

The University of Manitoba

A Self-Talk Package for Improving
Figure Performance by Young
Competitive Figure Skaters

by

Siri Ming

A Thesis
Submitted to the Faculty of Graduate Studies
In Partial Fulfilment of the Requirements for the
Degree of Master of Arts

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ABSTRACT

This study examined the effectiveness of behavioral strategies for improving figure performance by young figure skaters. A "self-talk" package consisting of training and both on- and off-ice practice of key words was used to improve performance of compulsory figures by pre-novice and novice level figure skaters. A multielement design with replications across subjects was used. Performance on one figure for which key words were used during the intervention phase was assessed in comparison to baseline levels and performance on an untrained figure. The second figure was also used to assess response generalization. All subjects improved their figure performance over baseline levels when using key words; performance gains ranged from 7% to 14% correctly performed components of the figure. Performance on the untrained figure remained stable for all subjects, suggesting that the use of the self-talk package had specific control over performance on the figure on which it was used and that response generalization did not occur. Both coaches who returned a follow-up questionnaire stated that they would recommend the use of key words; however, only one of the four skaters in the study felt that the key words improved her performance and would recommend their use. The primary issue detracting from acceptance of the self-talk procedure seemed to be the amount of time data collection and observation took. A follow-up after six months showed more positive results, however.

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INTRODUCTION

Operant technology has long been used in applied settings for improving a wide variety of behaviors. For example, research in educational settings has examined the application of behavioral principles to the development of motor skills such as handwriting, correct posture, and assembly tasks; and "classroom" skills such as on-task and instruction-following behavior (Martin & Pear, 1988). A natural extension of this research is to physical education and sport settings, which have many of the same behavioral requirements.

The first published research of operant techniques for developing and maintaining sport skills was Rushall and Pettinger's (1969) examination of several different reinforcement contingencies for increasing the number of laps swum by members of an age-group swimming team. Following this seminal work, researchers began to examine a number of behavioral techniques in the sport context. These techniques included public posting to increase attendance and work output (McKenzie & Rushall, 1974), sign prompting to replace equipment (Darden & Madsen, 1972), and task-specific praise to improve skill acquisition (Fueyo, Saudergas, & Bushall, Jr., 1975). In 1976, Rushall called for applied behavior analysis to be the new direction for sport psychology.

In the past fifteen years, researchers have examined the application of behavior modification principles to many areas of sport and physical education, and several review papers have been published (e.g. Donahue, Gillis, & King, 1980; Martin, 1984). Areas of research include:

- (a) skill development, such as Buzas and Ayllon's (1981) use of differential reinforcement procedures to improve tennis strokes;
- (b) increasing the frequency of practice behaviors and exercising, such as Cracklen and Martin's (1983) use of "fun time" as reinforcement for increasing appropriate practice activities;
- (c) decreasing problem behaviors, such as McKenzie and Rushall's (1980) decreasing of inappropriate swimming practice behavior through the use of a display board of good and bad behaviors;
- (d) enhancing competition performance such as Kendall, Hrycaiko and Martin's (1990) use of imagery rehearsal and relaxation; and
- (e) assessing and developing the behavior modification skills of coaches, such as with Smith, Smoll, and Curtis' (1979) Coach Effectiveness Training program.

Much of this research has focused on what has been termed "behavioral coaching" (Martin & Hrycaiko, 1983). Effective behavioral coaching has a number of salient characteristics, some of which parallel the characteristics of applied behavior analysis as described by Martin and Pear (1988). Specifically, effective behavioral coaching:

- (a) emphasizes specific, detailed, and frequent measurements of athletic behavior which are used to evaluate the effectiveness of coaching techniques;
- (b) uses appropriate techniques for either developing or maintaining behavior;
- (c) encourages athletes to improve against their own past performance;
- (d) emphasizes specific behavioral procedures for which effectiveness has been experimentally demonstrated;
- (e) uses behavioral principles to effect changes in coaching behavior; and
- (f) encourages social validation of all aspects of the athletic program (Martin & Hrycaiko, 1983).

More generally, effective behavioral coaching is concerned with "the consistent application of principles of behavioral psychology for the improvement and maintenance of athletic behavior" (Martin & Hrycaiko, 1983, p. 8).

In spite of a promising beginning and a rapidly expanding research base, further investigations are needed in many areas. Hrycaiko and Martin (1983) recommended the following areas for future research: (a) behavioral assessment of athletic skills, (b) skill development, (c) motivating performance and effort during practices, (d) generalization from practice to competition, (e) assessment and training of coaches, and (f) self-management by athletes.

The present study addresses a number of the above recommended areas in examining the use of self-talk, or stimulus cueing, with young figure skaters. This self-management technique was studied for its potential to improve skill development on compulsory figures and to produce generalization from practice to competition.

Self-Talk

A Behavioral Analysis

Self-talk is a self-directed technique for developing appropriate stimulus control over the performance of a skill. Key words are thought or verbalized and serve as discriminative stimuli for appropriate behaviors throughout the performance of the skill. These programmed thoughts also decrease the chance that unplanned and potentially distracting thoughts will detract from the performance.

As well as providing discriminative stimuli for correct performance in practice, the key words can also be used in competition. In this way, the practice and competition settings are made more similar, using the generalization strategy referred to by Stokes and Baer (1977) as "programming common stimuli".

Self-talk can be conceptualized as use of rules to govern behavior. Rules can be defined as verbally encoded guidelines for behavior which describe the contingencies operating on that behavior: the relationship among discriminative stimuli, the behavior, and the consequences (Baldwin & Baldwin, 1986). In self-talk, key words summarize or describe the contingencies controlling correct performance (e.g. if I *check lineup* then I

will skate tracings that will be even). Thus, the key words form a rule; the response cued by that rule (e.g. checking the lineup) is referred to as rule-governed behavior (Skinner, 1969).

When an athlete is initially encouraged to use key words, the athlete's past history of following coaching instruction would increase the probability of following the instructions implicit in key words. With further experience in using key words, including being reinforced by improved performance, the athlete would be more likely to continue to use that strategy with other skills. Rule-governed control of operant responses can be an effective strategy in a variety of areas of self-management (Baldwin & Baldwin, 1986).

Research on Self-Talk

While self-management strategies are widely recommended in the athletic self-help literature (Kirschenbaum & Bale, 1983), very little research has examined the use of athlete-directed strategies for skill development. As Ziegler (1987) stated, "a void exists in understanding the behavioral change process that is possible when the intervention is self-directed by the performer" (p. 405). Controlling the content of practice and

competition thought is one area of self-directed intervention which has only just begun to be examined.

Rushall (1979) suggested that a major portion of the thought content during athletic performance should comprise (a) task-relevant statements, which cue appropriate technique; (b) mood words, which cue desired sensory feelings; and (c) positive self-talk, which reinforces effort and combats fatigue. Martin (1989) proposed that key words can help to decrease a number of problems, including frequent technique errors, distractions, thinking too far ahead in an extended performance, becoming too anxious or aroused, presentation problems in judged sports, and fatigue or pain.

Rushall (1984) has provided evidence for the effectiveness of different types of thought content in enhancing performance of a number of repetitive skill tasks. Task-specific content was found to increase the length of time before exhaustion in a treadmill running task, increase speed of a 400 m swim, and increase ergometer performance of rowers. Positive self-talk was also found to increase ergometer performance; therefore, Rushall suggested that positive self-talk be used to fill the gaps between task-specific key words. Performance mood words were also found to increase ergometer performance and hand dynamometer performance by rowers. Additionally,

Shewchuk (1985) found that instructions to think mood words increased swimmers' training performance.

Rushall, Hall, Roux, Sasseville, and Rushall (1988) provided a more detailed analysis of the use of these three different types of thought content. Cross-country skiers were instructed to use one of task-specific, positive, or mood key words in a series of experiments. All subjects improved their performances to both a statistically and socially significant degree in at least one of the conditions, and 16 of 18 skiers showed marked improvements under all conditions. Heart rate data were used to control for increases in effort under each condition.

The degree of performance improvement varied across skiers and conditions, suggesting that there may be a hierarchy of effects of thought types for each athlete. Rushall suggested that the condition which resulted in the greatest improvement for the individual athlete should be emphasized proportionally more than the lesser effective conditions, and that specific thought content must be tailored to the athlete.

Rushall also proposed that different types of key words have differential effects on performance, and used this theory as the rationale for considering each type of thought content as a separate independent

variable. That is, task-specific content will enhance mechanical efficiency of the motor task, mood words will increase the mechanical capacities of the performer, and positive thinking will produce better physiological efficiency. However, these differential effects were not examined directly. It may be more useful to simply view each key word as a discriminative stimulus for following that instruction, rather than grouping words according to a more general class; the required instructions implicit in the key words would naturally be different from athlete to athlete.

The above studies provide evidence that controlled thought content can be used to achieve significant improvements in terms of speed of performance and volume of work output. Only one study, however, has examined the effect of key words on the topography of a complex skill. Ziegler (1987) used the key words "ball", "bounce", and "hit" as cues for specific requirements of tennis forehand and backhand returns. The quality of returns was judged via detailed behavioral checklists. The percentage of successful returns increased dramatically with the introduction of the stimulus cueing technique. This study provides evidence for the effectiveness of skill-specific key words in altering the performance of a complex skill.

Thus, there is some evidence for the effectiveness of key words used in several skills. However, as Ziegler (1987) recommended, the generalization of this technique to a wider range of sports needs to be explored. Experimental evidence is particularly lacking for the effects of self-talk on the topography of a complex skill.

Statement of Problem

Self-talk may be used by athletes practising on their own, and for this reason it may be particularly useful for sports such as figure skating in which instruction time is significantly lower than actual practice time. Srikameswaran (1989) noted that figure skaters at the provincial level often have a practice to instruction time ratio of 5:1. This low frequency of coaching feedback in comparison to skill practice suggests that self-management strategies might address a number of problems facing figure skaters, including lack of athlete-managed strategies to improve and maintain practice performance, lack of self-monitoring and self-evaluation skills, and lack of competition generalization strategies (Srikameswaran, 1989). Self-talk procedures address the first and last of these problems.

The present study used the self-talk package designed by Martin (1990, in press) as part of a "sport psyching" program for the Manitoba

provincial figure skating team. In this study, the self-talk package alone was used, rather than the entire sport psyching program. Until the present study, there was only anecdotal evidence for the effectiveness and acceptability of this program (Martin, in press; Watchorn, Note 1). The present study experimentally examined the effectiveness of the self-talk component of the program.

The key words recommended by this package are of three general types: (a) prompts to look for external cues, (b) "body tension" words, and (c) technique words. The key words used vary from skater to skater and are based on instructions from the coach regarding the improvement of common errors.

The purpose of this study was to determine if the self-talk package would more effectively improve performance of compulsory figures than would standard practice. Thus, this study followed Azrin's (1977) recommendation for an outcome-oriented approach, utilizing a combination of component procedures to obtain treatment success. Response generalization was assessed through performance on a second, untrained figure. Thought content was also qualitatively examined to determine differences in covert verbalizations during practice of experimental (key words used) and control (standard practice) figures.

METHOD

Subjects

Four members of the Winnipeg Winter Club participated in this study. Skaters were at the pre-novice (S1 and S2) or novice (S3 and S4) level, and were between eleven and thirteen years of age. Subjects 1, 2, and 3 are female; Subject 4 is male. Subjects were selected on the basis of the following criteria: (a) they were recommended by their coach, (b) they expressed interest in trying sport psychology techniques, (c) they agreed to practice figures at specific times, and (d) they were starting a new set of figures.

Subjects were preparing figures for formal figure testing: either Fourth (S1 and S2) or Fifth (S3) Figures Test, or for competition (S4). Two of these figures per skater were targeted for observation and intervention.

Setting

The study was conducted at the River Heights Community Centre during the summer skating school program. Skaters practised 5 days per week, with 1.75 hours per day designated as "patch", or figure practice time.

Skaters were observed three to five times per week, depending upon practical constraints such as lesson time and availability of clean layout patches.

The study lasted for 4 weeks during the spring session, during which time observer training was carried out. During the summer session (two months after the spring session ended), an additional one and a half weeks were spent training observers; baseline observations were then taken for seven days, and the intervention phase then lasted for two to three weeks.

Personnel

Behavioral observations were made by the author and an undergraduate psychology student. Training of observers followed the procedure developed by Srikameswaran (1989) as described in Appendix A. During observer training, an experienced figure skating judge helped to modify items on the behavioral checklist and was used for inter-observer reliability ratings.

Dependent Variables

Percent correct figure performance A modification of the checklist developed by Srikameswaran (1989) (as shown in Appendix A) was utilized to record subjects' performance on figures; the checklist is shown in Table 1. Only two categories of the original checklist were used: Symmetry of Circles and Quality of Turns. These categories refer exclusively to the figure tracing, as opposed to the skater's technique, and it is assumed that incorrect technique will lead to errors in tracing. Additional items on the checklist referring to errors in tracing were included upon the suggestion of judges and coaches during observer training, as was the weighting system. The weighting system was incorporated to identify reductions as well as elimination of errors, and to be more similar to criteria used in judging. The overall quality of the figure tracing is one of the primary features judged in testing.

Insert Table 1 about here

Table 1: Performance Checklist

SUBJECT: _____ FIGURE: _____
 OBSERVER: _____ SESSION # _____
 IOR: _____

Circle symmetry	> 1 bladlength diff. b/t long axis of circles	(2)							
	> 1 bladlength difference in line-up at circles	(2)							
	> 1 bladlength difference in size (width)	(2)							
	> 1 bladlength difference in length of circles	(2)							
	> 1 bladlength diff. b/t position of turns on circle	(2)							
	Serpentine not diagonal	(2)							
Stepdowns	incorrect edge	(2)							
	not on a circle	(2)							
	straight	(2)							
	hooked out	(2)							
Push offs	> 5" difference between pushoff and long axis	(2)							
	> 5" difference between pushoff and short axis	(2)							
Shape of circle	straight on top	(3/2)							
	straight on sides	(3/2)							
	bulged (ie: wobbles on top/sides of circles)	(3/2)							
Flats (cleanness of edges)	quarter of circle	(3)							
	2 to 3 bladlengths	(2)							
	1 bladlength	(1)							
Turn Errors	change in	(3/2)							
	change out	(3/2)							
	flats in	(3/2)							
	flats out	(3/2)							
	jumped (no turn on top)	(3/2)							
	hooked or pulled turns	(2/1)							
	forced turns (heavy edge)	(2/1)							
	scrapes	(2/1)							
	spooned	(1)							
% Correct									
% IOR									
Said Keywords ?									

Scoring: Please put \emptyset if no error; appropriate score if error(s) exist; draw a line if not applicable.
 For Multiple Errors: 1st score refers to errors on more than half, 2nd refers to errors on half or less.

As seen on the checklist, higher scores indicate greater numbers of errors. Thus, the percentage correct figure performance was determined by subtracting the total weighted score from the total possible weighted score, dividing by the total possible weighted score, and multiplying the dividend by 100%. For example, if a skater scored 35 with a possible total score of 61, her percentage correct performance would be $[(61 - 35)/61 \times 100\%]$ or 43%.

Assessment of Thought Content Thought content on each figure was assessed weekly throughout the study. A standard form was used, as shown in Table 2. Following figure layout, skaters were simply asked what they thought about during the layout of the figure.

Insert Table 2 about here

Table 2: Thought Assessment Form

THOUGHT ASSESSMENT FORM

- o complete this form weekly
- o remind skaters before each layout to:
 - o "Lay this figure out like you are at a test -- do your best so you can practice for the real thing."

**"Do you think of anything in particular when you practice this figure?"
"What do you think of?"**

Skater: _____

Date: _____

Figure 1: _____

Figure 2: _____

Treatment Variable: Self-talk package

The self-talk package, as developed by Martin (1990) involved the following components:

- (a) viewing Part I of the videotape "Sport Psyching for Figure Skaters" (Martin, 1989), which portrays National level figure skaters using key words both on and off the ice, and emphasizes the utility of using these techniques;
- (b) developing key words during the homework assignments (Appendix B, Assignment A), including:
 - i) drawing out of targeted figures on paper with key words placed at appropriate points,
 - ii) reviewing key words with coach, and
 - iii) memorizing key words;
- (c) doing off-ice practice of figures (Appendix B, Assignment B), including:
 - i) timing of figure layout on-ice, and
 - ii) walking-out and timing of figure off-ice, while verbalizing key words out loud;

- (d) practising figures on-ice, while verbalizing key words out loud.

During the treatment phase, the frequency of coached lessons remained the same as during baseline; however, the coach also provided feedback on the appropriateness of key words during lessons in the treatment phase.

Compliance was determined by homework assignments (see Appendix C) and checking of verbalization of key words by observers.

Characteristics of Phases

Baseline Assessments were conducted during patch time.

Approximately 10 to 15 minutes were required for each figure assessed. Seven days were spent on baseline assessment. Skaters were prompted to warm up the figure that they would be observed on approximately 5 minutes prior to assessment. Skaters were then asked to lay out the figure on a clean patch of ice if one was available, or to lay it out on the practice patch away from previous tracings. Observers stood to the side of the figure while the skater laid it out, and then assessed the tracing using the behavioral checklist. Once per week thought content was assessed following layout and prior to evaluation.

In almost all sessions, two skaters were evaluated on both experimental and control figures.

Training Skaters participated in two training sessions over two days, as outlined in the homework assignments in Appendix B.

Intervention Assessment during intervention followed the same format as during baseline sessions. In addition, homework assignments were carried out as in Appendix B. Specifically, skaters walked out their figures off the ice twice per week in the presence of the author, and used key words during the practice of the experimental figure. Approximately 2.5 weeks were spent on the intervention phase.

Experimental Design

A multielement design (Martin & Pear, 1988) was used. Following a period of baseline assessment on both figures, subjects were trained to utilize the self-talk package for one figure while maintaining usual practice behavior for the other. The time during practice at which each figure is assessed was alternated to control for fatigue effects. In addition, skaters and coaches were asked to maintain equal practice time on all figures.

The multielement design has a number of advantages over a reversal-replication or a multiple baseline design (McKenzie & Liskeyvich, 1983). A reversal to baseline is not necessary in this design to assess experimental control; this is advantageous since athletic skills are unlikely to reverse rapidly after learning. Because a comparison of treatments (self-talk and standard practice) occurs simultaneously, the lengthy baseline and intervention phases necessary in the multiple baseline design can be reduced considerably. This is a distinct advantage in sport settings with limited practice time. If the treatment is found to be effective, then it may be more quickly implemented with other behaviors, and if it is not, then it may be discontinued with less loss of practice time.

In addition to providing a measure of standard responding against which intervention responding may be assessed, the second figure allowed for an assessment of response generalization. That is, if performance on the second figure improved at a higher rate in comparison to baseline, response generalization is one possible explanation of such an outcome. However, if there was no improvement on the second figure, then clearly no response generalization would have occurred.

Reliability Assessments

Inter-observer reliability data on subject performance was collected for 35% of all observed sessions and for all observer training sessions. Two observers independently and simultaneously assessed figure performance. Inter-observer agreement was calculated in the following manner: items were scored both on agreement on error occurrence, and agreement on weighting of error (where the item could be assigned a weight). The number of agreements on error occurrence was added to the number of agreements on weighting, and the sum was divided by the total number of agreements and disagreements on both errors and weighting; the dividend was then multiplied by 100%. This gave a conservative estimate of agreement while still identifying differences in error weighting in addition to differences in agreement of error presence.

Social Validity Assessment

Social validity was assessed through follow-up questionnaire given to the skaters and their coaches (Appendix C) immediately following the study and again six months later.

RESULTS

Baseline assessments were conducted on two figures for each of the four subjects. One of these figures was targeted for intervention with the self-talk package for each subject.

The first subject's (S1) performance is shown in Figure 1.

Insert Figure 1 about here

As Figure 1 indicates, the use of the self-talk package resulted in a substantial improvement in figure performance for this subject, while figure performance using standard practice techniques remained stable. During baseline, S1's performance on Figure A averaged 44% correct, and increased to an average of 58% correct with the use of the self-talk techniques. In contrast, performance on Figure B (for which standard practice techniques were used throughout the study) remained stable at an average of 59% correct. It can be seen that only one data point for Figure A during intervention overlapped with baseline data, as compared to all data on Figure B. This effect was achieved very quickly after training.

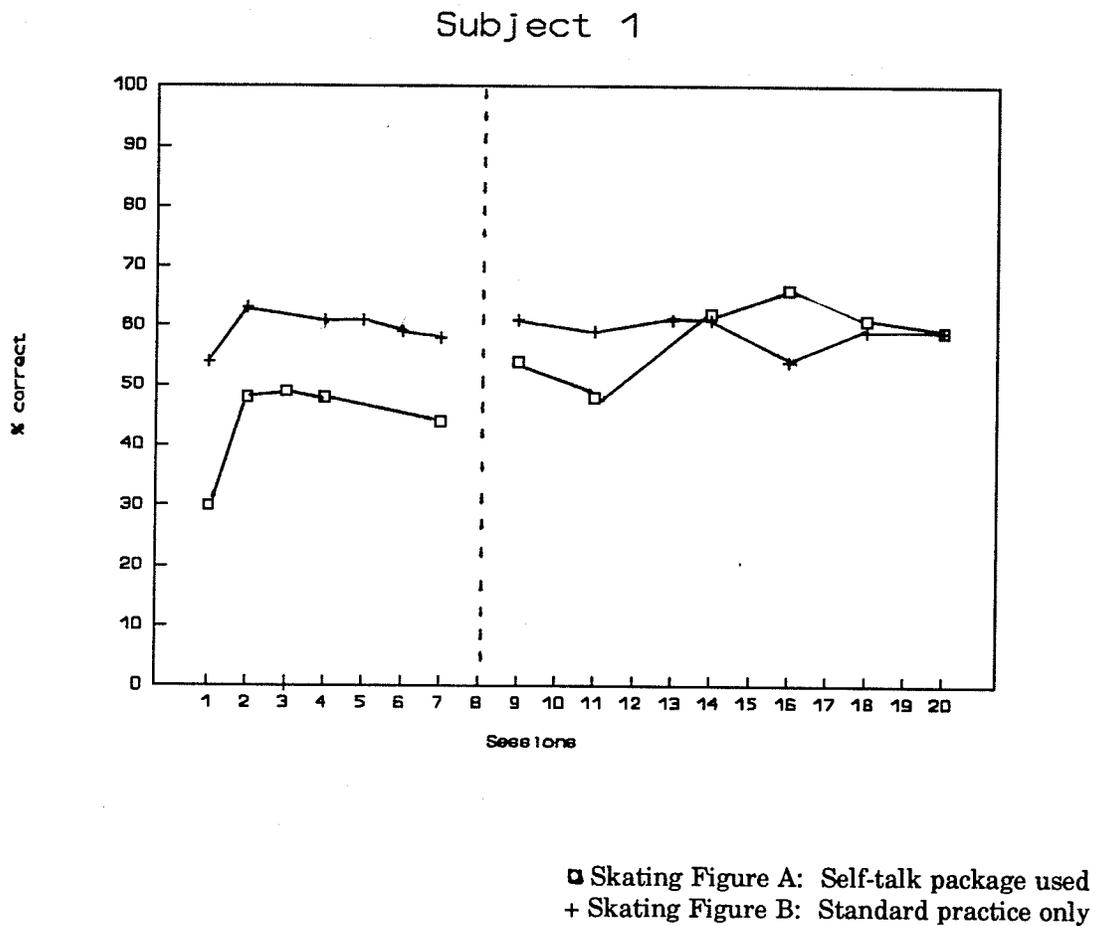


Figure 1: Performance for Subject 1: vertical axis represents percent correct figure performance as measured by the behavioral checklist; horizontal axis represents session number. Points to the left of the dotted line represent baseline sessions, while points to the right of the dotted line represent sessions in which key words were used on Skating Figure A.

The second subject's (S2) performance is shown in Figure 2.

Insert Figure 2 about here

As Figure 2 illustrates, the use of the self-talk techniques resulted in a clear improvement over baseline performance, while performance when using standard practice techniques remained stable. S1 averaged 58% correct performance on Figure A during baseline; this improved to an average of 65% during the intervention phase. In contrast, performance on Figure B remained stable at approximately 54% throughout the study. In addition, only half of the data for Figure A during intervention overlapped with baseline data, while performance on Figure B remained within the same range throughout the study.

The third subject's (S3) performance is shown in Figure 3.

Insert Figure 3 about here

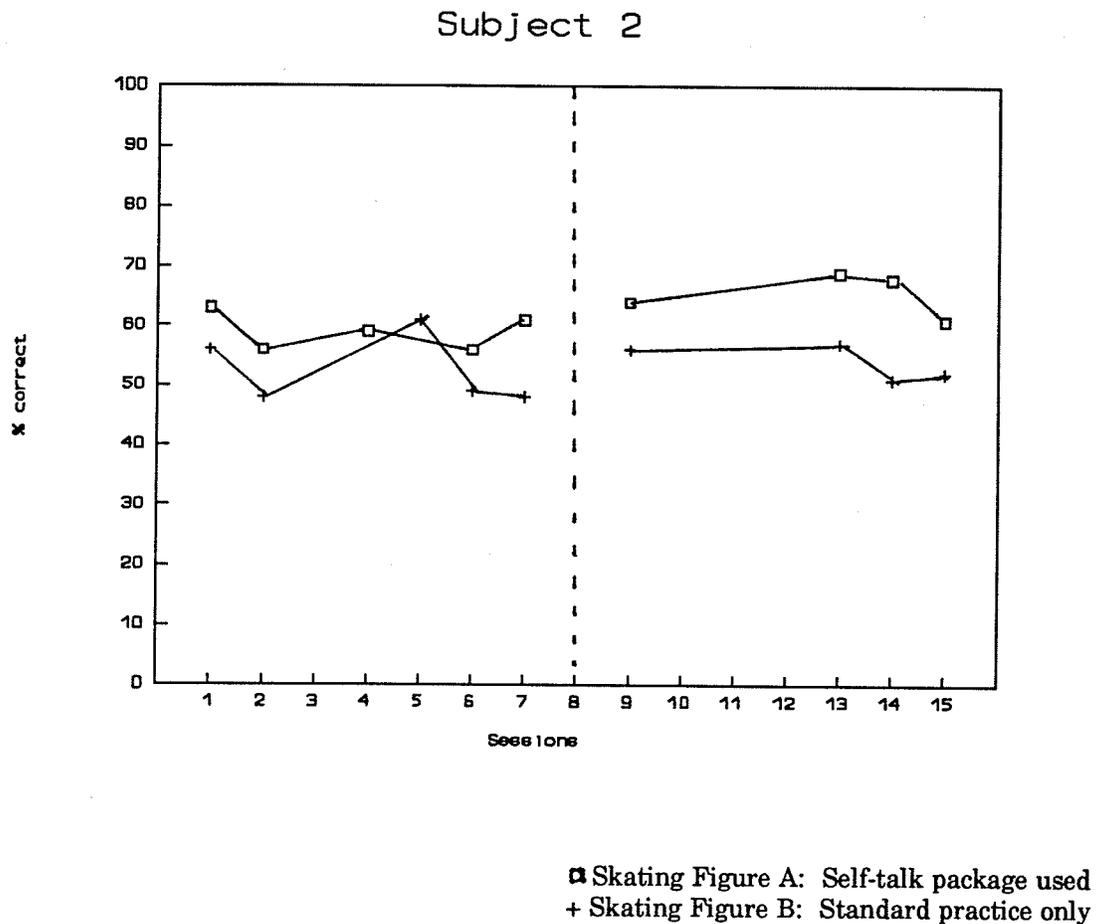


Figure 2: Performance for Subject 2: vertical axis represents percent correct figure performance as measured by the behavioral checklist; horizontal axis represents session number. Points to the left of the dotted line represent baseline sessions, while points to the right of the dotted line represent sessions in which key words were used on Skating Figure A.

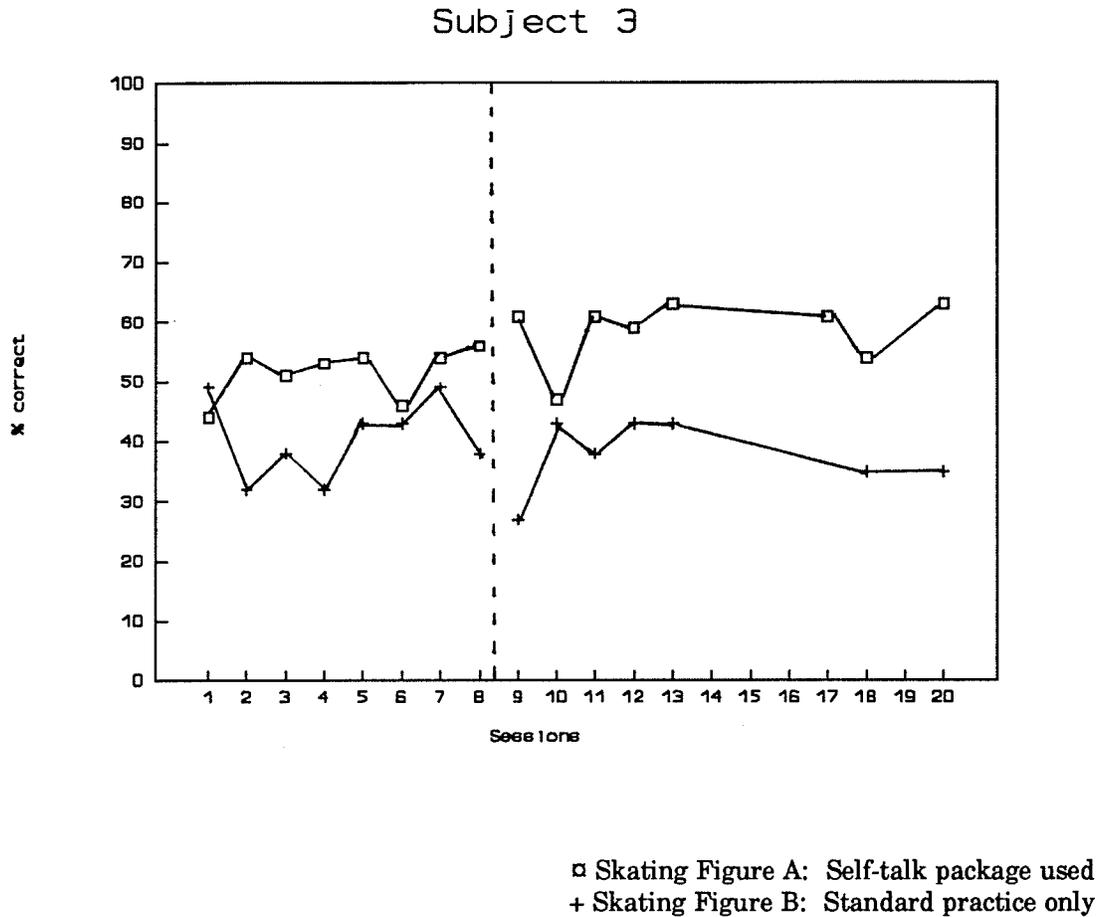


Figure 3: Performance for Subject 3: vertical axis represents percent correct figure performance as measured by the behavioral checklist; horizontal axis represents session number. Points to the left of the dotted line represent baseline sessions, while points to the right of the dotted line represent sessions in which key words were used on Skating Figure A.

As can be seen in Figure 3, the use of the self-talk package also resulted in an improvement over baseline for S3. Performance on Figure A increased from an average of 50% correct during baseline to an average of 58% correct with the use of key words; performance on Figure B using standard practice remained stable at approximately 38% throughout the study. In addition, only 20% of the data for Figure A during intervention overlapped with baseline data, as compared to 100% of data on Figure B.

The fourth subject's (S4) performance is shown in Figure 4.

Insert Figure 4 about here

As Figure 4 illustrates, the self-talk package was also effective in improving S4's performance. Performance on Figure A increased from an average of 42% correct during baseline to an average of 56% correct during intervention. Performance on Figure B, for which standard practice only was used, remained relatively stable throughout the study, actually decreasing slightly from 62% to 58% correct following introduction of the self-talk techniques with Figure A. Half of the data for Figure A during

Subject 4

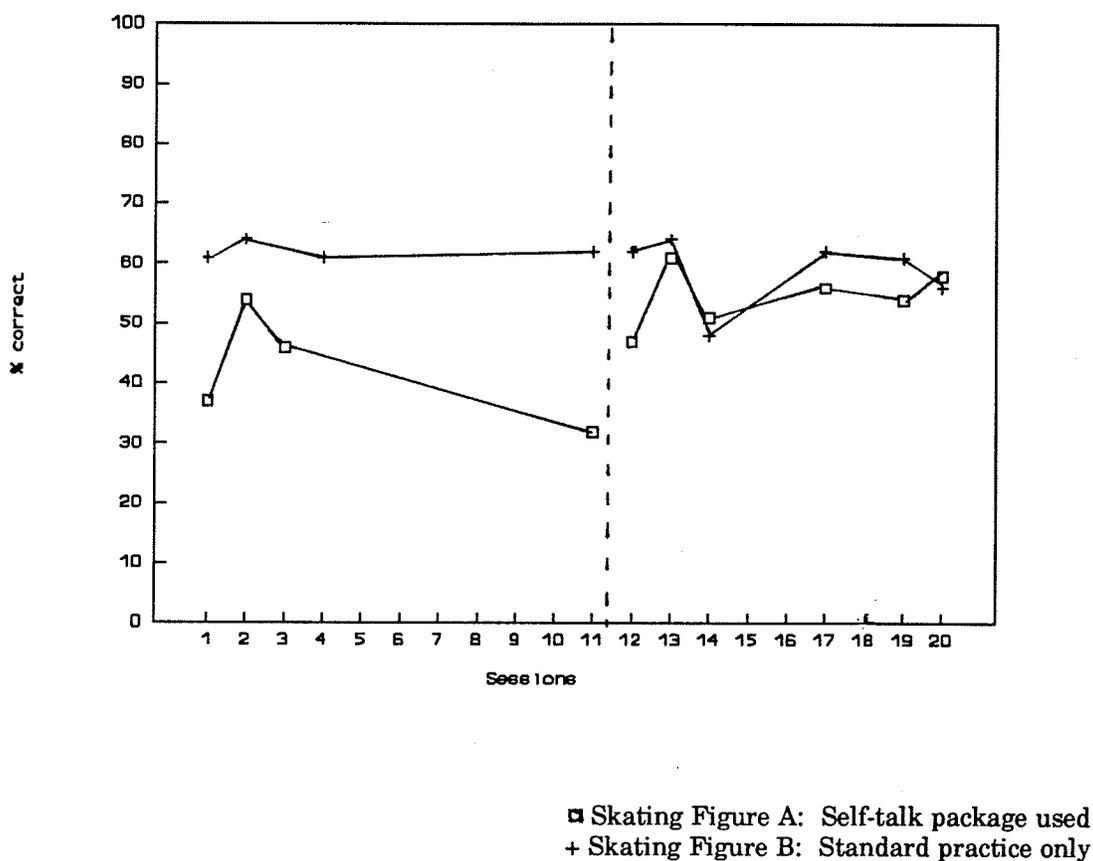


Figure 4: Performance for Subject 4: vertical axis represents percent correct figure performance as measured by the behavioral checklist; horizontal axis represents session number. Points to the left of the dotted line represent baseline sessions, while points to the right of the dotted line represent sessions in which key words were used on Skating Figure A.

intervention was above baseline performance, while all data on Figure B during this phase was at or below baseline performance levels.

In summary, use of the self-talk package resulted in increases in performance levels for all four subjects while performance using standard practice remained stable. This indicates both an effective treatment package and a lack of response generalization. Improvements ranged from 7% to 14%, as can be seen in Table 3.

Insert Table 3 about here

It is of particular interest to note that S1 and S2 had the same figures but in opposite order -- that is, the figure targeted for intervention for S1 was that used as the standard practice figure for S2, and vice versa. Thus, it can be seen that the effectiveness of key words was not tied to the choice of figures since each figure improved with the self-talk package and remained stable with standard practice.

Table 3: Summary of Performance

Subject	Figure	Average Baseline	Average Intervention	Difference
S1	A	44	58	14
	B	59	59	0
S2	A	58	65	7
	B	54	54	0
S3	A	50	58	8
	B	39	38	-1
S4	A	42	56	14
	B	62	58	-4

In addition, performance was improved regardless of whether the targeted figure was above or below the non-targeted figure during baseline assessment.

Thought Content

When using standard practice techniques, skaters responded quite variably to questions about their thoughts during figure lay-out. Responses differed between skaters and from week to week for each individual. Responses ranged from not being able to think of anything, to "sometimes I sing songs to myself", to a detailed list of things they weren't supposed to do (but often admitted to forgetting about during the figure), to a list similar to a key word plan (however, this list changed each time the skater was assessed).

When using the self-talk technique, skaters invariably responded with their planned key words. This effect is corroborated by a 100% use of key words during lay-outs as measured by verbalizations checked by the observers. Skaters also completed all homework assignments and participated in all off-ice lay-out sessions scheduled (invariably verbalizing their key words during these).

Social Validity

All four skaters and two of the three coaches involved in the study completed follow-up questionnaires immediately following the study. Three of the four skaters were also contacted after six months for an additional follow-up. Both coaches indicated that they would recommend using key words to their skaters. One coach did not complete the question on the overall helpfulness of the program, and the other indicated that the use of key words was "a little helpful". Both coaches indicated that the initial observation training/baseline phase was too long.

One skater indicated that she felt the use of key words helped her figures, would like to continue using key words, and would recommend the use of key words to others. This skater was also the only one who was formally tested at the end of the program, and she indicated that she did use key words during her test. She continued to use key words throughout the season, and at the six-month follow-up indicated that she used all of the techniques taught over the summer to prepare for a major competition (Sectionals). She also reported that she both felt she performed better and she placed better at this competition than she usually does.

The other three skaters were not as positive in their ratings of the program immediately following the observation period. However, at a six-month follow-up, one of these skaters used key words both in practice and competition, and indicated that he had performed better than average at a recent major competition. Another skater also indicated that she had performed better in competition and that she did off-ice walkouts of her figures (although she did not memorize specific key words). The third skater was not available for follow-up.

The results for ratings of "helpfulness" of various components of the package are shown in Table 4 below. None of the skaters indicated in the initial follow-up that walking out their figures off-ice was helpful; however, at the six-month follow-up, two of the three skaters contacted were using off-ice walkouts in preparation for competition. Three of the four skaters felt, at the initial follow-up, that saying key words aloud while laying out figures was at least a little helpful. After six months, two of the three skaters contacted were using key words in practice and competition.

Insert Table 4 about here

Table 4: Skater Questionnaire Results

Items were rated on a 7 point Likert scale, with "1" being "definitely not helpful", "4" being "a little helpful", and "7" being "very helpful".

<u>Helpfulness of:</u>	<u>Average Rating</u>	<u>Response Range</u>
Writing out key words	2.75	1 - 5
Walking out off-ice	1.25	1 - 2
Verbalizing during lay-out	3.5	1 - 5
Overall	2.0	1 - 5

As the coaches also commented, skaters felt that the phases prior to intervention took too long, and the time required to observe and score their figures during practice was also too long.

Reliability

Inter-observer reliability ratings were calculated for all sessions during observer training. Training continued until agreement among the judge and both observers consistently reached 80%; extensive training time was necessary due to the inexperience of both observers. Training with the judge took place over the end of the spring skating season, and lasted for approximately 4 weeks; the judge was present for 4 hour-long patch sessions, and the observers practiced for an additional 6 hour-long sessions between sessions with the judge. Observer training continued for the first 8 patches of the summer skating season, taking approximately one and a half weeks.

If agreement did not reach 80% on any observation during the baseline and experimental phases of the study, the observers re-examined the training material and discussed the differences in evaluation of the figure.

IOR ratings during the study averaged 88%, and ranged from 70% to 100%, with only 4 observations falling below 80%.

DISCUSSION

The results of this study suggest that a self-talk package incorporating the planning and memorization of key words, laying out figures off-ice using key words, and practising and laying out figures on-ice using key words can be effective in improving young figure skaters' performance of figures. The use of this package resulted in performance gains for all skaters, ranging from 7% to 14%. Moreover, this improvement was made within a period of only two to three weeks of practice.

Improvements were specific to the figure on which key words were used; response generalization to a second figure did not occur. This suggests that the key words did act as discriminative stimuli to cue specific error-correction behaviors, and that they did not affect techniques used in other figures. This finding reinforces the recommendations made by Rushall et al. (1988), and Ziegler (1987), that key words must be tailored both to the athlete's pattern of responding and to the requirements of the task. In addition, this result suggests that other features of the experimental situation, such as knowledge of evaluation and simply laying out the figure, did not exert significant control over the effectiveness of key words, since these features were present during observations of both figures.

Improvements were made regardless of the type of figure or baseline level of performance. However, greater improvements were made on figures which had relatively low baseline levels of performance. One possible explanation for this may be that lower levels of performance are associated with more variable thought patterns; as the skater has more potential errors to think about, s/he cannot consistently focus on any specific techniques. An important feature of the self-talk package is to focus the skater's thoughts on specific and consistent error-correction cues, and this would result in performance increases as the skater begins to practice correct techniques consistently. Assessment of thought content did indicate that skaters were less consistent when using standard practice than with the key-word technique. The less consistently these techniques were practised originally, the greater the improvement may be. An additional factor to consider is the possibility of a ceiling effect due to physical capabilities. The closer the skater is to her/his best possible level of performance given her/his level of physical preparedness, the more difficult it may be to make large improvements.

One skater indicated at the initial follow-up that she found the key word package to be helpful, and the coaches indicated that they would recommend the use of key word techniques to their skaters. However, despite clear improvements, questionnaire results indicated that the self-talk package was not initially well accepted by most of the skaters. From the comments made,

it appears that it was not the actual use of key words which was objected to, but the time required to carry out observer training prior to the onset of the project, and the time required to score figures during practice time throughout the project. When the project was first explained to the skaters, it was implied that key-word training would begin almost immediately. However, due to the difficult nature of scoring, and the inexperience of the observers, observer training lasted for much longer than expected. Thus, there was a much greater delay in training skaters on the key-word techniques than had been anticipated. Additionally, due to the extreme crowdedness of the rink, scoring often had to be done on the skater's practice "patch", which disrupted normal practice of other figures. The coaches also indicated that the experimental constraints of the study detracted from their enthusiasm for the package.

All the skaters contacted after six months indicated that they were using some components of the key-word package in preparation for competition, and that they had performed better in competition. This would seem to corroborate the hypothesis that skaters did not object to the key-word package itself, but to the observation requirements of the experiment, and that their negative opinion of those requirements generalized to their opinion of the actual package.

Perhaps if observer training could have been done in a different setting, and if scoring could have been less obtrusive (perhaps with the availability of a scoring patch so skaters could lay-out their figures and return to practice), all skaters would have accepted the package initially. During the intervention phase, many of the skaters did make positive comments about learning to use key words, so this also seems to indicate that it was the constraints of the experimental study which detracted from its acceptance. Previous questionnaires (Watchorn, Note 1) have indicated that the key word package is fairly well accepted when implemented without the experimental conditions and observation used in this study.

This study showed that self-talk procedures can improve performance in a very short period of time. However, due to practical constraints, longer-term follow-up was not possible. Because of the nature of skating tests and competitions, three of the four skaters started new figures after the spring season. For two of the four skaters, additional figures were required for competition, so practice time on test figures was limited. Additionally, one of the four skaters began a new set of test figures after the summer season. For all skaters, competition during the fall season precluded the availability of observation time. A more thorough examination of the maintenance and continuance of improvement over time is recommended to more fully determine the potential and limitations of these procedures.

It would be of great benefit to examine ways to make detailed assessment procedures less obtrusive in the applied setting. This was the primary concern raised among the subjects. However, if we are to recommend the use of self-talk and other packages, they must be proven to be effective, and this creates difficulty when doing applied research.

Another area of importance that was not examined was stimulus generalization from practice to competitive situations. Theoretically, self-talk should work to program common stimuli and thus enhance generalization. Research examining the utility of self-talk in this area is recommended.

In summary, this study addressed a number of issues in the field of applied behavioral analysis of sport. Self-talk procedures were extended to a novel sport environment, and were used successfully to improve skill development. These procedures were effective independent of the specific skill required or the initial skill level. They were also accepted enough by the athletes to be used at least in part six months following initial training. Of additional importance is that these procedures can be managed by the athletes, and thus can improve practice efficiency without putting a strain on limited coaching resources.

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APPENDIX A: Observer Training Package

A Behavioral Checklist for Evaluating Performance of Figures by Figure Skaters

The attached checklist was developed by Suja Srikameswaran for use in a research project concerned with improving performance of figures by young figure skaters. Four skaters were taught to use the checklist to evaluate selected components of their figures at three practices per week. The training package was clearly effective in improving performance of targeted components of figures in 3 out of 4 subjects, and these three subjects passed their figures test immediately after completion of the project.

The attached checklist was developed after careful study of the Canadian Figure Skating Association's Figure Judging Manuals (1986), and with the help of Ms Brenda Maher, a figure skating judge with several years of skating experience and three years of judging experience. For additional information on the research project, see:

Srikameswaran, S. M. (1989). Standardized coaching sessions and a self-evaluation package for improving performance of figures by young figure skaters. A thesis submitted to the Faculty of Graduate Studies, University of Manitoba, in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

or

Write to: Garry L. Martin, Professor of Psychology
University of Manitoba
129 St. Paul's College
430 Dysart Road
WINNIPEG, Manitoba CANADA
R3T 2M6

Table 1. Checklist used to evaluate subjects' performance of figures

Skater: _____

Scoring Key:

Please denote occurrence of error by placing a checkmark in the "incorrect" column (✓)

Date: _____

CATEGORY 1 - FORM (INCORRECT)

1. Hand positioning

- drooping or above waist
- palms up
- clenched fists
- fingers wide apart

2. Changing position/edges/turns

- jerky movements of free foot
- kicking foot forward or backward
- moving free foot out and around skating foot

3. Position of head/chin

- chin tucked into chest
- head tilted to side

4. Posture

- high shoulders
- drooping back/spine
- slouching
- weight over heel of skating foot

CATEGORY 2 - FLOW (INCORRECT)

1. Entry into circle

- pulling free leg
- slowing down toward end of circle

2. Speed

- going too fast
- losing speed half way to three quarters of the way around the circle

3. Pushoff

- lunging
- jumping onto edge

4. Turns and changes

- knee dips before turn
- (LOOP) straight knee through turn

CATEGORY 1 - FORM (CORRECT)

1. Hand positioning

- positioned below waist
- parallel to ice
- fingers together
- fingers pointed away from body

2. Changing position/edges/turns

- continuous movement of free foot from back to front of body (or vice versa)
- free foot is kept close to skating foot (so that they brush each other)

3. Position of head/chin

- chin should be level (head held level, eyes looking down)

4) Posture

- upright posture (i.e. upper body over skating foot, shoulders back)

CATEGORY 2 - FLOW (CORRECT)

1) Entry into circle

- maintain consistent speed until ready for pushoff

2) Speed

- maintain consistent speed around circle

3) Pushoff

- transition of weight from foot to foot is smooth

4) Turns and changes

- knee lifts during turn
- (LOOP) knee bent (intermediate position)

CATEGORY 3 - SYMMETRY OF CIRCLES (INCORRECT)

1) ≥ 1 bladlength diff. b/t LONG axes of circles

2) - ≥ 1 bladlength difference in line-up at circles
 - ≥ 1 bladlength difference in size (width)
 - ≥ 1 bladlength difference in length of circles

3) - ≥ 1 bladlength diff. b/t position of turns on circle
 - (LOOP) $\geq 1^\circ$ diff. in position relative to long axis

4) Stepdowns
 - incorrect edge
 - not on a circle
 - straight
 - hooked out

5) Pushoffs
 - $\geq 5^\circ$ difference between pushoff and long axis
 - $\geq 5^\circ$ difference between pushoff and short axis

6) Shape of circle
 - straight on top
 - straight on sides
 - bulged (i.e. wobbles on top/sides of circles)

7) Flats (cleanness of edges)
 - quarter of circle
 - 2 to 3 bladlengths
 - 1 bladlength
 (repeat occurrences of flats are more serious)

CATEGORY 4 - TURNS (INCORRECT)

1) Very serious errors
 - change in or out
 - change in and out
 - flats in or out
 - flats in and out
 - jumped (no top on turn)
 - (LOOP) size of loop > 1 by $1\frac{1}{2}$ bladlengths

2) Serious errors
 - hooked or pulled turns
 - forced turns (heavy edge)
 - skids (at top of loops)
 - scrapes

3) Least serious error
 - spooned

CATEGORY 3 - SYMMETRY OF CIRCLES (CORRECT)

1) Circles should be on the same long axis

2) - less than 1 bladlength diff. in lineup of circles
 - less than 1 bladlength diff. in width of circles
 - less than 1 bladlength diff. in length of circles

3) - Turns should be lined up exactly on circles
 - (LOOP) Should be within 2° of long axis

4) Stepdowns
 - should be lined up on circle (circles should be tangent)
 - correct edge

5) Pushoffs
 - should be lined up on long axis
 - should be lined up on short axis

6) Shape of circle
 - should be rounded (well traced, round, no wobbles)

7) Flats (Cleanness of edge)
 - $\frac{1}{2}^\circ$ of flats acceptable (assuming no other occurrences of flats in the layout)

CATEGORY 4 - TURNS (CORRECT)

1) All turns should be clean (i.e. without occurrence of any of the errors described in "incorrect" column)

2) Size of LOOP = 1 by $1\frac{1}{2}$ bladlengths

Training Manual

- Observers: Please read enclosed manuals on Figures Judging and the read description of use of the checklist.

Category: FORM

1. **Hand positioning:** Hands should be positioned below the waist or at waist level during the execution of the figure. Palms should be held parallel to the ice, with the fingers together and pointed away from the body. During the execution of turns and during pushoffs, you will notice transitions in the positioning of the arms (due to turning action and pushoff action). On these occasions, hands may be above the waist (1st component) - this will not be considered incorrect.
2. **Changing position/edges/turns:** As the skater is a) turning, b) changing edges at centre or c) changing position after she has pushed off, her free foot should move continuously to its appropriate position - e.g. "tucked" close to her skating foot. Her free foot should not be more than a blade length away from her skating foot.
3. **Position of head/chin:** The skater's head should be held level, with her eyes looking downward. On figures such as the loop and the backward inside and outside edged figures, having the chin at the shoulder is acceptable (otherwise, she won't be able to tell where she's going). However, as the skater is moving in a forward direction, her chin should be level and her head held straight and not tilted to the side. Thus, a chin tucked into the chest is considered incorrect.
4. **Posture:** A common problem seen particularly during turns (at the entry) are high shoulders. This component would be marked incorrect if a skater traced her figure with her shoulders at the level of the middle of her neck or higher. Drooping back/spine refers to the skater who leans back over the heel of her skate (often seen when the skater returns to centre). Slouching refers to the error where the skater leans over the ball of her skate, and is hunched over while executing her figure. The skater's upper body should be squarely distributed over the skating foot, and her shoulders should be back and "below" her neck.

Category: FLOW

1. **Entry into circle:** As the skater enters the circle, she should not be tugging or pulling with her free leg to assist her in reaching the centre where she will change edges. This error may occur in conjunction with the problem of loss of flow, that is the skater has not paced herself appropriately and therefore slows down toward the end of the circle (as

she's coming into centre). The skater should maintain consistent speed as she executes the figure, so that she's not struggling to complete it.

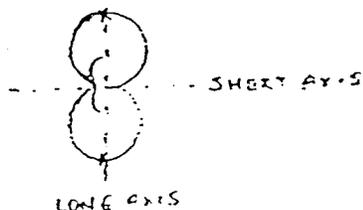
2. **Speed:** As mentioned previously, the skater should maintain consistent speed throughout the execution of the figure. A skater may not pace herself well after the pushoff, and you may notice that she's going very quickly around the circle, so much so that it appears she does not have good control of her edges or of her body position. Alternatively, she may have a weak pushoff and therefore she may lose speed as soon as half way to three quarters of the way around the circle (as opposed to the end of the circle, when she's coming into centre). These behaviors are considered to be errors.

3. **Pushoff:** At centre, the skater pushes off onto the circle. The action of pushing off is very important, as it determines the amount of speed or "strength" the skater will have to complete the tracing. One problem encountered is lunging. This is defined as the action of pushing off onto the circle such that most of the body weight is over the balls of the foot – the whole upper body looks as if it's getting onto the circle before the skating foot is! On the backward pushoffs, the skater looks as if she is placing most of her body weight on the heel of the foot; again, her upper body enters the circle before the skating foot does – this is an error. The error of jumping onto an edge appears much as it sounds – the skater has not effected a smooth transition of edge, or change of foot and "jumps" onto the edge of her blade.

4. **Turns and changes:** The proper action of the knee during a turn is as follows – prior to the turn, the knee is slightly bent. As the skater executes the turn, the knee lifts and then goes back to its slightly bent position. A common error is that a skater will anticipate the turn and straighten the knee before the turn, and then dip it during the turn. **LOOP:** The loop is done with the knee in an exaggerated bend, with the body weight and centre of gravity lower than it is for the other figures. The bend position in the loop is called the intermediate bent position. Therefore, a common error seen is that the skater will come out of the loop position (straighten up) in anticipation of the turn. Thus the knee should remain bent in the intermediate position (45 degree angle) throughout the figure.

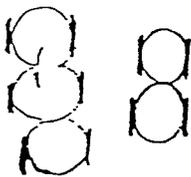
Category: SYMMETRY OF CIRCLES

NOTE that for all figures, WITH THE EXCEPTION OF LOOPS, the tracing should be executed such that there is LESS THAN OR EQUAL TO 1 bladlength (length of your boot or shoe) difference. AS LOOPS ARE SMALLER FIGURES, the tracing should be executed such that there is LESS THAN OR EQUAL TO one-half a bladlength difference.



1. **Long axes of circles:** refers to the vertical axis of all two (or three of the circles). First of all, establish where the centre is – this is the point where the skater started. You will

see a small flat ("railroad tracks") leading into a straight line where the circle begins. The space between where the skater has rested her free foot and the small flat is where the long axis lies. Lay a mitt or a pencil at the long axis. If the figure is three lobed, go to the next centre and establish the long axis. and lay a mitt or pencil there. Then travel to the tops of the circles, and establish the centre (top most point) of the circles, and lay a pencil or mitt there. You can then evaluate by visual inspection, the difference between the long axes, and thus determine whether the skater successfully maintained the long axis when she laid out the figure. The long axes of all the circles, including the centres, must be equal to or less than a bladlength in difference.



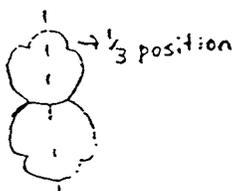
2. **Lineup of circles:** This refers to whether the lobes of the figure line up on the side (vertically). Place a mitt or pencil on both sides of each circle, at the roundest part of the circle. By visual inspection, determine if there is less than or equal to a bladlength's difference between lineup on respective sides. Both sides of the circle have to be lined up for this component to be considered correct.



3. **Width of circles:** This refers to the width (horizontal measurement) of the circles. From one side of the roundest part of the circle, pace out the width of the circle to the other side. You may count the number of footsteps across, but ensure that you measure both circles the same way. Again, there should be less than or equal to one bladlength difference in width of the circle.



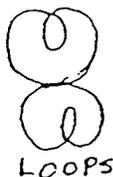
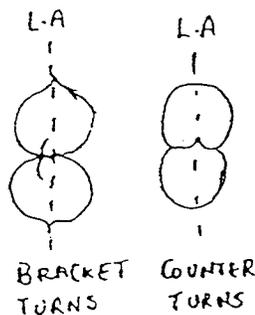
4. **Length of circles:** From the topmost point of the circle, pace out the length of the circle till you reach the centre. From the centre, pace out the length of the circle till you reach the topmost point of the next circle. (You should be travelling along the long axis).



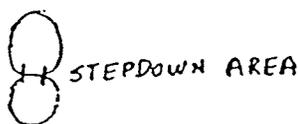
Long axis

Three-turns

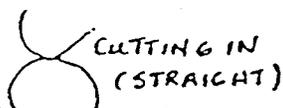
5. **Position of turns relative to the long axis:** There are several kinds of turns. Each circle will have two sets of "three" turns; 1 set of bracket turns, or one set of loops. Counter turns occur at the centre (rather than at the top or



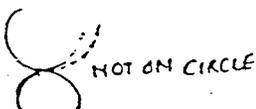
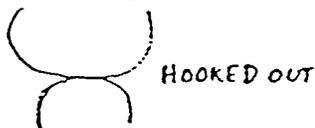
side of the circle). The "three" turns should divide the circle into thirds, and should thus be placed within one bladlength of the one-third position on the circle. The bracket turns and loops, as well as the counters, should be placed on the long axis (within one bladlength; EXCEPT FOR LOOPS = 2 INCHES, AS MEASURED BY THE LENGTH OF THE HEEL OF YOUR BOOT). First of all, establish the topmost point of the circle and/or the long axis. Measure the difference in position between each set of turns relative to the long axis. All turns have to be correctly placed to warrant a "correct" checkmark.



CAN BE:



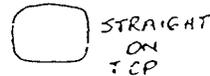
OR



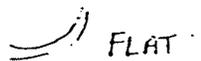
6. **Stepdowns:** The stepdown refers to where the skater placed the skating foot on the circle. Ideally, the skater should begin her tracing with the skating foot on the circle, using the correct edge. Check the stepdown to ensure the skater has changed edges at centre, before the stepdown, rather than at the stepdown itself. Check to ensure that the stepdown is on the circle, rather than cutting it in (straight), or hooked out. If the stepdown does not fit the previous descriptions, but is not on the circle, mark it incorrect. Essentially, the circles should be tangent, and should have a round shape.

7. **Pushoffs:** Pushoffs refer to the action of the skating foot at centre that gives the skater the momentum or flow to do the tracing. This action results in a pattern on the ice that is to be evaluated. Ideally, the pushoffs should be lined up or traced at centre, and they should be positioned less than or equal to 5 inches from the long axis, and less than or equal to 5 inches from the short axis. Determine where the long axis and short axis occur, and then evaluate the position of the pushoffs relative to the long axis. Problems potentially included scattered pushoffs – all the pushoffs should be within the same distance from the long and short axes.

8. **Shape of circle:** The circles should be round, well traced (i.e. each of the three tracings should overlap closely, ideally to the point of being indistinguishable). Often, skaters

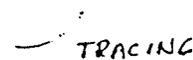
STRAIGHT
ON
SIDESSTRAIGHT
ON
TOP

WOBBLLED



FLAT

VS.



TRACING

AT CENTRE:



OR



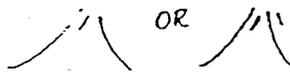
have difficulty establishing or maintaining the shape of the circles; they may be straight at the top of the circles (i.e. straight across when they should be rounded), or straight on the sides (the figure will look cut in), or bulged (or wobbled). Bulges and wobbles refer to "wavy" patterns on the ice where it appears that the skater has not been able to maintain good, consistent control of her skating foot and has not been able to trace out a circle properly. These are all considered errors, and should be marked as such.

9. Flats: The skater is supposed to trace the figure on one edge (except at centre, where she changes edges). Thus, there should only be a single line tracing on the ice. The skater may have difficulty maintaining an edge, and place the entire skateblade on the ice, resulting in a "railroad track", or double line pattern on the ice. The only time when a flat is appropriate is at centre, when the skater places the entire skateblade on the ice in order to change edges. Occurrences of flats elsewhere on the figure is considered an error. Examine the entire figure for occurrences of flats. They are more likely to occur coming into or out of turns and as the skater approaches centre. If you noticed a loss of flow in the execution of the figure, there is a higher probability that flats have occurred. Half an inch of flats (not including the "flat" at centre) is considered acceptable. This will account for any occurrences of "water flats" – often if there is water on the ice, the skater's blade may pick up the water and a double line pattern is left on the tracing – this is not an error.

Category: TURNS

Common errors in turns include changes, flats, jumped turns, hooked or pulled turns, forced turns, scrapes, and spooned turns. Examine each set of turns for these errors. Occasionally, turns are "traced", i.e. the turns are done overlapping one another, and it is difficult to distinguish between them. In those cases, evaluate the turns that are

Changes:



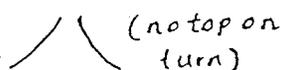
OR

Flats:

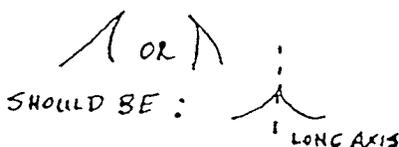


OR

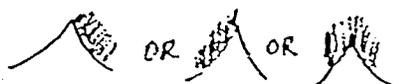
Jumped:



Hooked:



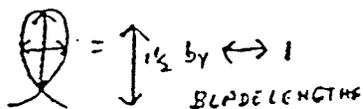
Scraped:



Spooned:



Looped:



Skids:



distinct. Changes refer to changes of edge that show up on the ice during the turn, leaving a very small flat at the top of the turn, at its point of entry and/or its point of exit. Ideally, the skateblade should "turn" from edge to edge, leaving a single line pattern on the ice. Flats refer to the "railroad" pattern on the ice. Flats are longer, and you may see them at the entry of the turn, and/or the exit of the turn. A jumped turn is a turn with no top on it -- all you will see is a single line entering the turn and a single line leaving the turn, with no turn *per se* traced on the ice. LOOP: the loop is an oval shaped turn -- it should measure one and one half by one bladengths. Loops half a bladength larger or smaller than this are considered errors.

Once the long axis or one-third position on the circle is established, place a pencil on the turns to establish the axis. A hooked or pulled turn will appear off axis at its crown -- this is considered an error. A forced turn is the result of a heavy edge, and thus the turn will appear quite scraped both in entry and exit. In contrast, a scrape will usually appear on either entry or exit from the turn. LOOPS: a common problem at the top of the loops are skids -- the loop will appear heavily scraped at the top. This is considered an error.

The least serious error is a spooned turn. At the top of the turn, you may see an oval or spooned shaped marking; this is a spooned turn.

**APPENDIX B: Homework Assignment
Package**

**SPORT PSYCHOLOGY FOR FIGURE SKATERS:
USING KEY WORDS TO IMPROVE YOUR
CONCENTRATION ON FIGURES**

Adapted from: Martin, G. L. (1990) Sport Psychology for Figure Skaters. University of Manitoba

by Siri Ming, Department of Psychology, University of Manitoba

NAME: SKATERNAME

KEY-WORD FIGURE: KWFIG

COMPARISON FIGURE: COMPFIG

INTRODUCTION

Thank you for agreeing to participate in this research project. We hope that we can help you to improve your concentration for skating.

In this project, we need you to follow a few rules:

1. Please use key words only when practicing the "key-word" figure (the specific figure will be decided on by your coach). Do not use key words when practicing any of your other figures.
2. Please make every effort to attend all of the patches at which we will be observing your practice. (See the schedule on the next page.)

Again, thank you very much for your cooperation in this project. If we find out that key words are better than your usual way of practicing, we will help you to use key words for all of your figures after the study is over.

PATCH SCHEDULE FOR THE KEY WORD PROJECT

DAY: APPROXIMATE TIME(S)

=====

MONDAY

TUESDAY

WEDNESDAY

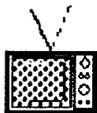
THURSDAY

FRIDAY

PART I: MAKING UP KEY WORDS

When skating a figure, the length of time that it takes might vary from approximately 30 seconds to approximately 2 minutes (of actual skating time), depending on the figure. During that time, you have to be thinking about something. We recommend that you plan and practice specific thoughts for each figure. The specific thoughts are called "key words". Key words can be of three types: (a) words to tell you what to look at, such as "check line-up" to remind you to see if the circles of the figure are appropriately lined up; (b) "body tension" words such as "relax" or "easy" to remind you to skate while relaxed rather than all tensed up; and (c) technique words such as "hands" to remind you to press down on the palms of your hands. If you plan and practice using key words for your figures, you will improve your concentration, and you will be less nervous at your next figures test or competition.

Following are some homework assignments which will be checked by either Siri or your coach.

ASSIGNMENT A: Writing out Key Words**Due Date****Checked
By: Siri
Coach**

1. Watch Part I of the videotape, "Sport Psyching for Figure Skaters". Listen carefully for Karrie and Jeff's key words as they skate their figures.

July 19**S: _____**

2. For your key word figure (**KWFIG**), draw out a pattern of the figure on a piece of paper, similar to the pattern shown in Diagram 1. The pattern doesn't have to be as neat as the one shown in Diagram 1, but you should have approximately one full page.



3. At the correct places on the drawing, print in the key words that you will use. You might select words to help you to concentrate on push-off, form, flow, edges, turns, and step-downs. For example, when skating a right forward outside counter, a skater might say, "check shoulders" to herself just after the change to remind herself to have her shoulders in the correct position (see Diagram 2). Another skater tracing the same figure might say, when coming around on the top circle, "hips firm" to remind himself to keep his hips still while looking over the left shoulder to check the line-up (allowing the hips to turn would cause the circle to go too far inward, see Diagram 2). You might also write in key words to remind yourself to check the tracing and the line-up of the circles, and to help you to relax.

4. Ask your coach to review your key words and make recommendations for improvement. Your coach will know the kinds of errors that you usually make while skating a figure, and can make good suggestions for key words to remind you to think about correct form to offset the error.

July 19**C: _____**

5. Review all of your key words to see if they remind you about what you're supposed to do, rather than what you're not supposed to do. In other words, make sure they are phrased in the positive (things to do) rather than the negative (things not to do).

July 21**S: _____**

6. Memorize your key words while imagining yourself laying out your figures at home. Continue memorizing them until you know them all by heart. Ask Siri to test you on your key words.

Diagram 1: RIGHT FORWARD OUTSIDE COUNTER
(S) stands for "start"

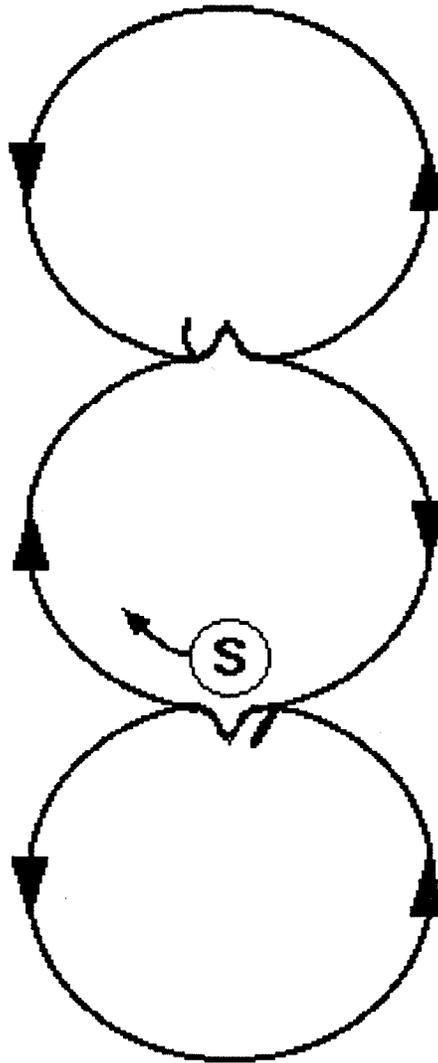
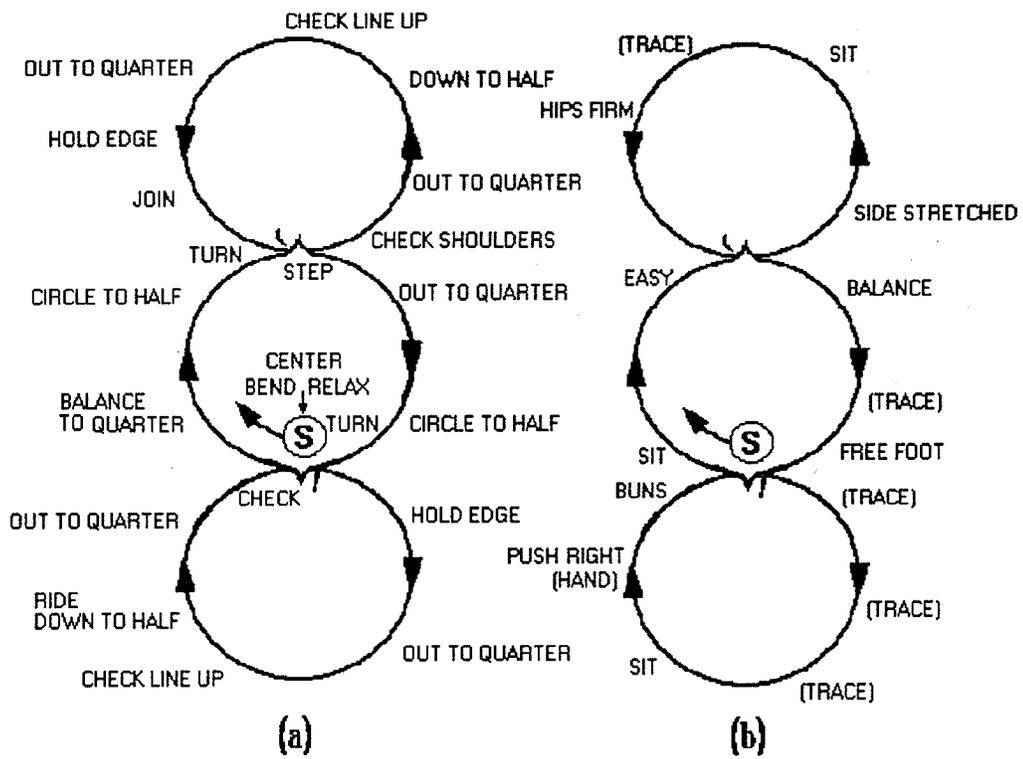


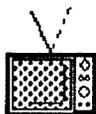
Diagram 2: EXAMPLE KEY WORDS
(a) novice skater; (b) senior skater
(S) stands for "start"



SKATERNAME'S KEY WORDS: KWFIG

PART II: OFF-ICE FIGURE PRACTICE

A study of Canadian Olympic athletes who performed well in the 1984 Olympics showed that all of them used a great deal of mental rehearsal or mental imagery. For skaters, this means that they went over their skating in their minds and imagined themselves landing a particular jump perfectly, or skating their entire program, or laying out a great figure. To do this with figures, you should actually walk out the figures off the ice, pretending that you are actually laying them out, and trying to imagine what it feels like when you lay them out at competitions. Following is an assignment which will help you to do this.

ASSIGNMENT B: Walking Out Figures Off-Ice**Due Date****Checked
By: Siri**

1. Watch the section of Part I of the videotape, "Sport July 21 Psyching for Figure Skaters", that shows Karrie and Jeff as they walk out their figures. Note the different strategies that Karrie and Jeff use. Try both strategies and then choose the one that works best for you.

S: _____

2. Ask Siri to time how long it takes you to lay out your July 21 figure (from the time you push off at the start until you're finished laying out the figure). Record that time so that you know what it is, at the bottom of this sheet. A right forward outside counter, for example, usually takes about 1 minute and 30 seconds.

S: _____

3. Walk out your figure at the rink so that:

July 22**S: _____**

- Siri acts as a judge, announces you, and times your figure for you;
- you pretend that you're at a competition and a judge has asked you to lay out the figure, and you then walk out the figure, saying your key words out loud;
- you try to make the simulation realistic in terms of lining up your axes before walking it out, paying attention to foot position (etc.) at turns, and presenting with style, grace, and good form;
- you practice to the point where you can walk out a figure within 3 or 4 seconds of the length of time that it takes you to skate that figure on the ice, and so that you can actually feel the correct movements when you say the key words.



4. Using the above instructions, walk out your figures at least four times per week, twice with Siri and twice on your own, from now on. Follow the schedule on the next page, and have Siri initial beside each date. If you can, ask someone else to watch and time your practice on your own.

Figure Time: _____

SCHEDULE FOR OFF-ICE FIGURE PRACTICE

Off-ice practice of your figure is scheduled twice per week, 15 minutes before one of your regular patch times:

OFFICE1 OFFICE2**PRACTICE WITH SIRI****PRACTICE ON MY OWN****DATE: INITIAL:****DATE: INITIAL:**

PART III: PRACTICE AT PATCH

In order for key words to help you, they must be practiced every time you trace out your figure. When you first practice key words while skating figures, they might be a little bit distracting. The first few times that you try them, you might not skate the figures as well as you usually do. But if you keep practicing them, you will get to the point where they will help you skate your figure more consistently than in the past. Remember, there is no magic here. You should not expect key words to suddenly make you skate your figure better than ever before. What they will do, if you practice them, is to help you to skate figures in competition as well as you skate them when you lay out good figures at practice. In other words, they will help you to more consistently skate near to your best level, whatever that level might be.

NOTES

APPENDIX C: Follow-up Questionnaires

Follow-up Questionnaire: Skaters

Thank you for helping us with our research this summer. We would like to know how helpful we were to you. Please fill out the following questionnaire and return it to your coach.

Level of skating: _____

Please rate the following questions on a scale of 1 to 7:

1	2	3	4	5	6	7
definitely			a little			very
not helpful			helpful			helpful

1. The homework assignment on writing out key words was: _____
2. Walking out my figure off-ice with Siri was: _____
3. Saying key words aloud while laying out my figure was: _____
4. Overall, I found using key words to be: _____
5. How much do you think the figure that you used key words with improved?
 - a) not at all
 - b) not any more than the ones I practiced normally
 - c) somewhat more than the ones I practiced normally
 - d) much more than the ones I practiced normally
6. Would you like to use key words to help you with your other figures?

yes no
7. Would you recommend to other skaters to use key words with their figures?

yes no
8. Are you still using key words on the figure you practiced over the summer?

yes no
9. If you were tested on your key-word figure at the end of the summer, did you use your key words during the test?

yes no
10. Please tell us any other comments you would like to make about this project (you can use the back of this page).

Follow-up Questionnaire: Coaches

Thank you for your participation in this research project. We would like to know how effective you feel this procedure was for your skaters.

1. Overall, how helpful was the use of key words for your skaters?

1	2	3	4	5	6	7
definitely				a little		very
not helpful				helpful		helpful

2. Would you recommend using key words for other figures to your skaters?

yes no

3. Would you recommend using key words to other skaters in the future?

yes no

4. Please write down any additional comments you would like to make about any aspect of this project.

6-month follow-up

Phone Contact:

Indicate to the skater that the results from the summer project have been completed. Tell her/him that you would like to briefly meet to let her/him know how well s/he did in the project and find out how s/he has been doing over the last season.

Meeting:

Explain the skater's results.

Ask the following questions:

- 1) How well do you feel you skated at sectionals compared to how you usually skate?
 - a) below average
 - b) average
 - c) above average

- 2) How well did you place at sectionals compared to how you usually do?
 - a) worse than previously
 - b) same as previously
 - c) better than previously

- 3) Did you use any key word techniques in your preparations for sectionals?
 - a) not at all
 - b) some
 - c) a lot