, Rosenfarb, Wulfert, Munt, Korn, & Zettle (1985) stated that self-regulation procedures are not effective when private (when others are not aware of the individual's goals and contingencies) but are effective when goals and contingencies are public. The public standard involves social consequences for achieving or not achieving the goals, which are more effective than private self-consequences. Martin and Lumsden (1987) also agreed that including a public component to the self-regulation procedures can lead to effective performance.

Self-Management Related Studies

McKenzie and Rushall (1974) had swimmers publicly self-record training unit completion on program boards in an effort to increase work output during swimming practices. This intervention produced an average work rate increase of 27%. Keefe and Blumenthal (1980) reported using a combination of self-recording, stimulus control (eg. specific warm-up exercises, locations, and times), a contract specifying the exercise criterion for self-reinforcement, and gradually increasing goals to help three subjects establish a regular exercise regimen. Levels of exercise increased following introduction of the behavioral treatment techniques. Improvement was maintained over a two-year period.

Hume, Martin, Gonzales, Cracklen, and Genthon (1985) successfully used a self-monitoring package consisting of a self-monitoring checklist and coach feedback regarding performance, to increase the frequency of young figure skaters' desirable practice behaviors. The target behavior was frequency of jumps and spins that the skaters already knew how to perform. Morgan (1987) tested the hypothesis that a combination of self-monitoring and goal-setting should enhance students' learning in private study. The subjects consisted of undergraduates taking an ongoing college course. Three experimental groups (self-monitoring alone, goal-setting alone,

and a combined self-monitoring and goal-setting condition) performed significantly better in final examination results than did two control groups. Interestingly, the the combination of goal-setting and self-monitoring did not yield better results than either procedure alone.

Honda (1985) examined self-evaluation effects on task performance and motivation of preschoolers (the relationship between self-evaluation and the motivation to finish a game and the relationship between self-evaluation and persistence). It was found that motivation persisted only when subjects could evaluate their own results.

Studies such as those described previously, suggest that self-management strategies can play an important part in improving performance of practice skills or exercise behaviors.

Goal-Setting

Motivation of sport performance depends in a very large part on goal-setting. The coach, the team, and each individual athlete must have goals (Locke & Latham, 1985). Motivating athletes to perform to their potential or to sustain maximum effort in order to complete a task successfully has always been a source of frustration for coaches and physical educators. One of the reasons for this dilemma is that motivation ultimately comes from within the individual and therefore cannot be observed

directly. As most coaches are not in a position to alter the athlete's personality structure, their pursuit of athletic excellence must incorporate various motivational strategies or incentives to encourage improvement and aid athletes in reaching their optimum performance levels. Goal-setting is one such technique (Hall, Weinberg, & Jackson, 1987).

Goal-setting in sport appears to be a very common practice. The basic premise of goal-setting theory is that cognitions serve to regulate purposeful human behavior (Miller & McAuley, 1987). These researchers have found that explicit performance goals have consistently influenced intensity and duration of behavior. Additionally, dimensional qualities of goals such as goal difficulty, degree of specificity and temporal proximity have been shown to greatly influence the goal-performance relationship. Individual ability and cognitive states relative to the task situation also determine goal effectiveness (Miller & McAuley, 1987).

Goal-setting is often viewed as a practical technique to increase and direct motivation in achievement oriented fields such as business, education, and sport. The acceptance and use of goal-setting in these fields came in response to evidence reporting the motivational and performance enhancing effects of goals in the organizational and industrial literature (Giannini, Weinberg, & Jackson, 1988). Locke and Lathams' (1985)

review of this literature revealed that 99 out of 110 studies have supported the hypothesis that specific, difficult goals, if accepted, result in higher performance than easy goals, vague goals, or no goals. These results were found in a variety of laboratory studies.

Much of the early research on goal-setting was initiated by two major sources, one academic and one organizational (Weinberg, Bruya, Longino, & Jackson, 1988). The organizational source came from the management-by-objectives program, which was widely employed in industrial settings. The academic source dated back to the early 1960's. The impressive literature generated in industrial, organizational, and academic settings has led many coaches, athletes, and physical educators to employ goal-setting programs to enhance performance. Unfortunately, empirical research in sport settings investigating the relationship of goals and performance has been sparse (Locke & Latham, 1985). The majority of articles concerning goal-setting and sport performance were designed to provide practical strategies to assist in the growth and development of athletes (Weinberg et al., 1988).

Locke and Latham (1985) suggested that the effects of goal-setting on sport performance should result in improvements similar to, if not greater than, those observed in the organizational setting. This is because the measurement of

performance in sport is typically easier than in the work environment (It is more acceptable and less intrusive to have viewers or observers in a sport setting than in a work setting). Locke and Latham (1985) listed findings which were derived from the research in organizations and the laboratory and hypothesized similar findings in sport as well. They are as follows: Goal-setting focuses and directs one's activities; goal-setting regulates one's expenditure of effort; if the goal is accepted, effort is exerted in proportion to its difficulty; the harder the goal, the greater the effort expended; goal-setting enhances persistence because effort is continued until the goal is reached; goal-setting can promote the development of new strategies for improving performance; specific goals direct activity more effectively and reliably than vague or general goals; difficult or challenging goals produce better performance than moderate or easy goals as long as the person is able to achieve them; goals must become progressively more difficult as the individual attains increased skill; short-term goals can be used as a means of attaining long-range goals; goal-setting may be task-specific in that goal-setting may be most effective for simple tasks; goal-setting only works if there is timely feedback showing performance or progress in relation to the goal; competition is a form of goal-setting in which the goal is the performance of another person; goals must be accepted and

there must be a commitment to them; commitment can be affected by asking the individual to accept the goal and explaining to them why the goal is important; commitment can also be affected by the coach showing support and allowing the athlete to participate in the setting of goals; selection is relevant to goal commitment in that people can be selected who are already highly motivated to improve and perform well; and finally, rewards and incentives are keys to ensuring continuing commitment. Locke and Latham (1985) also noted that goals can increase self-confidence. Goal-setting in practice requires one to enhance their powers of concentration. Trying to achieve a goal in practice entails tension. A tennis player who is trying to hit five serves in a row, is under stress because if he misses one, he must start over. After experiencing this tension repeatedly, he learns to deal with it effectively. In approaching the goal, this person experiences tension similar to that of a competitive situation. If the competitor carries this discipline into a game, confidence increases further.

In summary, goal-setting in addition to its direct effects on performance, gives an athlete a sense of control and positive self-direction. A goal provides anticipated satisfaction for desired accomplishment as well as the basis for a negative appraisal. Thus, a goal provides an athlete with the incentive for action. Because a specific goal designates the type and amount

of effort required, it facilitates self-satisfaction by showing clear signs of the athlete's accomplishment (Locke & Latham, 1985).

Recent empirical investigations of goal-setting in sport have not supported Locke and Latham's optimism (Hall & Byrne, 1988). Although a limited body of sport literature does support the overall findings from industrial and organizational settings (Botterill, 1977; Barnett & Stanicek, 1979; Burton, 1983; Weinberg et al., 1988; Hall et al., 1987), an increasing number of studies have brought into question these findings, reporting no significant differences between individuals assigned specific difficult goals and those instructed to do their best on the task (Barnett, 1977; Hollingsworth, 1975). The studies that do show positive goal-setting effects with the experimental group over the control group, usually fail to show significant differences between the goal-setting groups (Giannini et al., 1988; Hall et al., 1987; Weinberg et al., 1988). Overall, the results of empirical investigations concerning goal-setting in sport have been equivocal.

Hall and Byrne (1988) reported that when examining the pattern of goal-setting results in the sport literature more closely, the striking observation is that the majority of studies failing to find support for goal-setting effects on sport performance are field experiments. Those studies demonstrating support were either laboratory studies, well

controlled field experiments, or investigations involving lengthy training in effective goal-setting. This observation seems to suggest that when goal-setting research is moved from well controlled laboratory situations to actual sporting environments, presently unknown elements within these environments prevent goal-setting effects from being observed. A similar pattern was found in organizational settings. The larger goal-setting effects were obtained in laboratory investigations.

Goal-Setting Training

According to Miller and McAuley (1987) the application of a goal-setting training program to enhance performance is an approach which has received limited attention in the sport research. Barnett and Stanicek (1979) used teacher-led conferences to emphasize the importance of setting numeric and verbal goals for archery performance. The goal-instructed group demonstrated superior performance over that of a similar-ability group whose conferences focused only on problem areas in skill execution. In a more extensive goal-setting training procedure involving male intercollegiate swimmers, Burton (1983) reported goal-setting to have both performance and cognitive effects. Specifically, goal-trained swimmers, who were high in goal-setting skill, demonstrated greater performance

improvements and higher efficacy expectations during the course of the season than did control swimmers.

Since athletes and coaches use goal-setting as a natural part of the training process, it is important to implement these procedures properly. If goal-setting becomes a well-integrated part of the athletes' preparation, they may not only improve performance but also have more confidence (Miller and McAuley, 1987). According to Bandura and Cervone (1983) goal-setting mediates such cognitive mechanisms as self-efficacy and self-dissatisfaction. Improvement of sport performance is usually defined by objective success such as winning, but a number of studies in the sport domain have emphasized the importance of assessing both objective and subjective measures of success (Miller and McAuley, 1987).

Miller and McAuley (1987) assessed the effects of a 5-week goal-setting training program on basketball free-throw accuracy (objective performance measure), perceptions of success (subjective performance measure), and self-efficacy. The subjects consisted of 18 undergraduate students enrolled in a beginning basketball class. The goal-setting training program consisted of instruction in the various dimensions of goal-setting and in how to establish performance objectives. The GT (goal-training) group were told that goal-setting had been shown to enhance performance. They were instructed to take a positive

goal orientation toward the free-throw task (to phrase their goals in positive rather than negative terms). The importance of short-term goals was described, with regard to how sub-goals serve to create interest, generate greater effort, and increase persistence toward attaining long-term goals. The use of multiple goals was recommended to ensure some degree of success if performance failed to achieve the most desired level. Goal difficulty was presented as a major moderator of goal effects. Subjects were encouraged to set goals that would be at, but not beyond, their capabilities. The importance of both goal acceptance and goal commitment in determining the effectiveness of goals, easy or hard, was also stressed. Differences between outcome and performance goals were examined, by way of both definition and example. Subjects were told the benefits of performance-based goals, and it was suggested that their goals not hinge on scores. Goal specificity was the final dimension to be covered. Participants were taught to set their goals with specific objectives in mind, yet to make them flexible enough so failure to achieve some of them would not be a total loss.

The results of Miller and McAuleys' (1987) study showed that although the GT group performed better than the NT (no goal-training) group in four of five trials, the overall difference between groups was nonsignificant. Unlike objective

performance, however, a treatment effect did emerge for subjective performance, with GT subjects perceiving their performances as being more successful than subjects in the NT group. The GT group also had significantly higher self-efficacy at the end of the treatment period than did the NT group. In sum, it appeared that goal-setting did have a significant impact on success and efficacy perceptions, but the data did not support the hypothesis that goal-setting training enhances basketball free-throw performance.

Self-Set and Assigned Goal-Setting

There is considerable controversy in the literature as to whether assigned goal-setting or participant/self goal-setting is more effective in terms of performance effectiveness. Locke and Latham (1985) stated that participation in setting goals may sometimes help to gain commitment. Selection is relevant to goal commitment in that people who are motivated to improve and perform well may benefit from participant goal-setting. Those people who are initially acquiring a skill would probably benefit most from an assigned goal.

Carron (1984) stressed the importance of the participant's involvement in goal-setting. A person involved in a goal-setting program develops increasing maturity in the form of self-discipline, self-control, and self-management. However, goals

arrived at in an autocratic fashion by the leader have not proven to be any less effective than goals arrived at in a consultative fashion by leaders and their followers.

Botterill (1978) commented on the importance of participation by the athletes in goal-setting. Psychologists have gathered evidence to suggest that involving athletes in goal-setting can result in a form of psychological contracting. It can be a very effective motivational and leadership technique. Athlete participation in goal-setting can increase their awareness of goals and increase commitment to the goals. Botterill (1978) found that athletes set tougher more desirable goals. The coach's biggest task is often to keep goals realistic, specific, and achievable.

Many goal-setting studies in business and school organizations have been reported examining the effectiveness of externally-selected and self-selected (sometimes labelled as participant) goal-setting on work performance. The findings are inconsistent (Fellner and Sulzer-Azaroff, 1984). The findings show that both externally-selected and self-selected goal-setting can be effective in increasing work performance. Alexy (1985) examined the effects of goal-setting on reducing patients' frequency of health risk factors. The results of the study showed that the participative goal-setting condition was the most effective for weight reduction and the assigned goal-setting

condition was the most effective for current health age and life expectancy of the patients. Erez, Earley, and Hulin (1985) examined the participation effects of goal-setting on goal acceptance, satisfaction, and performance of a scheduling task with undergraduate students. The results of the study showed the participative goal-setting condition to be effective on performance increase, but the assigned goal-setting condition was just as effective. Erez (1986) examined the effects of participative and assigned goal-setting with three cultural groups: Kibutz, public sectors, and private sectors. The subjects were first-level supervisors of an Israeli Industrial Engineering Institute. The findings indicated that for the Kibutz group and public sector, participative goal-setting was most effective for performance increase among the supervisors' workers, whereas for the private sector, assigned goal-setting was most effective.

Shalley, Oldham, and Porac (1987) examined the effects of participant goal-setting on the intrinsic motivation level of computer programmers (undergraduates). The findings of the study indicated that the subjects with assigned goals had greater motivational levels than the subjects who participated in setting goals. Fellner and Sulzer-Azaroff (1985) compared the effects of assigned and participative goal-setting methods on the safety performance of paper-mill workers in 17 rooms of a paper mill. Results showed that only the assigned goal-setting group showed

an increase in the percentage of nonhazardous environmental conditions, but not of safe employee practices.

Campbell and Gingrich (1987) hypothesized that participation in goal-setting for a complex task would produce greater performance effects than assigned goal-setting, and that participation in goal-setting for a simple task would have no effect on performance. Computer programmers' performance on writing both a complex and a simple program, was evaluated. The findings of the study supported the hypotheses. Earley and Kanfer (1985) examined the effects of participative goal-setting on goal acceptance, satisfaction, and performance, with undergraduates using a class scheduling task. Results of the study showed performance to be highest for the individuals given choice over their goal and their strategy. Evans (1984) conducted a study to determine whether participative goal-setting with psychiatric patients would lead to greater goal involvement with future therapy goals. The results strongly indicated that the amount of participation in and the amount of influence the subjects had over the goals set were significantly related to later goal involvement. Erez and Arad (1986) examined three explanations as to why participation in goal-setting may lead to increased performance. Three factors were looked at: the social factor of group discussion, the motivational factor of involvement in goal-setting, and the cognitive factor of

information. A study was performed which involved low and high levels of group discussion, involvement, and information, to study male white collar employees who worked on a personnel selection task in an Industrial Engineering Institute. Results indicated that the social and motivational factors of participation increased performance quantity, group commitment, goal acceptance, and satisfaction. The motivational and cognitive factors significantly contributed to performance quality but the cognitive factor did not significantly affect performance quantity and work attitudes. It was suggested that a combination of the three factors leads to the highest level of performance.

Feedback and Displayed Results

Feedback is the information generated about a response that is used to modify the next response (Siedentop, 1976). Martin and Lumsden (1987) stated that detailed feedback is necessary in order that goal-setting may affect performance. This is a critical component of a motivational system. However, the feedback has to be meaningful. If an athlete can see a simple set of check marks on a graph that is easy to interpret and that clearly displays progress, then opportunities arise for factors such as self-praise, attention, coach's praise, and knowledge of improvement, to play a role in motivating that athlete. Providing

information about some aspect of behavior just after the behavior has occurred is what is meant by feedback.

Martin and Lumsden (1987) suggested that feedback can be enhanced if the measure of behavior is publicly displayed on a chart. Public posting can be effective in stimulating peer interactions that might reinforce increased output. Public posting can also serve as an important reminder to coaches to provide praise for progress. It can also keep the coach informed about the progress of team members in their individual training programs. Locke and Latham (1985) stated that for goal-setting to be effective, the goals must be accompanied by performance feedback. Locke and Latham (1985) concluded that neither goals alone nor knowledge of performance results alone is sufficient to improve performance, but rather both are necessary to facilitate improvement.

Research has suggested that females lack self-confidence in their abilities to perform in certain physical activity situations. Lenney (1977) postulated that a lack of clear, immediate performance feedback would undermine sport participants' confidence. The effects of performance feedback on female self-confidence was examined to determine if post-performance feedback (positive qualitative feedback) would enhance self-confidence of college-age females on a Balance Task and a Pursuit Motor Task (Petruzzello & Corbin, 1988). Results

indicated that the feedback treatment exerted its greatest influence on the low confidence feedback (LC-FB) group. The feedback treatment also served to increase self-confidence for high confidence subjects, although not as dramatically as for the low confidence subjects.

Petruzello and Corbin (1988) suggested that Lenney's (1977) hypothesis was incomplete and that experience with the task or situation needs to be included as a factor in determining one's confidence prior to engaging in a task. Harter (1978) made an interesting note on the importance of experience and success with a wide variety of physical activities and tasks in childhood. If a person has had less experience with physical activities and tasks and therefore, less opportunity for success with tasks, they will be less confident when given a new task to perform. This is often the case with females. Providing an evaluative reward for mastery attempts is a critical determinant of self-confidence. Therefore, it is important for males and females to be reinforced for mastery attempts in sport and physical activity at an early age. Petruzello and Corbin (1988) stated that when available, feedback will be used as a means of increasing feelings of efficacy on a task. When feedback is not available, self-confidence will increase, but over a longer period of time since it takes the individual longer to internalize standards of success and failure for a particular task.

Rewards

The method of influencing the behavior of athletes through rewards is referred to as contingency management. A contingency is a relationship between a behavior and its consequences (Carron, 1984). It is the management of these relationships that is important for improving athlete productivity in practice settings. Coaches, or coaches and athletes working together, decide on what has to happen during practices. Those athletes that meet the contingencies earn the rewards. Those that don't perform in practice go unrewarded. Studies outlining those instances where contingency management programs have been successfully implemented, are numerous (Martin and Hrycaiko, 1983).

Cracklen and Martin (1983) scheduled fun activity to occur at the end of swimming practice, contingent on the swimmers' practice performance. The result was a large reduction in the number of inappropriate behaviors when the reward was contingent on the target behavior. These results suggested that not only can fun activities be used to motivate improved performance of swimmers at practice, but also that such activities continue to be fun even when earned.

The above study relied on others to monitor the swimmers' target behaviors. This approach may be impractical

on a long term basis. Self-monitoring and self-reinforcement may be a better alternative. Keefe and Blumenthal (1980) carried out a study involving stimulus control and self-reinforcement procedures in the acquisition and maintenance of a walking exercise program. The subjects were instructed to select physical and material rewards that were relevant to exercise behavior itself (eg. running shoes, warm-up suits,). Such emphasis may help participants shift more quickly from dependence on material rewards to the more intrinsic benefits of exercise. The results of the study demonstrated that exercise levels increased following introduction of the behavioral treatment techniques. Improvement was maintained over a two-year period. The age of the subjects must be kept in mind (they were middle-aged males) when assessing the generalizability of the results to other age-groups. Interestingly, after some time, subjects no longer relied on the self-reinforcement component of the program because they found exercise itself to be rewarding. It appeared that the reinforcement contract was important during the early phases of the program, but that over time, the more intrinsically rewarding aspects of exercise assumed control over the exercise behavior.

Some guidelines to follow when using a reward system include: clearly defining and explaining the target behaviors to

the participants, monitoring the target behaviors consistently, stating the contingency clearly, and using simple rewards such as public recognition, relays, and fun activities (Carron, 1984).

CHAPTER 3

Methods and Procedures

Subjects

The subjects consisted of five female level-two competitive gymnasts ranging in age from 10-13 years (a gymnast at a competitive level has quite an advanced skill level. The levels range from level 1-5, the latter consisting of National calibre). The gymnasts were members of the Aerials Gymnastic Club and they attended three, three-hour practice sessions per week. The subjects had all been competing for a minimum of two years. This group of gymnasts were selected as the experimental group because the coach felt that they did not make effective use of their practice time on the balance beam event. It was felt that they could benefit from a motivational system such as a goal-setting, self-management package.

Consent from the gymnasts and parents was obtained prior to the experiment. The consent form requested permission for the gymnast to participate in a sport psychology project that would examine ways to improve the gymnasts' balance beam performance (see Appendix A).

Setting

All data were obtained in the gymnastic room of the Frank Kennedy building on the University of Manitoba campus, every Monday, Wednesday, and Friday, for eleven weeks. The task of interest was the balance beam event.

Materials

Recording Sheet A recording sheet was used by both the gymnasts and observers to record the frequency of balance beam skills performed by the gymnasts during the forty minute beam practice (see Appendix B). The sheet consisted of a list of specific beam skills with the number of repetitions required for each skill, for each gymnast (the short-term goals for the practice). The workout content on the sheet was determined by the coach one day per week, and by the gymnast one day per week. The workout content was tailored to each individual gymnast according to their ability level, their rate of progress from one practice to the next, and their preference for certain skills. The recording sheet was designed so that recording skill frequency would be easy and quick.

Reward List A list of fun activities was offered to the gymnasts on the goal-setting practice days. The gymnasts were allowed to choose an activity upon goal attainment. The activity was engaged in during the last 10-15 minutes of practice (see Appendix I).

Data Recording Procedures

Observers Behavioral observations were taken by five university students enrolled in an undergraduate psychology course who chose to work in the the study as an option to fulfill a course requirement. Prior to observer training sessions (orientations) they received a booklet and list of beam skills. The booklet consisted of diagrams of the skills with labels identifying the names of each skill (see Appendix C).

Reliability Prior to the study, the coach trained the observers to record the frequency of beam skills. The observers attended several gymnastic beam practices. The observers learned to identify the beam skills they would be recording during the study (see Appendix C). The names of the skills were matched to demonstrations by the gymnasts (the coach verbally labelled the skills being executed by the gymnasts and then had the observers label them). The observers also got to know the gymnasts by name. Definitions of an attempt and a complete were given as well as definitions for coach-subject interactions.

The observers were shown the recording sheet and practiced recording the frequency of the gymnasts' skills. The coach recorded the data independently and simultaneously with the observers. In this way reliability checks were done between the coach and each observer until an 80% or more agreement was reached. Each observer then recorded beam skills independently and simultaneously with another observer, until interobserver reliability scores (IOR's) with 80% or more agreement were obtained.

Prior to the study, the gymnasts were trained by the coach to self-monitor with the recording sheets. A procedure similar to that used to train the observers was used. Before the observer training sessions, the coach explained the observers' presence to the gymnasts. They were told that five psychology students would learn the names of and take notes on their beam skills performed in practice, and they would watch for coach-gymnast interactions.

During the study, IOR checks were carried out by the observers every gymnastic practice. Only three observers (stationary observers) were needed to record beam skills, since there were only three beams used for recording. The two remaining observers (extra observers), were each responsible to record the skills of one gymnast each, for every practice. Their recordings served as IOR checks with the stationary observers.

During Treatment 1, procedural reliability checks were done between each gymnast and the observers that recorded them. Again, the reliability score was calculated by dividing the number of agreements of the attempted skills, by the number of agreements plus disagreements of the attempted skills, and multiplying the result by 100. This was done for each skill performed by the gymnasts. This check was not to test the reliability of the observer data, rather to make sure the gymnasts were recording accurately. The coach did all of the reliability calculations throughout the study.

Dependent Variables Data was taken on two high beams and one low beam. There was another low beam which was used for warm-up before the gymnasts used the high beam. The gymnasts attempted each skill on their recording sheet until the specific criterion for each skill was met (normally, no more than twenty attempts per skill were allowed), then the gymnast moved onto the next skill. During the forty minute beam practices, the observers and gymnasts recorded the frequency of balance beam skills attempted and of those attempted, the number which were complete.

The number of attempted skills and the number of those attempted which were complete, were totalled for each practice skill assigned. At the end of the practice during intervention, each gymnast and the observers totalled the number of attempts

and completes made on the recording sheets. As well, the percentage of the total number of attempted skills which were completed were calculated for each practice session. The dependent variables were graphed daily, by the coach in baseline phases and by the coach and the gymnasts on separate graphs in the treatment phases (see Appendices D, E, F, and G).

The quantity of the skills were of concern and not the quality. On the balance beam event, all skills attempted must be well learned and have proper form and technique prior to being tried on the beam. This certainly does not mean that all of the skills attempted by the gymnasts were of good form. By determining whether each attempt was complete or not, an indirect measure of the quality of the attempt was considered (in order to stick a skill, it has to be done very well). However, if an attempt was judged to be poor but it didn't result in a fall, it would not be counted as a complete by either the gymnast or the observers.

Controlled Variable Coach-subject interactions were measured by the observers across all experimental conditions. Every time the coach interacted with a gymnast while she was on the beam, a mark was made on the observers' recording sheet. Therefore each observer recorded a gymnast's frequency of skills, as well as the frequency of coach-gymnast interactions and the type of interaction. The interactions measured,

consisted of positive feedback, negative feedback, and neutral comments. These measures controlled for the possibility of coach-attention effects across the experimental conditions. Reliability checks were done between the extra and stationary observers using a similar procedure to that described in the preceding reliability section.

Procedures

Baseline Standard Coaching at the gymnastic practices during the baseline phase consisted of verbal skill instructions, correctional feedback, technique correction, encouragement, reprimands, and spotting. The verbal skill instructions indicated the specific skills to practice and the number of repetitions for each skill to complete. Each gymnast reported back to the coach after having completed an assigned skill in order to receive the next instruction. Correctional feedback of the gymnasts' technique was given by the coach during practice. Technique correction involved verbal instruction or verbal instruction and demonstration by the coach, of the correct technique. Encouragement was given to the gymnasts by the coach if needed (eg. "Come on Paola, you can stick that cartwheel"). Praise for performance well done, was given to the gymnasts by the coach (eg. "Way to go"). Reprimands by the coach were issued to the gymnasts if they were off task (eg. "Viv, why are you just standing there looking around? You've got work

to do. Let's go"). Spotting was given to the gymnasts by the coach, when necessary.

After the verbal instruction was issued to a gymnast, the gymnast practiced their given skill and kept track of the number assigned to them by the coach. The gymnasts were given certain procedures to follow:

1. The gymnasts had to complete each skill at one beam only, before switching to another beam. Once they completed the required number of repetitions for a skill, they left the beam and returned to the coach for the next verbal instruction. This instruction involved the skill and the number of repetitions to practice.

2. Gymnasts were recommended to attempt only five repetitions of a skill at a time.

3. No more than 20 attempts should be made for each skill. The coach would call time when the beam practice was over. The gymnasts moved on to their next event at this time.

Recording sheets used by the observers were distributed by the coach just prior to beam practice. The stationary observers (1-3) sat together and recorded the skills performed on beams 1-3, respectively. The two extra observers received one recording sheet each for the entire practice, so that they each had one gymnast to record for that practice day. They sat adjacent to the stationary observers. The recording sheets used

by the observers were identical to the verbal instructions given to the gymnasts. The stationary observers (1-3), recorded the number of attempted skills (and of those attempted, the number that were complete) at beams 1-3, respectively, for any gymnast using the beam they were recording at. The stationary observers were assigned to the same beam throughout the entire study. The observers marked their beam number in the left-hand column of the recording sheet next to the skill they were recording (see Appendix D). This was so that the coach could later tabulate the IOR scores and identify inaccuracies made by the observers. At the end of each practice, the observers totalled the number of attempts, completes, and the percentage of completes at the bottom of each recording sheet. The observers handed the totalled sheets in to the coach and then left the gym.

At the end of beam practice, the coach collected the observers' recording sheets. The coach checked the sheets for accuracy. The coach asked the observers if everything went all right and if there were any problems. The coach thanked the observers and dismissed them. Later, the coach calculated the IOR scores and any observer inaccuracies were noted. Also, the baseline data was graphed for all subjects. The graphs were kept in private (see Appendix D).

The coach used the recording sheets to make up each

gymnasts' next recording sheet. In this way, the coach could make the next day's short-term goals in relation to each gymnasts' ability level and rate of progress during the previous practice.

Treatment 1 (Tr1) This phase involved 'coach' goal-setting, self-recording, graphing, coach feedback of the results, and the opportunity for a reward contingent upon goal attainment. The coach handed the recording sheets out (one to each gymnast, one to each extra observer, and one of each of the gymnasts' sheets to the observer table). The standard coaching procedures (minus the verbal skill instructions) consisting of corrective feedback, praise, encouragement, reprimands, and spotting were carried out by the coach. The observers recorded the frequency of the gymnasts' skills and the coach-subject interactions as explained in baseline.

Prior to the treatment phase, the gymnasts were told that they would be getting a program board which would be put up on the wall. On this program board was an assignment sheet and a set of three graphs (see Appendix E). The coach explained that the purpose of the sheet would be to guide the gymnasts through their beam practice. They were told that the sheet would clearly show them what they were expected to do in the practice, and that by recording, they would be aware of their frequency of beam skills in a practice. They would also be aware

of which skills needed the most work. The coach explained the difference between an attempted skill and a completed skill. They were shown how to record their skills using the circle and stroke method. The gymnasts were shown how to record their practice results on the set of graphs provided on the program board for each gymnast. The goal-setting procedure was explained to the gymnasts by the coach. They were told to aim for the coach-set goals on their graphs, and if they reached the set goals on two of their graphs (the attempts and completes graphs), they would be able to receive a reward during the last 15 minutes of practice that same day. They were told that the coach would call them over to the program board, one at a time to discuss their results. The list of reward activities (see Appendix I) was shown to the gymnasts and they were allowed to make any contributions to the list as long as the coach agreed to them. The reward list consisted of a number of fun gym-related activities (eg., free time on the trampoline). In addition to the guidelines used in the standard coaching condition, the gymnasts were given the following guidelines:

1. The gymnasts were expected to follow the assignment sheet in the correct order.
2. They were expected to finish the sheet.
3. Skills were to be recorded after every fifth attempt.

4. When the coach called time, the gymnasts would total and graph their recorded skills.

At the end of the practice, the gymnasts' sheets on the program board were totalled by the gymnasts. The gymnasts graphed their results (see Appendix E) and then met with the coach, one at a time to discuss their results (coach feedback). During this meeting, the coach observed the gymnasts' frequencies on the recording sheet to see how far the gymnast got in the workout. Praise or prompts for improvements were given according to the gymnasts' goal attainment. This coach-gymnast discussion allowed the opportunity for the gymnast to explain their performance results if necessary. The coach could evaluate the difficulty of the goals and make adjustments for the next workout if necessary. If the gymnasts reached the coach-set goals for both the attempts and completes graph, they would get to choose a reward. Later, the coach did the reliability checks on the observers' recording sheets, graphed the observer data which was kept in private from the gymnasts (see Appendix G), checked on the similarity between the observers and gymnasts' sheets, and used the observer sheets to make up the gymnasts' next workout.

Treatment 2 (Tr2) This phase consisted of self goal-setting, private self-recording and graphing, and a reward opportunity. The observers and gymnasts were both given blank

recording sheets. Prior to practice, the gymnasts were told to set their own goals for the practice. They had to list specific skills and the number of repetitions to complete for each skill. A list of level-two skills were posted on the wall and the gymnasts used this list in setting their short-term goals (see Appendix C). The gymnasts were taught how to set goals. In addition to the guidelines used in the standard coaching phase and in the intervention 1 phase, the gymnasts had to follow other guidelines:

1. Reasonably hard and challenging goals should be set. If goals are made too easy, then they may be reached (and therefore the opportunity for a reward would be available), but there would be no improvement and a lack of preparation for competition.

2. Goals must be realistic enough to actually achieve (the standard number of repetitions for a skill is 5 or 10 complete, with no more than 20 attempts per skill).

3. Every practice should consist of: approximately 4 dance moves, 3 basic tumbling moves, 2-3 new skills, and a mount or dismount of no more than 5 complete (when the workout involves a list of skills). The 'new' skills should be spread out in the workout so they do not all occur consecutively. When the workout consists of repetitions of combinations (4-5 different skills performed consecutively), there should be five

combinations each with 4-5 skills (3 of the skills must be a tumbling skill).

4. Goals should be set in accordance to the preceding practice (eg., If a new skill was assigned and the gymnast did not get to it in the last workout, they should begin with this skill in the next workout. If the gymnast hardly stuck any cartwheels in the last practice, they should definitely include this skill in the next practice).

5. Specific goals were to be set on two of the gymnasts' graphs (the attempts and completes graphs). These goals could be similar to the coach-set goals used in intervention 1.

6. The gymnasts were asked to keep their recording sheet and graphed data private (see Appendix F). The coach would not look at the recording sheets or graphs until the end of the year. The coach would sometimes ask if the gymnasts reached their goals or not. If the gymnasts reached their goals set for both the attempts and completes graphs, they got to choose a reward, as in Tr1. The observers had to list the skills that each gymnast was doing at the time of observation and recording. At the end of practice all sheets were totalled. Later, the coach checked the observers' sheets for accuracy, graphed their data (see Appendix G), and used the sheets to make up the gymnasts' next assignment sheet. Standard coaching procedures (minus verbal skill instructions) consisting of

corrective feedback, praise, encouragement, reprimands, and spotting when necessary, were carried out by the coach.

Experimental Design A single subject research design was used in the present study. In the single subject design, performance is compared under different conditions and the data obtained allow observed changes in performance to be more confidently attributed to specific interventions rather than to other events (Martin & Pear, 1988). The individual's behavior is observed for a period of time prior to the implementation of one or more experimental conditions. The successive alterations in conditions provide several opportunities to collect information analogous to that obtained by comparing experimental and control group performances. According to Wollman (1986) single subject designs eliminate the need for a no-treatment control group and permit the intensive investigation of athletes who have a specific performance disorder, thus eliminating the problem of group averages and any lack of statistical significance obscuring improvements in individual performance.

Experiments with single-subject designs lend themselves well to tailoring specific programs for individuals engaged in real-life athletics (Wollman, 1986). Bryan (1987) noted that traditional statistical procedures for data analysis are not appropriate for data obtained with most single subject designs. Behavioral researchers have typically relied on visual inspection of the data

to assess the effects of interventions, and are generally more concerned with practical or clinical significance than with statistically significant changes.

In the present study a multielement baseline (alternating treatments) design was used. The multielement baseline design measures the same behavior as it occurs during two or more alternating treatments or stimulus conditions (Martin & Pear, 1988). The alternating of the treatments occurs more rapidly than they would be done in the reversal-replication design (which includes a reversal to baseline conditions followed by a replication of the treatment phase). The design allows for the comparison of the effects of different treatments within an individual.

In the present study there were three stimulus conditions: a baseline condition with standard coaching only, a treatment 1 condition using the self-management package with coach goal-setting and coach feedback of the results, and a treatment 2 condition using the self-management package with personal self goal-setting, and private graphing and recording of the results without coach feedback. These three conditions were alternated on a day-to-day basis. All three conditions were used once for every week of practice. The order of presentation of the conditions was counter-balanced to control for sequence effects. To adequately measure the baseline at the start of the

study, baseline data was collected every practice until stability was reached (Martin and Pear, 1988).

The multielement design was used in this study because it allowed for a comparison of the three conditions over time. In this way, a true comparison of the conditions could occur during a similar time period (the design controlled for learning effects over time). It was thought that data could be adequately collected using the multielement design due to the limited amount of time in which the observers were available. According to Martin and Hrycaiko (1983) this design can be applied to behaviors that occur at unstable rates. A return to baseline for several weeks would not have to take place using this design. This was important because the gymnasts were preparing for competition and if the standard coaching procedures were not as effective as the others, it would have been unreasonable to ask the gymnasts to return to a less effective condition.

Social Validation Behavioral procedures must be demonstrably effective in producing behavior change, and also exhibit social validity along several dimensions (Wollman, 1986). Behavior modifiers need to socially validate their work on at least three levels. Firstly, the target behaviors selected should be ones that relevant individuals consider to be important. This criteria was attained by having the coach and gymnasts target goals. Secondly, the program should produce large enough

behavior changes (results) to be regarded as significant by all relevant individuals. Finally, the procedures used should be acceptable to all participants. The latter two concerns were evaluated by administering a questionnaire, just after the completion of data collection (see Appendix H).

Evaluation of Results According to Martin and Pear (1988) the evaluation of the effect of a particular treatment is typically made on the basis of two major sets of criteria: scientific and practical (the latter criterion was discussed in the preceding social validation section). Scientific criteria are used to evaluate whether or not there has been a convincing demonstration that the treatment was responsible for producing a reliable effect on the dependent variable. In applied behavioral analysis using single-subject designs, this judgment is commonly made by visually inspecting the graph of the results. Guidelines for inspecting one's data to judge whether or not a significant effect has occurred include the following. One has greater confidence that an effect has been observed: the greater number of times that it is replicated; the fewer overlapping points between baseline and treatment phases; the sooner the effect is observed following the introduction of the treatment; the larger the effect in comparison to baseline; and the more consistent the findings with existing data and accepted behavioral theory.

In the present study, the data were scientifically evaluated by comparing three of the experimental conditions at a time (those data points in closest proximity to each other) and determining the most effective condition in each comparison. The frequency of the most effective condition for each subject was then determined. The average skill frequency for each subject across all three conditions plus the initial baseline phase, were calculated and compared. The percentage of times the subjects reached their set goals in the two treatment conditions were compared. Evaluating the data in this way, gave an indication which condition was most effective for each subjects' skill frequency.

CHAPTER 4

Results and Discussion

Reliability Evaluations

Inter-observer reliability (IOR) was calculated by dividing the number of agreements during a practice recorded by each observer, by the total number of agreements plus disagreements and multiplying the dividend by 100 (Martin & Pear, 1988). The data collected on the five subjects included the number of attempted skills, and of those attempted, the number which were complete. Inter-observer reliability data are presented in Table 1. A maximum of 62 IOR checks were possible across the 31 practices. A total of 51 IOR checks were done (82%). Out of the 51 IOR's, the IOR fell below the 80% acceptance level on 6 occasions. In those situations, the IOR was 65%, 72%, 73%, 75%, 76%, and 79% on one occasion each.

Intervention Effects

The effects of the treatments on the subjects' frequency of balance beam skills in practice are shown in Table 2. The frequency of attempted and completed skills as well as the percentage of completed skills for the five subjects, increased in all 3 conditions following the initial baseline phase. However, the Tr2 condition had the greatest increase of mean attempts and completes, and percentage of completes.

Table 1

Inter-Observer Reliability Data

<u>Subject</u>	<u>Range</u>	<u>Mean</u>	<u>No. of IOR's</u>
S1	76-94%	89%	10.0
S2	84-100%	83%	10.0
S3	80-98%	86%	11.0
S4	72-99%	86%	11.0
S5	65-99%	84%	9.0

The effects of the interventions for each subject, can be seen in Table 2. S1 had a slightly greater mean frequency of skills in the Tr2 condition than in the overall baseline or Tr1 condition. While the frequency of skills performed in the overall baseline and Tr1 conditions were relatively stable over time, the frequency of skills performed in the Tr2 condition seemed to increase over time (see Figure 1).

S2 showed the same trend as S1, in that S2 had a greater mean frequency of skills in the Tr2 condition than in the overall baseline and Tr1 conditions, but to a much greater degree (see Table 2). The increase in the mean frequency of completed skills performed was the most notable in the Tr2 condition. S2 showed a greater mean accuracy of 11% in the treatment 2 condition, over the overall baseline and Tr1 conditions. The mean frequency of skills performed in the Tr2 condition seemed to increase over time to a greater degree than the mean frequency of skills performed in the other two conditions (see figure 2).

S3 showed a slightly greater mean frequency of skills performed in the Tr2 condition compared to the other two conditions. With this subject, unlike S1 and S2, the mean frequency of skills performed in the Tr1 condition was slightly greater than the mean frequency of skills performed in the overall baseline condition (see Table 2 and Figure 3).

S4 showed a slightly different trend than the preceding subjects, in that the mean frequency of skills performed was slightly greater in the Tr1 condition compared to the other two conditions (see Table 2). The mean frequency of skills performed in the overall baseline and Tr2 condition were very similar. Also unique to S4, was the stability of results across the entire study (see Figure 4).

S5 had a greater mean frequency of attempted skills in the Tr2 condition compared to the overall baseline and Tr1 conditions, respectively. Although the mean frequency was similar in these two conditions, the overall baseline phase showed a slightly greater mean frequency for the attempted skills compared to the Tr1 condition. A change was noted for the mean frequency of completed skills, in that Tr1 and Tr2 showed a greater mean frequency than the overall baseline condition (see Table 2). As with S1 and S2, the frequency of attempted skills performed by S5 in the treatment 2 condition seemed to increase over time (see Figure 5).

To determine the frequency of condition effectiveness for each subject, three adjacent data points (representing the three conditions) were compared at one time, over time. The frequency of the most effective condition in each comparison was then determined. The results can be seen in Table 3. For subjects 1, 2, 3, and 5, the Tr2 condition was the most effective

Table 2

Mean Frequency of Beam Skills Performed in Practice

	<u>No. of Attempts</u>				<u>No. of Completes</u>				<u>% Completes</u>			
	<u>IBs</u>	<u>Bs</u>	<u>Tr1</u>	<u>Tr2</u>	<u>IBs</u>	<u>Bs</u>	<u>Tr1</u>	<u>Tr2</u>	<u>IBs</u>	<u>Bs</u>	<u>Tr1</u>	<u>Tr2</u>
S1	76	81	73	86	45	53	44	59	60	64	60	66
S2	59	81	78	96	27	49	48	72	45	58	62	73
S3	59	60	64	69	24	37	41	45	40	59	62	66
S4	63	64	73	67	44	47	55	48	69	72	76	72
S5	63	70	67	83	38	39	50	49	54	55	65	58
<u>Mean</u>	<u>64</u>	<u>71</u>	<u>71</u>	<u>80</u>	<u>36</u>	<u>45</u>	<u>48</u>	<u>55</u>	<u>54</u>	<u>62</u>	<u>65</u>	<u>67</u>

Note. S = subject; IBs = initial baseline; Bs = overall baseline; Tr1 = treatment 1; Tr2 = treatment 2. The overall baseline condition includes all the baseline data following the initial baseline phase.

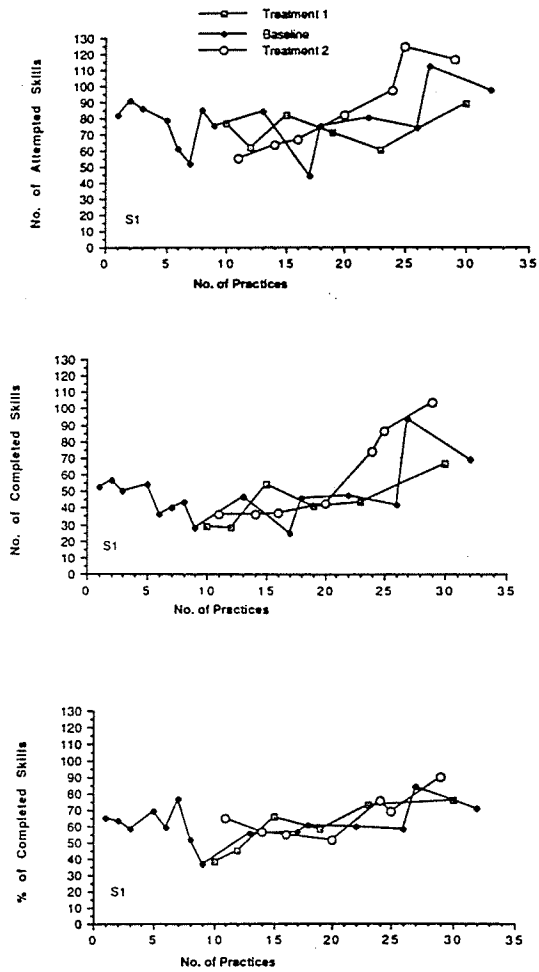


Figure 1. A graphical display of the frequency of beam skills for S1 under all of the experimental conditions.

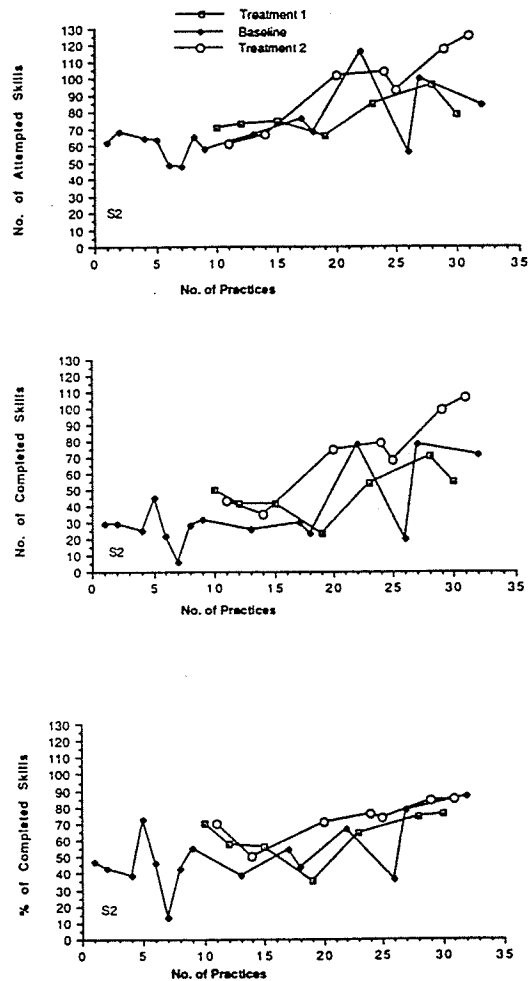


Figure 2. A graphical display of the frequency of beam skills for S2 under all of the experimental conditions.

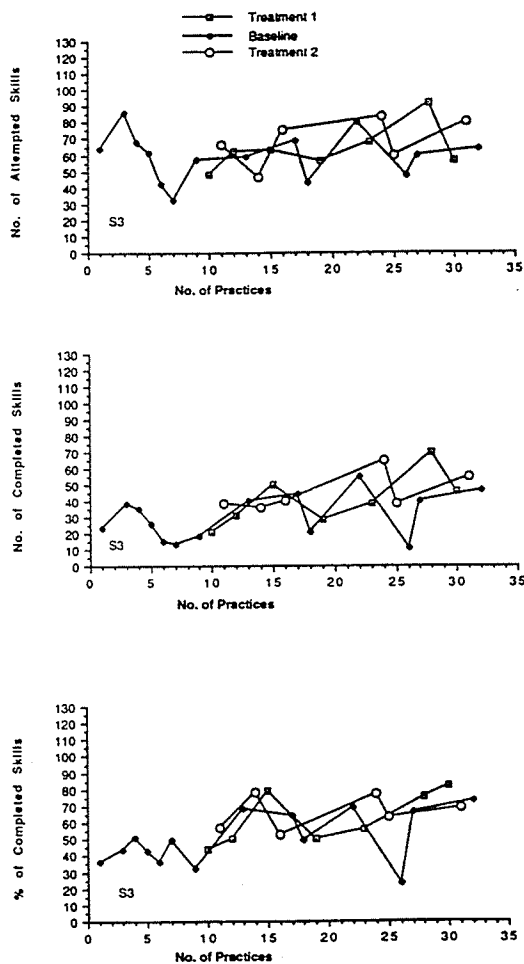


Figure 3. A graphical display of the frequency of beam skills for S3 under all of the experimental conditions.

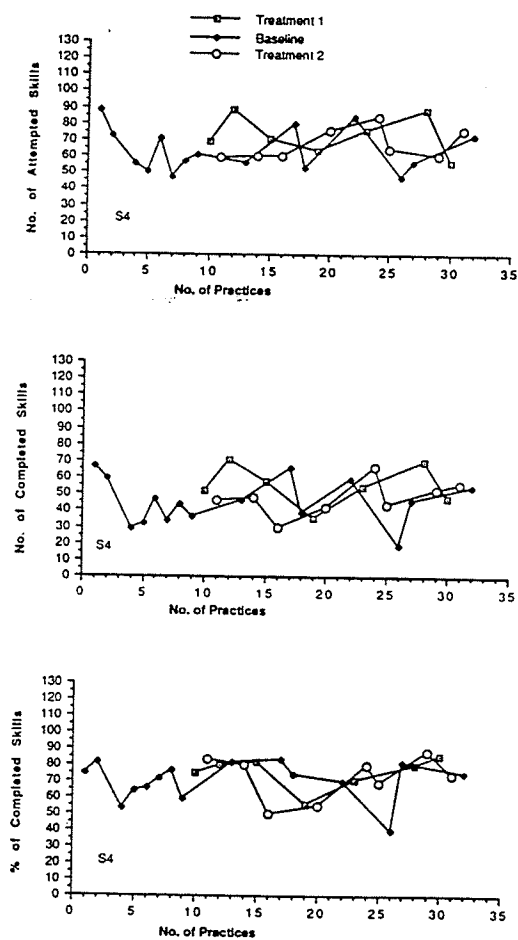


Figure 4. A graphical display of the frequency of beam skills for S4 under all of the experimental conditions.

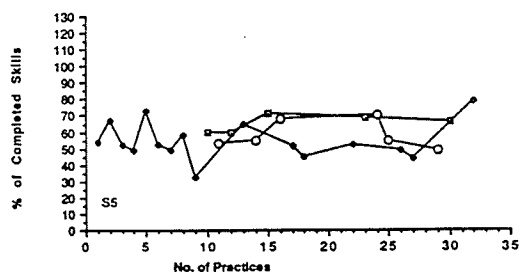
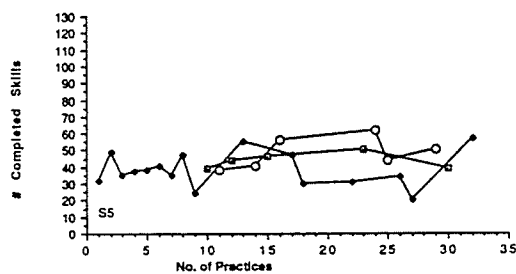
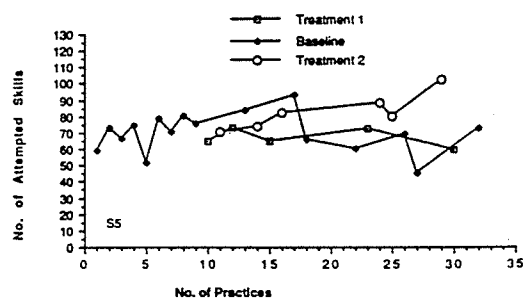


Figure 5. A graphical display of the frequency of beam skills for S5 under all of the experimental conditions.

condition most often (in terms of producing the greatest skill frequency). A change was noted for S4 in that the most effective condition the greatest number of times was Tr1, although the Tr2 condition was not far behind. The group of subjects as a whole, performed the greatest frequency of both attempted and completed skills in the treatment 2 condition, 47% and 48.5% of the time, respectively. The Tr1 and baseline condition seemed to be effective only 26.5% of the time for the frequency of attempts. However, both goal-setting conditions together were the most effective conditions 73.5% of the time for the frequency of attempts. For the frequency of completes, Tr1 was ranked second with it being the most effective condition 28.5% of the time compared to the baseline condition which was the most effective condition only 17% of the time. Together both goal-setting conditions were the most effective conditions 77% of the time for the frequency of completes.

The percentage of times the subjects reached their goals in each condition was calculated and is shown in Table 4. S1 reached her goals a greater percentage of times in the Tr2 condition than in the Tr1 condition for both the frequency of attempted and completed skills. S2 reached her goals a similar

Table 3

Frequency of Condition Effectiveness

<u>S</u>	<u>No. of Attempts</u>				<u>No. of Completes</u>			
	<u>Bs</u>	<u>Tr1</u>	<u>Tr2</u>	<u>All</u>	<u>Bs</u>	<u>Tr1</u>	<u>Tr2</u>	<u>All</u>
S1	1.0	2.0	3.0	0.0	0.5	2.0	3.5	0.0
S2	1.5	1.5	3.0	0.0	1.0	1.0	3.0	1.0
S3	1.0	1.5	3.5	0.0	1.0	2.0	3.0	0.0
S4	1.5	3.0	2.5	0.0	1.0	3.0	2.0	1.0
S5	3.0	0.0	2.0	0.0	1.5	0.5	3.0	0.0
T	8.0	8.0	14.0	0.0	5.0	8.5	14.5	2.0
%	26.5	26.5	47.0	0.0	17.0	28.5	48.5	6.0

Note. T = total number of comparisons of three data points (representing three conditions) over time.

percentage of times for the frequency of attempted skills in both conditions. In contrast, she reached her goals a greater percentage of times for the frequency of completed skills in the Tr2 condition compared to the Tr1 condition. S3 showed similar results to S1, in that for both the frequency of attempts and completes she reached her goals a greater percentage of times in the Tr2 condition (see Appendix G).

S1, S3, and S5 all reached their goals a greater percentage of times in the Tr2 condition over the Tr1 condition, for the frequency of both their attempted and completed skills. S2 and S4 also reached their goals a greater percentage of times in the Tr2 condition, but only for their frequency of completed skills. S4 seemed to reach her goals a greater percentage of times in the Tr1 condition for her frequency of attempts (see Table 4 and Appendix G). As a group, the five subjects reached their goals most often in the Tr2 condition compared to the Tr1 condition for both the frequency of attempted and completed skills. The greater percentage of goals reached in the Tr2 condition was most notable for the frequency of completed skills. It is important to note that the goal values were determined between the two conditions for each subject, and they were found to be of similar value in terms of difficulty. That is, the difficulty level of the goals were constant in both the Tr1 and Tr2 conditions.

Table 4

The Percentage of Times Goals Were Reached

	<u>No. of Attempts</u>		<u>No. of Completes</u>	
	<u>Tr1</u>	<u>Tr2</u>	<u>Tr1</u>	<u>Tr2</u>
S1	67%	86%	33%	57%
S2	71%	71%	43%	71%
S3	71%	83%	43%	67%
S4	71%	50%	57%	63%
S5	40%	100%	60%	83%
<u>Mean</u>	<u>40%</u>	<u>78%</u>	<u>47%</u>	<u>68%</u>

The frequency of coach-subject interactions were recorded by the observers to act as a control variable for treatment effectiveness. A coach-subject interaction consisted of a verbal statement given to the gymnast by the coach, while the gymnast was on the balance beam. The coach-subject (C-S) interactions may be either positive, negative, or neutral in nature. The frequency of the C-S interactions were constant across the three experimental conditions. The average frequency of coach-subject interactions per subject per practice, was calculated to have a value of 7.

Social Validation At the end of the study the subjects were given a social validation questionnaire to complete (see Appendix H). When the gymnasts were asked whether they liked the baseline condition (consisting of standard coaching procedures only) four out of five of the subjects answered that they did not really like the baseline procedures, and S3 had no opinion. Several questions were asked about the goal-setting, recording, and reward system in general (Tr1 and Tr2). All five subjects liked the goal-setting system used in both treatments; all claimed they tried harder with the goal-setting system (effort); all liked to find out how they performed in beam practice in terms of the frequency of their attempted and completed skills (feedback); all found the procedures to be of average difficulty; all liked the reward opportunity; and four

subjects found the task of recording to be satisfactory, while S3 thought it was too time-consuming.

Specific questions on the coach goal-setting (Tr1) procedure were asked, and the findings were as follows: Four out of the five subjects liked the coach goal-setting procedure while one subject had no opinion; all five of the subjects reported that they tried harder in this condition; two of the subjects said the pressure was greater, one subject reported the pressure to be average, and two of the subjects said there was no real pressure in this condition; all five of the subjects said that the coach goal-setting procedure was of average difficulty; and three out of the five subjects said that the coach goal-setting procedure was the most helpful in terms of achieving a greater frequency of skills performed in a practice.

Specific questions on the self goal-setting (Tr2) procedures were asked and the findings were as follows: All five of the subjects liked the self goal-setting procedures; all five of the subjects tried harder; two of the subjects found the pressure to be greater, one of the subjects found the pressure to be average, and two of the subjects found there to be no real pressure in this condition; all five of the subjects reported the self goal-setting procedure to be of average difficulty; and two of the five subjects reported this procedure to be the most helpful

in terms of achieving the greatest frequency of skills performed in a practice.

When the subjects were asked to choose one procedure to use all week, three subjects chose the self goal-setting procedure and two subjects chose the coach goal-setting procedure. When the subjects were asked to choose two procedures to use all week, four subjects chose the coach and self goal-setting procedures, while one subject chose the baseline procedure and the self goal-setting procedure. When the subjects were asked if they would prefer to use all three coaching procedures for variety, four subjects said that they would prefer to use all three procedures on an alternating basis. S3 said that she would not want to use all three of the coaching procedures because she did not like the baseline condition.

Four of the subjects said that both of the goal-setting, recording, and reward opportunity procedures were the most fun. One subject said that the baseline procedure was the most fun. The subjects were asked if they would ever use the goal-setting procedures in the future if they were on the university gym team, for example, where they were partly responsible for their own workout plan. All five of the subjects said that they would list the skills (goals) that they would work on. Three subjects said that they would actually record the frequencies. Overall, the social validation results indicated that the subjects

preferred the goal-setting self-management procedures (Tr1 and Tr2) over the baseline condition.

Discussion

The present research demonstrated that a goal-setting, self-management package can be effective in improving the practice performance of gymnasts on the balance beam event, although there were inconsistent findings with some subjects. According to Martin and Pear (1988) there are scientific considerations for evaluating the effect of a treatment. First, the immediacy of the treatment effect or the sooner the effect is observed following the introduction of the treatment, can determine whether an effect has occurred. In the present study, there were no immediate treatment effects. However, over time, the Tr2 condition demonstrated increasing effectiveness for 3 of the 5 subjects. A second scientific consideration to note when evaluating a treatment effect is the number of overlapping data points between baseline and treatment phases. The fewer overlapping points seen, the better. In the present study, there were overlapping data points. Overlapping data points may have been due to generalization and/or contrasting effects between the alternating conditions. A third scientific consideration to note is the size of the treatment effect in comparison to the baseline. In the present study, the

size of the effect was determined by the numerical difference between the goal-setting and baseline conditions. In the present study, the group of subjects as a whole averaged 9 more attempted skills/practice in the Tr2 condition compared to the Tr1 and baseline conditions. This was a 12.6% increase for the frequency of attempted skills. The group of subjects as a whole averaged 10 more completed skills/practice in the Tr2 condition compared to the Tr1 and baseline conditions. This was a 22% increase for the frequency of completed skills. Three of the subjects in particular showed performance increases for both the frequency of attempts and completes with Tr2. Subjectively, this increase in skill frequency was significant to the coach involved in the present study. A fourth scientific consideration involved when evaluating a treatment effect is the replication of the effect. In the present study, Tr2 produced the greatest skill frequency for 3 of the 5 subjects (see Table 2); Tr2 was the most effective condition most often for 3 of the 5 subjects (see Table 3); 4 of the 5 subjects reached their goals most often in the Tr2 condition; and the two goal-setting conditions were the most effective treatments (73.5% of the time for the frequency of attempts and 77% of the time for the frequency of completes). Even though Tr2 seemed to be more effective than Tr1, there were inconsistencies between and within subjects. However, all subjects improved their frequency

of attempts and completes over standard coaching in at least one of the two goal-setting conditions.

A final scientific consideration to note when evaluating the effects of a treatment is the consistency of the results with the literature, behavioral theory in particular. As discussed in chapter 2, the literature suggests that goal-setting has a positive effect on performance. In the present study it can be stated that the effects of the goal-setting treatments, although not strong effects, were consistent with most of the research findings, showing goal-setting to positively affect performance compared to control groups (Lock and Latham, 1985; Burton, 1983; Hall et al., 1987; Weinberg et al., 1988; Miller and McAuley, 1987; Giannini et al., 1988).

In the present study, the graphical results show many overlapping data points and a lack of immediate treatment effects. There are some possible reasons for the lack of strong treatment effects between the two treatment conditions and the overall baseline condition. With regards to the immediacy of the effect, the time span allotted for each condition to show its' effect may have been too brief. The multielement design involves alternating two or more conditions considerably more rapidly than would be done in a reversal-replication design (Martin and Pear, 1988). Giannini et al (1988) stated that the time frame must be considered when assessing goal-setting

effects. They suggested that basketball shooting like many other sport skills requires extensive practice to reach significantly higher levels of performance, and an immediate increase in effort may not be met by an immediate increase in performance. Goals may still be effective in such cases, but the time frame for goal attainment may have to be extended to allow for necessary practice. Similarly, Hall and Byrne (1987) have suggested that three weeks may not be enough time to observe the advantages of employing flexible (participant) goals. They recommended that future studies use much longer interventions to allow the flexibility of self-set goals to take effect. The duration of the present study was 11 weeks, however, each treatment condition was only implemented once a week for an 8 week period.

Martin and Pear (1988) have identified interaction effects as another problem with the multielement design. Interaction effects would result in one of the treatments producing an effect either because of the contrast to the other treatments in alternating sessions or because of generalization across conditions. Contrast effects occur due to novelty or variety in the workout; while generalization may occur because of similarities between conditions. In the present study, it could be that the baseline condition failed to show a greater decrease in some of the gymnasts' skill frequency due to contrasting effects and/or generalization across conditions. Martin and

Pear (1988) suggested that one way to test for contrasting effects and generalization across conditions, would be to revert back to baseline conditions for an extended period of time. This would give a better idea of the effectiveness of the baseline condition without the goal-setting conditions present. However, in the present study, the multielement design was selected because it was not necessary to revert back to an extended baseline. In the present study, the baseline had some common elements with the treatment conditions. Goal-setting occurred in the baseline phase, but it was in verbal form. The gymnasts would receive a reinforcement (praise and success) if they reached the coach-set goals. It could be that the effective use of behavioral coaching strategies as part of the standard coaching procedures contributed to hiding strong goal-setting effects. Perhaps for other coaches not using a behavioral coaching approach, the goal-setting effects would have been more pronounced.

Although the size of the treatment effects may seem to be small, one must point out that to a coach they are quite significant. If a gymnast can increase the average frequency of completed skills consistently by 10 skills per practice, they will complete approximately 30 more skills per week, which is the equivalent of 120 more skills that remain on the beam, per month. This can make a big difference in the gymnasts'

progress and competition results. There is no known scientific evidence to support the significance of this improvement, but after discussing the issue with a number of competitive gymnastic coaches, they agree that even a slight increase can prove worthwhile.

There are other factors that may limit goal-setting effectiveness. Hall and Byrne (1987) stated that the nature of the subjects may prevent goal-setting effects from being observed. These researchers suggested, for example, that all participants in their study were highly motivated to perform. Most sporting activities or tasks are often highly motivating to the participant. Thus, the activity itself may be a more salient motivational factor than the technique of goal-setting in such situations.

Miller and McAuley (1987) discussed ability ceiling effects to be a possible reason for a lack of goal-setting effects. Improved performance through goal-setting depends very much on the participants' own abilities. Once performance limits are approached, goals will have little or no effect on subsequent performances. In the present study it could be that some of the subjects (S3 and S4) were limited in the amount that they could improve. This possibility would hide any effects of goal-setting and possibly make the subject's performance level consistent across all conditions. Miller and McAuley (1987) discussed the

stabilizing effect that goal-setting can have. In their study the goal-setting groups' consistent performance suggested a stabilizing effect of goal-setting. If performance can be made more consistent through goal-setting, at or near an athlete's maximum level of ability, then its utility in sport should not be underestimated by an absence of continuous performance increments. The authors stated that the key to sport psychology in fulfilling its promise with high level athletes will be determined by sport psychologists' ability to bring about consistent performance in athletes who were once inconsistent. In the present study, some of the subjects seemed to have variable performance results in the baseline condition (see Figures 1, 2, and 3). The subjects' performance appeared to stabilize or increase in the two goal-setting conditions.

Another possible reason for the lack of major differences between the overall baseline condition and the treatment conditions, is that the present study was a field study as opposed to a laboratory study, where greater control of the variables is possible. According to Hall and Byrne (1987) the majority of goal-setting studies failing to find support for goal-setting effects on sport performance, are field experiments. The studies demonstrating support for the effectiveness of goal-setting were either laboratory studies (Hall et al., 1987), well controlled field experiments (Barnett and Stanicek, 1979), or investigations

involving lengthy training in effective goal-setting (Burton, 1983). It seems that when goal-setting research is removed from well controlled laboratory situations to actual sporting environments, unknown elements within these environments prevent goal-setting effects from being observed (Hall and Byrne, 1987). Although the coach tried to control for difficulty for each subject across all conditions in the present study, it wasn't always possible. Practice 19 (Tr1 condition) showed quite a decrease in frequency of skills across every subject (see Figures 1 to 4). The coach firmly believed that the decrease was due to the nature of the particular practice, specifically, the difficulty level. The ratio of tumbling to dance elements was much greater in this practice compared to most of the practices with average difficulty (a tumbling element on beam is often more difficult than a dance element and it takes longer to attempt a tumbling skill). The data derived from practice 21 was eliminated from the study because the coach tried a new workout plan involving combinations of skills (instead of a list of separate skills to be practiced one skill at a time, which can make the repetitions quite boring). The ratio of tumbling to dance elements was very low in this practice. The effects were clearly shown across every subject, in that the frequency of skills performed, increased dramatically. The researcher felt that this data would have contaminated the results of the study because the dramatic

frequency increase was thought to be due to the type of workout and not the treatment condition itself. Therefore, it was necessary to eliminate practice 21 from the data collected in the study. Practice 22 (Baseline condition) showed a dramatic increase in skill frequency for all of the subjects except S5 (Figures 1 to 4). It was during this practice that the new workout plan consisting of combinations was again put into effect, and although the coach tried to stabilize the difficulty level by increasing the number of tumbling skills, the combinations themselves seemed to account for the dramatic performance increases. It may be that the coach discovered a new motivation technique which involved grouping five skills (a mixture of tumbling and dance) to be practiced at one time, instead of the common listing of individual skills to be practiced one skill at a time. It could be that a combination of skills to practice may allow for variety and an opportunity for success with the gymnasts. For example, a gymnast assigned 5 complete cartwheels may attempt 15 and not complete one. The same gymnast may be assigned to complete 5 combinations each consisting of the cartwheel skill as well as other skills before and after the cartwheel skill (some of which are dance skills which allow for success because they are easier to complete), and even though the gymnast may fall on every cartwheel in the combination they would still complete the majority of other

skills in the combination at the same time. Practice 26 (Baseline condition) involved a return to a listing of skills rather than combinations. Again, every subjects' frequency of skills performed (except for S5) decreased dramatically due to the nature of the workout. For practice 27 the coach returned to the use of combinations trying to keep the difficulty level consistent. As could be predicted, all of the subjects' skill frequency increased (dramatically for S1 and S2, but not at all for S5) (see Figures 1 to 5 and take note of practices 26 and 27). Although it was not the most appropriate time for any extraneous variables to interfere with possible goal-setting effects, it's just one of the characteristics of a field experiment. The discovery of the combinations acting as a motivator for skill frequency was accidental yet for the coach, a very productive discovery!

Subject absences in the present study may have played a role in performance results especially if the absence occurred after the initial baseline condition (the initial baseline condition had a sufficient number of data points to represent the performance level of the subjects in this condition). S1 and S2 each had 2 absences (S1 was absent once in Tr1 and once in Tr2; S2 was absent twice in Tr2). S3 and S5 were absent 4 times (S2 was absent twice in Tr2 and twice in Bs; S5 was absent twice in each of the treatment conditions). S4 was not

absent in any of the conditions following the initial baseline phase.

The Tr2 condition seemed to be a somewhat more effective condition for some subjects, yet because Tr1 was not as effective, the goal-setting, self-monitoring, and reward opportunity solely, could not be responsible for the effect on skill frequency. There must be some element(s) present in the Tr2 condition that are responsible for the effect. Likewise, it could not be stated that the goal-setting, self-monitoring, and reward opportunity are not responsible at all for the effect, rather these elements as well as one or more other elements appear to be responsible for the effect. Kirschenbaum (1985) stated that goals which are experimenter-set should be flexible rather than rigid. If goals are not flexible, then unforeseen events such as illness or injury may prevent their attainment, resulting in adverse self-reactions and perhaps a failure to reach the goals. When goals are highly specific, they do not allow for fluctuations in situational forces which can lead to frequent failure and a performance decrease. Allowing the individuals the freedom to set their own personal goals permits more positive benefits than assigning them rigid goals because self-imposed goals take into consideration the individual's personal situation. Flexibility in the goal-setting process may encourage individuals

to seek more challenge and strive for further personal improvement if their initial progress toward a goal is rapid.

Miller and McAuley (1987) investigated the effectiveness of goal-training (GT) on skill performance of the free-throw shot used in basketball. Although there were no significant objective performance differences between the GT group and control group, the GT group reported significantly higher perceptions of success and self-efficacy. There may be other reasons why the self (or participant) goal-setting condition may be slightly more effective than the coach goal-setting condition. It could be that the majority of the gymnasts were already motivated to improve and perform well and they may therefore, have benefited from participant goal-setting (Locke and Latham, 1985). According to Botterill (1978) athlete participation in goal-setting can increase the athlete's awareness of goals and increase commitment to the goals. Erez and Arad (1986) examined three explanations as to why participation in goal-setting may lead to increased performance. The three factors looked at were: the social factor of group discussion, the motivational factor of involvement in goal-setting, and the cognitive factor of information. These factors could explain why the Tr2 condition was more effective in some of the gymnasts' overall frequency of skills performed in practice. Although Tr2 was more private than public the gymnasts were by no means left unguided in setting their own

goals. The subjects had to adhere to specific guidelines in order to keep the goals relatively similar to the coach-assigned goals. The difference was the choice involved in the selection of skills and the number of repetitions to aim for. However, the subjects were limited in the freedom of their goal choice. The subjects had to choose all of their skills from a list, but they could only choose so many dance skills, and they had to aim for no less than 5 complete of each skill chosen.

The social validation questionnaire results provided strong support for the effectiveness of the goal-setting treatments and surprisingly there was not as much difference between the subjects' responses toward the Tr1 and Tr2 conditions, as one might expect. There was however, a significant difference between the subjects' responses toward the standard coaching procedures and the two treatment conditions. The subjects favored both of the goal-setting conditions to that of the standard coaching conditions. Therefore, it seems as though the social validation results cannot account for the slightly greater effectiveness of the Tr2 condition.

The findings contribute to the research in several ways. First, it provides the first research on self-regulation procedures in a gymnastic setting. Second, the results of this study also contribute to the literature regarding the effectiveness of private and public self-regulation procedures. The research comparing

the effects of assigned and participant goal-setting occurs most often in organizational settings and is controversial. To date this writer is not aware of any goal-setting research done in a gymnastic setting, specifically.

CHAPTER 5

Summary and Conclusions

The main purpose of the study was to examine the motivational effects of a goal-setting, self-management package on the practice performance of young competitive gymnasts on the balance beam event. The study also compared three coaching conditions to determine which condition was the most effective for each of the five subjects. Measurements consisted of the frequency of skills attempted, and of those attempted, the frequency which were complete. A frequency recording sheet was used to determine the skill frequency for each gymnast for each practice. The data was collected over an eleven week period by five psychology students. Five young competitive female gymnasts were selected as subjects for the investigation. All subjects and their parents were required to sign a consent form prior to the intervention phase of the experiment.

A single subject design (the multielement design) was employed to assess the effects of the intervention on the frequency of balance beam skills for each subject. Frequency tables and a visual analysis of the data indicated that changes in skill frequency did occur.

The results of the present study demonstrated that a goal-setting self-management package can be effective in increasing

gymnastic skill performance on the beam for some of the gymnasts. The private self goal-setting condition was a slightly more effective condition in terms of increasing the gymnasts' skill frequency. The effectiveness of self-regulation and participation in the goal-setting process is supported by various authors (Kirschenbaum, 1984; Bandura, 1976; Botterill, 1978; Carron, 1984) and by various research studies (Campbell & Gingrich, 1987; Early & Kanfer, 1985; Evans, 1984; Erez & Arad, 1986). The present study found self-regulation procedures to be effective for gymnasts aged 10-13 years, following goal-setting training.

Conclusions

1. There was an increase in the skill frequency of all subjects in all conditions following an introduction of the treatment conditions. The goal-setting conditions showed a greater skill frequency increase compared to the baseline condition.
2. The self goal-setting package was slightly more effective than the coach goal-setting condition, as it produced a greater mean skill frequency.
3. Four of the five subjects reached their set goals most often in the self goal-setting condition.

4. Social validity measures indicated that subjects preferred both goal-setting conditions to the baseline procedure.

Recommendations

1. Additional study should be undertaken on the effects of goal-setting (self and assigned goal-setting) on other gymnastic events, and with subjects of a different age, ability level, and sex.

2. Additional research is required utilizing single subject designs such as the reversal replication design or the multiple baseline design with a replication of the most effective condition.

3. Future studies of goal-setting in sport should assess the effects of goal-setting on diverse tasks and sports using the single subject design in applied settings.

4. The long-term effects of goal-setting should be examined to determine whether goal-trained subjects continue to systematically set goals after the treatment ends.

Practical Implications

The following suggestions are made to the coach/athlete interested in implementing a goal-setting, self-management package:

1. The coach should utilize more than one goal-setting coaching procedure to determine which procedure each subject prefers to use and which procedure each subject performs the best under.
2. The self goal-setting procedure can be used with a private component on some practice days and with a public component on other practice days.
3. The coach must guide (train) the athletes in the goal-setting process. This technique can be utilized by implementing assigned goal-setting procedures prior to self goal-setting procedures.
4. The coach may want to assign combinations of skills instead of a list of individual skills to practice.

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APPENDICES

Appendix A
Consent Form

September 25, 1988

Dear Parents:

I am writing to request the permission of you and your daughter for including your daughter in a project on sport psychology that I would like to conduct during the coming year with the gymnasts whom I coach. Specifically, I am interested in examining ways to improve the performance of the gymnasts on balance beam skills. As a part of the project, I will have five university students observing the gymnasts in my group and collecting observations on their beam skills. We will then introduce a self-management program consisting of goal-setting, self-recording, and graphically displaying the results for each gymnast. Based on previous projects of this nature, I anticipate that the program will improve balance beam skills of all the gymnasts, and that it should help make their practices more interesting and more fun. The project will last from approximately the end of September through to the middle of December. I would greatly appreciate your support in allowing your daughter to participate in the project.

Thank you,

Karen Wolko

I give my daughter permission to participate in the project.

(Parent signature)

I am happy to participate in the project.

(Gymnast signature)

Appendix B

RECORDING SHEET

LOW BEAM 1.
MIDDLE BEAM 2
HIGH BEAM 3

GYMNAST: _____
PRACTICE No.: _____
DATE: ____/____/____
 D H Y

No.	SKILLS	RECORDING	COMPLETE	ATTEMPTS
1		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
2		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
3		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
4		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
5		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
6		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
7		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
8		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
9		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
10		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
11		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
12		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
13		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
14		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
15		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
16		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
17		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
18		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
19		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
20		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
PERCENT COMPLETE: _____ %			TOTALS	

Figure 1B. Gymnast's recording sheet (unfilled) used to record the frequency of beam skills in practice.

RECORDING SHEET

LOW BEAM 1
MIDDLE BEAM 2
HIGH BEAM 3

GYMNAST: _____
PRACTICE No.: _____
DATE: ___/___/___
 D H Y

No.	SKILLS	RECORDING	COMPLETE	ATTEMPTS
1		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
2		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
3		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
4		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
5		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
6		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
7		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
8		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
9		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
10		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
11		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
12		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
13		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
14		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
15		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
16		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
17		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
18		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
19		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
20		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
PERCENT COMPLETE: _____ %			TOTALS	
COACH - SUBJECT INTERACTIONS				

+ F.B.	NEUTRAL	- F.B.	TOTAL

Figure 2B. Observer's recording sheet (unfilled) used to record the frequency of a gymnast's beam skills and coach-subject interactions in practice.

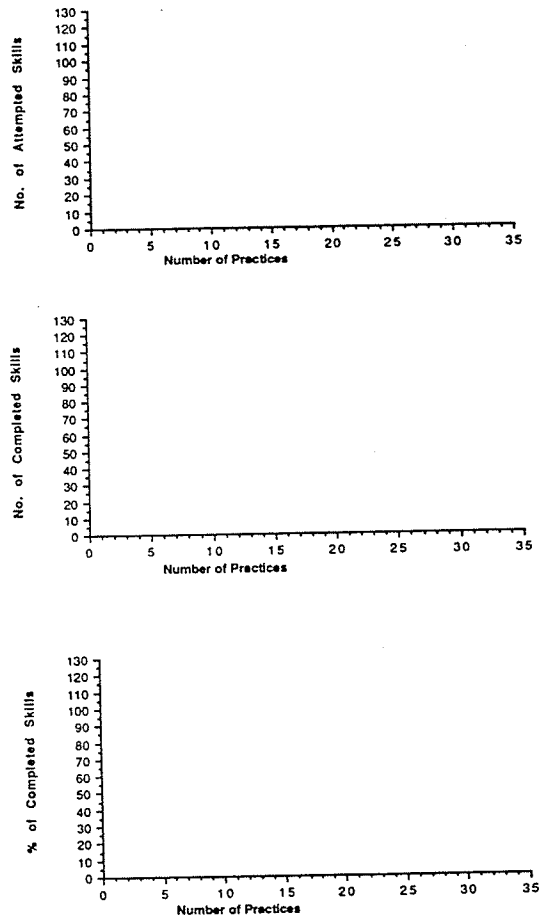


Figure 3B. Gymnast's graphs (unfilled) used to plot their data points.

Appendix C
List of Beam Skills

Leaps

Split, switch, stag.

Jumps

Plain, switch, half (J 1/2), tuck (TJ), tuck half (TJ 1/2),
split, stag, double stag.

Turns

Half (1/2), full (1/1), 1 1/2.

Basic Tumbling

Handstand (H), cartwheel (CW), backwalkover (BW).

Optional Tumbling

Frontwalkover (FW), tictoc, valdez, round-off (RO),
backhandspring (BH), handstand roll (H Roll).

Dismounts

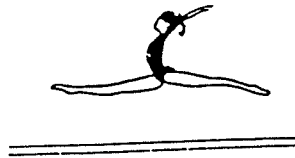
Side aerial, front aerial (ft. aerial), front somie (ft. somie).

Combinations

Gym-gym (2 dance moves together), acro-gym (a tumbling
skill and a dance skill together), acro-acro (2 tumbling skills
together).

BEAM SKILLS

Split Leap



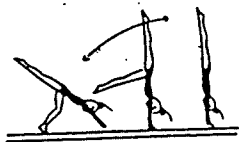
Full (1/1) Turn



1/2 Turn Jump



Handstand



Free-roll



Cartwheel (c.w.)



1-Hand Cartwheel

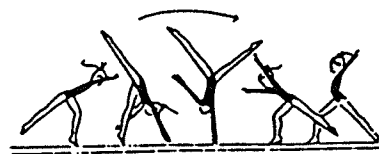
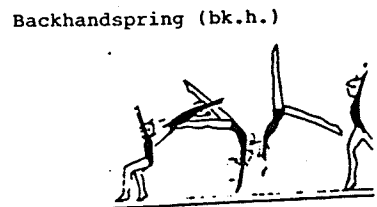
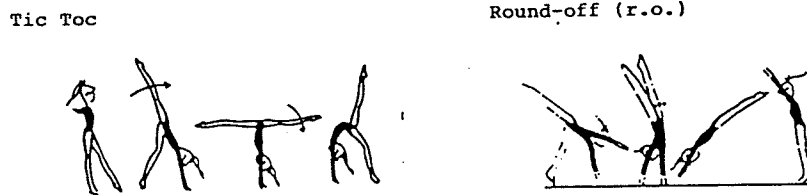
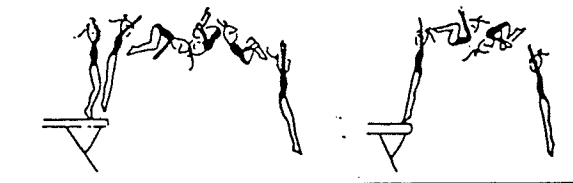


Figure 1C. Diagrams of gymnasts' beam skills. These are used to train observers in identifying gymnastic beam skills.



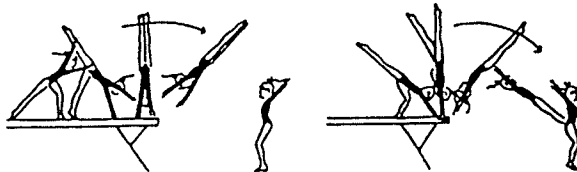
Front Somie (tuck) dismount

Back Somie dismount (dism't)



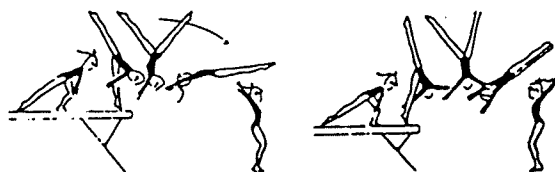
Round-off dismount

Front Handspring dismount



Front-Aerial dismount

Side-Aerial dismount



Appendix D

RECORDING SHEET

LOW BEAM 1
MIDDLE BEAM 2
HIGH BEAM 3

Gymnast: Sue
Practice No.: 1
Date: 5/10/88
O H Y

No.	SKILLS	RECORDING	COMPLETE	ATTEMPTS
3	1 10 Leap	100000 000000 11 12 13 14 15 16 17 18 19 20	10	10
3	2 10 1/2-Jump	100000 100000 1100 13 14 15 16 17 18 19 20	10	12
2	3 5 1/2-Turn	011000 00 7 10 11 12 13 14 15 16 17 18 19 20	5	7
3	4 10 H-Jump	000000 110100 1100 14 15 16 17 18 19 20	10	13
2	5 CW	1001000 7 10 11 12 13 14 15 16 17 18 19 20	5	7
2	6 5 Dismant	100000 0 7 9 10 11 12 13 14 15 16 17 18 19 20	5	6
1	7 5 BW	11111 01114 4013 44 44044	4	20
8		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
9		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
10		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
11		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
12		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
13		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
14		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
15		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
16		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
17		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
18		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
19		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
20		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
PERCENT COMPLETE: <u>65</u> %			TOTALS	
			49	75

COACH - SUBJECT INTERACTIONS

+ F.B.	NEUTRAL	- F.B.	TOTAL
		+++ 1	(12)

Figure 1D. A hypothetical example of an observer's recording sheet used to record a gymnast's frequency of beam skills and coach-subject interactions in practice number 1 during Baseline.

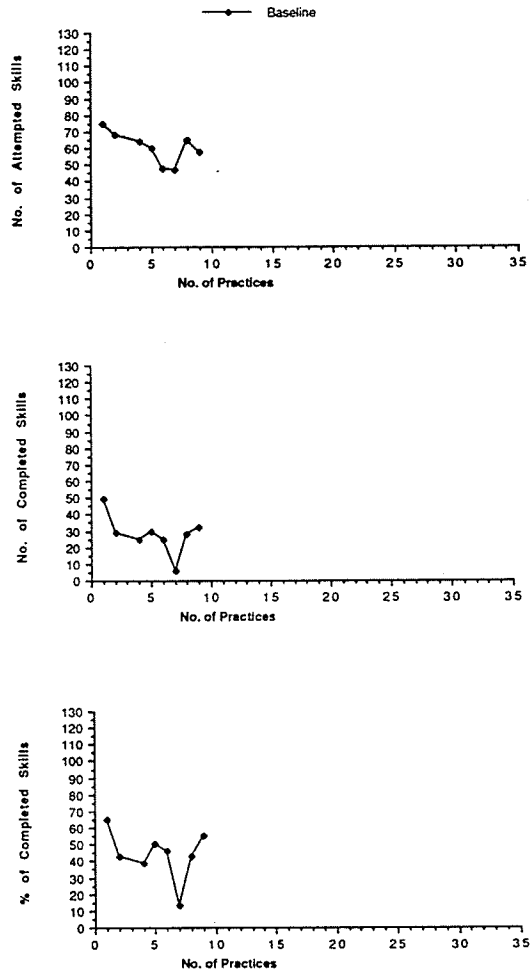


Figure 2D. A hypothetical example of a gymnast's graphed data of the frequency of beam skills performed in practice 1, during Baseline.

Appendix E

RECORDING SHEET

LOW BEAM 1.
MIDDLE BEAM 2
HIGH BEAM 3

GYMNAST: Mary-Lou
PRACTICE No.: 10
DATE: 19 / 10 / 88
 0 H Y

No.	SKILLS	RECORDING	3 rd COMPLETE	5 th ATTEMPTS
1	10 1/1 Turns	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	10	20
2	10 Leap-Jump	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	10	12
3	10 Split Jump	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	10	10
4	10 H-Jump	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	10	12
5	5 CW	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	5	5
6	5 BW	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	5	7
7	5 BW-BW	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	5	8
8	10 Dismount	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	5	5
9		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
10		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
11		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
12		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
13		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
14		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
15		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
16		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
17		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
18		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
19		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
20		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
PERCENT COMPLETE: <u>16</u> %			TOTALS	<u>60</u> <u>79</u>

Figure 1E. A hypothetical example of a gymnast's recording sheet used to record the frequency of beam skills in practice number 10, during Tr1 (coach goal-setting).

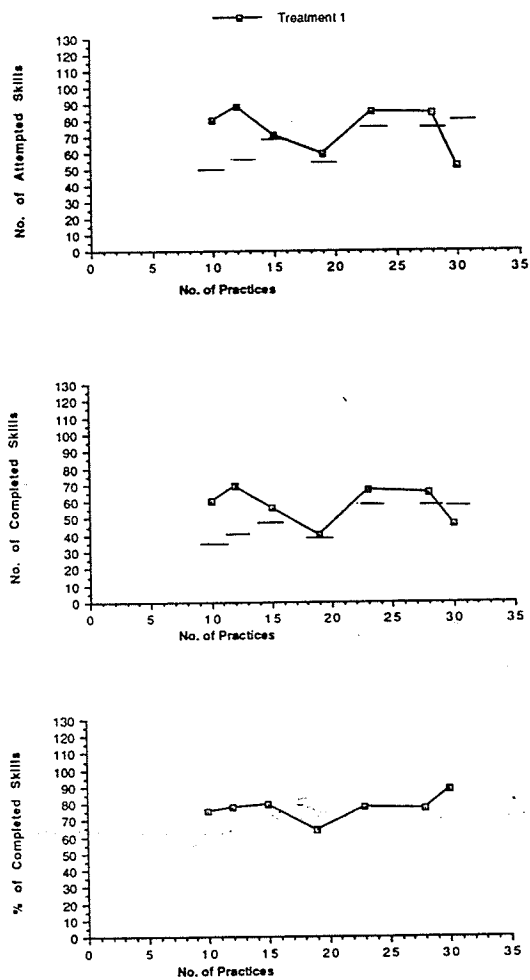


Figure 2E. A hypothetical example of a gymnast's graphed data of the frequency of beam skills performed in practice number 10, during Tr1 (coach goal-setting).

Appendix F

RECORDING SHEET

LOW BEAM 1.
MIDDLE BEAM 2
HIGH BEAM 3

GYMNAST: Nadia
PRACTICE No.: 31
DATE: 21 / 12 / 88
 D H Y

No.	SKILLS	RECORDING	% COMPLETE	% ATTEMPTS
1	5 Fwd Roll	X X O O O / O O O 10 11 12 13 14 15 16 17 18 19 20	5	8
2	10 BW	X X O O O / O X X X X O O X X X X X O O O O 20	10	19
3	5 CW	X X O O O O O O 7 8 9 10 11 12 13 14 15 16 17 18 19 20	5	7
4	5 H	O O O O O 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	5	5
5	10 T-Jump	O O O O O / O O O O O O 11 12 13 14 15 16 17 18 19 20	10	11
6	5 1/2 Turn	O / O O O O 7 8 9 10 11 12 13 14 15 16 17 18 19 20	5	6
7	10 Dismount	O O O O O / O O O O O O 11 12 13 14 15 16 17 18 19 20	10	11
8	10 Leaps	O O O O O O O O O O 11 12 13 14 15 16 17 18 19 20	10	10
9	5 Valdez	X X O O O O O 7 8 9 10 11 12 13 14 15 16 17 18 19 20	5	7
10	5 FW	X O O O O O 7 8 9 10 11 12 13 14 15 16 17 18 19 20	5	6
11	10 H-Jump	O O O O O O O O O O 11 12 13 14 15 16 17 18 19 20	10	10
12		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
13		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
14		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
15		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
16		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
17		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
18		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
19		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
20		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		
PERCENT COMPLETE: <u>80</u> %			TOTALS	<u>80</u> <u>100</u>

Figure 1F. A hypothetical example of a gymnast's recording sheet used to record the frequency of beam skills in practice number 31, during Tr2 (self goal-setting).

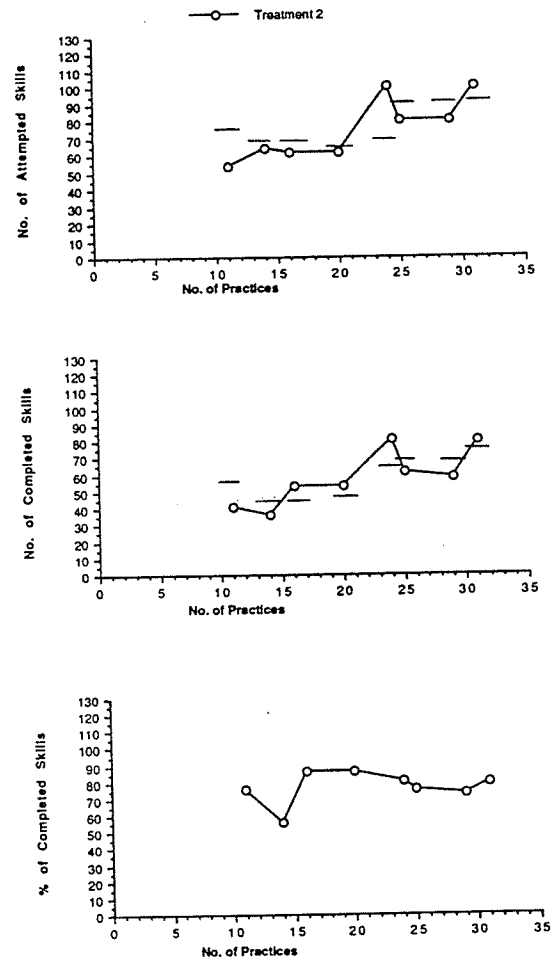


Figure 2F. A hypothetical example of a gymnast's graphed data of the frequency of beam skills performed in practice number 31, during Tr2 (self goal-setting).

Appendix G

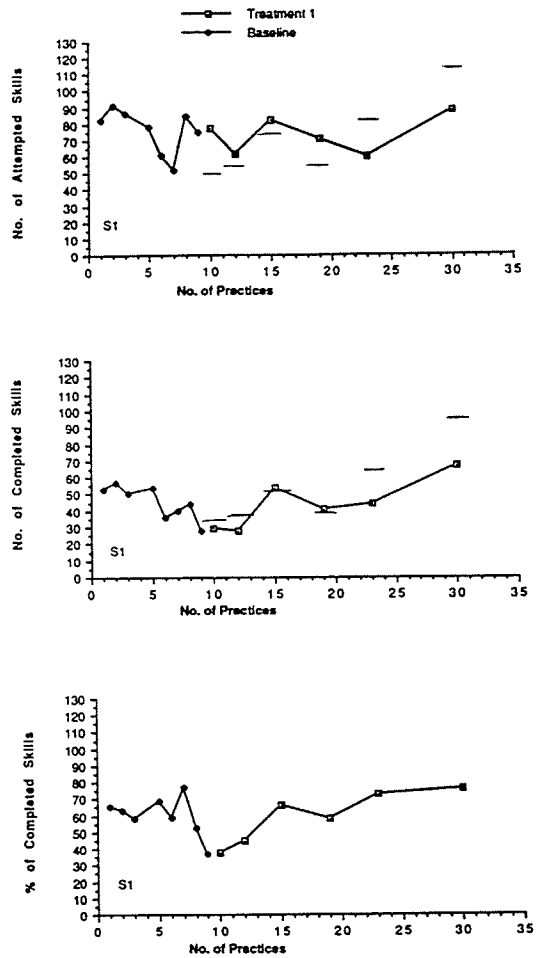


Figure 1G. A graphical display of observer-recorded skill frequency results and coach-set goals for S1, in Tr1 (coach goal-setting).

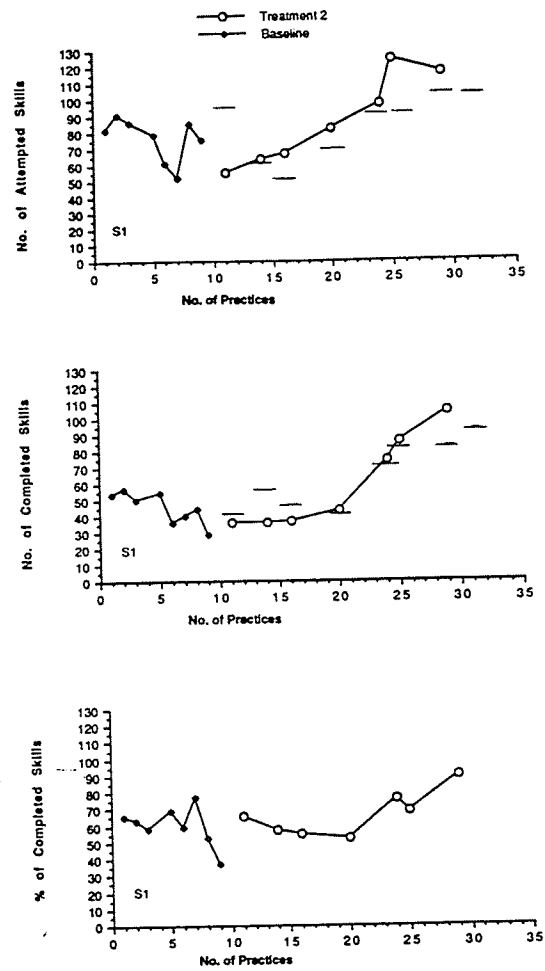


Figure 2G. A graphical display of observer-recorded skill frequency results and self-set goals for S1, in Tr2 (self goal-setting).

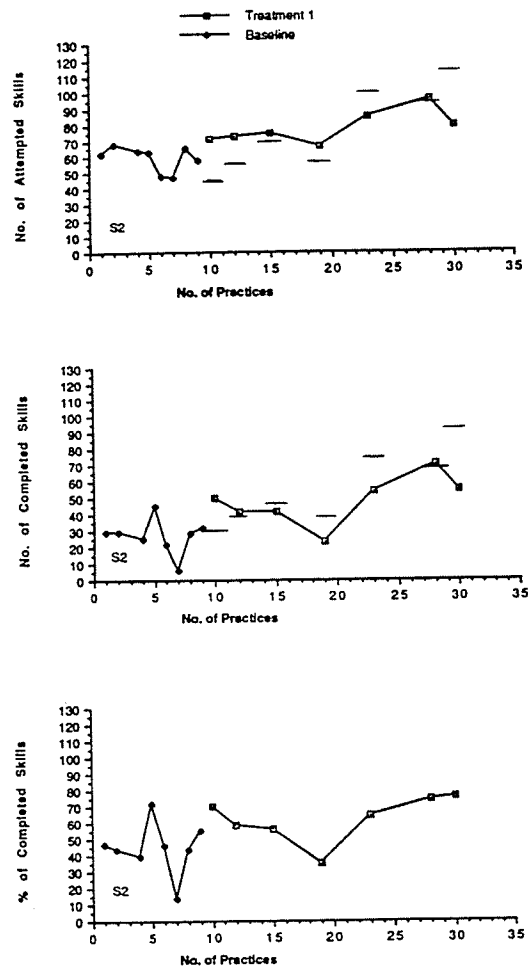


Figure 3G. A graphical display of observer-recorded skill frequency results and coach-set goals for S2, in Tr1 (coach goal-setting).

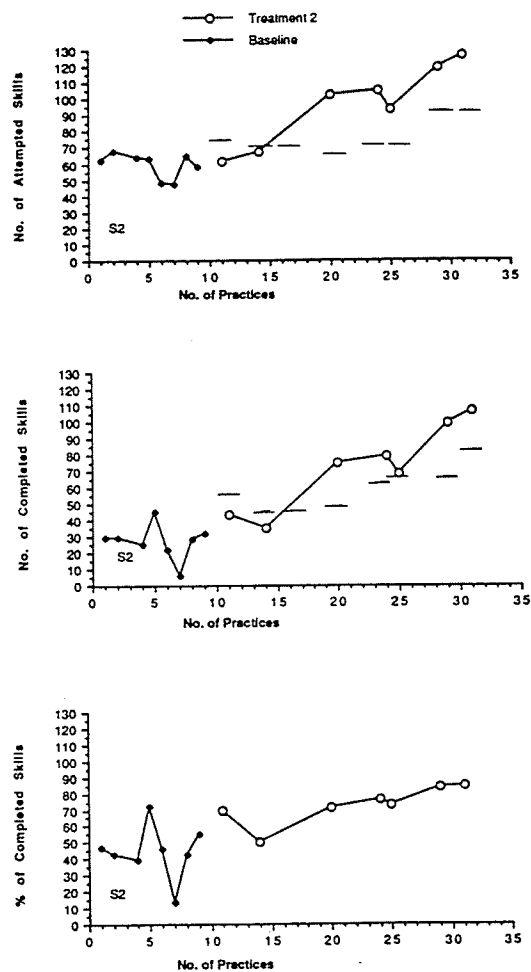


Figure 4G. A graphical display of observer-recorded skill frequency results and self-set goals for S2, in Tr2 (self goal-setting).

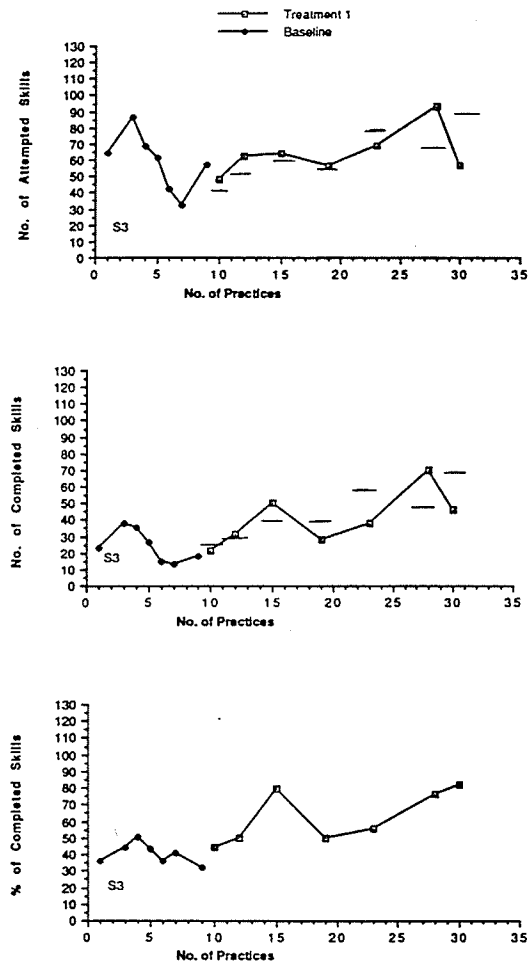


Figure 5G. A graphical display of observer-recorded skill frequency results and coach-set goals for S3, in Tr1 (coach goal-setting).

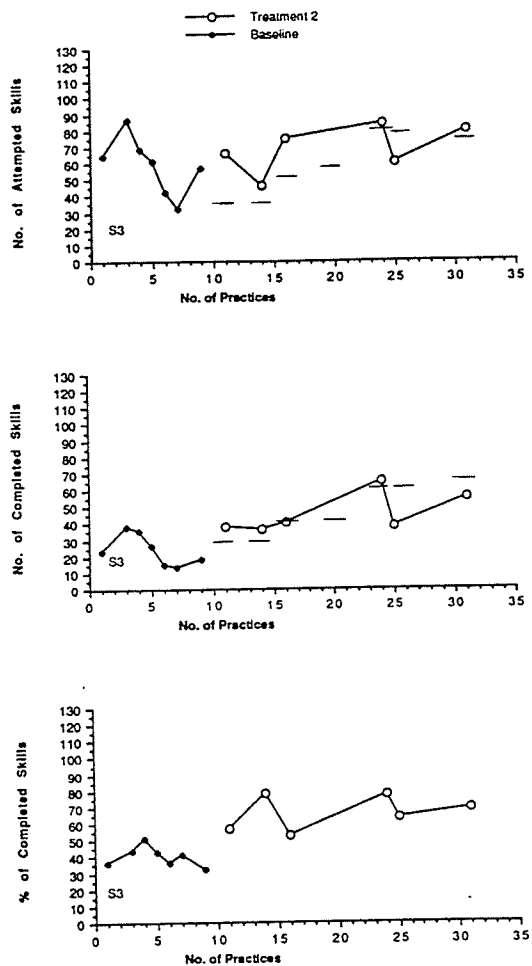


Figure 6G. A graphical display of observer-recorded skill frequency results and self-set goals for S3, in Tr2 (self goal-setting).

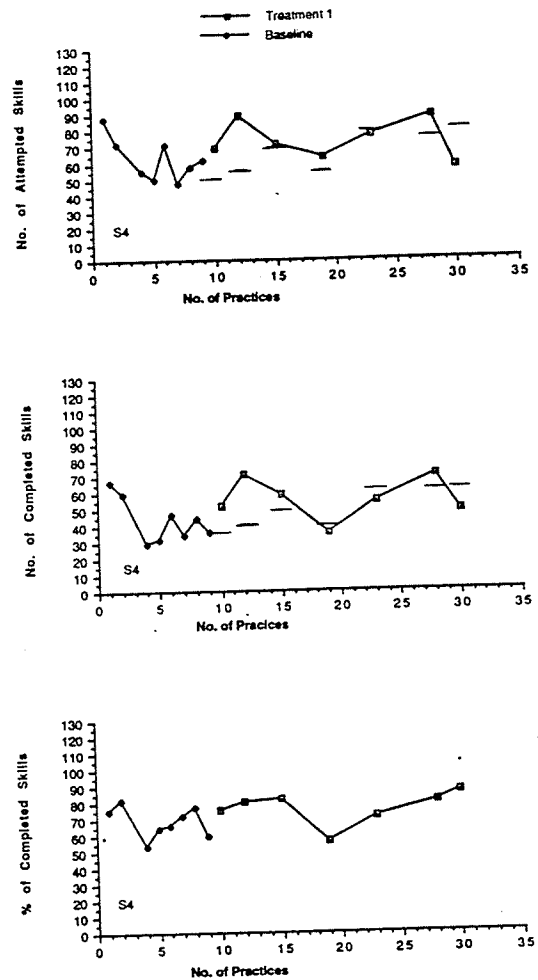


Figure 7G. A graphical display of observer-recorded skill frequency results and coach-set goals for S4, in Tr1 (coach goal-setting).

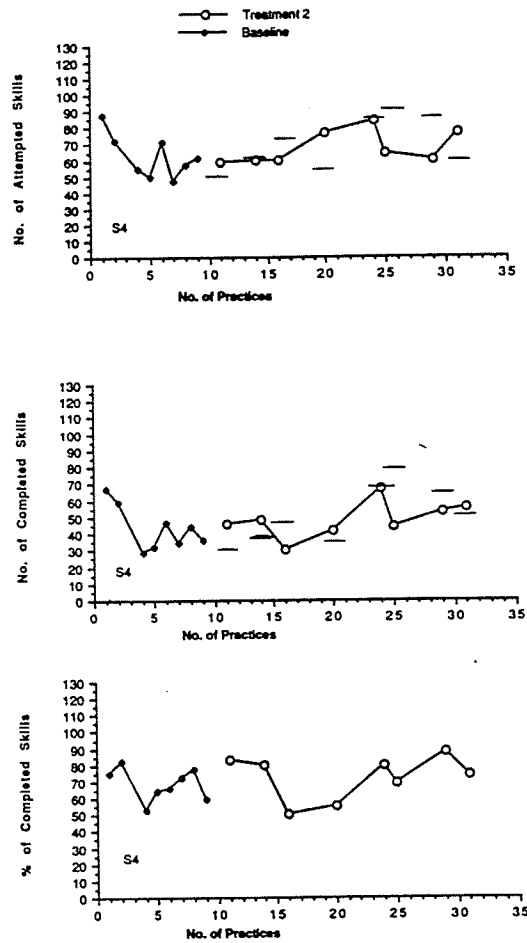


Figure 8G. A graphical display of observer-recorded skill frequency results and self-set goals for S4, in Tr2 (self goal-setting).

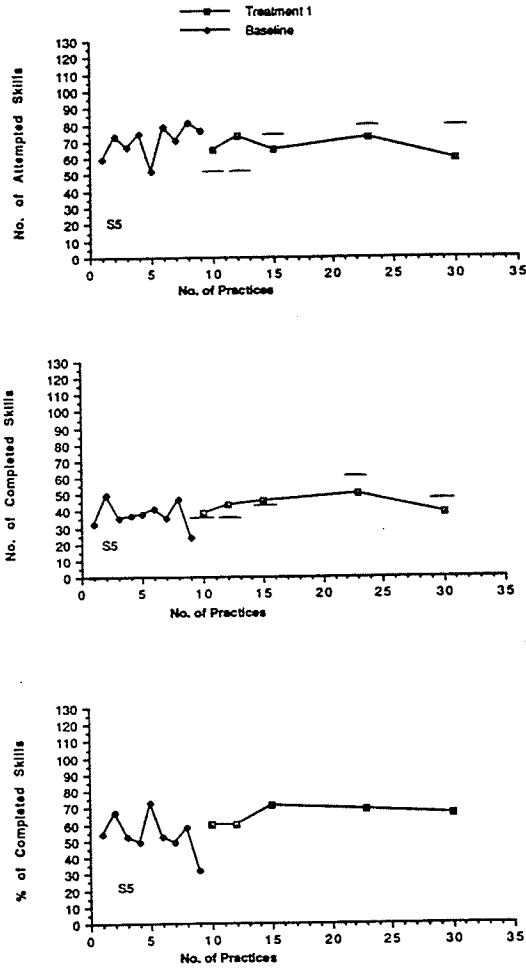


Figure 9G. A graphical display of observer-recorded skill frequency results and coach-set goals for S5, in Tr1 (coach goal-setting).

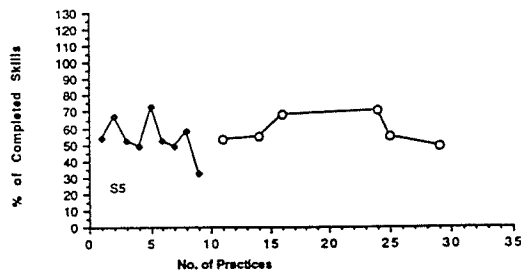
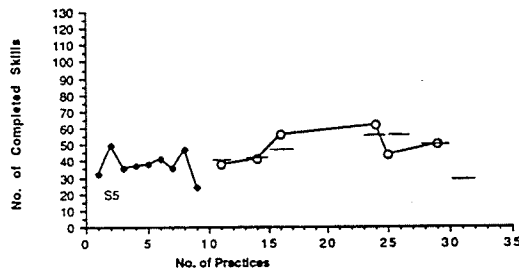
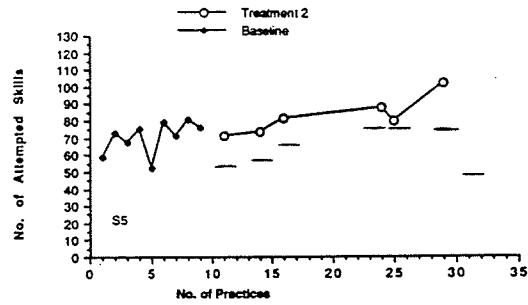


Figure 10G. A graphical display of observer-recorded skill frequency results and self-set goals for S5, in Tr2 (self goal-setting).

Appendix H

Social Validation Questionnaire

1. How much did you like working with an assignment sheet which listed exactly what you were to practice on beam that day?

1. Did not like at all
2. Did not really like it
3. Did not matter
4. Liked it
5. Liked it very much

1a. Would you rather know what is expected of you in a beam practice that day (in terms of a list of skills and the # reps to do for each)?

1. Definitely not
2. Not really
3. Does not matter
4. I guess so
5. Definitely

1b. Do you think that by knowing the planned workout in advance, that this may get you to work a little quicker/harder?

1. Definitely not
2. Not really
3. Makes no difference
4. I guess so
5. Definitely so

1c. How did you like recording?

1. Did not like it at all
2. Did not really like it
3. No opinion
4. Liked it all right
5. Liked it very much

1d. Did you like finding out how you performed in beam practice (in terms of # attempted and # completed skills)?

1. Did not like to find out
2. Did not really like to find out
3. Did not matter
4. It was ok to find out
5. Liked to find out.

1e. Did you like the opportunity to have a reward if you reached your goals?

1. Did not like the opportunity
2. Did not really like the opportunity
3. It did not matter
4. Liked the opportunity
5. Liked the opportunity very much

1f. Did you find it difficult to record, total, and graph?

1. Was very difficult
2. Was quite difficult
3. No opinion
4. It was not difficult
5. It was not difficult at all

1g. Did you find it time-consuming to record, total, and graph?

1. Was very time-consuming
2. Was quite time-consuming
3. No opinion
4. Was not time-consuming
5. Was not time-consuming at all

2. How helpful was the Recording sheet and Reward System (in getting you to practice better/work harder)?

1. Not at all helpful
2. Not very helpful
3. No difference
4. Somewhat helpful
5. Very helpful

2a. Did you find it helpful to know how you performed in a practice (in terms of the frequency of skills attempted and completed).

1. Not at all helpful to know
2. Not really helpful to know
3. Did not matter whether I knew
4. It was helpful to know
5. It was very helpful to know

3. Did you like the usual standard coaching procedures (where coach gives you one verbal instruction at a time, you don't know the whole planned workout in advance, you're not aware of the total # skills you attempted and completed, and no reward system is available for reached goals)?

1. Did not like this procedure at all
2. Did not really like this procedure
3. Did not matter
4. liked it somewhat
5. Liked it very much

3a. Was there anything you did not like about standard coaching?

1. Not knowing workout plan in advance
2. Having to return to coach for each instruction
3. No assignment sheet to follow.
4. No reward
5. Not sure how well you performed in practice
6. Other-

4. Did you like the Coach-assigned recording sheet (assignment sheet, coach-set goals, recording, and a reward opportunity)?

1. Did not like it at all
2. Did not really like it
3. No opinion
4. Liked it
5. Liked it very much

4a. Was there anything you did not like about the coach goal-setting sheet?

4b. How did you find the difficulty level of the coach-set goals?

1. Not at all difficult
2. Not really difficult
3. Average difficulty
4. Quite difficult
5. Too difficult

4c. How hard did you work with this procedure (compared to days without the sheet, reward, etc)?

1. Worked a lot less harder
2. Worked a little less harder
3. No difference
4. Worked harder
5. Worked much harder

4d. How did you find the pressure involved in using this procedure (compared to standard coaching)?

1. No pressure at all
2. Little less pressure
3. Same pressure as always
4. More pressure
5. A lot more pressure

5. Did you like the self goal-setting recording sheet (assignment sheet, self-set goals, recording, and reward opportunity)?

1. Did not like it at all
2. Did not really like it
3. No opinion
4. Liked it
5. Liked it very much

5a. Was there anything you did not like about the self goal-setting procedure?

5b. How did you find the difficulty level of your self-set goals?

1. Not at all difficult
2. Not really difficult enough
3. Average difficulty
4. Quite difficult
5. Too difficult

5c. How hard did you work with this procedure (compared to standard coaching days)?

1. Worked a lot less harder
2. Worked a little less harder
3. No difference
4. Worked quite hard
5. Worked very hard

5d. How did you find the pressure involved in using this procedure (compared to standard coaching days)?

1. No pressure at all
2. Not much pressure
3. Average pressure
4. There was pressure
5. A lot of pressure

6. How often would you prefer to have the standard coaching procedure (no recording sheet, no awareness of workout plan, no recording, no specific knowledge of performance, no reward opportunity)?

1. Never
2. Sometimes
3. Does not matter
4. Often
5. All time

6a. How often would you prefer to use the coach goal-setting, recording, and reward procedures?

1. Never
2. Sometimes
3. Does not matter
4. Often
5. All time

6b. How often would you prefer to use the self goal-setting, recording, and reward procedures?

1. Never
2. Sometimes
3. Does not matter
4. Often
5. All time

7. Which procedure do you feel helped you to do the greatest frequency of beam skills?

1. Standard coaching
 2. Coach-set goals, recording, and reward
 3. Self-set goals, recording, and reward
- Reason?

8. If you had to choose one procedure to use for two weeks straight, which one would you choose?

1. Standard coaching
2. Coach goal-setting
3. Self goal-setting

8a. If you had to choose two procedures to use alternatively for two weeks straight, which two would you choose?

1. Standard and coach-set
2. Standard and self-set
3. Coach-set and self-set

8b. Would you prefer to use all 3 on an alternating basis since this offers variety?

9. Which procedure was most fun?

1. Standard
2. Coach-set
3. Self-set

10. In future, suppose you are a member of the University gym team and you are responsible for planning your own workout in terms of which skills to practice and the # reps to do for each skill.

Do you think you would write down the skills and reps to practice?

Do you think you would keep track on paper?

11. Did you mind having observers present?

1. Minded not at all
2. Minded a little bit
3. Did not matter
4. Sometimes minded
5. Minded very much

Appendix I

Reward List

1. Foam Pit

Front tumbling with beat board or back tumbling.

2. Minitramp

At: bars, vault, floor, or in pit.

3. Vaulting with mat.

4. Practice Moves on any event.

5. Beat board

Front somies or front aerals.

6. Standing back somies

On: floor, a height, or pit edge.

7. Beam or floor dance routines.

8. Make up: a beam or bar routine.

9. Trampoline.