Imagery Rehearsal Self-Efficacy and the Performance of Australian Rules Football Skills

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This thesis is presented in fulfilment of
the requirements of the degree of
Doctor of Philosophy

Department of Physical Education and Recreation
Faculty of Human Development

Victoria University of Technology

1996

Abstract

This thesis examined imagery, self-efficacy, and performance. A single-case, multiple-baseline study presented an imagery rehearsal program on kick passing to ten Australian Football League (AFL) players over half a competitive season. Kicking performance, assessed by three expert judges, increased for eight players after imagery rehearsal was introduced, according to visual analysis of individual graphs. Significant split middle technique analyses ($p<0.05$) provided support for four players. A second single-case, multiple-baseline study presented an imagery rehearsal program on attaining front and centre position to eight AFL players over more than half a competitive season. Percentage of front and centres in matches, and self-efficacy, assessed by Bandura's (1977) microanalytic technique, increased for all eight players after imagery rehearsal was introduced, according to visual analysis of individual graphs. Significant split middle technique analyses ($p<0.05$) for performance provided support for six players. Twenty one AFL players and 18 elite juniors participated in a study of a closed, non-competitive goal-kicking task. Players completed a microanalytic self-efficacy scale, kicked at goal once from 20 positions, and reported self-efficacy again. Half the senior and junior players completed 10 audio-taped imagery rehearsal sessions, reporting self-efficacy after sessions 4, 8, and 10. The others did relaxation on sessions 4, 8, and 10, completing self-efficacy assessment after each. All players then performed kicks from 20 positions, and completed a final self-efficacy rating. Analysis of Variance (ANOVA) showed significant interaction effects ($p<0.05$) for performance, $F(1,36)=78.81$, $p<0.001$, and self-efficacy, $F(1,180)=29.59$, $p<0.001$. Newman-Keuls post hoc tests indicated that the imagery

group performed significantly better than the control group at post-test, while self-efficacy was significantly higher for the imagery group for all measures once treatment started. LISREL indicated significant paths ($p<0.05$) from imagery to post-test performance and to self-efficacy on all occasions after treatment started, but no significant path from self-efficacy to post-test performance. The results of three studies consistently supported the efficacy of imagery rehearsal for enhancing performance and self-efficacy of expert performers, but did not support self-efficacy as a mediator between imagery and performance.

Acknowledgements

I sincerely thank Dr. Tony Morris, my principal supervisor, for his professional guidance, encouragement, attention to detail, and friendly advice over the last six years. Tony went to great pains to make himself available for consultations at short notice and was even happy to provide such assistance at his own home. Tony refused to "leave any stone unturned" in all aspects of this presentation. I will always be indebted to Tony for his diligence and friendship in the latter part of my professional development. I know that Tony, I, and our families have developed a lasting friendship throughout this marathon task.

The most significant people to show appreciation to, for their support and encouragement, throughout the production of this thesis, are, my wife Kate, and my children, Katie, Ben, and Matt. They have endured my back for countless hours, as I have sat and typed at the word processing keyboard without ever complaining or becoming upset. Now is their turn for the good things that have been placed on "the back burner". May the words "not now" or "a little later" never be uttered by me to them again.

Liz Horner "Head" of the Human Movement Department, in which I teach, and Dannielle McKernan "Head" of the University, have been a tower of support as well as providing a calming influence. Liz never finds any academic's demand too challenging and is a whiz at reading our handwriting. Margaret Burgess, provided the same spontaneous support to me when Liz Horner departed ACU on maternity leave. Margaret and Carolyn Billings provided terrific direction when computing problems arose. I am extremely grateful to Bill Howarth for his usual "co-operation" with the printing of draft after draft, and finally this final document.

Special thanks to Dr. Peter Rendell and Dr. Neil Diamond for their assistance in the statistical analysis and the structural equation modelling. Thanks also To Dr. Mark Anderson, my second supervisor, for his advice and for also introducing me to the "little book" The Elements of Style.

I will always be indebted to Professor Bernie Daffey, Associate Professor Kevin Burke, and Associate Professor John Saunders for encouraging me to pursue my career path and enabling me to complete these studies.

Finally, I extend my appreciation to players and coaches who, by their cooperation, made it possible for me to conduct my research in a manner that facilitated smooth sailing.

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Chapter 1: Introduction

Mental practice, and in particular imagery rehearsal, has been a widely employed technique in endeavouring to enhance sport performance (e.g., Corbin, 1972; Jowdy, Murphy, & Durtschi, 1989; Kendall, Hrycaiko, Martin, & Kendall, 1990; Kim & Tennant, 1993; Suinn, 1980). Researchers have conducted a large number of studies on imagery rehearsal and examined its use as a means of improving skilled performance in a variety of physical activities (e.g., Blair, Hall, & Leyshon, 1993; Kolonay, 1977; Hall & Erffmeyer, 1983). Much of the past research, which has produced positive results when employing imagery as an intervention, has been experimental, and used closed skills or analogue tasks. It has often employed novice participants (e.g., Hall & Erffmeyer, 1983; Woolfolk, Murphy, Gottesfeld & Aiken 1985). Other supportive 'evidence' for imagery as a performance enhancement intervention comes from anecdotal reports. For example, Nicklaus (1974) reported on how he used imagery to help him play successful golf shots. Furlong (1979) conducted athlete interviews to establish self-reported use of imagery by athletes, and Hall, Rodgers, and Barr (1990) employed evaluation questionnaires to establish how players used imagery. The difficulty with this type of evidence is that it is largely descriptive in nature and provides a validity by association only, from which no conclusions can be drawn.

Sport psychology is used widely in the applied field, but little research has experimentally investigated the effects of imagery rehearsal in real life athletics and game situations. Much of the past research has employed questionable methods

(Howe,1991). In endeavouring to cater for the demands of the competitive arena, it is necessary to study skilled competitive athletes and real sport situations, rather than to base practice on studies carried out in the non competitive environment of the laboratory, often with college students. Open skills should be studied, as, at present, most applied work is based on studies of closed skills. Research should also examine the processes by which imagery in the real world may enhance performance.

That the role of imagery remains equivocal after such a large amount of research, is largely attributable to poor research designs for which there are a multitude of reasons. There is a need for research to be conducted with the aim of providing more information on the processes involved in imagery. Research needs to be conducted on performance in elite sport, to examine the applicability of imagery in that context. Research should examine the impact of imagery on the performance of open skills in competition. Single-case research designs may be an effective way of establishing the impact of imagery interventions on skill performance in real world competitive settings.

The aim of this thesis was to examine the use of imagery rehearsal to enhance performance of elite athletes in the real competitive environment with a focus on open skill performance. It was also intended to investigate possible processes whereby imagery rehearsal enhances performance in the real competitive context.

Chapter 2: Literature Review

2.1 Introduction to the Literature Review

There has been considerable debate about the nature of imagery. Several terms have been used to label the phenomenon. A number of theories have proposed mechanisms by which imagery operates. A range of measurement instruments have been developed to assess the process of imagery. To place imagery in its context, the major definitions, theories and proposed measures of imagery are considered. There is a large amount of research literature on imagery and related phenomena, such as mental practice. This review summarises research, proposing distinctions between types of studies and focussing on the conception of imagery which forms the basis for the research reported in this thesis. There have been many research methods adopted in the study of imagery. One which has not been widely used, but which could resolve the perennial problem of doing sport psychology research which has ecological validity, is the single-case design. The principles of single-case design research are considered in the literature review because this methodology has the potential for the study of sport psychology interventions like imagery, in the real world settings, although it has not been widely used as yet. To conclude the literature review, the aim of the present thesis is presented.

2.2 Definitions

Mental practice refers to the symbolic rehearsal of a physical activity in the absence of any gross muscular movements (Richardson, 1967a). Corbin (1972) defined mental practice as the repetition of a task without observable movement, but with the specific intent of learning. Suinn (1980) defined mental practice as any form of covert practice or symbolic rehearsal, including simply thinking through a motor action. Murphy and Jowdy (1992) provide a succinct summary definition of mental practice, concluding that it is a descriptive term for a particular non physical technique used by athletes and many other individuals. In summary, mental practice consists of covert practice or symbolic rehearsal other than physical practice. In this practice or rehearsal, imagery mirrors sensory or perceptual experiences, in that the person is consciously aware of these experiences and usually controls them.

A number of other terms have been used for processes similar to mental practice. These include mental rehearsal, visualisation, imagery rehearsal, symbolic rehearsal, modelling, imaginal practice, and visual motor behaviour rehearsal. A form of mental practice that has received research attention recently is imagery rehearsal. The study of imagery is concerned primarily with how people represent and process information mentally or symbolically. Imagery, along with other cognitive processes, has often been referred to as mental practice. Imagery rehearsal was defined by Suinn (1976) as a more narrow term than mental practice. Suinn claims that imagery rehearsal is covert practice whereby a person experiences sensory-motor sensations that reintegrate reality experiences, thus enabling the individual to gain control over the physical experience. Imagery is understood to be a multi-modal process, that is, one that involves all or many of the sense modalities. Suinn (1976) sees imagery as more than an isolated, one dimensional thinking process. It is a retrieval of experience that is holistic and is multi dimensional. It is more than visual, it is tactile, auditory, emotional, and muscular. During imagery, the participant actually lives the situation. Thus, the individual experiences motor, emotional and physiological involvement during the process of imagery (Suinn, 1976). Suinn (1983) distinguishes between imagery rehearsal and mental practice in that only in imagery rehearsal can it be concluded that imagery was used to achieve the covert practice, whereas in mentally practising, any number of techniques might be employed. One of these techniques is imagery rehearsal. Suinn (1976) developed visuomotor behavioural rehearsal (VMBR), a specific technique to execute imagery rehearsal.

Thus, while imagery rehearsal can be thought of as a general term for the use of imagery to practise and develop skills, VMBR is a specific technique used to conduct imagery rehearsal. In employing VMBR, relaxation precedes the use of imagery of an activity, with the intent of improving or maintaining the skills imaged. Suinn (1976) makes important distinctions between mental practice, as described above, and imagery rehearsal. Mental practice, as described by Suinn (1976), refers to Corbin's (1972) definition, that is, the repetition of a task, without observable movement, with the specific aim of learning. Imagery rehearsal, on the other hand refers to training in the use of imagery and is a skill whereby the individual gains control over the experience. In this thesis, the term imagery rehearsal is widely used, because the research conducted adopted this conceptualisation, based largely on Suinn's original work. The term mental practice is applied to previous laboratory research, where operationalization of the psychological process did not reflect the multi-modal reintegration of experience emphasised by Suinn.

Some sport psychologists have distinguished two imagery perspectives in research on sport performance. These are internal and external imagery (Mahoney & Avener, 1977). Internal imagery has been regarded as predominantly kinesthetic in nature, that is, athletes imagine themselves to be within their own bodies while performing the imagery and focusing on the muscular feelings associated with performance. Athletes feel themselves participating, but they also see, hear, and smell the object of attention. External imagery is considered to be primarily visual in nature, that is, athletes imagine watching themselves from the outside. Mahoney and Avener (1977) described visual imagery as external and kinesthetic imagery as internal with regard to imaginal focus. In external imagery, a person views themself from the perspective of an external observer (much like in home movies). Internal imagery, on the other hand, requires an approximation of the real-life phenomenology, such that the person actually imagines being inside their body and experiencing those sensations which might be expected in the actual situation. Mahoney and Avener (1977) argue that this requires a predominantly kinesthetic input and assumes a first person perspective, whereas external imagery takes on a third person perspective. Athletes can benefit from both internal and external imagery. It has been suggested, however, that internal imagery has its greatest impact on performers who already possess a high level of skill. Mahoney, Gabriel, and Perkins (1987) concluded that, relative to their non-elite peers, elite athletes rely more on internally focused and kinesthetic imagery. Also, Mahoney and Avener (1977) found that elite gymnasts who qualified for the Olympic team favoured an internal perspective more often than did nonqualifiers.

A similar study on skiing also found an internal perspective to be more frequently used by the very best skiers, who visualised the course from an internal perspective, whereas the less successful skiers visualised from an external perspective (Rotella, Gansneder, Ojala, & Billing, 1980). Doyle and Landers (1980), after revising the Mahoney-Avener (1977) questionnaire and administering it to 184 rifle shooters representing an elite and a subelite group, found that the elite rifle shooters used predominantly internal imagery, whereas the subelite group used a mixture of internal and external imagery. Following this early research, which was questionnaire-based only, there has not been a clear demonstration that internal imagery is always superior to external imagery. Other studies have been conducted that were unable to support the supremacy of the use or effect of internal imagery over external imagery. Meyers, Cooke, Cullen, and Liles (1979) found no relationship between imagery perspective and expertise in their study of highly skilled racquetball players. On a dart throwing task, Epstein (1980) found no difference in dart throwing performance between an internal imagery and an external imagery group. A similar finding for an ice skating performance was established by Mumford and Hall (1985), the major difference in this study other than the performance task being different, was that the researchers included three types of imagery group, identified as internal kinesthetic, internal visual, and external visual. There are various aspects of internal and external imagery that are not clear. For example, whether there are differences in effectiveness of the two types of imagery, whether either can be trained, or whether an activity, or the way in which it is taught, can affect either internal or external imagery. Furthermore, the suggestion that internal imagery equates with the kinesthetic modality and that external imagery equates with the visual modality has not been demonstrated and might be more confusing than helpful. Both internal imagery and external imagery can have kinesthetic and visual aspects. The form of imagery used might again depend on the person, the activity, the nature of training, or the specific instructions given. In short, there are many unanswered questions about internal and external imagery. An examination of the impact of imagery on performance might presently put aside the internal/external imagery issue. Similarly, care in the use of terminology and the precision with which techniques and procedures are described and used, is advisable in the imagery area in general.

2.3 Theories of How Imagery Works

Various theoretical explanations for how imagery facilitates performance have been advanced in the literature. There are four main theoretical explanations of imagery: psychoneuromuscular theory, symbolic learning theory, bioinformational theory, and attentional-arousal set theory.

2.3.1 Psychoneuromuscular Theory

Psychoneuromuscular theory suggests that imagery rehearsal duplicates the actual motor pattern being rehearsed. It is proposed that similar impulses occur in the brain and are transmitted to the muscles when athletes imagine movements. The impulses are similar to those occurring when they actually make those same movements. Jacobson (1930a, b, c, d, 1931a, b) when studying muscle activity among subjects imaging such activities as bending the forearm, curling a weight, or climbing, found that muscle activity in the specific muscles normally required to effect the movements was generally greater while imaging than when at rest. Schmidt (1982) has speculated that very small forces are generated by mental practice. Schmidt postulates that these small forces are detected by the Golgi tendon organs which provide feedback to the premotor cortex. This process strengthens the existing motor program or allows for adjustments in the motor program to take place. These changes in the motor program improve subsequent performance. With the advances in the development of psychophysiological assessment devices and techniques, this theory might well be able to be tested with much greater sophistication. The psychoneuromuscular theory has been referred to as the theory of muscle memory, or the neuromuscular feedback theory (Harris & Robinson, 1986; Vealey & Walter, 1993). Fundamentally, this theory suggests that the motor-efferent patterns generated in imagery rehearsal are identical with those achieved for learning, correcting or enhancement of performance through physical practice (Suinn, 1993). Skill advancement, it is proposed, is enhanced by feedback associated with low level muscle innervation. Scientific evidence supports the notion that vivid, imagined events produce similar innervation in the muscles to the actual physical experience (Jacobson, 1931; Jowdy & Harris, 1990). Vealey and Walter (1993) stated that psychoneuromuscular theory has been supported in that imagery has been shown to elicit muscle innervation, but the occurrence of this low-level muscle innervation has not been shown to relate to performance improvement. Similarly, Perry & Morris (1995) question this research on the grounds that low-level muscle innervation was measured on physical actions with no performance element, or it is not possible to link the intervention to performance enhancement.. Even if the innervation and performance enhancement were to be shown contiguously (i.e. together), it could be that the muscle innervation is a byproduct of imagery for performance enhancement, which occurs through another process. Therefore, the difficult question that needs to be addressed is can this research be replicated when studying skilled performance in such a way that demonstrates that the low level muscle innervation has caused the facilitation of performance. At this stage it is difficult to see this issue being resolved.

2.3.2 Symbolic Learning Theory

Symbolic learning theory was first proposed by Sackett (1935), who stated that imagery enables performers to rehearse the sequence of movements as symbolic components of a task. That is, imagery symbolises in the brain the movements needed to perform skills and, hence, to facilitate performance. By this conceptualisation, the learning or performance enhancement which occurs relates to cognitive learning.

Sackett (1934, 1935) used a maze tracing task that had many symbolic components and found that imaginary practice led to greater effects on performance than verbal or overt rehearsal. Perry (1939) found that imaginal practice was most effective in pegboard, symbol digit substitution, and card sorting tasks; and less effective in mirror tracing and tapping (acts requiring actual movements). Vealey and Walter (1993) have used the term "mental blueprint" to describe the symbolic learning theory and suggest that the use of imagery strengthens the blueprint that enables the skill to become automatic. They contend, that athletes can understand the notion of employing imagery to strengthen their mental blueprint or to make the skill more automatic. Indirect support for this theory comes from research which suggests that imagery is more effective in tasks with large cognitive components compared with those having high motor content (e.g., Hird, Landers, Thomas & Horan, 1991; Ryan & Simons, 1982). Furthermore, a meta-analysis by Feltz and Landers (1983) concluded that the effect size was much larger in studies that used cognitive, rather than motor or strength tasks.

2.3.3 Bioinformational or Information Processing Theory

According to bioinformational theory (Lang, 1977, 1979) performance effects should be higher where imagery more closely replicates the actual response situations of the task. Lang argues that learning and performance involve the linking of appropriate stimulus and response propositions, and these sets of propositions are stored in long term memory. Furthermore, in Lang's view, imagery is a process that permits links to be strengthened. A study supporting the view that response processes during imagery facilitate performance on various tasks was conducted by Hecker and Kaczor (1988), using propositions for a familiar action scene, a familiar athletic anxiety scene, and an unfamiliar fear scene. A neutral control scene had no response propositions attached to it. Heart-rate data supported the effects of the response propositions on the familiar scenes, as bio-informational theory predicted. The effect on performance, however, was not linked to the physiological data in this study. According to bioinformational theory, performance effects should be higher where imagery replicates the actual response propositions of the real task (Suinn, 1993). Ziegler (1987) distinguished between "active imagery" and "passive imagery" across three imagery conditions, passive imagery, active imagery, and passive imagery plus practice, but found no significant difference across the three imagery groups, when 100 women from a fitness class imagined making basketball free throws. Because this theory is comparatively new, it requires much further research.

2.3.4 Arousal or Activation Theory

The arousal theory suggests that imagery helps the athlete to set the optimal arousal level for performance and to focus attention on the relevant aspects of the task. More specifically, imagery establishes a level of arousal or physiological activation that is optimal for the performance in question (Suinn, 1993). Schmidt (1982) observed that the "performer is merely preparing for the action, setting the arousal level and generally getting prepared for good performance" (p. 520). Vealey and Walter (1993) refer to this as a "mental set" perspective. After studying the moods of a task relevant group that imaged performing well at the task and another group that remembered positive mood state experiences, Lee (1990) reported, that the relevant image group produced significantly better performance than the general positive mood group. In a second study of 142 male participants, Lee (1990) concluded that the content of the imagery is important but that the imagery effect does not occur by affecting mood state. Feltz and Riessinger (1990) compared the influence of "in vivo emotive imagery" plus feedback versus feedback alone on muscle endurance and self-efficacy. The emotive imagery involved generating "images that were assumed to elicit feelings of competence and being psyched-up... (and) holding out longer than the opponent and being successful" (p. 135). The authors concluded that in vivo emotive imagery is effective in increasing one's sense of perceived efficacy to endure muscular isometric performance, and to a lesser extent actual performance. The weakness of the arousal/activation theory is that it does not specifically explain how imagery optimises arousal and attention, nor has the theory been validated by research. Nevertheless, from an applied perspective this theory has great practical appeal because it can be readily applied by the performer. The performer can also associate with the idea that by using productive imagery prior to competing, that performance can be facilitated.

Psychoneuromuscular theory (Jacobson, 1930a) and symbolic learning theory (Sackett, 1935) have been studied for more than sixty years. Some studies have shown muscular innervation, but others have found it to be generalised, not specific to be made with caution, if anything these findings could be seen as encouraging, because skilled performers doing the skill at which hey are experts, should be more highly motivated and ego-involved.

2.6.3 Closed Skills out of the Competitive Environment

Mixed results have been produced from research that has studied imagery rehearsal, for real skills of the closed type. Some of this research has been conducted away from competition. Kolonay (1977) used Visuo-Motor Behavioural Rehearsal (VMBR), a technique developed by Suinn (1976), that incorporates relaxation exercises with imagery rehearsal intervention, to help improve free shooting in basketball. She assigned 72 male basketballers, from eight college basketball teams, to one of four experimental groups: relaxation and imagery rehearsal (VMBR), relaxation alone, imagery rehearsal alone, and a no imagery control group. Training was provided through audio tape recordings in order to ensure standardised experiences. These recordings were played prior to each of 15 basketball practices, covering a six week period. The players were pre-tested on their ability to throw baskets from the foul line and then post-tested at the end of the six week training period. Both tests took place in a non-competitive environment. It was found that the group incorporating relaxation and imagery rehearsal improved their goal shooting significantly compared to the other three groups.

Further positive results from studies on imagery rehearsal and performance of skills have also been based predominantly on closed skills. Hall and Erffmeyer (1983) looked at free throw shots in basketball. Woolfolk et al., (1985) studied putting a golf ball, and Koop and Martin (1983) studied the elimination of swimming stroke errors. Blair et al,. (1993) studied the effects of an imagery training program on the performance of soccer tasks by skilled and novice players. These tasks were closed and included dribbling, passing at targets, shooting, and checking off. Performance on the post-test as measured by response time revealed a significant improvement from the pre-test for both the skilled and the unskilled players in the imagery group, whereas the control group failed to show any improvement for either skilled or novice performers.

Such findings are encouraging, but many skills are open in nature, in the real competitive environment, and not protected by the non-competitive environment. These two aspects, that is, open skills and the real competitive environment, require much greater attention in further research. Examples of the limited studies that have been conducted in these areas will be addressed in the following two sections.

2.6.4 Closed Skills in Competition

Approaches have been adopted to examine imagery in sports in their natural settings. An example was a limited baseline study conducted by Titley (1976) in an attempt to overcome the problems of unrealistic laboratory settings and inappropriate participants, such as, unskilled college undergraduates, and to provide research rigour. Titley made comparisons between pre-intervention and post-intervention performance. The intervention took the form of visuomotor behaviour rehearsal (VMBR), involving imagery of a standardised kicking motion when kicking for goal. It was found that goal kicking in male American footballers improved both in consistency and accuracy. In the games following VMBR, the kicker improved his consistency and accuracy from greater distances in particular. As with anecdotal accounts, there were no controls in these studies to fulfil the rigours of traditional research design.

Another study conducted by Noel (1980) examined the effect of VMBR on the closed skill of tennis serving in a tournament environment. The primary concern of this study was to investigate whether the VMBR training would improve serving accuracy, compared to a control group. It was concluded that mentally rehearsing the tennis serve, while relaxed, facilitated performance under tournament conditions, but only for high ability players. Studies conducted in baseball (Lane, 1980), using multiple imagery training sessions, showed indications of positive effects of improvement in performance of closed skills in competitive settings. It can be seen, however, that more studies need to be conducted in this area of examining the influence of imagery on the performance of closed skills in competition.

2.6.5 Open Skills Out of Competition

Little research has been published on open skills out of competition. Blair et al., (1993) did, however, conduct a study that closely approximates this situation. They investigated the effect of an imagery program on the performance of a soccer task by 22 skilled and 22 novice soccer players. Two performance measures were recorded, response time, and performance accuracy. The task was open in nature because it consisted of dribbling, passsing, shooting and checking off, which are all open in real game situations. The imagery group participants were given an imagery training program, consisting of two 15 minute sessions per week, for a six week period. The control group developed a competitive strategy that was totally unrelated to the performance task. This consisted of two sessions a week over a six week period coinciding with the timing of the imagery program for the imagery group. Performance on the post-test as measured by response time revealed a significant improvement for both the skilled and novice players in the imagery group, whereas, the control group failed to show any improvement. No effects were found for performance accuracy. Much further research is required, like the Blair et al. (1993) study to establish the impact that imagery has on the performance of the execution of open skills in the non-competitive setting.

2.6.6 Open Skills in Competition

Little research has been published on open skills in the real competitive environment. A major difficulty with research conducted on open skills in the real world is that it is not clear, when an effect is found, which of the elements of the intervention or, what extraneous factors, may have influenced the results. For example, difficulty of opposition can have a major effect on performance of open skills in competition. Because of the difficulty of controlling such variables, it would appear that most researchers have steered clear of such research in the past. The real competitive sporting world, however, comprises many open skills, and players and coaches alike want to benefit from the results of research related to such skills.

Kendall et al. (1990) examined the use of imagery to enhance a defensive basketball skill in four women basketball players at the collegiate level. The defensive skill was to be exhibited by the defender in the defensive zone when the offensive player attempted to dribble towards the basket. These players had no previous experience with mental skills training. Using a single-case design, they monitored performance of the skill, rated by expert judges from video, during a baseline period. Then they introduced the intervention and continued to monitor performance for several weeks. The intervention was introduced to each player on a daily basis during a five day interval when they were not playing. The treatment included a general introduction to mental preparation, relaxation exercises, imagery rehearsal techniques, self-talk, and the use of audio tape to help in imaging performance of the defensive skill. Generally, the intervention period was associated with improved performance. Unfortunately it is not possible to draw any firm conclusions concerning the efficacy of imagery, because it was part of an intervention package that included relaxation and self-talk, even though Kendall et al. do emphasise the role of imagery in the package.

Nevertheless, this research was conducted in a real game setting.

McKenzie and Howe, (1991) found training involving imagery rehearsal for tackling in Rugby, was as effective as physical practice in terms of transfer to game performance. This study was conducted on 74 male rugby players, who were placed into three positional groups, "Tight Five", "Back Row and Halfback", and "Outside Back" Players. There were three treatment conditions (Mental Imagery, Physical Practice, and Mental Imagery and Physical Practice). Following each two week training period, games were videotaped and reliable measures of tackling performance were obtained. It was found that tackling training involving mental imagery was more effective than physical practice, and the combination of mental imagery and physical practice was the most effective training method. The results of this study are most encouraging and further promote this type of research as a means of bridging the gap between research in the laboratory and the applied world.

2.6.7 Research on Imagery When Combined with Other Techniques

Some studies have found imagery rehearsal to be an important intervention when combined with other components of mental training (e.g., Suinn, 1976; Kolonay, 1977; Weinberg, Seaborne, & Jackson, 1981, 1987). Suinn, (1976) created and employed the Visuo-Motor Behaviour Technique (VMBR), which commences with relaxation and continues with imagery rehearsal. Suinn (1980) observed bursts of EMG activity which were concurrent with imagery of bends and jumps by a skier imaging a course. Kolonay (1977), used VMBR, to help improve free shooting in basketball. It was found that the group incorporating relaxation and imagery rehearsal improved their goal shooting significantly compared to three other groups.

Weinberg et al. (1987) investigated whether imagery, preceded by arousal or relaxation, was more effective in terms of quality of the imagery, as well as performance, on a variety of motor tasks. Forty-two students, enrolled in self-defense classes met three times a week for 16 weeks. After six weeks, which served as a baseline for establishing performance capabilities in three karate measures, the participants were assigned to one of the following conditions: arousal imagery, which included listening to upbeat music; relaxation imagery, which involved participants performing relaxation techniques; and a control, which required, amongst other things, memorising and reciting Chinese writings. During the next four weeks, the experimenter met with all participants individually and helped train them in their specific technique. Participants were tested in weeks 12 and 16 and told to use their mental preparation strategy just prior to each performance test. Results indicated that the relaxation imagery group produced significantly better performance on the karate measure of skill than did all other conditions. There were no differences between any of the groups for a variety of activities involving coordination, endurance, strength, and speed of movement. Weinberg et al. concluded that, perhaps the best type of preparation for imagery is dependent on the type of activity employed, and furthermore, it appeared that relaxation was not the only way to prepare athletes for ensuring imagery enhanced subsequent performance.

Kim and Tennant (1993) hypothesised that a combined visualisation and Danjeon breathing group would elicit greater improvement than either technique alone, and that the separate visualisation and Danjeon breathing groups would achieve higher scores than a control group. Danjeon breathing is a relaxation technique concerned with voluntary control of breathing in an attempt to achieve a higher level of mental state and readiness. Forty-eight college students were randomly assigned to one of four groups, control, visualisation, Danjeon breathing, and visualisation plus Danjeon breathing. The results suggested that the combination of visualisation plus Danjeon breathing facilitated air pistol shooting performance, compared to visualisation or Danjeon breathing alone. Together these studies of combined techniques suggest that imagery may work better when combined with other components of mental training, although improvement in performance in these studies could be due to an additive effect of other independent techniques, such as when imagery is combined with relaxation or self talk.

Another technique that has been used as an aid to imagery usage is modelling and more recently video modelling. Bandura's (1977) social learning theory supports this practice, because it claims that vicarious experience, or observation of a model performing a task, enhances performance. In combining video modelling with imagery the performer is able to image ideal performances after having seen the skill on the video. Hall and Erffmeyer (1983) included video modelling in a study of relaxation and imagery of college basketball players. The video modelling group performed better than the group that did imagery and relaxation without video modelling. Gray and Fernandez (1990) found the same result when replicating the Hall and Erffmeyer study with varsity basketball players. In a study of the effect of mental rehearsal on table tennis performance (Lejeune, Decker, & Sanchez, 1994), found participants who combined physical practice, observational learning, and imagery were the only players to improve their performance in two table tennis performance conditions, which were to repeat a shot and to alternate between shots. Participants assigned to the other three groups, a control group, a physical practice group, and an observational learning group, did not produce a significant improvement in performance. Because this study did not employ a physical practice and imagery group, it is not possible to conclude that the combination of all three components was superior to other conditions.

Using a single-case, multiple-baseline design, Kendall et al., (1990) examined the effects of an imagery rehearsal, relaxation, and self-talk package on the performance of a specific defensive basketball skill during competition by four female college basketballers. They concluded that the intervention was clearly effective. It must be noted that each of the techniques in this study had a purpose and they were not just used to support imagery, as is the case in the relaxation studies mentioned previously. That is the relaxation and self-talk packages were being assessed independently. Also it must be recognised that the research reported here, except for Kendall et al. (1990), was conducted on closed skills or analogue tasks, that is, laboratory skills rather than sports skills in real competition.

2.6.8 Motivational Role of Imagery

Another aspect of the impact of imagery on performance was proposed by Paivio (1985), who suggested that mental imagery plays a motivational role in mediating motor behaviour. He argued that motivated behaviour as manifested through frequency, persistence, and efficiency of the overt practice of performance skills, may be enhanced by imaging the performance of these activities. Van Gyn, Wenger, and Gaul (1990) also pointed out the motivational influence, when investigating the possibility of using imagery as a method for enhancing the transfer of non specific training to performance, although they concluded that "transfer-appropriate processing" was a more likely explanation for their findings, and the motivational influence was downplayed. In this case, cycle training was used in an attempt to enhance 40 metre sprint performance. Forty participants were pre-tested on a Wingate cycle ergometer for peak power output and for a 40 metre sprint time. Participants were then assigned to four groups; imagery training (IT), power training (PT), imagery and power training (IPT), and a control group. Participants trained for six weeks in their groups and were then re-tested. It was found that imagery alone did not enhance sprint performance or peak power, but that IPT enhanced peak power and the 40m sprint performance. Van Gyn et al. point out that this transfer could occur as a result of a motivational context created by imagery.

In a recent study in support of this motivation notion, Martin and Hall (1995) hypothesised that participants who used mental imagery would spend more time practising a golf putting task (persistence and effort) and would have higher task specific self-efficacy than control participants. It was found that, during the performance-oriented phase, participants in the performance imagery group practised more than participants in the control group. Martin and Hall (1995) concluded that despite repeated negative feedback, participants who used imagery were more motivated to practise than control participants. Martin and Hall offered a possible explanation for the motivational effect, because during the training-oriented phase, when performers had no other performance goals nor objective means of evaluating their progress, there was no difference among the groups for time spent practising. Beginning with the fourth imagery session, however, participants were cued to compare their putting performance with a list of specific norms/goals. These comparisons acted as performance feedback and apparently made all participants acutely aware of their shortcomings as evidenced by their adoption of lower self-set goals. The performance imagery group responded to this awareness with increased motivation to practise. The rationale for this hypothesis was only partially confirmed, as the imagery group was no more efficacious than the control group when self-efficacy for performance was compared. The motivational influence is suggested because of the attention given to participants. It must be recognised that this claim could be made about any research that pays attention to participants regardless of the techniques used.

2.7 Problems with Imagery Theory and Research

Howe (1991) in a review of the literature, summarised his assessment that imagery can perform a useful function under particular circumstances. These circumstances are that imagery is more effective for experienced athletes, and if it is multi-sensory, rather than purely visual. This statement could be questioned, because the devices used to determine what kind of imagery has been employed lack validity. In his review, Howe (1991) proposed that imagery can serve a useful function under certain circumstances such as, it is more effective for more experienced athletes, imagery is more effective for those who consider themselves to be effective imagers, imagery is more effective when combined with physical practice, imagery is more effective for closed skills than open skills. This last statement could be queried, because imagery has been found to be effective with closed skills, but little research has been conducted on open skills to make a comparison between the impact of imagery on open and closed skills. Nevertheless, Howe (1991) raised several issues that still need to be addressed by research on imagery. Among these are the need to explore the effectiveness of imagery programs intended to enhance performance of basic motor skills for young children and older populations, because most research has examined young adults. In addition, the question of when imagery might be most effectively employed in the learning or performance of skills, and the optimal duration of an imagery program for skill improvement must be considered. Furthermore, there are still questions to resolve about the content of imagery programs, the length of training sessions, and the measurement of imagery, according to Howe.

Studies unable to support imagery as an intervention have also surfaced. For example, Andre and Means (1986), and Wollman (1986), concluded that the results of previous studies are far from consistent. It was argued that the results of research suggested that imagery alone would not guarantee the successful completion of a particular task in any given motor performance situation. Wollman, Hill, and Lipsitz (1985) conducted two experiments to assess the effects of imagery on sport performance in a naturalistic setting. The first study, employing 14 men's college cross country runners as participants, found no significant difference in running times between two groups. The first group was exposed to an intervention of relaxation, information on running technique, and imagery, the second group was exposed to only relaxation and running technique information. The results of utilizing a package including imagery and the sport performance of running is interesting, however, whether this finding can be generalised to the execution of sport skills is questionable. Feltz and Landers (1983) in a meta-analysis found that cognitive tasks were more largely effected than tasks which were essentially motor or involved strength. Firstly, there were only seven participants in each group and that would suggest a high probability of making a Type II error. Secondly, it might have been that imagery did not facilitate running time because there was no real "skill" to enhance. The study measured running times, and it is difficult to argue that a physical skill is being influenced in this situation. Any significant effect of imagery on running times is more likely to arise from motivational or confidence changes, rather than changes in running "skill". Indeed it may be difficult to establish any cause and effect relationship between imagery and running times. The second study was based on twenty-six professional bowlers. The experimental group heard a lecture and a tape stressing relaxation, imagery, attentional focussing, and positive mental attitude. The control group received no treatment. Analysis showed that scores in the experimental group did not improve significantly over those of the control group and, in fact, were almost all significantly worse. Again, this study had a small number of participants which poses the possibility of Type II error. It was also possible the experimental group had insufficient time to rehearse the imagery intervention, so a subsequent effect of imagery treatment was highly unlikely.

Lamirand and Rainey (1994) investigated the effectiveness of physical practice augmented by imagery alone, for improving basketball foul shooting. It was hypothesised that only the imagery condition would improve foul shooting. A sample of 19 female college basketball players was used. They were randomly assigned to a relaxation or a mental imagery training condition. There were four training sessions over three weeks. The imagery training consisted of focussing on kinesthetic, visual, and auditory stimuli, whereas, the relaxation group participated in various breathing exercises. Sessions for each group lasted approximately 20 minutes and were presented via audio tape. After each session, participants performed three sets of ten foul shots. The participants were instructed not to practice outside these times. The results showed an improvement only for the relaxation group via an increase in mean accuracy (65%-70%), while the imagery group showed a slight decrease from 71% to 70%. There were a number of limitations to this study, which included a small number of participants, no assessment of imagery ability, and no supervision of practice. It may have been that the relaxation condition caused the participants to approach their ideal performance state for the task more than the imagery condition that was employed. Nevertheless, this research did not support imagery as an effective intervention.

A study conducted by Woolfolk et al., (1985) found a degradation in performance in conditions employing negative outcome imagery, but another group showed enhancement of performance after using positive outcome imagery. Fifty male college students were assigned to one of six experimental conditions, in a design that allowed the presence or absence of mental rehearsal of the physical movements involved in the task to be completely crossed with the imaginal depiction of task outcome (successful, unsuccessful, or no outcome component). The results suggested that imagery of a poor performance may be as powerful in its ability to damage skilled athletic performance, as is positive imagery in its capacity to improve performance. Thus, rather than suggesting that imagery was not an influential intervention, it could be argued that imagery was shown to be a powerful intervention in affecting performance from a negative perspective. In summary, there is relatively little research that has found no effect of imagery on performance, compared with the large amount of positive research on mental practice and imagery rehearsal.

It is important to apply sport psychology effectively in sport, but little research has experimentally investigated the effects of imagery rehearsal in real life athletics and game situations. The research conducted by Kendall et al. (1990) is one exception, but it employed a package and the role of the imagery rehearsal component the muscles involved in the imaged action. Also, no studies have shown muscular innervation and enhanced performance. If any did, it could be that both were effects of imagery. Psychoneuromuscular theory thus lies in abeyance. Similarly, indirect support for symbolic learning theory comes from repeated findings that cognitive tasks produce larger effect sizes. It is not clear, however, what the symbolic code might be. Also, it is difficult to equate cognitive and motor tasks in terms of their demands. It could be that those used were easier or that there was more room for improvement. A major difficulty that the symbolic learning theory has to confront is that it relies on studies of tasks that are cognitive in nature, whereas many sports have substantial motor components. Nevertheless, the conception of the cognitive "blueprint" stage as the first stage of skill acquisition, could be enhanced greatly by developing the symbolic learning theory, because the associative stage and the autonomous stage of development can not proceed until the learner has cognitively understood the task to be performed. The challenge for the bio-informational theory (Lang, 1977) and the activation theory (Schmidt, 1982), is that there is little evidence to support them. Proponents need to promote research that tests the theories. Imagery is a covert process. Despite a range of ingenious theories and many creative attempts to test them, the mechanisms underlying imagery are not well understood.

2.4 Measurement

Perry and Morris (1995) have observed that, because imagery is a mental process which is not directly observable, the measurement of imagery has been a problem for as long as imagery has been studied. It is possible to measure the performance of a task that imagery has influenced, but this measurement can not be equated with the measurement of imagery. Because of this inherent difficulty in measuring imagery, psychologists have often ignored the issue of measurement (Perry & Morris, 1995). Certainly, there is much supportive information existing for imagery rehearsal, however, as Murphy and Jowdy (1992) contend, allowing the individual to define the cognitive strategy can cause confusion, in that, when an athlete says they used "imagery," this tells us nothing about the process they engaged in. Also, much of the supportive evidence is a mixture of anecdotal reports, athlete interviews, and evaluation questionnaires (Furlong 1979; Lazarus 1977; Nicklaus 1974). Anecdotal reports and interviews are largely descriptive in nature, providing evidence of a 'grass roots', 'folk medicine' and self-discovery nature (Suinn, 1980). Suinn argues that the validity of these types of accounts is really a post hoc validity, a validity by association rather than by controlled study. All provide an abundance of testimonial evidence on imagery use in the performance of elite athletes. A problem exists with this type of evidence, because there is no research control in any of these subjective assessments and therefore no substantial conclusions can be drawn.

The questionnaire approach is common in psychology, but suffers from reliance on self-reporting. Two types of questionnaire have been employed in research on imagery. One explores imagery use, considering whether athletes use imagery and, if they do, under what conditions. The other attempts to assess imagery ability, examining the self-reported quality of imagery in various sense modalities and on dimensions, like vividness and controllability. Imagery use questionnaires have mainly been applied to elite athletes. A study of 381 male and female participants from six sports, employing a self-report measure called the Imagery Use Questionnaire (IUQ) exemplifies this approach (Hall, Rodgers & Barr, 1990). Athletes in this study reported using imagery more in conjunction with competition than with practice. Importantly, this study found that the higher the competitive level, the more often the athletes reported using some form of imagery in practice, before an event, and during competition. The difficulty with accepting these reports is to evaluate what, how, and for how long these participants were involved with the imagery. Research using questionnaires, like testimonial evidence, suffers from a lack of control and also poses the problem of what is being established via the questionnaire. There are several shortcomings in the research conducted by Hall et al. that should be noted. The questionnaires for the U.S. players were not completed as a team at the tournament site, but instead individually and returned to the researcher four months later. This could cause inaccuracies in responses due to the retrospective nature of responding, and participants may not be motivated to respond with care at that later time. In addition, there were only a small number of returns from several countries. When looking at the findings from such studies one must be sure to establish the difference between self-reports of imagery use and self-reports of imagery effectiveness or ability. For example, there must be a degree of scepticism accepting blindly a person reporting they are using imagery "a lot". The difficulty confronting the analyst with this response is how to quantify "a lot". Participants are often asked to imagine themselves completing an upcoming task, and it is accepted that the participant is carrying out that instruction. A major problem, again, with this procedure is that there is no check or evaluation of how well that participant is able to carry out the instructions and what they actually imaged during the imagery time. Therefore, many questions require answers before comparisons and conclusions can be made with other research that has employed the use of questionnaires. For example, it is important to establish what imagery is being used, how well the person is imaging, and the duration of the imagery.

Despite the difficulties of imagery measurement, a number of tests have evolved that purport to measure aspects of imagery ability. From an applied perspective, it is important to establish how well an athlete may or may not be able to image. Like many skills, imagery may require training to improve a person's ability to employ it, therefore, some type of assessment of imagery ability is needed. The first published test of imagery was the Betts (1909) Questionnaire on Mental Imagery (QMI). This is a scale of 150 items that investigates imagery in seven different sensory modalities: visual, auditory, cutaneous, kinesthetic, gustatory, olfactory, and organic. In it, participants evoked images suggested by the items and rated the vividness of their imagery on a seven point rating scale that ranged from "no image present at all" (7) to "perfectly clear and vivid" (1). A Shortened Questionnaire on Mental Imagery (SQMI) was developed by Sheehan (1967), based on the original QMI. Reliability has been reported with an internal consistency of 0.95 (Juhasz, 1972) and test-retest of 0.78 (Sheehan, 1967). This test, however, only measures vividness of imagery and not controllability or any other dimension. A 12 item test was also developed by Gordon (1949) called the Test of Imagery Control (GTIC), which measures controllability of unusual manipulations of real objects. It is a self report test designed to assess, not how vividly a participant images, but how well they can manipulate and control the images. In this test, participants answer either yes or no depending on their ability to manipulate evoked visual images. Thus, in earlier times, two independent tests were typically employed to evaluate two components of imagery ability, vividness and controllability.

More recently Hall and Pongrac (1983) developed the Movement Imagery Questionnaire (MIQ) with more of a motor skill emphasis. This is an 18 item test consisting of nine items on visual perspective and nine items on kinesthetic perspective. The participant is instructed to image each movement from both an internal perspective and from a kinaesthetic perspective, and is then required to score on a seven point Likert scale, how they rate the quality of imagery, in each case leading to subscale scores on visual or kinesthetic imagery of movement. Reliability has been reported as internal consistency co-efficients of 0.87 (visual) and 0.91 (kinesthetic), in addition to a test retest reliability of 0.83 (Hall & Pongrac, 1983). Moran (1993) notes that the MIQ has been used in research, but that it has not been adequately validated. Another problem with the MIQ, with respect to its use in sport, is that it examines basic movements, and it is not clear to what extent this tests sport specific imagery ability.

The Vividness of Visual Imagery Questionnaire (VVIQ) developed by Marks

(1973) has recently become a well used test in research on imagery. This is a 16 item self report inventory, which is an extension of the visual subscale of the Bett's questionnaire, where participants are required to rate on a five point scale the visual vividness of their images of four different scenes. The lower the scores, the better is the self-rated imagery. Test-retest reliability has been reported as ranging from 0.67 to 0.87 (McKelvie, 1990). Another imagery test was developed along similar lines. It is called the Vividness of Movement Imagery Questionnaire (VMIQ) and was developed by Isaac, Marks, and Russell (1986). It contains 24 items and claims to measure the visual imagery associated with movement itself, as well as kinesthetic sensations. Items examine basic body movements and movements requiring precision and control in upright, unbalanced, and aerial situations. The VMIQ was measured on a Likert scale and had a test-retest reliability of 0.86.

A further test that has wide usage in the applied sport psychology domain is Martens' (1982) Sports Imagery Questionnaire (SIQ). The SIQ presents four scenarios in sport, that participants image, after which they rate on a Likert scale how vividly they were able to image the situations. The 16 item test examines imagery relevant to sport situations across three sensory modalities, visual, auditory and kinesthetic, as well as an emotional or mood scale for each scene. Participants are required to rate items from 1 to 5 with 1 representing no image and 5 representing a clear or vivid image. Vealey and Walter (1993) have recently added controllability to the Martens test as well as an internal/external item for each of the four scenes. Perry and Morris (1995) note that the SIQ cannot be used in research on the grounds that it has no reliability and validity to support it. Moran (1993), furthermore, points out that none of the tests considered here have acceptable validity, even though some have satisfactory reliability. That is, there is no conclusive evidence that the construct being measured in the test is imagery. All of this evidence supports the comment made at the beginning of this section, that the measurement of imagery has been a problem for as long as imagery has been studied, even though imagery has an abundance of stated operations in the applied setting. The real challenge for measurement of imagery is for research to be conducted that does develop a measurement technique that provides validity, and is supported by appropriate reliability analyses. To be applicable to the multi-modal conception of imagery, such a test must measure imagery across the range of sense modalities. Ideally, it should also assess imagery on a number of dimensions, including not only vividness and controllability, but also aspects like ease of access and duration of images.

2.5 Imagery Use in Sport

Imagery, as a form of mental practice, has been used as a means of enhancing athletic performance, and employed widely in the sporting domain. Gould, Tammen, Murphy, and May (1989) found it to be the most widely used technique among United States Olympic sport psychology consultants. Jowdy et al., (1989) discovered that 90% of athletes, 94% of coaches, and 100% of sport psychologists surveyed in the United States, reported using imagery techniques regularly in their training programs. In a study of 55 elite female lacrosse players competing in the world championships, Heishman and Bunker (1989) used a questionnaire method to examine imagery use. They established that 81% of participants considered mental strategies as being very important in preparing for competition. Of the mental strategies used, visualisation/imagery was used regularly by the highest percentage of participants (76%). Heishman and Bunker stated that these findings concurred with the findings of Mahoney and Avener (1977) that imagery facilitated performance and separated the more successful from the less successful athletes. Interestingly, Heishman and Bunker (1989) noted that the Welsh lacrosse players in their study, were the group that placed the least value on mental preparation and actually reported using mental strategies less than any other teams. The Welsh finished last in the tournament without winning a single game.

It would thus appear, that in the real competitive environment, many forms of imagery are being employed. From the perspectives of theory, research, and effective practice, what needs to be established is, what imagery techniques are being used, when is imagery typically used by athletes, what length of time is imagery being used for, how is imagery being employed, and for whom is imagery most effective. Furthermore, it is important to determine how effective and how appropriate the present imagery interventions.

2.6 Research

2.6.1 Research on Mental Practice and Imagery

Researchers have examined the use of mental practice as a means of improving skilled performance in a variety of physical activities. Representative examples are Clark (1960) with one hand foul shots in basketball, Corbin (1972) with a wand juggling task, and Woolfolk et al., (1985) with putting a golf ball.

There have been a number of reviews of mental practice research. Richardson (1967a, 1967b) published a two part review covering 25 mental practice studies over a thirty year time span. Corbin (1972) discovered and evaluated over fifty studies of mental practice, and Feltz and Landers (1983) published their findings of a meta-analysis on sixty studies. It must be clearly recognised that these early studies were on mental practice in general and not specifically on imagery. From the earlier reports it is suggested that, in many situations, mental practice can lead to gains in motor performance, although there were enough negative results to leave the issue equivocal. In general, early experiments that employed traditional research designs, showed either, that mental imagery groups produced better results than control groups, but physical practice groups produced greater gains than mental imagery (e.g., Egstrom, 1964; McBride & Rothstein, 1979), or that mental imagery and physical practice groups produced similar gains in results that were significantly greater than control group performance (Clark, 1960; Kohl & Roenker, 1980; White, Ashton, & Lewis, 1979; Wrisberg & Ragsdale, 1979). In more recent times, Murphy and Jowdy (1992), Perry and Morris (1995), and Vealey and Walter (1993) have published reviews of imagery and mental practice. They conclude that there is little doubt about the value of imagery as a technique being used in the practice of applied sport psychology. The research has been conducted in a range of contexts and has used a variety of tasks and participants. The following sections provide a review of research by these variables. The sections do not review research comprehensively, but reflect the different contexts in which imagery has been studied.

2.6.2 Analogue Tasks

Much early research on imagery or mental practice was conducted on analogue tasks, that is tasks not directly applicable to real sport situations, such as maze learning (Sackett, 1935), maze tracing (Perry, 1939), mirror drawing (Perry, 1939; Smyth, 1975), and wand juggling (Corbin, 1967). These tests were often chosen specifically because they were novel. Thus, the rationale underlying this research was that studying novel tasks would allow the investigation of imagery effects during the early stages of learning a skill. It is difficult to generalise findings from such tasks to expert sport performers carrying out skills with which they are very familiar and accomplished. Many of these analogue tasks are artificial in nature, used mainly in laboratory studies, and have little direct relevance to the real world. Another difficulty with analogue tasks is that they are often not very interesting, so the participant is unlikely to be motivated to perform at an optimal level. Ego-involvement is likely to be low, since the tasks are not perceived to reflect important aspects of participants' self-concept. Perhaps the most appropriate conclusion from this work is that it is suggestive for real sport. The weight of this research supports imagery for skill enhancement of novices. Although generalisation to real sports must is not clear. Much more research will need to revolve around real athletes, and real sport situations. This especially applies to open skills which can never adequately be simulated outside real competition

Much of the past research has employed questionable methods and has also raised issues as to what, when, and how imagery is incorporated into the training and performances of athletes. Wollman (1986) advised that future research should include: (a) appropriate control groups, (b) different types of imagery, (c) sensitive measures of experience and performance, (d) techniques and evaluations of performance that take individual factors into account, and (e) varied situations and tasks to ensure generalizability of effects. There are limitations to many of the research findings because of the use of analogue tasks, or not actually testing performance in competition. As a result the question of validity of the application of research findings to the real world (Lee, 1990) is raised. Also, many studies have used novices or non-athletes in non-competitive situations as participants, rather than athletes in real competitive environments. In many studies, the amount of time taken to teach the use of imagery rehearsal has been very short, often just a few minutes in a single session. Sometimes there has been no training, simply an instruction to "picture yourself" or "think about" doing the task. In that sort of context, participants with no background in imagery rehearsal, might find it difficult to master the imagery, let alone the execution of an unfamiliar skill. Imagery rehearsal, like any skill, requires practice to develop to a competent level of usage, and will often need several sessions to become effective. On the other hand, elite performers can already perform the physical skill competitively and in many instances use their own forms of intuitive imagery rehearsal. Participants' motivation to be involved and to produce their best at all times must be questioned in many studies. It is unlikely that the levels of motivation of athletes performing analogue tasks or those of non-competitive individuals will be as high as the motivation levels of those who are engaged in the actual competitive activities in which they have attained elite status. For all these reasons, it is important that sport psychology researchers find ways of studying expert performers in the competitive environment.

2.8 Single-Case Research Designs

One potentially fruitful approach to the examination of performance enhancement interventions with elite performers in real competition appears to be the application of single-case designs. The individual establishes a stable baseline score, and is then exposed to an intervention, and monitored during the presentation of the intervention, and in the period when it is used. It is also possible for the monitoring to continue after the intervention period. Wollman (1986) called for imagery researchers to complement traditional group research designs with single-case methodology. Suinn (1993) also distinguished between single-case design studies and group or experimental studies. Kendall et al. (1990) argue that single-case designs can also lead to generalisation of findings. Generalisation is based on replication of findings across a number of cases, where the same intervention is used. Single-case designs also allow for the detection of successful effects for individual participants that may otherwise have been masked by the averaging across groups, which occurs in traditional designs (Bryan, 1987). Furthermore, single-case designs could be better suited than group designs for working and performing research with skilled athletes, who are not likely to improve much from pre-training levels. Small but consistent changes may be seen for individuals in single-case design studies. Bryan (1987), following Zaichkowsky (1980), has proposed the use of single-case designs in sport psychology as a way of carrying out essential research in sport environments. Morris (1991) has also argued for their use in research on psychological skills training in real sports settings.

In areas of psychology other than sport, which have employed single-case designs, those designs have included A-B, A-B-A, and A-B-A-B research designs. In the A-B single-case design, performance is measured on a target behaviour with repeated measures throughout the baseline (no treatment) period called the A phase. At the completion of this period, the participants are exposed to an intervention, or treatment variable. This treatment period is called the B phase. Throughout the treatment period, performance measures are taken so that comparisons can be made between the two periods, A and B, to ascertain if the intervention influenced the dependent variable. Thus, with some reservations, changes in the dependent variable are attributed to the effects of the treatment (Barlow & Hersen, 1973; Kazdin, 1976). These reservations include the possibility that changes in the B period might have occurred regardless of the introduction of treatment or that changes in the B phase might have resulted as a function of some uncontrolled event, such as strength of an opponent, weather conditions, or level of fitness, depending on the activity in question. A second difficulty is presented by Risley (1972). It relates to the limitations of forecasting the B phase on the basis of data obtained in the A phase. For example, if there was already an upward trend in the A phase and this continued on into the B phase then, no definitive conclusion can be made regarding the treatment. It may have been a natural progression. In summary, the A-B design is subject to the influence of a number of confounding variables and is best applied as a last resort measure when circumstances do not allow more extensive experimentation (Hersen & Barlow, 1976).

The A-B-A design was introduced in an attempt to overcome the above mentioned reservations. The treatment variable is introduced at the B stage of the design and then withdrawn at the second A phase of the design. The A-B-A design allows for analysis of the controlling effects of the introduction and subsequent removal of the treatment. If, after baseline measurement (A), the application of the treatment (B) leads to improvement, and conversely, deterioration results after it is withdrawn (A), one can conclude more confidently that the treatment variable is the agent responsible for observed changes in the target behaviour. There is, however, a problem with this design from clinical and ethical perspectives. Ultimately, the A-B-A strategy leaves participants at the A or baseline phase, therefore denying them the full benefits of the experimental treatment. Barlow and Hersen (1973) have argued that

> "On an ethical and moral basis it certainly behoves the experimenter-clinician to continue some form of treatment to the ultimate conclusion subsequent to

> the completion of the research aspects of the case. A further design, known as the A-B-A-B design meets this criticism as the study ends on the B treatment phase" (p. 321).

While the participant finishes in a treatment phase in the A-B-A-B design, there is still a retrograde stage, the second A stage. A strong case can be made that removing some or all of the improvement that is associated with personal development or performance enhancement is not ethical. In elite sport, the coach would also look unfavourably on the second A phase for practical reasons.

An important single-case research design is the multiple-baseline approach, which demonstrates the effect of an intervention without withdrawing the treatment, because such withdrawal can present problems in terms of ethics and practice, as noted. The reluctance to stop the treatment arises because patients and competitive performers alike do not wish to terminate a perceived successful treatment. Very often in sport and sometimes in other contexts, withdrawing the treatment is also a problem because it cannot be assumed that participants have not learned and thus changed their behaviour irreversibly. In a single-case, multiple-baseline design, the experimenter applies the same independent variable (intervention) at a staggered baseline timeframe for each participant. Those not exposed to the intervention at any specific point in time would be expected to show no variation in output, whereas those who have been receiving the treatment would demonstrate change. Traditional research often requires the participant to withdraw from the treatment as in an A-B-A design to ascertain if there is any regression of performance. In multiple-baseline studies, there is no need for withdrawal back to the A (no treatment) phase because new participants are being introduced on a staggered basis to overcome the problem of any variable acting on one specific occasion, such as a stirring team talk, bad weather, or weak opposition. Any impact from one of these extraneous influences may occur as a "one off", however it is unlikely that they would continue on for the duration of the study. Changes occurring for most participants at the different times when they start receiving the intervention but not during the baseline, adds to the conviction that a genuine effect has been observed. Thus, at any point in the study, treated participants should show effects of the treatment on dependent/outcome variables, but starting from different times corresponding to their staggered introduction to the treatment, whereas participants still in the baseline phase, should not demonstrate any such effects. Baseline and treatment phases can be conceptualised as separate A-B designs, with the length of baselines (A phases) increased for each succeeding participant in the multiple baseline analysis. The controlling effects of the contingency are inferred from the rate changes for target behaviours in the treated participants, while rates remain unchanged in the untreated participants.

Research using non-elite performers and that which constructs artificial versions of sport skills away from the pressures of elite competition have been questioned on the grounds of ecological validity, that is, whether the results apply to the real world setting of elite competitive sport. Although its use has been limited in sport psychology research (e.g., Kendall et al., 1990), for the reasons presented in the previous section, a single-case, multiple-baseline methodology offers an appropriate way to examine the efficacy of imagery rehearsal, in open skills, in competition, and in elite sport.

2.9 Summary

The literature available reveals that, research has been conducted on imagery using controlled laboratory experiments, field studies, and surveys of sport psychologists, coaches, and athletes. This literature indicates that imagery is a very frequently employed tool for performance enhancement and skill acquisition in the laboratory and on the playing arena. There are still many unanswered questions, and questionable procedures that require further attention before the real role of imagery can be fully understood from a theoretical perspective, as well as in the applied sporting domain. Many discrepancies that have occurred could be attributable to poor research designs, that have employed inadequate sample sizes in their studies, have used inappropriate samples, such as non-athletes, or have not included adequate controls. The amount of time spent on imagery, the type of imagery employed, and the amount of time spent on instructions and training to use imagery have varied greatly. All these factors have made it difficult to compare previous research or to draw valid conclusions. In some mental practice studies, imagery has been used once for 5 - 10 minutes, immediately before a test, whereas in a small number of sport psychology studies it has been used continuously throughout the research, that is, several times a week over many weeks. This suggests that there is no standardization regarding, not only the time of the implementation of imagery, but also the content of the imagery. Thus, when comparing and contrasting results of previous research, one must be careful in considering what is being compared and what conclusions are able to be made. Other important considerations are issues such as, the age and experience of the participants. Also, the nature of the task must be considered; whether it is open or closed, analogue (laboratory) or real world, motor skill or muscular endurance, and strategic or simple. Another issue is whether the type of imagery employed is internal or external, single sense modality or multi-modal. The methods used to check whether participants are using the designated imagery mode or perspective are often not made clear. Finally, it must be questioned whether the imagery is employed to improve the performance of a physical skill, to eliminate errors in performance, to increase scoring, or to prepare for competition by eliminating or controlling anxiety. There are many ways in which imagery can be used, and it needs to be clearly stated what the intended use of imagery is in a particular context. Unintended effects should also be noted.

As more research is conducted, thus providing more information and eliminating or controlling for many of the above mentioned variables, the theory and practice of imagery as a psychological intervention will be further enhanced. The results of research to date strongly suggest that imagery rehearsal can be an important performance strengthening tool. Very little research has been conducted in the real world setting, employing elite participants, whilst they perform open skills in their sports.

2.10 The Present Thesis

The aims of this thesis were to examine the effectiveness of imagery rehearsal as a performance enhancement technique in a real world, elite competitive setting, using the actual skills of the game, which are often open skills. It was also intended to consider some of the underlying factors which might influence the effectiveness of imagery rehearsal in the real competitive context.

Chapter 3: The Effect of Imagery on the Performance of an Australian Rules Football Skill

3.1 Introduction

Success in most competitive ball sports requires that the athlete executes the necessary skills properly to maintain possession of the ball or to score. Australian Rules Football (ARF) is a game of many open skills, using both hands and feet, and proper execution of the disposal skills is vital for success. Disposal involves transfer of the ball to a team-mate by hand or foot. Immense pressure is placed on the players to perform the skills so as to maximise the advantage to their team. Players in executing the disposal skill of kick passing attract much criticism, because they consistently 'turn the ball over'. This term is defined as poor skill execution which results in the ball being lost to the opposition. The ball is turned over to the opposing team, usually due to either, a poor selection among the options of disposal, or a poorly executed kick. Coaches and performers alike, in trying to overcome the turning over of the ball, have designed many skill disposal exercises. It would appear, however, that for many players, the training track does not simulate the pressure setting of the competitive game and, consequently, while the execution of these drills can become excellent, the performance of the disposal skills improves very little in the game situation.

Imagery rehearsal is a psychological intervention that has been successfully used in recent times for improving skill execution in sport (e.g., Blair et al., 1993; Hall & Erffmeyer, 1983; Kolonay, 1977). There is, however, very little literature on the use of imagery rehearsal in the game of Australian Rules Football. Study of imagery in the development of open skills in real competitive settings is also very limited (e.g., Kendall et al., 1990), especially at the elite level of sport. By the structured use of imagery, a skill can be rehearsed as if in the real performance context. This could provide the link missing in training track drills.

The present study focused on imagery rehearsal of established sport skills in elite performers rather than on motor skill training. In particular, this study looked at the effects of imagery rehearsal on the execution of the disposal of the football by foot, in the actual competitive setting of Australian Rules Football, at the elite level of the Australian Football League (AFL). It employed a single-case, multiple-baseline design with several individuals displaying the same behaviour, in the same setting. It was predicted that participants exposed to imagery rehearsal would improve their skills compared to their baseline performance. A prediction is preferred to a hypothesis in this study because the single-case design is not amenable to direct statistical testing, although a statistical device called the split middle technique was applied to the data.

3.2 Methods

3.2.1 Participants

Ten Australian Football League (AFL) first eighteen players, from the Richmond Football Club (RFC), were employed as participants. AFL is the elite league of this football code in Australia. It is also the premier sport participated in and watched by spectators of all sports in Australia. The players had been recruited from local, and country leagues as well as from other states of Australia. They had a diverse background of educational and occupational experiences. Their ages ranged from eighteen to twenty seven-years ($\underline{M}$ = 22.0, $\underline{SD}$ = 2.74). Participant 1 was 23 years old, had played 85 senior games, was recruited from country Victoria, and regarded as one of the best defensive players in the team. He was a trained secondary teacher. Participant 2 was 24 years old, had played 80 senior games, played as a key forward, a very strong mark , and was one of the major goal kickers. He was studying a Masters degree at university. Participant 3 was 20 years old, played 50 games, was recruited from the country, played in the midfield, and was one of the best young players in the club. He was studying physical education at university. Participant 4 was a 25 year old, had played 80 games over six years at the club, mainly as an on ball player. He was a hard plasterer. Participant 5 was 20 years old, recruited from the local junior league, had played 40 senior games as a midfield player, and was regarded as one of the best young players in the team. He was a plumber. Participant 6 was 18 years of age, recruited from the country the previous year, and had played 20 games mainly as a midfield player. He was a builder's labourer. Participant 7 was 27 years old, had played 110 games, 40 of these with another club, mainly as a key defender. He was a carpenter. Participant 8 was 22 years old, had played 50 senior games mainly in defense, was recruited from the country as the number one draft choice as an 18 year old. He was a banker. Participant 9 was 20 years old, recuited from the local junior league, had played 25 games mainly as a forward. He worked at the stock exchange. Participant 10 was 21 years of age, recruited from Western Australia, had played 35 games as a midfield player and forward. He was studying accounting at university. Participants were free to withdraw from the treatment at any time they wished to do so.

3.2.2 Design

A single-case, multiple-baseline design was employed. Each player was randomly assigned to one of the multiple-baseline intervention dates. Baseline performance was measured from week 10 of the AFL season. Starting in week 13, a new participant was introduced to the multiple-baseline schedule every Monday (matches are normally played at the weekend), until the 22nd game, and the treatment intervention continued until the last game of the season, as shown in Figure 3.1. Thus, the shortest baseline consisted of three games (games 10 - 12 for player A) and the shortest treatment consisted of three games (games 22-24 for player J). The package of imagery intervention was identical for all players, commencing with five sessions in the first week and three sessions per week for the remainder of the competitive year.

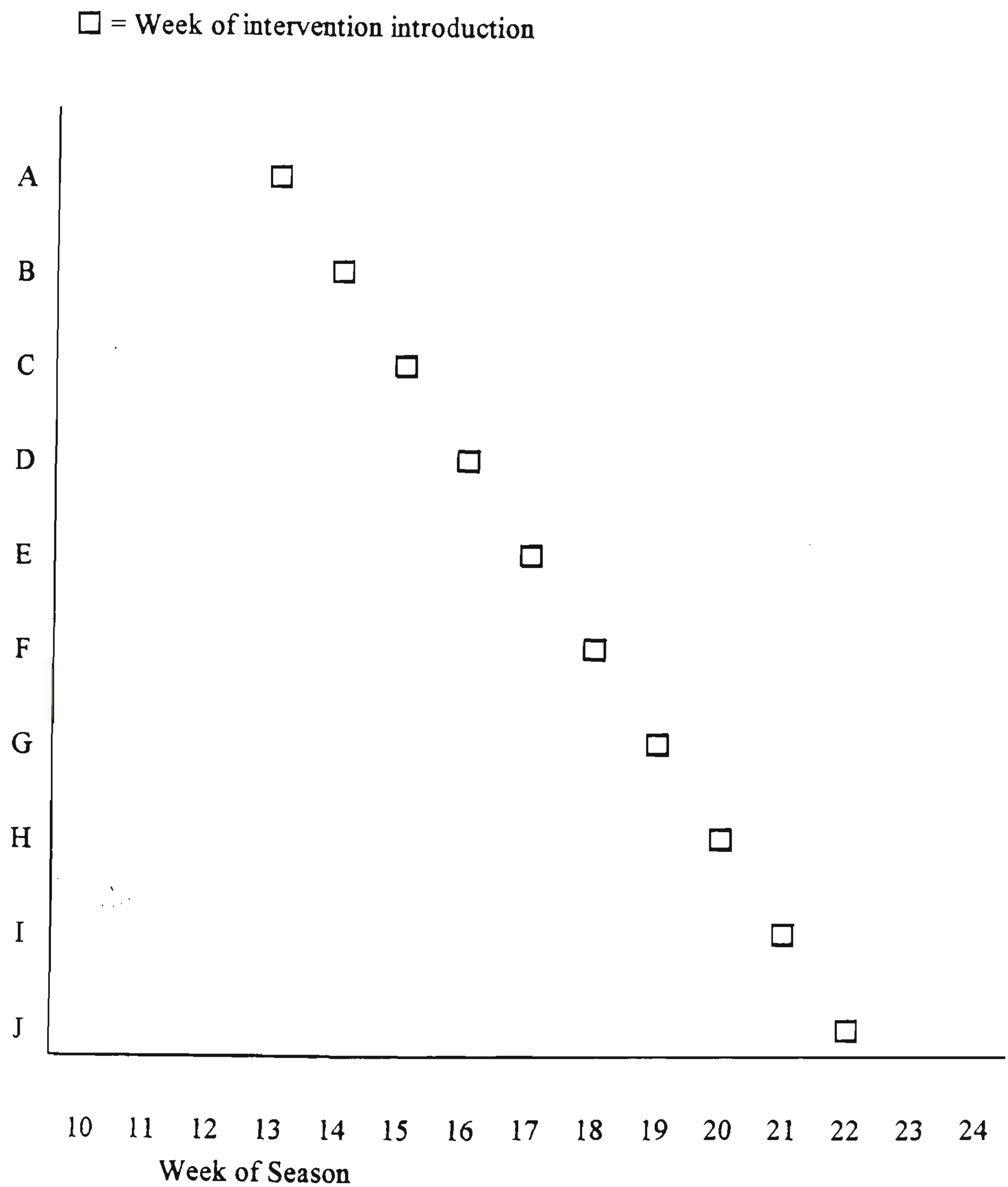


Figure 3.1. **Staggered introduction of intervention on a weekly basis in single-case, multiple-baseline design.**

Performance of all players was measured until the end of the 1991 season. Analysis of the effect of intervention was determined by several criteria, mean baseline and mean treatment scores, maintenance of scores following introduction of the intervention, and the number of data points above the celeration line in the treatment stage.

3.2.3 Treatment

In the first week of the imagery intervention period for each player, there were five sessions, each approximately 30 minutes in duration. At the conclusion of each session, the player was asked to complete an imagery assessment sheet that provided an indication as to how well the player was able to image the situations. The first two sessions dealt with basic imagery training in a relaxed environment.

These assessments were also designed to indicate the player's imagery ability in vividness and controllability. The initial two sessions also familiarised the player with the multi-modal approach to internal imagery. The player was asked to rate his imagery ability in relation to how vividly he saw himself, how clearly he heard sounds, how effectively he experienced body movements, and how strongly he felt the emotions of the situation.

Session one introduced the participant to a basic relaxation technique, to assist the participant to relax before the imagery session. This was followed by imaging four scenarios that were very familiar to all members of the RFC. These included, arriving at the RFC car park on match days, walking from the car park towards the Melbourne Cricket Ground (MCG), approaching the players entrance of the MCG, and eventually entering the players change room inside the MCG (see Appendix A for complete details). In addition, in session two the player was asked to imagine controlling four unusual scenarios about aspects of football, for example, watching the ball take peculiar flight paths through the air. The four controllability situations included, examining a ball in great detail, removing the stitching from the ball, kicking for goal and performing an extraordinarily long kick (as shown in Appendix B).

Session two continued with the basic relaxation introduction, followed by imaging four scenarios that were very familiar to all players who had participated in games at the MCG. These included standing on the boundary line and facing towards the centre of the field, walking toward the centre of the field experiencing the different textures of the field, jogging from the centre to the goal square, and sprinting and changing directions on different surfaces on the ground (see Appendix C for complete details).

The third and fourth sessions applied imagery rehearsal to football game situations and experiences. The introduction was the same as that used for sessions 1 and 2. In session three, the player was asked to image five scenarios that occur before the commencement of play. These included, the minutes prior to leaving the change rooms, running onto the ground, crashing through the 'run through' (banner), performing the running warm up, and taking up position on the playing arena prior to the commencement of play (see Appendix D for complete details).

In session four, the player was asked to image five scenarios that often happen during a game. These included, charging into a pack taking possession of and kicking the ball, kicking the ball long to advantage, taking a mark and playing on, gathering the ball and kicking in front of a leading teammate, and focussing on the coaches after match address (see Appendix E for complete details).

In session five, the player viewed ten of his own well executed disposal skills on video. These were compiled from the first six games of the 1991 season before baseline measurements had started. After each segment was shown, the player had as much time as was required to imagine twice the experience at normal playing speed. The instructions to the player were, "You will watch each disposal on the video, one at a time. After a disposal is shown and the tape is stopped, you will sit in a relaxed manner in the chair, lightly close your eyes and use imagery rehearsal to feel playing that disposal segment. You are to try and experience each kicking skill at normal playing speed and time. You will rehearse each skill two times before opening your eyes, pausing for fifteen seconds and moving on to the next skill." This video modelling imagery procedure in session five was conducted in the player's home on the morning of the game. The player had a response sheet to complete at the end of session five (details are shown in Appendix F).

After week one of each player's intervention, there were three-twenty minute imagery rehearsal sessions each week. The first session of each week required the players to recall five very good disposals that they had made in the most recent game and to image each of the disposals separately, trying to image these disposals at the speed and timing that they occurred during the game. At the conclusion of imaging each of the disposals, players were asked to classify the most important attributes of each of these skills. This was done to enable the players to develop an awareness of the important aspect of the skill that needed to be imaged. These attributes could have included kicking the ball in front, kicking the ball to a space, kicking the ball long to advantage, kicking the ball to a leading player, kicking the ball to a teammate by himself, or any other attribute that the player felt was appropriate (as shown in Appendix G). The players were also asked to remember any disposals that they could have executed more effectively. They were then asked to image each of these kicks, but now modifying the action so that they were making a better choice and execution of the disposal. The players were also asked to sum the number of their disposals that were effective and ineffective in the game (as shown in Appendix G). The players were then asked to analyse what aspects of their disposal skills they needed to work on to improve their kicking, which included kicking the ball in front, to a space, long to advantage, to a moving player, to a teammate by himself, or any other attribute that they thought was appropriate (as shown in Appendix G). Finally in this session, the players were asked to image performing these attributes in training the coming week.

Session 2, the midweek session was conducted prior to training. In this session, players were to image performing disposal skills by foot in practice drills that would occur at training that evening (an example of a Wednesday session is shown in Appendix H). This was possible because the content of the session was based on the listing of drills that the coach circulated before each training session.

Session 3, the Saturday morning session, required players to view segments of their disposals compiled from previous games, to image themselves in these segments and to complete a response sheet on the session. The disposals were shown to the player one at a time. The tape was stopped after each disposal and the player made any modifications in his mind to make the disposal better. He then rehearsed the situation that he saw on the tape with modifications, three times at playing speed. This was done for the ten segments that appeared on the tape.

3.2.3.1 Diary of Reactions to Treatment

The players were asked to enter their reactions to treatment procedures and outcomes in a diary at the completion of every session. In the first week of the imagery intervention period for each player, there were five sessions, each approximately 30 minutes in duration. At the conclusion of each session, the players were asked to complete an imagery assessment sheet indicating how well they were able to image the situations. The final question in each of these five sessions was an open ended question about the session itself. In sessions one, two, three and four, the players were asked to rate, after each scenario was read out to them, how well they could vividly image or control the image of situations.

In session five, players viewed ten of their own well executed disposal skills on video. After each segment was shown, they had to twice imagine that scenario occurring before moving on to the next segment. At the conclusion of session five, players were asked to complete a response sheet. Responses required them to answer direct questions and to offer any personal thoughts on the session. These questions required answers about the time of the day the session was conducted, the length of time the session took, the adequacy of the time for the session, the speed of imagining the skills, the value of the sessions in helping performance, ways in which the exercise could be improved, and any other comments they wished to make (as shown in Appendix I).

After week one, there were three, twenty minute imagery rehearsal sessions each week. The first session was a recapitulation of the previous game whereby the players were required to recall and image disposals that they had performed the previous week. In the log book, the players responded to questions about where they kicked the ball in that game. They were also asked to record aspects of their kicking disposal skills that they needed to work on, and finally they could comment on any aspect of the program if they wanted. The second session was conducted prior to training. In this session, players were to image performing disposals by foot of practice drills that would occur at training that evening. This session did not require any written responses, however, the researcher recorded comments that were made by players during and after these sessions. The third session was conducted mainly on Saturday mornings, requiring players to view segments of their disposals compiled on video from previous games, to image them and complete a response sheet about the time of the day the session was conducted, the length of time the session took, the adequacy of the time for the session, the speed of imagining the skills, the value of the sessions in helping performance, ways in which the exercise could be improved, and any other comments..

3.2.3.2 Football Imagery Questionnaire.

A Football Imagery Questionnaire was designed to measure vividness and control based on Vealey's (1986) version of the Martens (1982) Sports Imagery Questionnaire (SIQ), as well as Betts (1909), Questionnaire on Mental Imagery (QMI), developed into a 35 item short form version by Sheehan (1967) and Gordon's (1949) Test of Visual Imagery Control. Two separate assessment sheets were provided for the participants to score how vividly they were able to image three different football scenarios and how well they could control four different football situations. A description of each scenario was read to the participants who were then given thirty seconds to image that situation, following which they rated how well they had imaged the situation. The vividness ratings were made on four scales reflecting visual, kinesthetic, auditory, and emotional experience of the imagery. The ratings were based on a five point Likert scale ranging from 1 = a very clear and vivid image, 2 = moderately clear and vivid image, 3 = not clear or vivid but recognisable, 4 = vague image, and 5 = no image present. The three vividness situations were, entering a boot room, entering on to the arena, and taking a mark (as described in Appendix A).

Assessment of control was established by requiring participants to rate, on a Likert scale from 1 through to 5, how well they were able to control four different situations. The points on the Likert scale were 1 = very clear control, 2 = moderately clear control, 3 = partially clear control, 4 = vague control and 5 = unable to control. The four controllability situations were examining a ball, removing the stitching from a ball, kicking for goal, and kicking a long distance (as shown in Appendix B). No reliability or validity data were collected for this questionnaire, because it was employed to monitor on-going reactions of the players, that is, as part of the applied process, not as a research tool.

In the first week of the imagery intervention period for each player, there were five sessions, each approximately 30 minutes in duration. At the conclusion of each session, the player was asked to complete an imagery assessment sheet as to how well the player was able to image the situations described in that session. The first two sessions dealt with basic imagery training in a relaxed environment. These were also designed to measure the players' imagery in terms of vividness and controllability. These two sessions familiarised the players to identify with the multi-modal approach to internal imagery. The players were asked to rate their imagery in relation to how vividly they saw themselves, how clearly they heard sounds, how effectively they experienced body movements, and how strongly they felt the emotions of the situation.

In the final session of the week players were asked to watch a video of ten of their own, well-executed disposals. After watching each of the segments and imaging each one players were asked to rate how vividly they were able to image the activities shown on the video. Participants were asked to rate the imagery according to seeing oneself in the situation, feeling oneself making the movements, hearing the sounds in the situation, and feeling the emotions of the situation. The rating system ranged from 1 through to 5, where 1 = "a very clear and vivid image", 2 = "a moderately clear and vivid image", 3 = " not a clear or vivid but recognisable image", 4 = "a vague image", and 5 = " no image present". Also in this session, the participants were asked to rate the value of the exercise by underlining one of, extremely worthwhile, very worthwhile, somewhat worthwhile, a little worthwhile, and not at all worthwhile.

The treatment continued, with three sessions each week, until the end of the season. The evaluation questionnaires and log were used throughout.

3.2.4 Measures

3.2.4.1 Performance Rating

The performance rating was based on a player's performance of kick disposal skills in AFL senior games. The disposal skills of each player in every game during the baseline and treatment periods were video taped and rated by three independent expert judges, the senior coach, a senior selector and a senior skills coach. The judges scored each performance on a six point scale ranging from zero for a disposal that was incorrectly executed and resulted in the team being disadvantaged, to five for a disposal that was perfectly executed, i.e., backward spinning, appropriate trajectory, and as a result finished to the team's advantage (as shown in Table 3.1).

A brief pilot study was implemented to develop clear instructions for rating the scores for each performance. Scores ranged from zero to five, zero being for a very weak disposal, and five for an excellent disposal. Each one point grade in between had a verbal instruction for rating. The scale, including verbal descriptions, is presented in Table 3.1. To check the reliability of the rating scheme, the three judges rated disposals from the first six games of the season, which were not used in the study. The instructions for ratings were clarified by the researcher, who explained the verbal descriptions of the kicks and the value of each of those kicks was to be awarded, then all judges rated each of the kicks in the pilot.

After all three judges had rated all disposals from the first six games, correlations between the ratings of pairs of judges were calculated to examine the inter-rater reliability. All three reliabilities exceeded 0.9 ($r_{1,2} = 0.913$; $r_{1,3} = 0.911$; $r_{2,3} = 0.914$), so it was assumed that the rating scale was clearly understood and could be applied consistently by the judges.

Inter-rater reliabilities were conducted on three occasions throughout the study, for weeks nine, seventeen, and twenty-three. All reliabilities on these occasions were above 0.8 (Week 9, $r_{1,2} = 0.82$; $r_{1,3} = 0.89$; $r_{2,3} = 0.87$, Week 17, $r_{1,2} = 0.89$; $r_{1,3} = 0.90$; $r_{2,3} = 0.90$, Week 23, $r_{1,2} = 0.97$; $r_{1,3} = 0.95$; $r_{2,3} = 0.94$). These reliabilities supported that the judges were consistent in rating the disposals.

Table 3.1

<u>Verbal Descriptions and Points Scored for Disposals</u>

Score	Verbal Description of Kick
5	**<u>Excellent disposal</u>**, the kick was weighted so that the player to whom the ball was passed could: take the ball in front of his body, be able to run on to the ball and not be impeded by an opponent.
4	**<u>Very good disposal</u>**, whereby a teammate was able to take possession of the ball but might have had to: alter the direction of his lead while the ball was in flight, change the speed of his lead to receive the ball.
3	**<u>Good disposal</u>**, the ball was kicked to a teammate, but he had to stop and wait for the ball, or had to stop and change direction to have a chance to take the ball.
2	**<u>Fair disposal</u>**, the ball was kicked to a contest when the player should have kicked to the front position of a teammate.
1	**<u>Poor disposal</u>**, the ball went off the side of the foot to no one in particular.
0	**<u>Very weak disposal</u>**, the ball after being kicked went directly to an opponent.

All AFL football games are filmed by a commercial television station. This station made the match tapes of all the 1991 RFC games available to the researcher. A sophisticated video editing unit at the RFC was used to edit, from the match tapes, the appropriate skill segments that involved the players. No analysis was conducted during the period of data collection for two reasons. Firstly, all of the data had to be evaluated together to ensure no biases entered the judgements. Secondly, the researcher was required to remain "blind" to the performance ratings until after the treatment was concluded. Thus, at the end of the season, after the treatment period was completed, an edited video on each player's kicking performances, from the 1991 competitive season was compiled, excluding the first six games, which were used in the video-modelling procedure. Each of the tapes included all the disposals, where the player was not being physically restricted by an opponent. Each player's tape was reduced to individual disposal segments. Single disposal segments were compiled in random order, by drawing the individual tapes separately from a box and copying the next disposal treatment tape onto the master tape. This process was continued until all the tapes had been randomly selected and copied onto the master tape. Only the researcher knew which examples came from baseline and which came from treatment periods. The three judges then independently rated the random sequence of disposals for games 10 to 24. The average rating for the three judges was used as the score for a disposal. The scores within each game were averaged to give a score for each baseline and treatment game. The number of disposals for any player varied from game to game. These scores are graphically represented from game to game, as in the example shown in Figure 3.2.

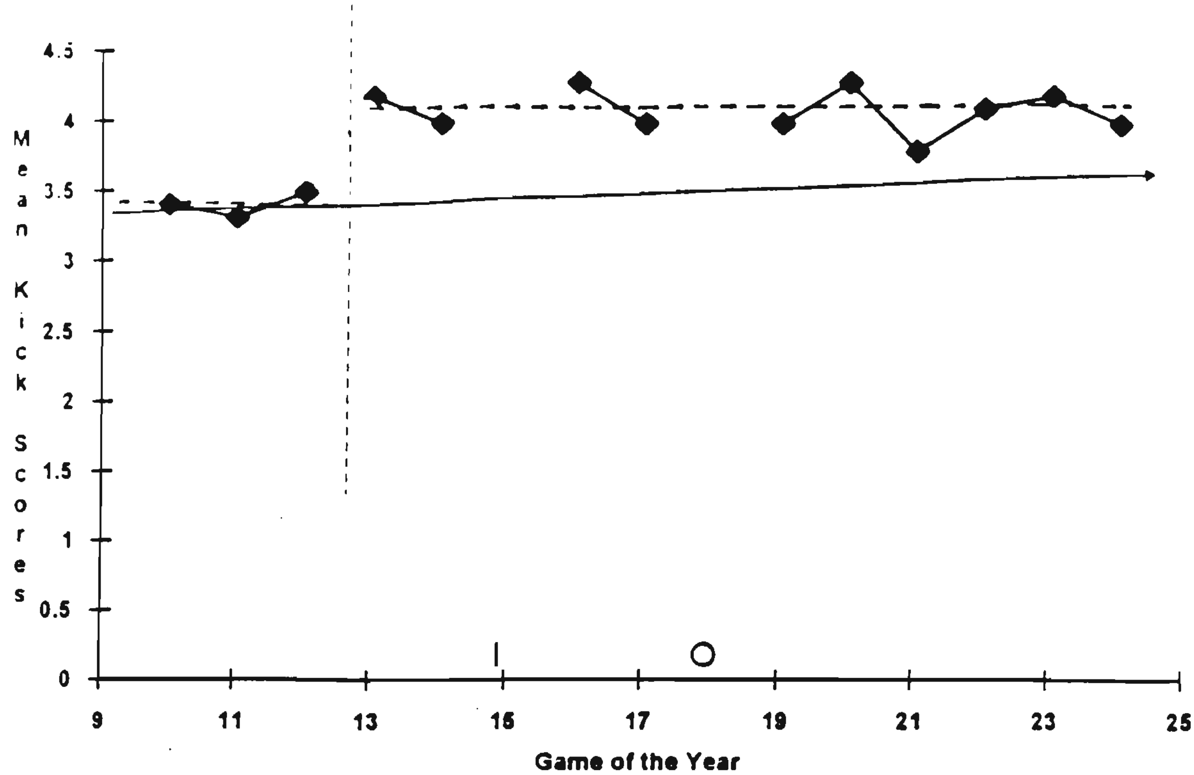


Figure 3.2 An example of a player's mean disposal scores per game for Australian Rules Football Games 10 to 24, 1991.

As shown in Figure 3.2 each baseline game and each treatment game score is plotted. The baseline and treatment phases are separated by a vertical intermittent line, in Figure 3.2, with the baseline scores to the left of the vertical line and the treatment scores to the right of the vertical line. The vertical axis represents the average score for all an individual's kicks per game. The horizontal axis represents the games that the RFC played in the 1991 football season in which the research took place. A (O) symbol, just above the horizontal axis, signifies that the conditions were too wet for meaningful assessment of disposals to be undertaken. An (i) symbol appearing on the graph, signifies that the player was injured and unable to play in that match.

3.2.4.2 Social Validation Questionnaire

Comments that were made by players about the value of the imagery program throughout the experiment were noted. Participants anonymously completed a social validation questionnaire at the end of the study. This comprised open ended written questions about the total exercise. For example, players were asked what were some of the positive aspects of this training technique, as well as about individual components of the program (e.g., they were asked was it difficult to fit in the session on the morning of the game). Further information was acquired by the use of appropriate prompts or casually speaking to the them. Players were also to make any other comments or ask any questions about issues that concerned them. On this basis, players were fully debriefed, that is, any concerns were discussed and resolved.

3.2.5 Procedure

Access to participants was gained through the Richmond Football Club coach, who was informed about the project and agreed to cooperate in the research. He selected ten on ball players (players who are continuously in the play), to participate in the study, because they usually had most possessions in a competitive game. Players were informed of the nature of the study in general terms. They were told that they were free to withdraw at any time and that their data would be kept confidential. They then signed a consent form agreeing to participate in the research. Detailed instructions were withheld until each player was introduced to the intervention. All players were made aware that baseline testing started in week 10 and that they would be randomly selected to start the treatment in ensuing weeks. Each player was invited to attend imagery training immediately after he was randomly selected to participate. The program was introduced to each player in an identical manner at one week intervals. The first week of the treatment included daily imagery rehearsal exercises. The first two sessions involved basic imagery training, the third and fourth sessions involved imagery rehearsal of preparation and game experiences of Australian Rules Football, and the fifth session involved the introduction of a video of the player's best performances, to assist imagery rehearsal. This enabled the player to image their ideal performances. Each session took approximately 30 minutes.

Subsequent weeks involved three twenty minute sessions until the end of the 1991 season. The players were asked to complete a sheet at the end of each session, which included answering specific questions, as well as offering their personal thoughts on the exercise. The first session was a recapitulation of the previous game, whereby the players were required to recall and image five very good disposals that they had performed the previous week, as well as to recall any poor disposals and image these being performed perfectly. The players had a response sheet to complete at the end of this session. This is displayed in Appendix G.

The second session was conducted half an hour prior to the start of training. The players were in a group (one in week 13, two in week 14, three in week 15 and so on) and each of the planned practice drills was read out to them. The players were asked to image themselves performing the disposal skills of the drills at the appropriate speed and perfectly executed. The third session was performed by each player alone, on the morning of a competitive match. This took the format of watching, on video, ten well-executed examples of his own disposals that had been compiled from games played earlier in the year. After each skill execution was shown, the player stopped the tape, and imaged himself performing that skill twice, at the correct speed. After each imagery session, the players recorded their actions and reactions to the imagery rehearsal exercise itself in their logs (as shown in Appendix I). This three session procedure was followed until the end of the season. As well as recording comments made by players throughout the season about the imagery program, the researcher made appointments to meet with each of the players individually at the end of the season and recorded, in writing, their reactions to the program, in a social validation exercise and final debriefing session. Following debriefing the players were thanked for their participation and were invited to make contact with the researcher at any time if they required further assistance in developing the use of imagery for other aspects of their game.

3.3 Results

Mean ratings across the three judges for the performance of the disposal skills for each game in the baseline and treatment periods were calculated. These game performance scores were averaged for the baseline period and for the intervention period. Table 3.2 shows the mean ratings for each player for the baseline and treatment periods. As noted earlier, averaging data for groups often obscures noteworthy individual patterns. The presentation of mean baseline and treatment values for individuals is considered to be relevant, because it clearly describes the data and reflects the effect of the treatment for all players. Increased mean scores are noticeable for nine of the ten players. Player 4 was the only player whose mean treatment period score was less than his mean baseline period score (3.80 to 3.43).

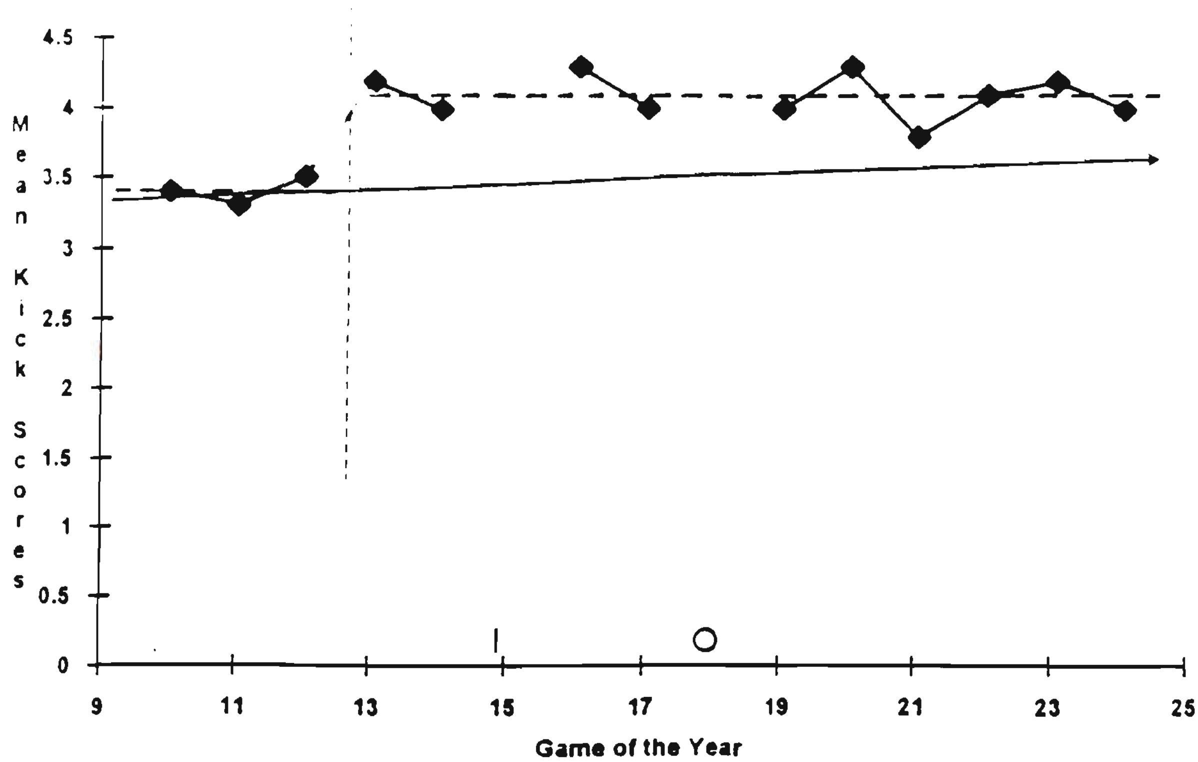
Individual players' week by week mean game scores, for baseline and treatment periods, are presented for each player in Figures 3.3 to 3.12. The results were not considered for game 18, due to torrential rain falling throughout the entire game, causing the ground to be in such an appalling state that it was impossible to execute kicking skills at an acceptable level.

Table 3.2

Means and Standard Deviations for Disposal Skills for Baseline and Treatment Periods

	Baseline		Treatment	
Player	Mean	SD	Mean	SD
1	3.40	0.10	4.10	0.16
2	3.57	0.10	3.70	0.51
3	2.88	0.24	4.10	0.18
4	3.80	0.42	3.43	0.45
5	3.57	0.14	3.85	0.39
6	3.51	0.24	3.98	0.48
7	3.25	0.73	3.84	0.39
8	3.26	0.18	4.20	0.42
9	3.04	0.23	4.00	0.31
10	3.64	0.19	4.10	0.19

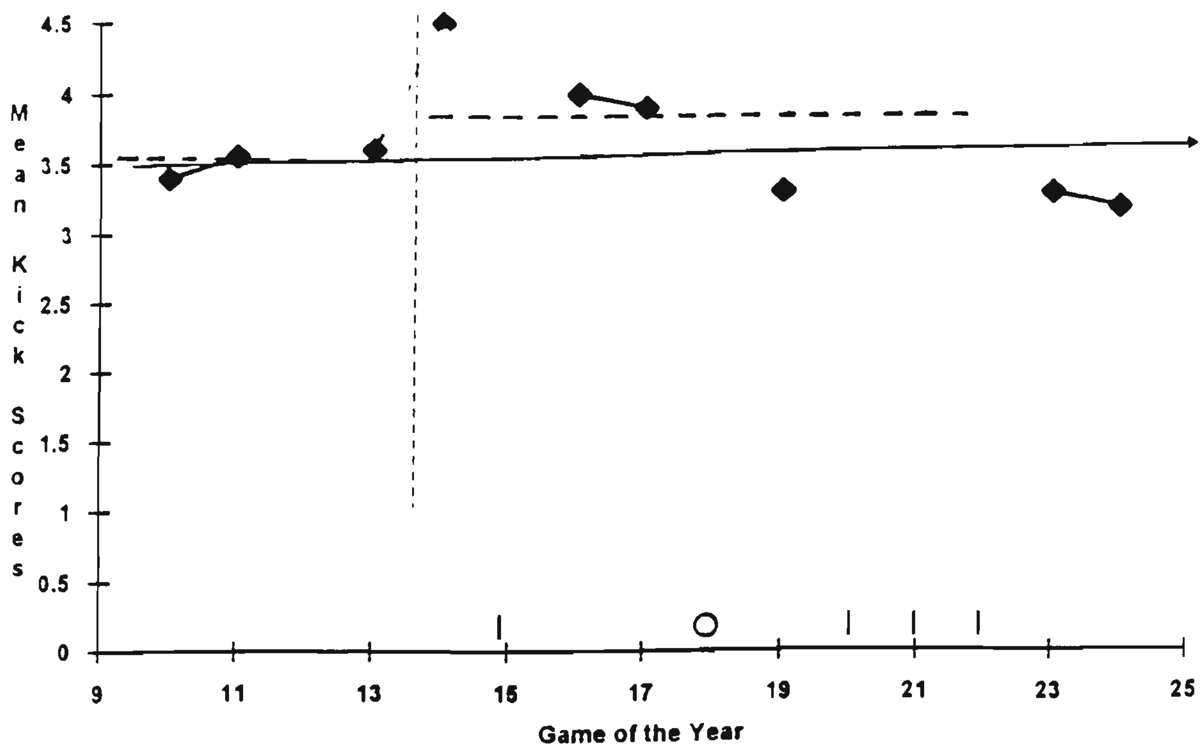
The results for player 1 were graphed and they are shown in Figure 3.3. Results for player 1 show an immediate rise in his disposal score after the imagery treatment was introduced (final baseline 3.5 & initial treatment 4.2). As can be seen in Figure 3.3, this improved scoring performance was maintained for the remainder of the 1991 season, with treatment scores ranging from 3.8 to 4.3 (the highest baseline score was 3.5).



$p < .001$

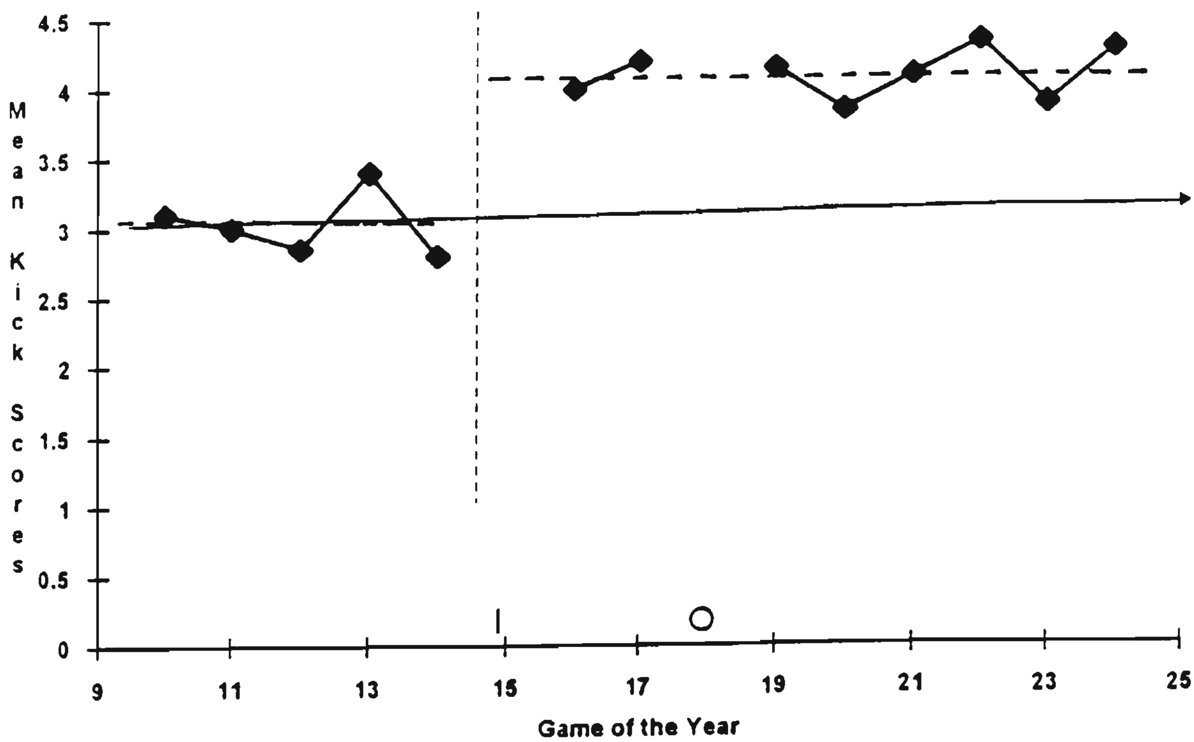
Figure 3.3. **Mean disposal scores per game of player 1 for Australian Rules Football games 10 to 24, 1991.**

The results for player 2 were graphed and they are shown in Figure 3.4. This graph presents a stable baseline, followed by an immediate rise in the player's disposal score after the imagery treatment was introduced (final baseline, 3.5 & initial treatment, 4.2). As can be seen in Figure 3.4, however, this initial increase (4.2) was not maintained. After one week of the treatment period, player two was injured which caused him to miss a week. The two weeks following the injury to player 2, show his mean kicking scores (4, 3.9), were still higher than the baseline scores (3.4, 3.55, 3.6) but not as high as immediately following the introduction of the treatment (4.2). After this period, scores for player 2 fell below those of the baseline period (3.3, 3.3, & 3.2). This was due in part to the fact that player 2 was hampered by injury, which forced him to miss three more games. He was unable to regain full fitness for the rest of the season.



<u>Figure 3.4.</u> Mean disposal scores per game of player 2 for Australian Rules Football games 10 to 24, 1991.

The results for players 3 were graphed and they are shown in Figure 3.5. Figure 3.5 demonstrates a rise in the disposal score for player 3 after the imagery treatment was introduced. The first treatment result was a perfect score of five. This score was not considered due to the fact that player 3 only had one kick in this game before being forced from the ground with an injury and was unable to return to the playing field for the remainder of the game. Nevertheless, Figure 3.5 clearly illustrates an improved and consistently maintained disposal performance, in the treatment period, for the remainder of the 1991 season, with all treatment scores (3.85 to 4.35) being above those of the baseline period (2.85 to 3.4).



$p < .001$

Figure 3.5. Mean disposal scores per game of player 3 for Australian Rules Football games 10 to 24, 1991.

The results for player 4 were graphed and they are shown in Figure 3.6. It was difficult to establish a suitable baseline period or treatment period trend for player 4 due to him being injured early in the baseline phase, and also being injured in much of the treatment period of the season. No celeration line could be calculated. Because of these factors it was decided, that the results of player 4 could not be considered in the analysis.

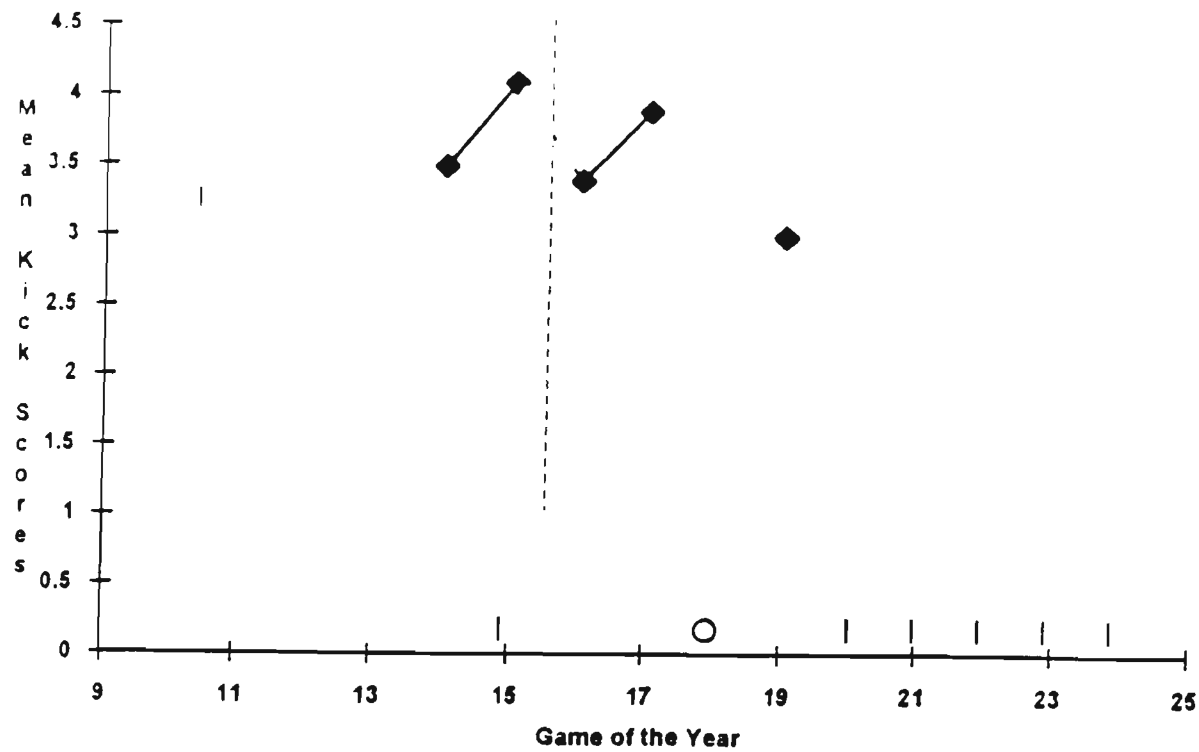
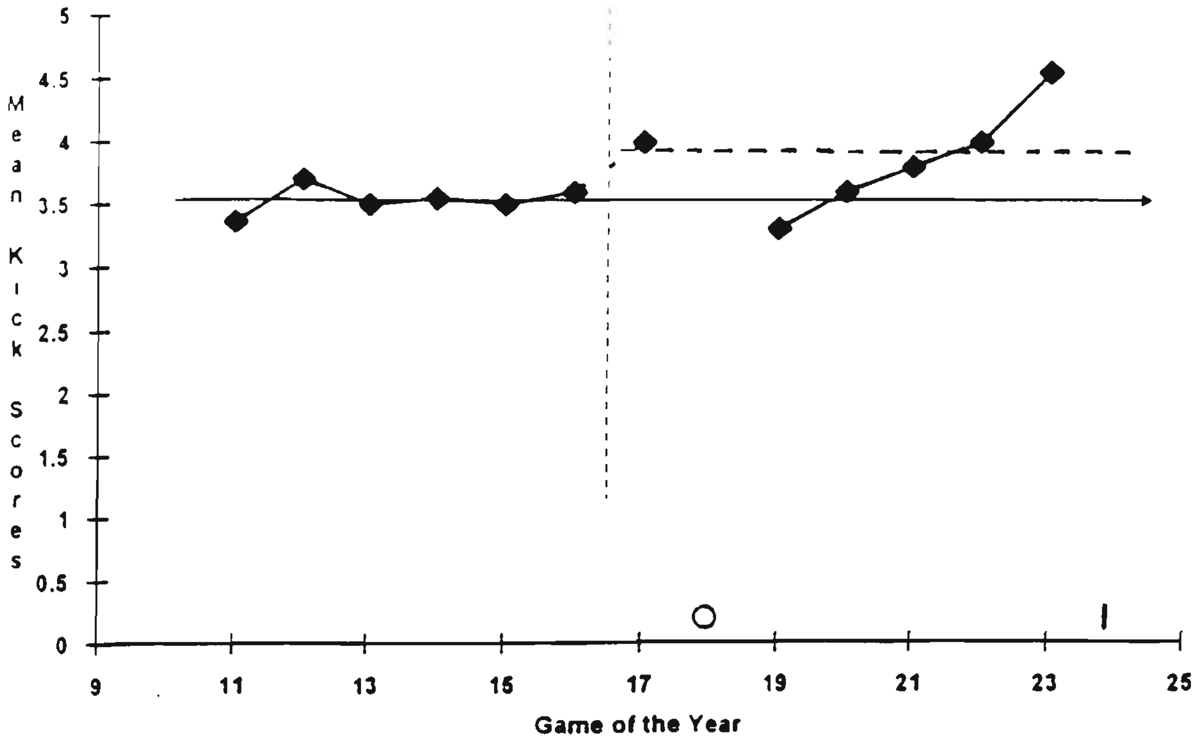


Figure 3.6. Mean disposal scores per game of player 4 for Australian Rules Football games 10 to 24, 1991.

The results for player five were graphed and they are shown in Figure 3.7. The graph for player 5 shows a very stable baseline (3.36 to 3.6), with a rise in performance immediately after the treatment was introduced (final baseline, 3.6 & initial treatment, 4.0). As can be seen in Figure 3.7, this improved scoring ability was only maintained for one game before falling for one game (3.3) to be below scores in the baseline period. After this initial fall, it can be seen that there was a steady and consistent rise in kicking performance to the end of the season for player five (3.6, 3.8, 4.0, 4.45). (Player five did not play in the last game of the year due to ill health).



$p < .01$

<u>Figure 3.7</u> Mean disposal scores per game of player 5 for Australian Rules Football games 11 to 24, 1991.

The results for player 6 were graphed and they are shown in Figure 3.8. These results show an immediate rise in disposal score after the imagery treatment was introduced (final baseline, 3.2 & initial treatment, 4.5). It can be seen in Figure 3.8 that this improved scoring ability was variable (3.75 to 4.50) and tended to level out at a scoring rate (3.75, 3.9, 3.8) still higher than the baseline period, but not at the level attained for the game immediately after treatment. This may have been in part due to the fact that player 6 was trying to regain form after missing two games through injury in weeks 20 and 21. The nature of his injury made it impossible for him to perform any leg work training. The player might have lacked fitness in both his leg muscular endurance and cardiovascular capacity to make as many of the contests as he had been able to do before he sustained the injury. When he got the ball he may not have had his normal leg strength to dispose of it.

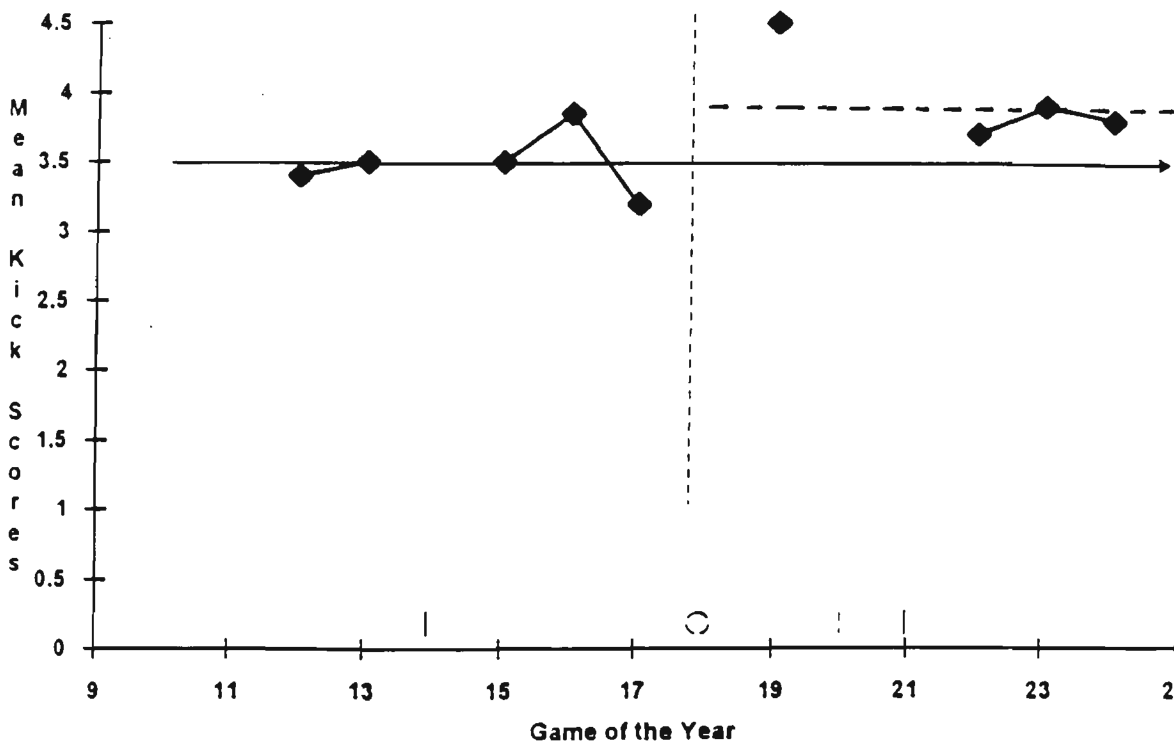
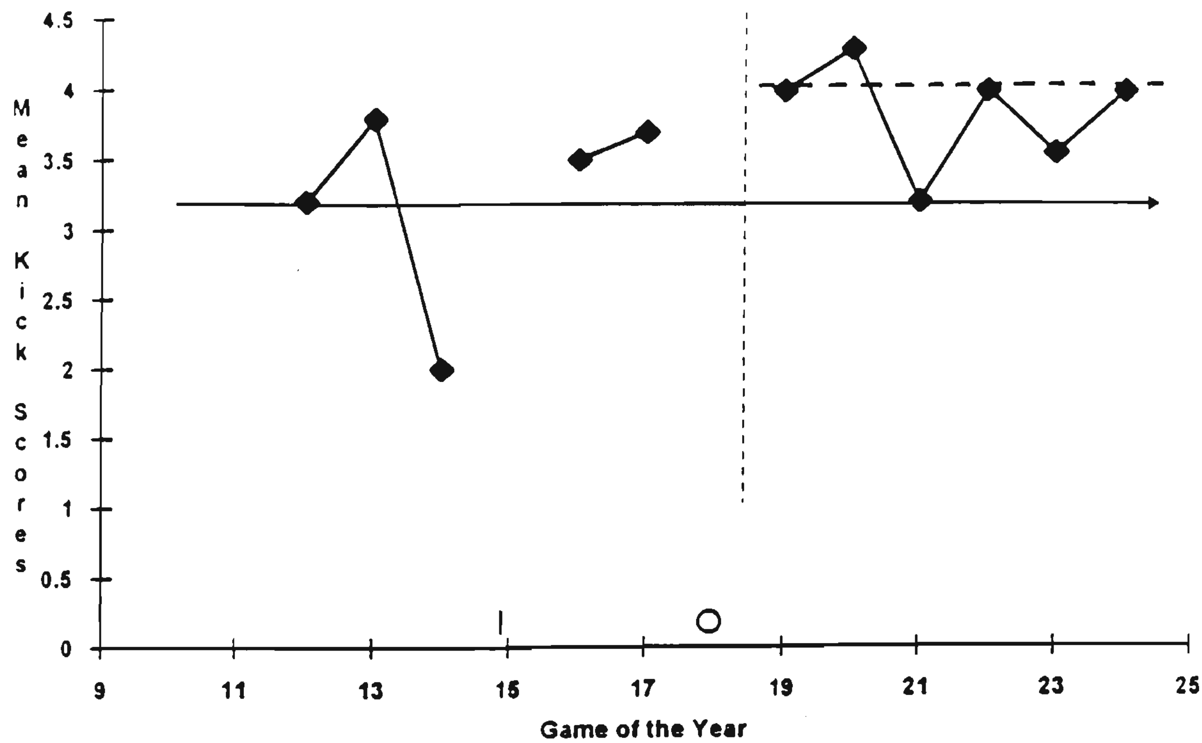


Figure 3.8. Mean disposal scores per game of player 6 for Australian Rules Football games 12 to 24, 1991.

The results for player 7 were graphed and they are shown in Figure 3.9. These results show an immediate rise for two weeks after treatment (final baseline, 3.7 & initial treatment, 4.0). Figure 3.9 demonstrates that results for the remainder of the treatment period cover quite a wide range (3.2 to 4.3). All scores after the treatment are higher than in the baseline period, except for weeks 21 (3.2) and 23 (3.5). The score in week 23 is still well above the celeration line.



$p < .01$

Figure 3.9. - Mean disposal scores per game of player 7 for Australian Rules Football games 12 to 24, 1991.

The results for player 8 were graphed and they are shown in Figure 3.10. This graph shows a stable baseline with an immediate increase in kicking performance scores after the treatment was introduced (final baseline, 3.35 & initial treatment, 4.1). Furthermore, Figure 3.10 clearly illustrates an improved disposal performance, which, although rather variable, shows a trend of further improvement in the treatment period, for the remainder of the 1991 season (4.1, 3.8, 4.8, 4.25).

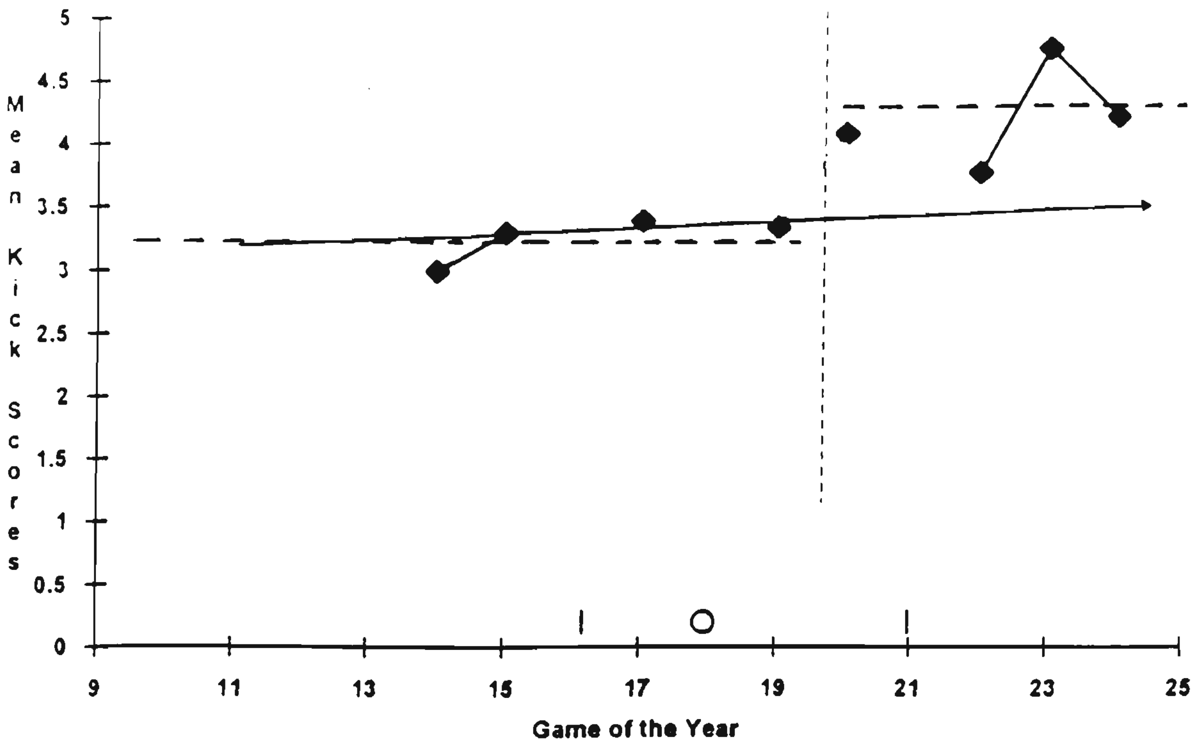


Figure 3.10. Mean disposal scores per game of player 8 for Australian Rules Football games 14 to 24, 1991.

The results for player 9 were graphed and they are shown in Figure 3.11. This graph depicts a clear and relatively stable baseline prior to intervention. This is followed by an immediate increase in kicking performance scores after the treatment was introduced (final baseline 3.1 & initial performance 3.6). Furthermore, Figure 3.11 clearly illustrates an improved disposal performance (3.6, 4.05, 4.0, 4.35) over the whole treatment period, which shows a trend for continued improvement for the remainder of the 1991 season.

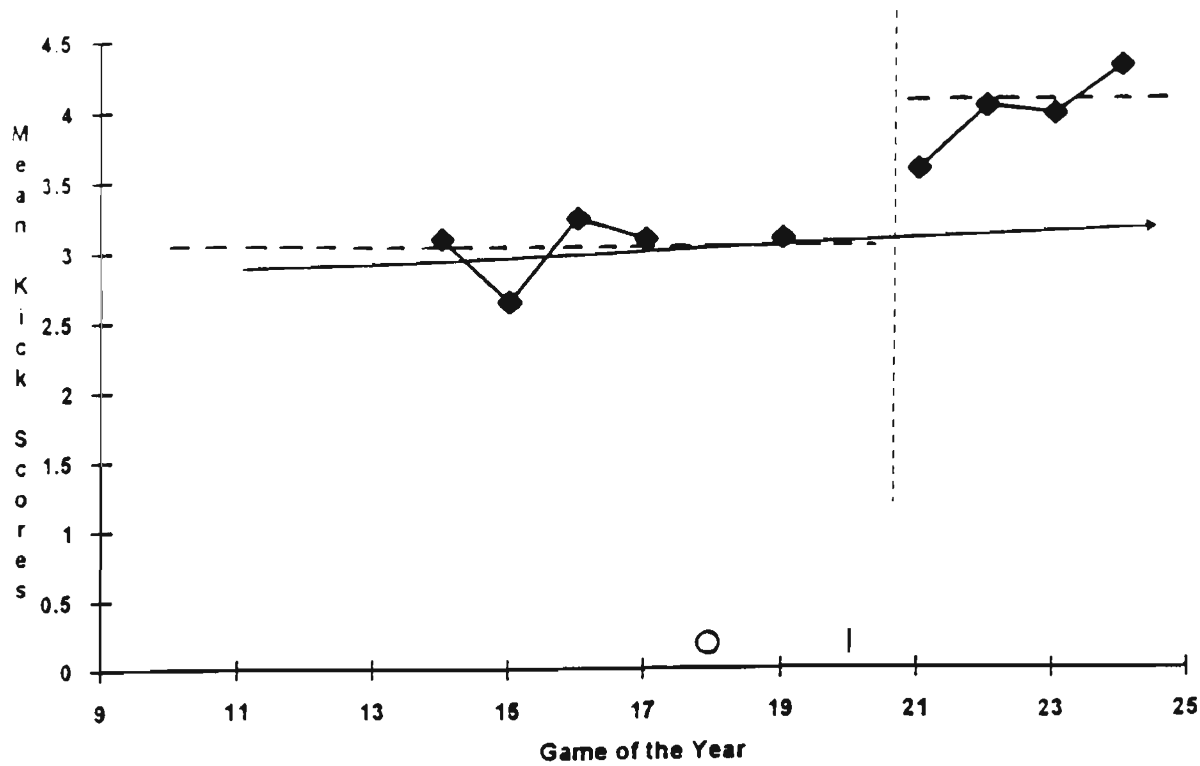


Figure 3.11. **Mean disposal scores per game of player 9 for Australian Rules Football games 14 to 24, 1991.**

The results for player 10 were graphed and they are shown in Figure 3.12. This graph depicts a clear and stable baseline prior to intervention, except for one score (4.0) in week 16. Figure 3.12 demonstrates that there was an immediate increase in kicking performance scores after the treatment was introduced (final baseline, 3.5 & initial treatment, 3.9). Furthermore, Figure 3.12 clearly illustrates a progressively improving trend line for disposal performance (3.9, 4.2, 4.25), for the remainder of the 1991 season.

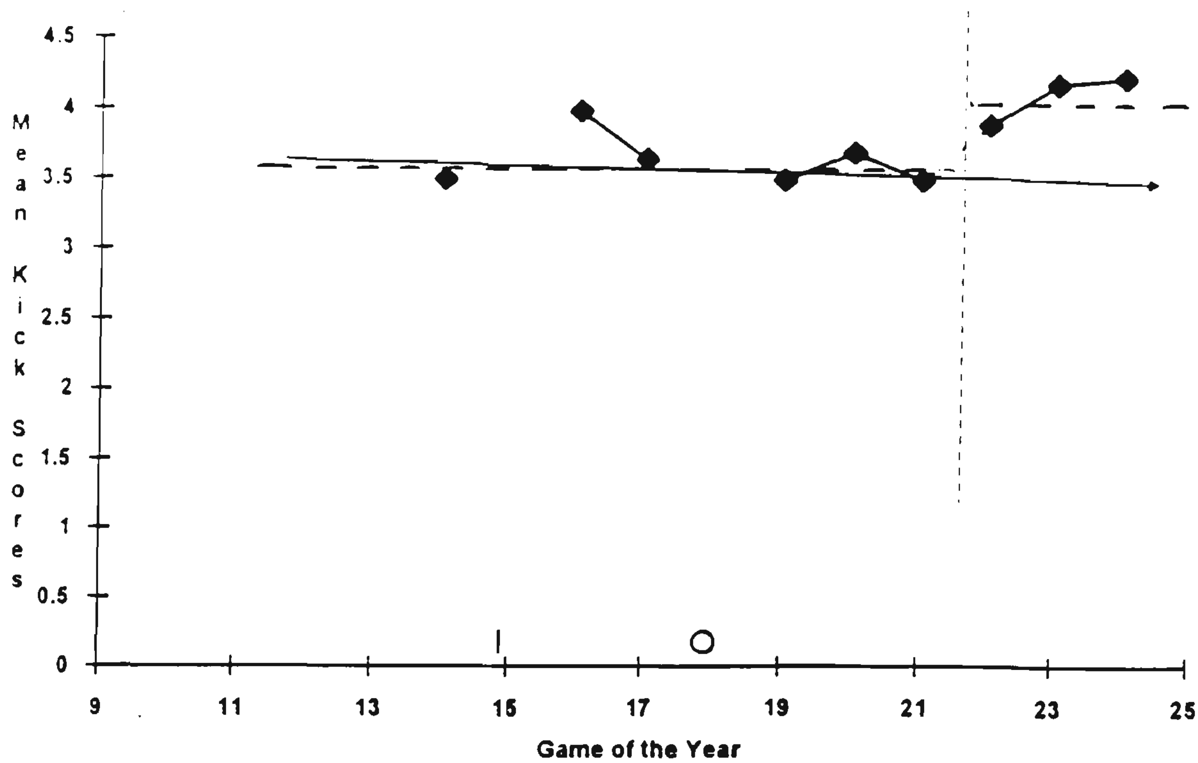


Figure 3.12. **Mean disposal scores per game of player 10 for Australian Rules Football games 14 to 24, 1991.**

Visual inspection of the results for players 1, 3, 8, 9 and 10, illustrated in Figures 3.3, 3.5, 3.10, 3.11, and 3.12 respectively, shows clear and sustained improvement in performance for these players during the treatment phase. Graphs of players 5, 6 and 7, (Figures 3.7, 3.8, 3.9) are more variable but still show a distinct trend of improvement during the treatment phase. Only the results for players 2 and 4 (Figures 3.4 & 3.6) show no indication of a positive effect of the treatment. Player 2 was injured early in the program and did not regain full fitness for the rest of the season. Thus, his results do not represent a fully functioning player. Player 4 suffered both injury and 'loss of form' which made it impossible to perform any worthwhile analysis on his results, because he rarely gained possession of the ball to be able to dispose it, especially in later games.

The split middle technique (Hersen & Barlow,1976; Kazdin,1976) was employed as an inferential test of the hypothesis that the improvements were not due to chance. The split middle technique provides a method of describing the rate of behavioural change over time for a single individual or group (Kazdin, 1976). A general advantage of this type of analysis is that it is important for the real world, in that it reveals a linear trend ("line of progress" or "celeration line") from the baseline data. Predictions can then be projected about future performance, if there is no external influence. From this information, decisions can be made about an individual's performance status and whether some form of intervention might assist in achieving a higher level of performance. Similarly, where an intervention has been used, it is possible to determine whether that intervention has produced a significant difference from the predicted line of progress, based on the baseline data.

In this procedure, carried out for each player, the data was plotted and a clear delineation depicted for baseline and treatment periods, as shown in Figure 3.1. The medians were determined for each half of the baseline period for each player. A trend line was drawn by placing the medians at the 25th & 75th percentile points of the baseline period and connecting these points with a straight line. The line drawn, connecting these two points, was extrapolated through the treatment period, constituting the line of progress or celeration line. The celeration line indicated how the player's performance with respect to target behaviour was predicted to progress based on baseline performance. This celeration or median split trend line is shown on the graph of each player's game by game rating of performance in Figures 3.2 to 3.11. If there was no intervention, it would be expected that 50% of the data would fall on or above the celeration line and 50% on or below the celeration line, when the celeration line is extended into the future. The probability of a data point during normal B phase or treatment falling above the projected line is, thus, 50% (i.e., $\underline{p} = .5$), given the null hypothesis that there is no significant effect of the treatment. The number of points during the treatment phase that were above the trend line was noted, along with the total treatment data points. From these two values, the probability of the number of points above the trend line having occurred by chance was determined from a table of values of the binomial distribution. Herson and Barlow (1976) propose that a minimum number of treatment measures is three occasions. This guidance was followed in the present study. Following Herson and Barlow's advice, the probability was calculated. Recent study has revealed a formula for calculating the binomial probability direct. It is $(n/x)p^n$...., where n is the total number of treatment points, x is the number of points above the celeration line, and p is always 0.5 the probability that half the points being above the line and half the points being below the line. Considering this formula, where all the treatment scores are above the celeration line, $x = n$ and $n/x = 1.0$. Thus $(n/x)p^n = p^n$. For $n = 3$. $p = 0.125$, and for $n = 4$, $p^n = 0.06$. Thus, only for $n = 5$, where $p^n = 0.03$ and beyond an n of 5 does the formula allow the maximum score, that is, all points above the celeration line, to produce a significant probability. This means that for players, 6, 8, 9, and 10, the split middle technique can not be used. The qualification to the guidance given by Herson and Barlow (1976) should be noted by those using the technique in the future. Probabilities for all participants, where applicable are noted below the individual graphs in Figures 4.2-4.9 For four of the ten players (1, 3, 5, and 7) the probability was significant at the $p <$ .05 level. It can be clearly seen in Figures 3.8, 3.10, 3.11, and 3.12, however, that all treatment points in these figures appear above celeration lines, suggesting, if further competitive games had been available for analysis, the Split Middle calculations could have revealed significance. Probabilities for all players, where appropriate, are noted below the individual graphs in Figure 3.2 to 3.11. It should be noted that celeration lines based on limited numbers of baseline points can be distorted by one atypical point. Thus, conclusions drawn from the split middle technique should be tempered by consideration of the stability of baseline data. In the data presented here, baseline data are relatively stable and typically lead to celeration lines with shallow positive slopes, suggesting a continuation of similar performance or further gradual improvement. This seems reasonable in terms of the pattern of skill development expected for expert players, and challenging, because the treatment was required to demonstrate still greater improvement. In this light, it is proposed that the split middle results add a degree of confidence that the intervention affected performance of the disposal skill.

The participants in this study were also asked to comment on their reactions to treatment procedures and experimental outcomes in two formal ways. Each player was asked to complete a social validation questionnaire anonymously on completion of the study. This was in addition to the log of reactions to the treatment supplied by the players during the experiment. Examination of comments made during these two procedures, during and after the season, indicated that all the players enjoyed their participation in the study and felt that the intervention procedures were helpful and worthwhile. All agreed that they would like to continue with the program and to apply imagery rehearsal to other aspects of their individual games. It must be acknowledged that the major input of written comments was made at the end of the program when the players had an opportunity to take time to consider their involvement and the program itself. The reason for this was that the competitive season had concluded and they had more time to reflect on their involvement in the program. Understandably, the players have a great deal of pressure on them during the competitive season and it was decided to rely more on verbal comments made rather than insisting on the players making written comments in their diaries, although players were encouraged to make open ended comments in their diaries if they wanted to do so. The social validation also suggested that players felt more confident in performing the disposal skill as a result of the imagery intervention. Examples of the type of comments frequently made were, "I really find that I am making the right disposal option in a game now", "We, as a team are making a lot less turnovers than we were earlier in the season", "I'm also using this technique in other areas of my game", "My concentration has improved a great deal when I'm kicking", "This is great!" Player two became a little disenchanted, in general because of his injuries, and found it difficult to adhere to the program, especially when there was no feedback. He made comments such as "what's the point when I can't try the skills in a game?" Comments were, however, mostly positive.

In addition, after every session the players had an opportunity to make comments in their log books about the sessions. This was open ended in that the player was simply asked to write any comments that they had about the session or the program in general. This section was well used, especially early in the program, when the players had positive comments to make. As the program continued it was not as frequently responded to and didn't produce comments in the quantity that were initially made. This was mainly because the players did not want to keep repeating themselves. Comments were still recorded, however, that were made when verbally communicated to the researcher. Nevertheless, written comments such as, "I'm able to see myself clearly in the situations described", "The sessions at home are easy to follow", "Imaging skills from the previous game helps me focus on what I need to do the following week" were again mainly positive. As mentioned before, a major source of feedback, most beneficial to the researcher, was derived from speaking to the players as individuals and in a group. Importantly most of the reports from a social validation perspective were constructive, positive and encouraging.

The effect of the intervention was shown clearly across eight of the nine players for whom full data were available. Performance level was noticeably higher immediately after intervention than prior to intervention and the improved performance was maintained for six players, but for two others it declined somewhat, but stabilised at a level above the baseline results.

3.4 Discussion and Conclusions

The results of this single-case, multiple-baseline study supported the prediction that an imagery program would significantly enhance performance of the disposal by foot. Practice of the imagery program enhanced the performance of the disposal skills for eight of the ten players. The results clearly depict an immediate improvement in kicking performance as participants were introduced to the imagery treatment, and increases in performance were maintained at a level above the baseline kicking scores. In the instances where such a result was not found or sustained, other, extraneous factors appeared to influence the results. These were factors beyond the control of the study, including, loss of form, whereby the player was unable to gain possession of the ball let alone kick it, or injury which prevented a player from participating in one or several games. Such factors affected a player's ability to return to the team and participate at a level of performance that he displayed under normal circumstances.

The results are encouraging for the use of imagery in several ways. First, they supported findings from previous research that also suggested imagery is an effective intervention for improving the performance of skills, For example, Kendall etal, (1990) found the use of imagery had positive effects on basketball players' ability to carry out a specific defensive basketball skill, though they examined the effects of an imagery rehearsal, relaxation, and self-talk package on the performance of a specific defensive basketball. Kolonay (1977) explored relaxation-imagery in an early study using VMBR, and established, when employing imagery, that players improved in their ability to score from free throws in basketball. A main difference of the Kolonay (1977) study to the present study is that the present study employed a much less formal relaxation procedure. It must also be recognised that in the case of the Kendall et al. (1990) study that there were two other potential influences on performance other than imagery, namely, self-talk and relaxation. Similarly, relaxation and videomodelling facilitated the imagery treatment in this study, although only in an imagery facilitating role, that is, to assist imagery to be more vivid. A particularly important aspect of the present findings, however, is that they support the conduct of similar research in the real competitive environment. This is a important consideration from both a theoretical and applied perspective. Theoretical findings need to flow on to the real competitive world of sport, producing results that are acceptable to coaches and players alike.

Second, the results showed that a single-case, multiple-baseline design can be effective in the real competitive situation, as advocated by Bryan (1987), Kendall et al, (1990) and Wollman (1986). Most reports supporting imagery as an intervention in sport skills in the real competitive environment have relied on testimonial and traditional experimental design findings. Traditional experimental design has been the major form of research design when analysing and testing the influence that an independent variable on a designated outcome. From an applied sporting perspective, however, the difficulty with such experimental design is that it relies on large samples and randomly directing participants to either an experimental or a control group. This assignment of players to a control group does not have great deal appeal to coaches and players within the competitive season. They would prefer that all players be involved with the treatment, because they desire to gain the greatest possible advantage, as far as winning is concerned, and the experimental outcome is only of secondary importance to them. This is not the situation with the single-case, multiple-baseline design because firstly, it does not require the numbers that are necessary in traditional experimental design, and secondly, there is no requirement for a control group in the single-case, multiple-baseline design, as a critical feature of the design is the fact that each subject acts as their own control. The comments from both the senior coach and players suggest that a single-case design is an acceptable non-intrusive method of research that is appropriate to the competitive setting. More importantly, such a design is experimentally valid.

Thirdly, the results from the present study demonstrated that it is possible to conduct this kind of research on open skills in their natural context. The major differences between the present study and the Kendall et al., (1990) study, is that they used only four subjects in their single-case, multiple-baseline design study whereas ten subjects made up the single-case, multiple-baseline design in the current research. The skill Kendall et al. studied was a strategic positioning skill compared to a physical execution disposal skill in the present study. Also, the intervention employed by Kendall et al., comprised a combination of relaxation, imagery, and self-talk, whereas the present study employed an informal relaxation technique, and video viewing to assist the imagery rehearsal intervention.

The results of the present study (similar to Kendall et al, 1990) also support the use of social validation techniques in field research. Through written and verbal feedback, the players expressed extremely positive statements about the imagery intervention and noted that they had gained in confidence as they used the imagery techniques. All players agreed that they would like to continue the program and to apply imagery rehearsal to other aspects of their individual games. These were expressed in the formal social validation interviews that were conducted at the termination of the imagery program. They were also reflected in the logs kept by players during the program and especially in the informal comments by players that were recorded during the program.

It could be argued that the substantial initial improvement in scores observed for some players immediately after treatment was introduced could have been due to motivational effects. In the case of the present study, results did improve immediately after the treatment for nine of the ten players, with the remaining player's scores not being considered representative due to loss of form and also injury. Such immediate improvement could be attributed to a Hawthorne Effect. Any influence of the Hawthorne Effect is typically shortlived (Dworetzky, 1982), showing an immediate improvement in performance after treatment, but this increase would not be maintained. As stated earlier, for most players in this study, the results did show large initial improvements when the treatment was introduced, and these large elevations were not always sustained. Nevertheless, the positive performance effect was maintained to the end of the season for most of the participants. For those, whose performance levels did fall from high early intervention scores, generally results oscillated between the high initial intervention scores and a level above the baseline scores for the rest of the intervention period. Although there may have been a motivational component of being involved and trying something new, that contributed to the improvement in scores immediately after the treatment was introduced for some players; there was no evidence of a return to the baseline level. Therefor, it is proposed that the improvement in scores was largely due to the imagery treatment. Thus, it was concluded that any continued improvement in performance was attributable to an imagery effect.

As stated previously, the strength of this study is that it examined real skills in a real competitive environment, giving it ecological validity. The real world, nevertheless, can introduce variables that are difficult to control on any competitive day. These factors may include wind conditions that influence dropping of the ball to the kicking foot or the trajectory of the ball through the air, and strength of the opposition team, which could affect the number of opportunities that a participant may have to dispose of the ball in a game. A player may have a "tagging" or " stopping" role to perform in a game, whereby the individual's main role is to stop his opponent from gaining possession of the ball rather than attempting to gain possession of the ball. This demand reduces the player's ability to gain the ball in a game, let alone dispose of it. Also, when playing against a much stronger team the numbers of opportunities a player has to gain the ball may be affected by the sheer dominance of that opposition. These and other factors can affect individual performance. Another important issue in single-case, multiple-baseline research is that, ideally, a player should only be introduced to the intervention after they exhibit a stable baseline on the measure of behaviour being recorded. It could be suggested that future research in this field should be conducted using a procedure where a sample of participants are only selected, as was the case in this study, but rather all players' scores are monitored and players are introduced to the treatment only when they display a stable baseline in performance of the skill under study. This would be ideal in a controlled environment, however, in the real competitive world the research is restricted to the competitive season and stable baselines may not be able to be established within those time constraints. Therefore the strict compliance to a perfectly stable baseline before treatment is introduced might have to be dispensed with in order to ensure the study goes ahead in the competitive season. Of course one would have to eliminate extreme cases of baseline variability.

Study of the results show that, players' baseline scores are reasonably stable, so that the split middle celeration lines reflect intuitively acceptable shallow slopes. It is worth noting that in the case of the Kendall et al. (1990) study, the four baseline scores considered as the baseline data for each player prior to treatment were also not perfectly stable, but, as was the situation in the current study, the scores were stable enough to be considered as adequate. It is important to recognise that the single-case design was valuable in allowing for individual analysis in a real world setting, whereas traditional research design is usually manageable in the laboratory environment only. An issue worth reflecting on for future research in considering single-case, multiple-baseline design is whether the researcher who is also the program manager should know any of the performance scores before or during the treatment phase(s). This issue could be overcome by having someone else run the treatment program, if the researcher monitors and assigns participants to the treatment. Or, have someone else monitor and assign players to the treatment if the researcher must run the treatment. Issues, like the one just mentioned, are worth considering in future research because it is not known just how they might influence the results of the study.

The social validation responses strongly suggested that highly motivated athletes are very positive and prepared to participate willingly in research such as this study. This research provides the players with a training tool that offers them an opportunity to improve performance, beyond any gains made, based on the traditional routines of physical training.

Also, it must be recognised that the nature of single-case, multiple-baseline research had great appeal to the senior coach of the sporting club used in the study. He had a stated progressive and positive attitude to the nature of research in football and sport in general. He did have reservations about the nature of the research, however, believing it would disrupt or influence the rest of the club's training program. At that stage the coach thought that a lot of the players would be required and that there would be an experimental and a control group. He was also concerned about the timing of the introduction of the intervention exercises, and argued that, if the intervention was "going to be so valuable", why could not all players be exposed to the program from the start.? He was concerned, when the notion of research was first mentioned, because his previous experience of research in the exercise physiology area had been disappointing when overly enthusiastic researchers, who did not understand what the club was primarily endeavouring to achieve, had overstepped the mark in implementing their research. This was especially his view about research, while players were engaged in a demanding competitive season.

Many coaches have a stated interest in advancing knowledge in their sport, but most have a greater vested interest in winning rather than losing. This passionate pursuit of winning often sees them, at a whim or wish, dismiss a training technique without the possibility of further discussion. Most would feel that these same "knee-jerk" reactions could apply to research using a traditional design, if a team was losing its games during the experimental period. Termination of research in mid-project for such reasons would have disastrous effects. Perhaps this is one of the major reasons why there is so little research performed on open skills, in elite sports, in the real competitive environment. This single-case multiple-baseline design did not provide the same scale of "perceived interruption" in the mind of the coach, however. This was because it was explained to the coach that the design had an inherent control and that no control group was required.

Furthermore, fewer players would be required for the research. The coach felt very comfortable with the research proceeding, because he felt assured that the design would be potentially far less disruptive to his major goal of winning and it also made him feel positive about furthering the cause of research. It must be noted that he only had a superficial understanding of the concept of such research. Nevertheless, he felt comfortable with this approach because he could not see any major ways in which the research process and its implementation would greatly disrupt normal procedures.

The coach also felt that he could remain removed from a logistical perspective. That is, he could observe others conducting the research, but not be directly involved himself. This could be a major point of persuasion when endeavouring to convince other coaches to allow access to their players and facilities for research purposes.

From a statistical and a practical point of view, results supported the proposal that imagery rehearsal can lead to the improvement of open skills, such as Australian Rules Football disposal skills, in a non-controlled environment. At the elite level of sport, the slightest improvement may be enough to tip the scales towards the player who tries some additional intervention. Thus, the improvement in performance observed here appears to be of practical value to players. This might have been the case even if the intervention was not found to be significant from a statistical perspective. Perhaps future research in sport at the elite level needs to consider, that the possibility of statistical improvement at the .05 level might be limited, and overrated, but an improvement in practice, as small as it is, might be important enough to make the difference between winning and losing.

In conclusion, the results from this study suggest that imagery rehearsal had a positive effect on the performance of a disposal skill of high level players in Australian football. These players have been exposed to a large range of physical practice exercises over their playing careers and could have reached the upper level or ceiling of skill performance potential through this approach, even though other physical skill drills might be introduced. It is important to recognise that the improvement in the players' kicking performances, has been largely brought about by the imagery treatment, although relaxation and video footage of very good performances were also used to assist the players with the imagery treatment. The results are most encouraging and they support further study in this area, especially in a sport which has traditionally employed, and relied on, physical training as the major means of improving performance, and where psychological intervention is not a commonly used means of improving performance. The process by which the improvement occurred in this study is unclear. Further research is needed to investigate that process. It was noted from the logs, debriefing interviews. and the casual comments of players, that their confidence in their ability to perform the skill of the disposal of the ball by foot increased as the treatment progressed. This social validation finding is in keeping with claims made by Watkins, Garcia, and Turek (1994) that one's knowledge of past performance will govern estimates about efficacy to perform the behaviour in the future. Neither self-confidence nor the closely related concept of self-efficacy, however, was monitored in this study other than via the social validation feedback that was abundantly supplied. Rather, this study is one of the first in observing the impact of an imagery rehearsal intervention on the performance of an open skill in a competitive setting. Further research is required to examine the imagery rehearsal process with open skills in the competitive setting. It is possible that examination of confidence as a mediator might help to understand the mechanism whereby imagery rehearsal enhances performance.

Chapter 4: The Effects of an Imagery Program on Self Efficacy and Performance of an Australian Rules Football Skill

4.1 Introduction

4.1.1 Implications of the Study of Imagery Rehearsal and Disposal Skills in Australian Rules Football

In the first study of this thesis the prediction was supported that an imagery rehearsal intervention would improve disposal skills in the competitive setting of Australian Rules Football. In addition, the players in that study commented on their reactions to treatment procedures and experimental outcomes in three ways. Each participant was asked to complete a social validation questionnaire anonymously on completion of the study. This was in addition to the log of reactions to the treatment supplied by the participants during the experiment. Also recorded throughout the study, were casual comments made by the players. It was noted from the logs, debriefing interviews and the casual comments of players that they felt their confidence in their ability to perform the disposal by foot increased as the treatment progressed. Examination of comments made during and after the season indicated that all the participants enjoyed their participation in the study and felt that the intervention procedures used were helpful and worthwhile. All agreed that they would like to continue with the program and to apply imagery rehearsal to other aspects of their individual games. This social validation seemed to suggest that players felt more confident in performing the disposal skill as a result of the imagery intervention. The descriptive data or the social validation qualitative reports suggested that self-confidence, or, more precisely, task specific self-efficacy, was enhanced. The comments about self-confidence started to rise early in the treatment phase. This raised the possibility that self-efficacy could be a mediating link between imagery and performance.

Bandura (1977) proposed that psychological intervention, alters the level and strength of the self-efficacy for the activity, that is, the belief that one can successfully execute a given activity. In the previous study, imagery rehearsal was adopted as the form of psychological intervention. Bandura (1977) proposed that performance accomplishments, vicarious experience, verbal persuasion, and physiological reactions are the four major antecedents of self-efficacy. Bandura (1986) suggested self-efficacy theory as a social cognitive approach to behavioural causation that postulates behavioural, physiological, cognitive factors, and environmental influences operate as interacting determinants of each other. Self-efficacy theory focuses on the role of self-referent thought on psycho-social functioning and provides a mechanism through which people demonstrate control over their own motivation and behaviour (McAuley,1992). Suinn's (1984) view of imagery rehearsal as a multi-modal reintegration of reality experience, involves imaging previous, successful performance. Such rehearsal could be considered to be an experience somewhere between performance accomplishment and vicarious experience (including a physiological component), which are both antecedents to self-efficacy. Thus, there are considerable grounds for proposing that imagery of previous successful performances is likely to enhance self-efficacy for that task. Some applied sport psychology texts propose this imagery approach to building confidence (e.g., Martens, 1987; Williams, 1986). To date, no research has come to light testing the relationship between imagery and self-efficacy. There are, however, several articles that have alluded to this relationship (e.g., Bandura, 1986; McKenzie & Howe, 1981)

There is, however, a great deal of research demonstrating that enhanced self-efficacy leads to improved performance (e.g., Feltz, 1982; Feltz, 1988; Garcia & King, 1991; Martin & Gill, 1991; Suinn, 1987; Weiss, Wiese & Klint, 1989). It is possible that self -efficacy or task-specific self-confidence acts as a mediator between imagery and performance. If this is the case, imaging oneself performing a skill successfully could enhance one's self-efficacy for that skill. The increased self-efficacy would then lead to enhanced performance. For this relationship to be assessed, further research is required to establish if there is any causal relationship between imagery rehearsal, self-efficacy, and performance.

Efficacy expectations differ from outcome expectations, because individuals can believe that a particular course of action will provide a certain outcome (outcome expectation), but have serious doubts about whether they can perform the necessary activities to produce the outcome (efficacy expectations). Conversely, a person might believe that they can perform the task (high self-efficacy), but not see the connection to the outcome or not believe the outcome will result from the action (low outcome expectation). In either event, they are unlikely to act. Weinberg et al. (1981) agree that individuals who doubt their capabilities to master an environmental challenge will reduce their efforts, whereas those who possess a strong sense of self-efficacy will exert greater effort to overcome the challenge. According to Bandura's (1986) social cognitive theory, if the person does not value the outcome, they will not act, no matter how strong their self-efficacy. For example, a leading tennis player might not enter certain tournaments that she believes she can win, because the prize money is not high enough. In much of the research on self-efficacy and performance links in sport, outcome expectation has not figured strongly, presumably because researchers believe that the attraction of the outcome (good performance) is uniformly high in sport performers.

It remains unclear how imagery affects skill performance and what role confidence may play in this process. Individually, imagery, performance and self-confidence have each received much attention, in the sport psychology literature. Less empirical work has been conducted on the role of imagery in enhancing self-efficacy although many claims are made by practitioners (e.g., Gould, Weiss & Weinberg, 1981; Highlen & Bennett, 1979, 1983; Mahoney & Avener, 1977). Very little research or theoretical work can be found that considers self-confidence or self-efficacy as a link between imagery and performance (Perry & Morris, 1995). Comments made from a social validation perspective in the first study, which found that imagery rehearsal does enhance the performance of a kicking skill in Australian Rules Football, suggested that the role of self-efficacy might be a fruitful line of research to follow. First, it is necessary to briefly review the literature on self-efficacy and performance, imagery and self-efficacy, and imagery, self-efficacy, and performance.

4.1.2 Self-Efficacy and its Relationship to Imagery and Performance

The construct of self-confidence has received an enormous amount of attention. Self-confidence has been called the most critical cognitive factor in sport performance (Feltz, 1988a; Gill, 1986). Research has established that successful elite athletes exhibit greater self-confidence than less successful elite athletes (Gould, Weiss, & Weinberg, 1981; Highlen & Bennett, 1979, 1983; Mahoney & Avener, 1977). Bandura (1977) proposed that many psychological interventions serve as a means of creating and strengthening expectations of personal efficacy. This accounted for the different effects accompanying the diverse methods of treating anxiety in sport, test, social, and other anxiety-producing situations. Thus, Bandura proposed self-efficacy as a common cognitive mechanism for mediating behavioural responses. Self-efficacy is described by Bandura (1977) as the strength of an individual's conviction that they can successfully execute a behaviour required to produce a certain outcome. Bandura (1986) defined self-efficacy as "peoples' judgements of their capabilities to organise and execute a course of action required to attain designated types of performances" (p. 391). Self-efficacy is a situation specific form of self-confidence in which individuals believe they can do whatever needs to be done in that specific situation (George, 1994).

Bandura (1977) proposed that expectations of personal efficacy are derived from four principal sources of information: performance accomplishments, vicarious experience, verbal persuasion, and physiological states. Of the four principal sources of information, Bandura (1986) argued that performance accomplishments provide the most influential source of efficacy information because they are based on actual mastery experiences. A number of factors are identified as influencing the cognitive processing of efficacy information arising from behavioural, vicarious, exhortative, and emotive sources, all leading to an efficacy expectation. Such efficacy expectations determine how much effort people will expend and how long they will persist in the face of obstacles and aversive consequences (Bandura, 1977).

Early support for Bandura's conception of self-efficacy and its role was found in research conducted by Bandura and his colleagues mainly studying the impact of interventions that enhanced self-efficacy related to phobias (e.g., Bandura, 1977; Bandura et al., 1977; Bandura, Adams, Hardy & Howells, 1980). Around the same time, several studies examined the effects of efficacy expectations on motor performance. Weinberg, Gould, and Jackson (1979) conducted the first study to test self-efficacy predictions in a competitive setting. Self-efficacy was manipulated by having participants compete face to face against a confederate on a muscular leg endurance task in which the confederate was said to be either a varsity track athlete who exhibited higher performance on a related task (low self-efficacy for participant), or an individual who had a knee injury and exhibited poorer performance on a related task (high self-efficacy for participant). Results supported self-efficacy predictions with high self-efficacy participants extending their legs longer than low self-efficacy participants. An extraneous variable that was not considered in this experiment was that the participants faced one another and that either of the participants could have received cues from the other participant, concerning strategies for persisting at the task. To overcome this possible influence, Weinberg, Yukelson, and Jackson (1981) designed an experiment which required the participants to sit back to back on the leg lift task to eliminate non-verbal persistence cues from other participants. Results from this research indicated that changes in efficacy expectations were accompanied by corresponding changes in performance. Specifically, the efficacy main effect indicated that high efficacy participants extended their legs significantly longer than low efficacy participants, thus supporting self-efficacy predictions as well as extending the Weinberg et al. (1979) findings to a "non-facing" situation. It should be noted that the face to face activity produced significantly more persistent performance than back to back activity in both high efficacy and low efficacy groups. This implies that there are other extraneous influences when facing a competitor to perform the task, such as motivation or competitiveness.

Other studies have examined the effects of efficacy expectations on motor performance (e.g., Feltz, Landers & Raeder, 1979; Weinberg, Yukelson & Jackson, 1981; Weinberg et al., 1979). Generally these studies have shown increases in self-efficacy expectations to be positively related to increases in sport or motor performance (Feltz, 1992; McAuley, 1985, 1992). Further studies by Feltz (1982, 1988a), Feltz and Mugno (1983), and Schunk (1981) found self-efficacy to be an important determinant of performance. In testing Bandura's causal model, they also found direct effects of treatment on performance and of past performance on future performance.

Many studies have shown increases in self-efficacy expectations to be positively related to increases in sport performance (Feltz, 1982; Feltz & Mugno, 1983; Garcia & King, 1991; Lee, 1982; Martin & Gill, 1991; Schunk, 1981; Weiss et al., 1989). When comparing results from various studies distinctions need to be made between the nature of the various tasks being assessed, for example, is the activity an endurance task or a skill task, or is the setting in which the task is assessed competitive or non-competitive. Other task variables concern whether this task is a task that most could attempt, or a high avoidance task such as a back dive (Feltz 1988), whether it is analogue or real, and, most importantly, in relation to the present study, whether it is a sport skill measured in or out of competition.

Bandura (1986) defined self-efficacy as a construct that is more concerned with one's judgement of performance potential given one's specific skills, rather than with one's global self-confidence in the sheer number of skills one possesses. That is, self-efficacy is situation specific. Self-efficacy theory states that when the necessary skills and appropriate incentives are available, self-efficacy will predict actual performance. Bandura (1986) contends further that self-percepts of efficacy determine choice of activities, effort expenditure, and persistence, as well as thought patterns and emotional reactions during actual and anticipated encounters with the environment. Little research has supported Bandura's (1977) contention that self-efficacy acts as a mediator between environmental or internal demands and behaviour. A lot of research has indicated that performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal frequently enhance self-efficacy. Examples of such research can be found in sport for performance accomplishments (Feltz, Landers & Raeder, 1979; McAuley, 1985), vicarious experience (George, Feltz & Chase, 1992; Gould & Weiss, 1981), verbal persuasion (Feltz & Reissinger, 1990; Fitzsimmons, Landers, Thomas, & van der Mars, 1991), and emotional arousal (Feltz & Mugno, 1983). It is vital to note, however, that very few studies have examined a mediating role (at least in sport) for self-efficacy between imagery and performance (Bandura, 1986; McKenzie & Howe, 1991).

Watkins et al.,(1994) have raised questions of concern about the measurement and conceptualisation of efficacy itself. They noted that Kirsch (1985) argued that, in some contexts, self-efficacy, encompasses motivation or coping efficacy (e.g., phobias, exercise adherence), whereas in other contexts efficacy really refers to an ability efficacy. Watkins et al. (1994) claim this distinction is important in terms of causal direction of the relationship between self-efficacy and performance. They contend that efficacy is more likely to predict behaviour in the case of coping performances, where the crucial element is the extent to which a person is motivated to perform the particular behaviour and believes in their ability to do it. In the case of ability efficacy, however, performance has usually been demonstrated already, and an individual knows how good he or she is at the behaviour. Watkins et al. (1994) claim, in such a case, one's knowledge and evaluation of past performance will govern estimates about efficacy to perform the behaviour in the future. Furthermore, they claim that, within the fields of applied sport and exercise psychology, this distinction has not been made, and efficacy is generally thought of as a contributor to performance.

Watkins et al. (1994) studied cage batting ability in baseball. They examined four trials in a batting cage, where participants who were youth and adolescent athletes, estimated their abilities to hit successfully from one to six pitches. They found, when testing time–pattern, of relations between self–efficacy and sports performance, that self–efficacy did not predict batting performance. As well, previous efficacy was only modestly related to hitting performance. Self–efficacy research has typically employed non–athletes or participants inexperienced in the activity. Thus, it has not addressed potential differences in the cognition of athletes and non–athletes in relationship to the resiliency or stability of efficacy expectations across a range of occasions and conditions (George, 1994). Beginners are possibly likely to have greater fluctuations in performance leading to greater modifications of self–efficacy beliefs. For the expert performer, self–efficacy for most skills in that performer's sport should be relatively high and stable, because the performer has a vast amount of previous performance of the task on which to base that self–efficacy. Furthermore, Watkins, et al. (1994) claimed that much previous research on self–efficacy has typically involved laboratory experiments and that the notion of external validity becomes problematic, leading to concerns about the generalizability of the findings outside the laboratory setting. This is a similar situation to that noted in Study 1 of this thesis, where it was observed that much of the earlier research conducted on imagery rehearsal was executed in the laboratory context. This is one of the factors that led to the examination of the effects of imagery in real competition in the first two studies of this thesis.

George (1994), in endeavouring to overcome the above concern, investigated the network of relationships hypothesised by Bandura's (1986) self-efficacy theory in an actual sport setting, studying 53 experienced male baseball players. There were 25 collegiate players and 28 high school players. The participants completed self-efficacy, anxiety, and effort questionnaires on nine successive game days. Objective hitting performance was measured by calculating each batter's contact percentage by game over the nine game period. Perceptions of self-efficacy, competitive state anxiety, effort expenditure and objective hitting performance were measured and interrelations among these variables were tested. The overall results of this study supported Bandura's (1986) assertions and provided some initial evidence for the predictive ability of self-efficacy for future performance, using experienced athletes in an actual sport setting. George (1994) contends that earlier studies had provided correlational support for the self-efficacy-performance relationship in sport settings, but that this study provided external validity for the causal and directional elements of Bandura's (1986) model. This was also found in more controlled settings (e.g., Feltz, 1982, 1988b; Feltz and Mugno, 1983; McAuley, 1985).

In addition, George (1994) contends that the correlational design of the majority of studies has not permitted inferences to be made with regard to causality or direction of the self-efficacy-performance relationship. One of the first attempts to study such a relationship was conducted when Feltz (1982) used path analytic techniques to examine Bandura's self-efficacy model in a study of back diving performances. The results demonstrated a cause and effect relationship between self-efficacy and back diving. After the first dive, however, performance was found to exert a greater influence on self-efficacy than self-efficacy exerted on performance. Bandura (1986) found that self-efficacy was the most powerful predictor of performance but previous performance was found to have a stronger effect on future performance than did self-efficacy. Feltz proposed a respecified model, including previous performance and self-efficacy as dual predictors of motor performance. Subsequent research has provided considerable support for the respecified model (e.g., Feltz, 1988a; Feltz & Mugno, 1983; Fitzimmons et al., 1991).

Feltz (1988a), in studying gender differences in the causal elements of self-efficacy on a high avoidance motor task, contrasted path analysis models for forty males and forty females based on the predictions of the respecified model of Bandura's (1977) self-efficacy theory. The hypothesised (respecified) model proposed that previous related experiences, self-efficacy, and heart rate predicted initial back diving performance and that previous performance and self-efficacy predicted subsequent performance. The path analysis results indicated that the hypothesised model fit the data better for females than males. Only females showed a reciprocal relationship between self-efficacy and performance. Results, both for males and females, showed that previous performance and self efficacy predicted subsequent performance. Feltz (1988) concluded that "the results of this study, together with my previous research, lend strong support to Bandura's (1977) predictions of self-efficacy as an important predictor of performance" (p.165).

Recently, Feltz and Riessinger (1990) examined the effects of in vivo emotive imagery, performance feedback, and self-efficacy on performance in a competitive muscular endurance task. It was hypothesised that the participants who were given emotive imagery in vivo in the task context, plus performance feedback, would have higher efficacy expectations and demonstrate a greater duration of performance than participants who received only performance feedback, who in turn would have higher expectations and longer performance than controls. In this study, 120 (60 male and 60 female) college physical education and psychology students were randomly assigned to one of three conditions. These conditions were mastery imagery including performance-feedback, performance feedback only, and a no performance feedback control. The participants were required to hold a 'phantom sit ' chair position against a wall for as long as possible against a confederate. The mastery imagery exposure involved the participants listening to a 5-minute audiotape of mastery producing images, and then mentally practising the technique without the tape for two trials. All groups were given self-efficacy questionnaires to complete five times throughout the study. During competition, the imagery group were guided through in vivo imagery by listening to their audiotapes through headphones.

The results supported the hypothesis that in vivo emotive imagery is effective in increasing one's sense of perceived efficacy to endure muscular isometric performance. The participants who were given imagery exposure had higher and stronger efficacy expectations during performance and had greater duration of performance than the feedback and control groups. A secondary purpose of the Feltz and Riessinger (1990) experiment was to examine the bases or sources of participants' efficacy beliefs. Initial beliefs about one's own expectations were, understandably, found to be based on one's own experiences.

These results supported Bandura's (1977) contention that one's own experience is the most relied upon source of efficacy information. After examining the sources of comparative and self-efficacy information for subsequent trials for the different groups, Feltz and Riessinger (1990) concluded that the sources of information used as the basis for self-efficacy were important in determining the effect of self-efficacy. Those imagery condition participants who based their expectations on the strategy, tended to hold higher beliefs after receiving the imagery exposure. They also tended to use their imagery more during competition than those who continued to base their beliefs on other information. This finding was similar to that of Girodo and Wood (1979) who found that believing in the cognitive strategy is an important variable in making the strategy effective.

The Feltz and Riessinger (1990) results are of great interest, representing a rare example of research that has considered task specific imagery, self-efficacy and performance. Unfortunately, especially in view of the pioneering role that Feltz played in introducing causal modelling to sport psychology, Feltz and Riessinger (1990) did not report any causal modelling in this study. Causal inferences are, thus, difficult to draw. It appears that self-efficacy and performance were enhanced in the presence of imagery, but each could have improved due to independent effects of imagery, or self-efficacy, acting as a mediator, might have improved the level of performance. It is even possible that raised performance levels mediated the improvement in self-efficacy. Other weaknesses in this study, with respect to imagery and self-efficacy in sport, is that it employed an endurance task and the participants were largely untrained at the task.

Other studies that have examined the effects of efficacy expectations on motor performance include, for example, that by Feltz, Landers, and Raeder, (1979). Weinberg et al., (1979) found when they studied self-efficacy predictions on performance of a muscular leg endurance task, that the high self-efficacy participants extended their legs significantly longer than a low self-efficacy group. Weinberg, Gould, Yukelson, and Jackson (1981) conducted a study that was designed to replicate the Weinberg et al. (1979) efficacy performance results, but in this study participants were exposed to a back to back situation, rather than facing each other. The findings supported the Weinberg et al., (1979) findings. These studies found increases in self efficacy expectations to be positively related to increases in the quality of task performance.

In another, recent study, (Lee,1990) examined how the use of imagery enhances performance. Lee sought to determine whether it is the imaging of the specific task that is crucial, or simply the positive aspects of a mental image, or just a general "psyching up" effect. Fifty two male students used task relevant imagery, task irrelevant imagery, or a distraction control procedure before performing an analogue muscular endurance task of bent knee sit ups. The results showed clearly that, in performing sit-ups, the relevant image group, who had to imagine themselves performing the sit ups 30 seconds prior to being tested, performed more sit-ups than did either of the other two "psyching up" groups. Mean number of sit-ups performed by participants following intervention was significantly greater for the relevant imagery group than the irrelevant imagery group or the control group. From this study, it was concluded that the content of imagery is important and that imagery effects do not occur solely by affecting mood states.

In Study 1, it was established that imagery rehearsal, as a psychological procedure, helped to improve the execution of a skill in Australian Rules Football at the elite level of competitive sport. It was also noted from other information that self-confidence improved. The evidence that increasing self-efficacy can raise performance is strong. There is some, if limited, evidence that imagery can enhance self-efficacy. Feltz & Riessinger (1990) and Lee (1990), found positive effects for self-efficacy and performance from emotive and task specific imagery, respectively. The activities, however, were analogue endurance tasks and the context was unskilled experimental participants in a laboratory. It is, thus, important to examine imagery and self-efficacy in real sport settings. It is also necessary that research be conducted on the causal relationships between imagery, self-efficacy, and performance. This type of research would be done most effectively using causal modelling. Before that research route can be taken, however, it is important to determine if imagery influences self-efficacy, as well as performance of skills, in elite sport competition. Thus, the aim of the present study was, to examine whether imagery enhances self-efficacy and performance of an open sports skill in the context of elite competition. The study also permitted a replication of the test of the influence of imagery on performance, that was conducted in the previous study of the disposal skill, but with a different football skill. It was predicted that an imagery program would enhance the performance of the front and centre skill in elite Australian rules football, and would enhance self-efficacy for that skill.

4.2 Methods

4.2.1 Participants

The participants were eight Australian Football League (AFL) first eighteen players, from the Saint Kilda Football Club (SKFC). AFL, as described in study one, is the elite league of this football code in Australia. It is also the premier sport participated in and watched by spectators of all sport codes in Australia. The players had been recruited from all states of Australia. They had a diverse background of educational and occupational experiences. Their ages ranged from eighteen to twenty six years (M = 22.2, SD = 1.7). Players were free to withdraw from the treatment at any time they wished to do so.

4.2.2 Design

A single-case, multiple-baseline design was employed in the study. Players worked on an imagery program after their performance was monitored during a baseline period. Each player was introduced to the program in a different week of the season. In this design, each player was randomly assigned to one of the multiple-baseline intervention dates. Baseline performance was measured from week 9 of the AFL season for the first player. Starting in week 14, a new player was introduced to the multiple-baseline schedule every Monday (matches are normally played at the weekend), until the twenty-second game of the season as shown in Figure 4.1. Thus the shortest baseline consisted of five games (games 9 – 13 for player A) and the shortest treatment consisted of three games (games 22–24 for player H). The package of imagery intervention was identical for all players, commencing with five sessions in the first week for each player, and continuing with three sessions per week for the remainder of the competitive year. Performance of all participants was measured until the end of the 1994 season. Participants' performance of the front and centre skill was measured throughout the baseline and treatment periods. Their self-efficacy was also tested throughout the treatment period.

Game	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Participant															
1					□										
2						□									
3							□								
4								□							
5									□						
6											□				
7												□			
8													□		

□ = Week when a new participant is introduced.

<u>Figure 4.1.</u> Introduction of participants to imagery program under multiple-baseline conditions

4.2.3 Task

The front and centre skill requires players to position themselves at the front of a pack to crumb a ball that could be gathered if it came to ground. A pack is defined in Australian Rules Football (ARF) as a group of two or more players attempting to mark (catch) a ball that has been kicked above the pack. Crumbing is the skill of positioning oneself to pick the ball up off the ground when it is not marked in the pack. If the ball is marked by one of the players, that player has free and unimpeded use of the ball and is able to dispose (kick or handball) the ball as that player chooses. Match analysis statistics, which most AFL clubs have access to, covering large numbers of matches indicate that, if the ball is not marked, it will fall to the front of the pack 80% of the time. The other 20% of the time the ball falls to the back or sides of the pack. Therefore, the best position to be in, if not attempting to mark the ball, is at the front of the pack and facing the pack. In ARF, many players who are not involved in the pack, position themselves at places other than at the front of the pack. Ball players often have to decide whether to make the front of the pack or to adopt another position away from the pack in the hope that one of their teammates will gain possession of the ball and pass it out to them. Often they choose the 'soft option' of staying away from the pack because of the reduced physical demand. The player then need not run quickly over great distances to gain access to the front of the pack or be subjected to strong physical buffeting at the front of the pack in their efforts to be "front and centre". Consistent performance of the front and centre skill over a complete game requires speed to get to the packs, endurance to continue to make the packs throughout a game, physical strength to hold that position against an opponent who also wants to take the same position, agility and timing to be in the right position to crumb the ball when it is available, and appropriate reading of the game to predict where packs will form, and finally the ability to identify the front and centre position of a pack when it forms.

4.2.4 Imagery Program

4.2.4.1 Imagery Sessions

The imagery program included, in the first week, five sessions of approximately 30 minutes duration. In session one, the participant was introduced to the imagery rehearsal concept (as shown in Appendix J). After the introduction in session one, the multi-modal approach to internal imagery was described to the player. This was followed by an assessment of the player's vividness and controllability of imagery for different situations. Players were asked to sit in a relaxed position, close their eyes, and try to image themselves in situations that were verbally described to them (as shown in Appendix K). At the conclusion of listening to each scenario, participants were asked to rate their imagery ability in relation to how vividly they saw themselves, how clearly they heard sounds, how effectively they experienced body movements, and how strongly they felt the emotions of the situation. The participants were encouraged to image the situations internally, that is, as if they were performing the skills, during and after each of the scenarios was read to them. Finally, in session one, the player was given five basic imagery training scenarios that dealt with familiar situations that players had experienced many times in their involvement with the SKFC. This was done to establish, in the players' minds, their ability to image common experiences. These scenarios included, driving into the Waverley car park on match days, walking from the car park to the stadium, approaching the players and officials entrance to Waverley, exchanging pleasantries with the gate person, and reaching the players' change rooms (as shown in Appendix L). Copies of the rating response sheets for vividness and controllability are shown in Appendix M.

Session two continued with the basic imagery training that dealt with the playing arena, seeing the colour and feeling the texture of the grass, and sensing the different surfaces on the field, changing directions on the field, and returning to the change rooms (as shown in Appendix N). Session three introduced imagery of a real match day situation and presented scenarios concerned with waiting to enter the playing arena before the start of a game, entering onto the ground and breaking through the banner, performing the on ground warm up sprints, and experiencing the huddle before taking up individual positions (as shown in Appendix O). Session four dealt with imaging situations that occur during game play, along with the coach's responses to play, including taking the ball and kicking it to advantage, being congratulated by the coach, taking a strong mark, accelerating and deviating, and focussing on the coach's after match address (as shown in Appendix P). In session five, on the morning of the game, the players viewed on video ten examples of their own well-executed positioning in the front of the pack. These were compiled from the first six games of the 1994 season, before baseline measurements had started. After each segment was shown, players had as much time as was required to two times imagine the experience at normal playing speed. (The instructions to the player are shown in

Appendix R). At the end of session five, players completed a response sheet on vividness, controllability and perceived value of the exercise (as shown in Appendix S).

After the first week of the imagery intervention, players participated in three, twenty minute imagery rehearsal sessions each week until the end of the competitive season. In session one, players were asked to complete an imagery rehearsal recapitulation. In this exercise, the player was asked to image five very good front and centres that he made in the previous game. He had to close his eyes and rehearse each of those front and centre examples at normal playing speed. At the completion of each segment, he had to classify the most important attributes of that front and centre from Table 4.1.

Secondly, the player had to try to remember any situations where he should have made the front position but did not. He then had to image himself making the front position in that situation. He was then asked to classify the attributes that he needed to work on to ensure that he made every front position of the pack that was possibly in his range. Finally, he was asked to image practising those attributes in training that week. A copy of this exercise is presented in Appendix S.

Table 4.1

Important Attributes of Front and Centre in Australian Rules Football Games.

. took the ball from the front of the pack.
. hurt (extended cardio-vascularly) yourself to make the front and centre position.
. used physical strength to demand the front position.
. were on your toes in the ready position to move to take the ball if it came your way.
. initially you were out of position but forced yourself into the front position.
. ran from behind the pack to make the front position.
. any other scenario.

The mid-week session required the player to image himself making sure he made the front position in any drills that may have allowed such an action to occur. This was possible because the coach always had a typed running sheet of that session's training activities (as shown in Appendix T). At the end of the imagery session, the player completed an assessment of the session. On a Likert scale, he was asked to evaluate how well he saw, heard sounds, experienced the movements, and felt the emotions of the imaging. Finally, he was asked to assess the value of the exercise, on a 5 point Likert scale ranging from 1 = "extremely worthwhile" to 5 = "not at all worthwhile".

The concluding exercise of the week required the player to watch ten very good front of pack segments of his own that had been compiled from early games of the 1994 season. This was done to help him image ideal front and centre performances in a real game situation, which would also make him aware of the advantages of making the front and centre position of a pack. The player did this on the eve or on the morning of the game. He watched the video at home with clear, written instructions that were to be followed precisely. He was to stop the tape after each segment and to image himself performing this action three times at normal playing speed. The player was asked to complete a response sheet (as shown in Appendix U), at the conclusion of the exercise, as to the length of time that the session took to complete, the adequacy of the time taken and images generated, the speed at which the imagery skills were conducted, and the value of the exercise. The player was asked to make written comments on the value of the whole imagery program and ways of improving it.

As mentioned earlier, throughout the imagery program, participants were asked for written feedback on their feelings about each exercise and the imagery rehearsal program in general. This feedback provided information for reports on the social validation of the research. For the first session, the recapitulation session, the players recorded the important attributes of front and centres they had performed in the previous game. In addition, they recorded aspects of their individual games that they needed to work on to ensure that they made more front and centres in future games. During the mid-week imagery session, the players rated how vividly they were able to image seeing, hearing, smelling, feeling, and experiencing moods and emotions of training situations that were described to them from the coach's training sheet for that evening. A final question of this mid-week session asked that each player rate the value (worth) of the imagery exercise which included,"extremely worthwhile", "very", "somewhat", "a little", "not at all worthwhile". At the conclusion of the pre-game evaluation sheet, three questions were asked. One was for the player to evaluate whether he thought the imagery sessions were assisting his performance. The second was to be completed if there were any ways in which the player felt the exercise could be improved and the third asked for any other comments (as shown in Appendix U). In the final session of the week, the player recorded how long the session took, ways in which the session could have improved his personal performance, and ways in which the player felt the program could be improved. The package described above was introduced to a new player every week for eight weeks until the eight participants were all performing the imagery program.

4.2.4.2 Diary

The participants were asked to enter their reactions to treatment procedures and outcomes in a diary at the completion of every session. This took the form of:

(i) an imagery rehearsal recapitulation of the exercise just participated in

(ii) a section that allowed for comments on the program

(iii) a request for suggestions of ways in which the program might be improved.

4.2.5 Measures

4.2.5.1 Performance Scores

All AFL games in which the SKFC competed during 1994 were video taped by a commercial television station. These videos were loaned for the research by Channel 7. To obtain a score on the front and centre skill for each player, the number of times a player appeared in front position of a pack in a game was summed. As a pack appeared the video was slowed down to enable the researcher to establish if any of the participants appeared in the front of the pack on the video. If the player appeared on the video in front of the pack he was given a score of one (1). After the video of each game was analysed in this way, the number of times each player appeared in the front position on the video was summed for that game. The number of packs that form in a game, and the number of packs that players are able to make in a game varies from game to game, depending on a number of factors, such as position played by a player on that day, the opponent he is playing against, and the size of the arena being played on, so that the number of opportunities to make the front and centre in one game may be much greater than in another game. To account for this, the number of packs that appeared on the video was aggregated for that game, and the number of successful front and centres for each player for each game was presented as a proportion of the total number of packs that formed in each game. More precisely, the player's score for a game was the number of times he made the front position in the game as a proportion of the number of packs that formed during the time that the player was on the ground. Time on the ground was taken into consideration because some players only participated in parts of some games, due to injury, poor form, or tactical substitution. The proportion of front and centres was calculated from the number of packs where the player achieved the front position divided by the number of packs formed while he was on the playing field.

4.2.5.2 Self-Efficacy Ratings

Bandura (1977, 1986) proposed the use of a microanalytic approach for the measurement of self-efficacy and this, according to Bandura, should be achieved by assessing along three dimensions: a) level of self-efficacy, which concerns the individual's expected performance attainment or the number of tasks they can perform, b) strength of self-efficacy, which determines the certainty with which the individual expects successfully to attain each level, and c) generality, which refers to the number of domains in which individuals consider themselves to be efficacious. In the present study, Bandura's (1977) microanalytic technique was modified to measure level and strength of self-efficacy together, following an approach used by Dzewaltowsky (1989). Generality was not measured as only one domain or task was examined. Players were asked to rate how positive they were of attaining the front and centre of packs in a game of Australian Rules Football on a 100 point scale. A zero (0) rating meant that a player was completely certain that he could not make the front and centre position that number of times in a game. A one hundred (100) rating meant that he was completely certain that he could make the front and centre position that number of times in a game.

At the conclusion of each week's video viewing of the ten compiled segments and having completed the response sheet, the players were asked to rate how certain they were of reaching the front and centre position of packs that formed in AFL competitive games. This required them to rate how certain they were, out of one hundred, that they could make the front of a pack a specified number of times in a game. The numbers were 2, 5, 10, 15, 20, 25, 30, and more than 30 times. These numbers were initially established by observing the number of front and centres made by players in games previous to the research period and were checked in a pilot study with coaches and players not participating in the research, to ensure that they covered the range of performance for AFL players and that the steps were sensitive enough to detect changes for players at this level. The certainty ratings for the number of front and centres were then averaged for that rating sheet. The self-efficacy response was conducted at the conclusion of the final imagery session of each week. A copy of the self-efficacy rating sheet is presented in Appendix V. This approach saved participants from completing separate exercises to rate level and strength. The levels which a player felt unable to do at all simply receives a rating of zero strength.

4.2.5.3 Social Validation

In addition to the diary, which was used to record reactions and monitor imagery use, the experimenter was in constant contact with the players and was able to regularly discuss the imagery program with them. Their thoughts and feelings, were recorded on how they perceived the study. Furthermore, observations were made regarding the players' views on having structured, on–

going sessions of imagery training and using imagery rehearsal as a performance enhancement training technique, when most of their previous psychological interventions were usually introductory and "one off" lectures in mental training. Finally, at the end of the study, all participants were asked to evaluate the total program by providing, three responses, regarding ways the program assisted individuals, ways of improving the program, and other comments that the participant wished to make.

4.2.6 Procedure

The coach was approached and informed of the project and agreed to co-operate in the research. He selected eight players to participate in the study. This was agreed to because he wanted to ensure that the team would derive the greatest benefit, if there was to be any improvement in players gaining additional use of the ball. He chose six players who played in an "on ball" role and two others who were asked to play in many different positions often including "on ball" positions. An "on ball" role is played by those players who tend to have a free roaming capacity around all of the playing field. The two utility players were also asked to play tagging roles at times, whereby they would attempt to defensively take an opposition player out of the play by close man-to-man checking, meaning that on those occasions they were unable to take the front and centre position of the pack, unless the player they were tagging took up that position. This became relevant for scoring their performances.

Players were asked for their co-operation in the exercise. They were informed of the nature of the study. They were told they were free to withdraw at any time and that their data would be confidential. Then they were asked to sign a consent form agreeing to participate in the research. Detailed instructions were withheld until each player was introduced to the intervention. Each player was randomly assigned, by the researcher, to one of the multiple-baseline intervention dates. A new player was introduced to the multiple-baseline schedule every Monday until the third last game of the season as shown in Figure 4.1. The imagery intervention package was identical for all participants. The program commenced with five sessions in week one and three sessions per week for the remainder of the competitive season as described in the treatment section (4.2.4).

On their first night, players were asked to complete a self efficacy rating on how confident they were about the number of times they could make the front of a pack in a game. When they had completed this self-efficacy rating they were provided with an extensive diary, in which every session was included. Players were asked not to divulge the contents of the exercise or the diary to other players. In the first week of the imagery intervention period there were five sessions. First, there was an introductory session, which dealt with explaining the concept of imagery rehearsal. In addition, players rated vividness and controllability of their imagery in situations that were described (as explained in section 4.2.4.3). Session 2 continued with basic imagery training that was aligned to a football environment. Session 3, on the third night, introduced imagery training based on real match day situations that occur before the game commences. Session 4, dealt with situations that typically occur during play and also during the intervals when the coach addresses the players. Session 5 was conducted on the morning of the game at the player's home. Players viewed front and centre situations from previous games that had been compiled on video tape, and then imaged each situation. The content of all sessions is described in detail in section 4.2.4.1.

After the introductory week of the imagery intervention, players participated in three twenty minute imagery rehearsal sessions each week until the end of the competitive season. These were usually conducted before normal training on Monday and Wednesday evenings with the third being held on Saturday mornings. Exceptions to this schedule were when players had Sunday matches. They then had imagery sessions on Tuesday and Thursday evenings and Sunday mornings. In session one, players were asked to complete an imagery rehearsal recapitulation on front and centre performances from the previous game. They were then asked to recall instances when they could have made a front and centre but did not, and, finally, to image performing these situations as front and centres. The mid-week session required players to image themselves making sure they made the front position in any drills that were to be employed at training that evening. The concluding exercise of the week required players to watch, on the eve or on the morning of the game, ten very good front of pack segments which that player had performed and that had been compiled from early games of the 1994 season. They were instructed to stop the tape after each segment and to image themselves performing this action three times at normal playing speed. Players were asked to complete a response sheet at the conclusion of each session, commenting on the time that the session took, the adequacy of the time taken, the speed at which the imagery skills were conducted, and the value of the exercise.

4.3 Results

4.3.1 Front and Centres

Individual percentage performance per game was calculated as described in the Performance subsection 4.2.5.2 of the Measures section. The percentages of successful front and centres for each individual, were averaged for each of the baseline and treatment periods, and these percentages are presented in Table 4.2. These averages are based on different numbers of games for each player because of the staggered introduction to the treatment.

Table 4.2 illustrates that the mean percentages for front and centres for all players are greater in the treatment period than in the baseline period. This suggests that the imagery rehearsal intervention had an impact upon performance in the treatment period for all players. It should be noted that there is a large variation in the individual percentage means in both the baseline (8.1 - 26.8) and treatment (15 - 36.36) periods. This variation can be largely attributed to the nature of the positions assigned to players, and the opportunities players had to be in the front and centre position. For example, player 1 predominantly plays on the ball, and he is exposed to the packs more regularly than player 5 who is sometimes given a "tagging" role.

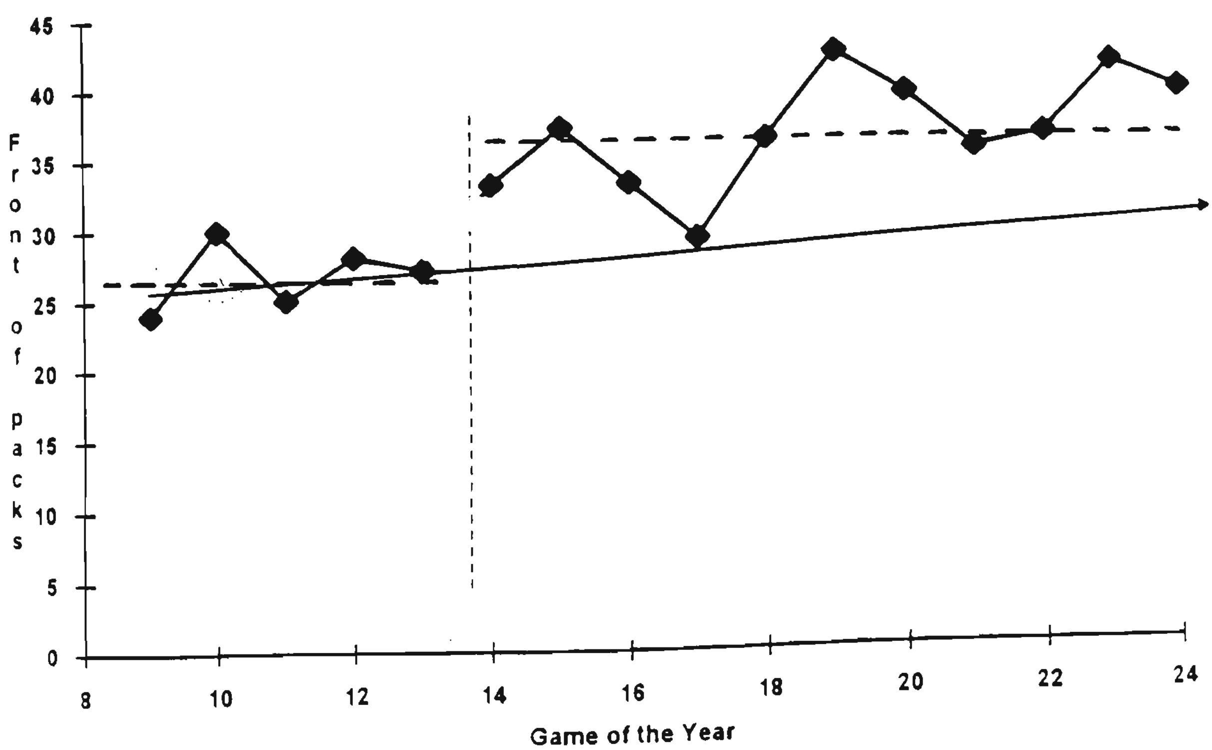
Table 4.2

Means and Standard Deviations for Front and Centres for Baseline and Treatment Periods

Subject	Baseline Percentage Mean F&C	SD	Treatment Percentage Mean F&C	SD	Difference +/-
1	26.80	2.38	36.36	3.82	+9.56
2	8.10	1.87	15.00	5.59	+6.90
3	11.60	2.07	16.00	3.96	+4.40
4	18.10	3.18	25.00	12.34	+6.90
5	10.20	1.48	17.50	5.13	+7.30
6	14.00	3.77	23.30	3.50	+9.30
7	18.60	3.54	25.50	2.94	+6.90
8	10.80	4.79	21.00	3.00	+10.20

With respect to the total levels for all players, it should be noted that these represent underestimates. No player can reasonably be expected to make all front and centres in a whole game. There will always be times, because of the flow of play, when a player is too far away. Deciding which pack a player should have reached, brings in a subjective judgement. The approach adopted here of including all potential front and centre situations in that game, relies on an objective score. For each player, it includes some packs that would not have been possible for that player to reach, thus, underestimating percentage success. At the same time, it allows within participant comparisons for all games in the baseline and treatment periods.

Individual player percentage game front and centres were plotted graphically for each player as shown in Figures 4.2 to 4.9. The results for player 1 were graphed and they are shown in Figure 4.2. There was an immediate rise in the percentage of front and centres reached after the imagery rehearsal was introduced (27% to 33%). Apart from the game in week 9 of the program (29%), which is still above the baseline mean, there is a clear and consistent improvement in the number of times that player 1 was able to make the front position of the pack, for the rest of the 1994 competitive season. It should be noted that the variability in scores is greater in the treatment scores than in the baseline scores.



$p < .001$

Figure 4.2. **Percentage of front positions attained for player 1.**

The results for player 2 were graphed and they are shown in Figure 4.3. Immediately after the imagery rehearsal was introduced, player 2 missed the next two games through injury. There is, however, a substantial elevation in front and centre performance (24%) in week 17, the first week of treatment results. Apart from one low score in week 18, player 2 was able to maintain his ability to make a higher percentage of front and centres (15%–24%), compared to the baseline period (5%–10%). The very large jump from week 14 to week 17 does suggest the influence of an extraneous variable, perhaps motivational, along with a genuine imagery effect, which appears to be sustained in weeks 20, 21, and 24.

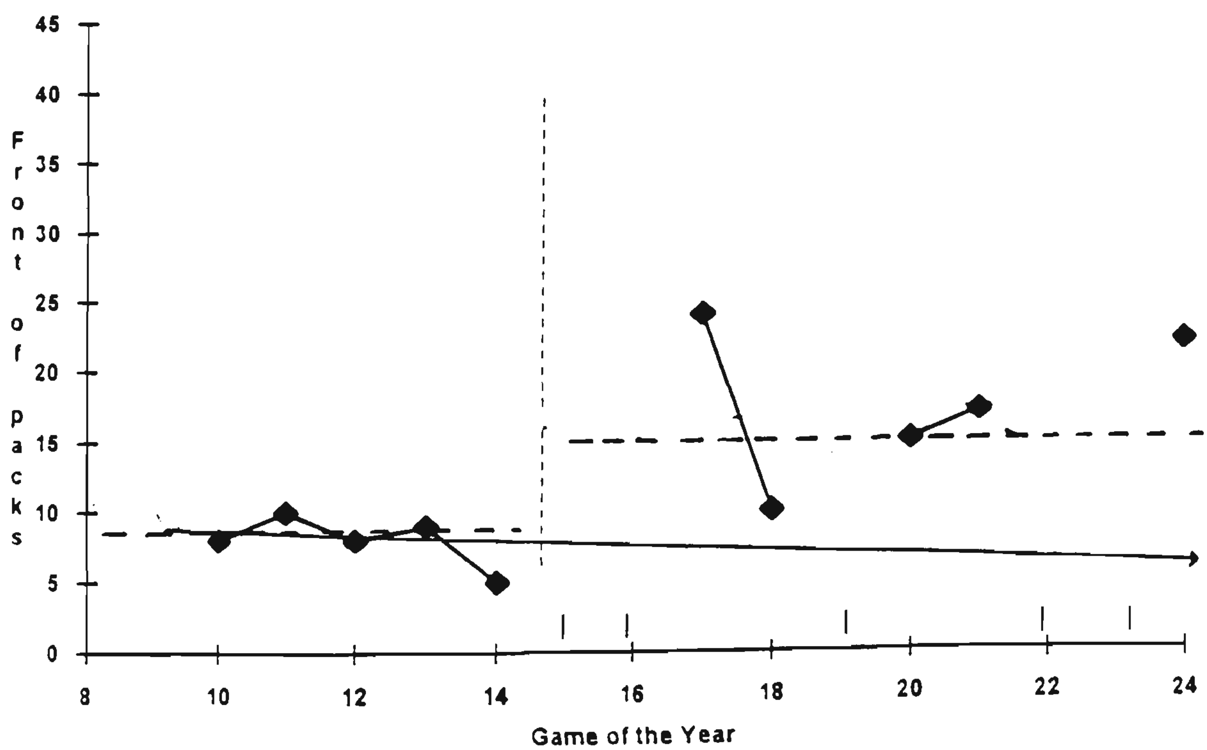
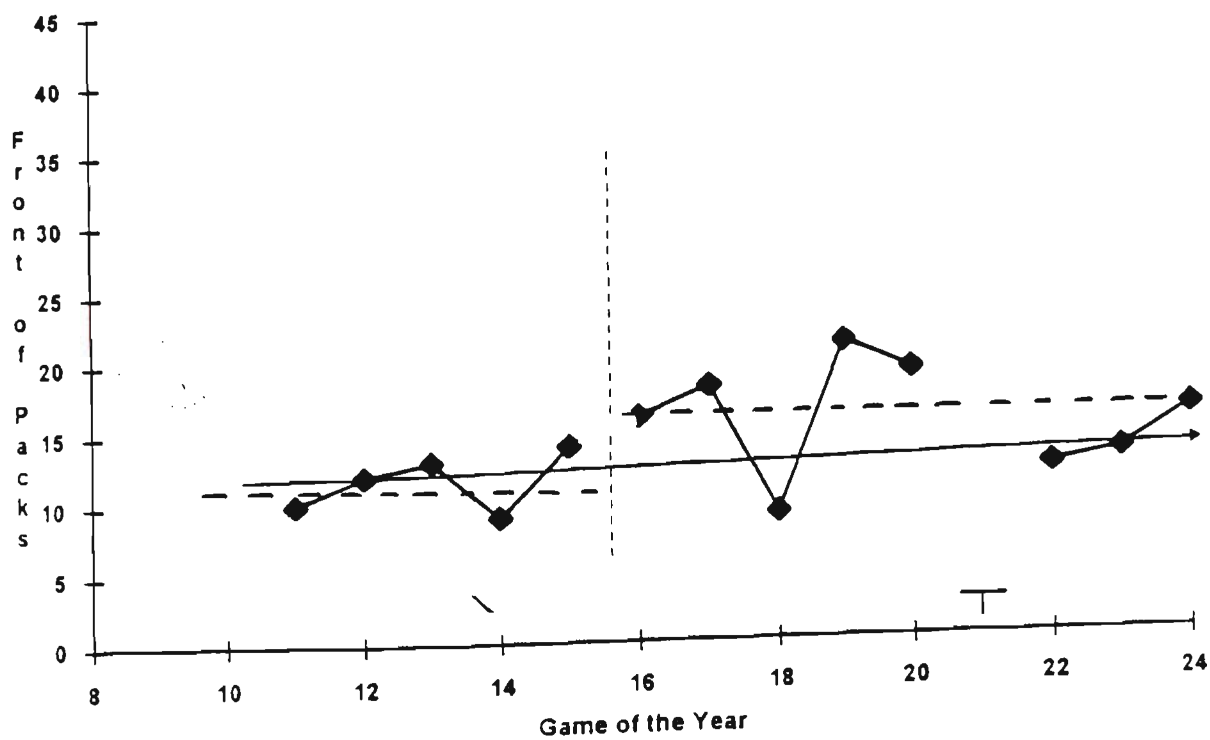


Figure 4.3. **Percentage of front positions attained for player 2.**

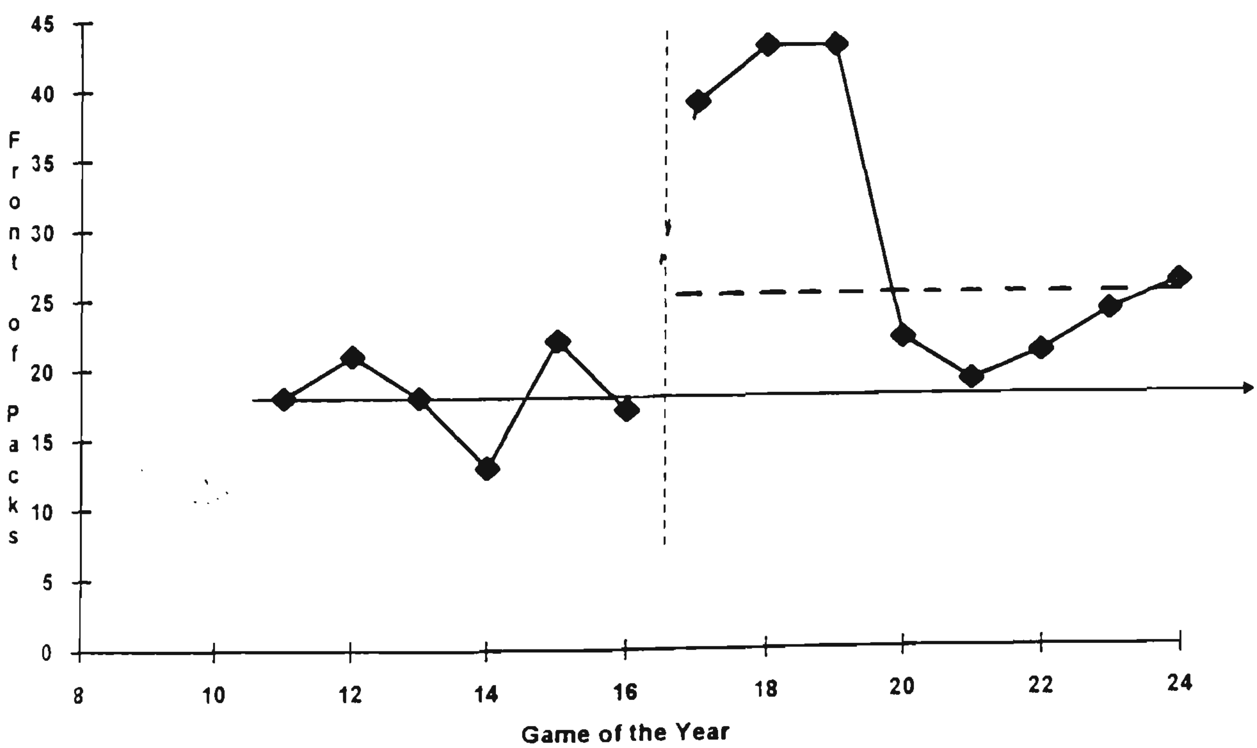
The results for player 3 were graphed and they are shown in Figure 4.4. There were two distinct sets of front and centre performances in the treatment period. There was an immediate rise in the percentage of front and centres after the imagery rehearsal was introduced and this was maintained for four weeks, 16, 17, 19, and 20 (16% to 21%), except for the third week (week 18) after commencement of the imagery intervention (9%). Scoring was not considered in week 21 because player 3 was given the sole role of 'tagging' an opponent which meant he had to sacrifice his usual game play in order to stop his opponent. After the tagging role, there followed a drop in front and centres for the next game (12%), but the pattern for that game and the next two, the last two games of the 1994 season shows a positive trend (12%, 13%, and 16%)



$p < .05$

Figure 4.4. Percentage of front positions attained for player 3.

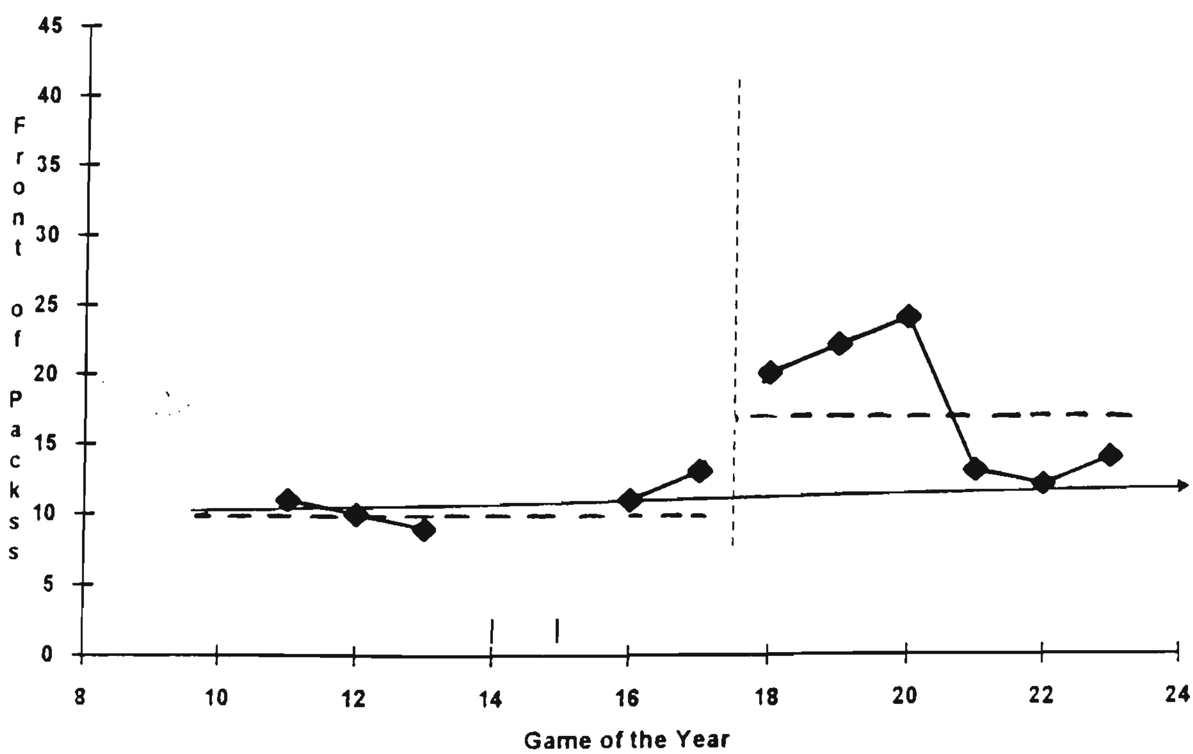
The results for player 4 were graphed and they are shown in Figure 4.5. There were two distinct sets of front and centre performances in the treatment period. There is an immediate and very substantial rise in the percentage of front and centres after the imagery rehearsal was introduced and this was maintained for three weeks, games 17, 18, and 19 (39%, 43%, 43%). For the remaining five games of the season, the percentage of front and centres per game dropped substantially (19%–26%), but showed a level which was still above the average for the baseline period (18.1%) and where an upward trend for improved performance was shown (19%, 21%, 24%, and 26%).



$p < .01$

Figure 4.5. **Percentage of front positions attained for player 4.**

The results for player 5 were graphed and they are shown in Figure 4.6. There were two distinct sets of front and centre performances in the treatment period. There was an immediate and very substantial rise in the percentage of front and centres after the imagery rehearsal was introduced and this was maintained for three weeks, games 18, 19, and 20 (20%, 22%, 24%). In the last three games of the season, the percentage of front and centres per game declined substantially, but the skill was performed at a consistent level (13%, 12%, 14%), and was still above the average for the baseline period (10.2%). Player 5 was injured for the final game of the year.



$p < .01$

Figure 4.6. **Percentage of front positions attained for player 5.**

The results for player 6 were graphed and they are shown in Figure 4.7. In the initial four weeks of the baseline score there was a considerable decline in scores, games 12, 13, 14, and 15 (22%–10%), this, however, was followed by a final two weeks, games 17 and 18, of balanced baseline scores (16% & 17%). An immediate and consistent rise in the percentage of front and centres performed per game, was observed, after the imagery rehearsal was introduced (19%–29%), for four games, 19, 20, 21, and 22. There was a slight deterioration in the final two front and centre scores of the year, games 23 and 24 (25% and 24%). These two scores, as seen in Figure 4.7 are still higher than all other scores except for game 22 (29%).

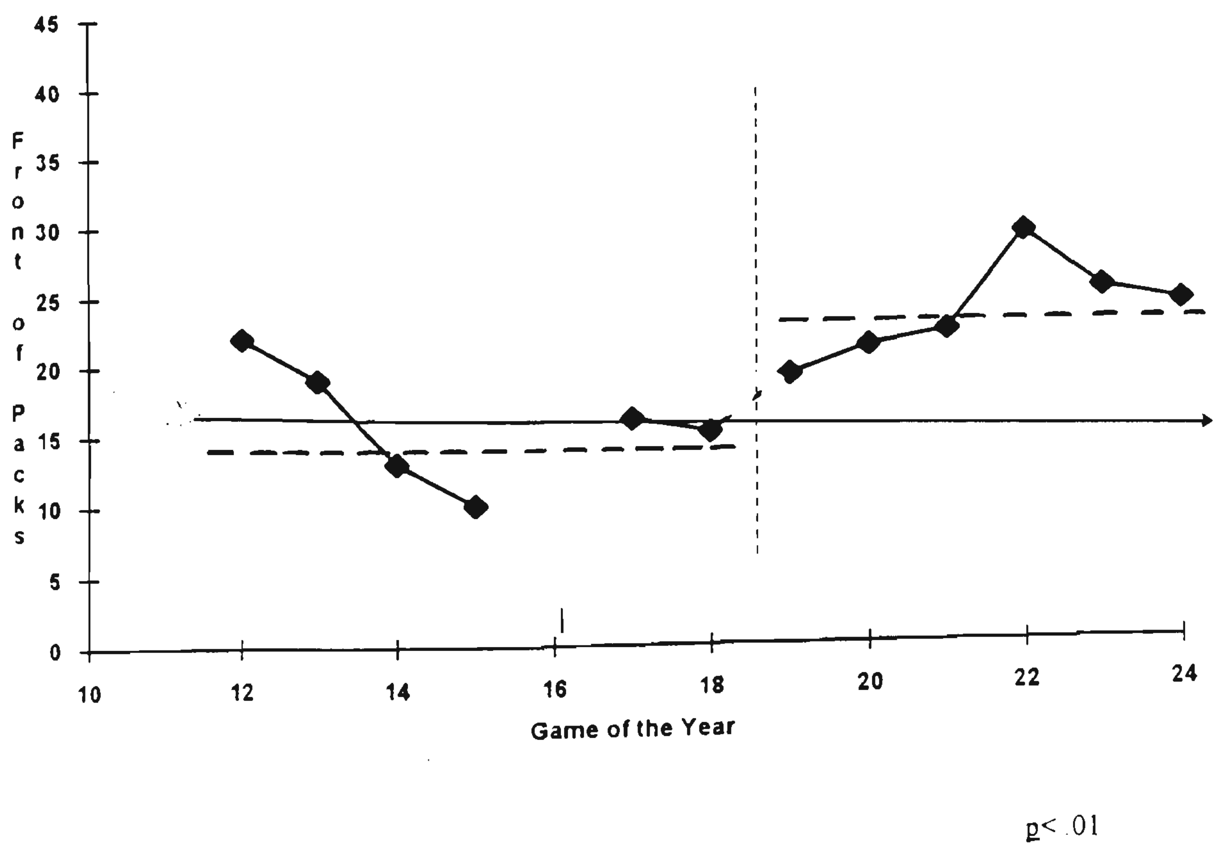


Figure 4.7. Percentage of front positions attained for player 6.

The results for player 7 were graphed and they are shown in Figure 4.8. There were moderate fluctuations in the baseline period. Because there was a long baseline period for this player, a trend can still be detected. This baseline period was followed by an immediate, improvement for game 21, in the performance of front and centres after the treatment was introduced. This was followed by an upward trend in the percentage of front and centres performed per game, in the treatment period (21%–28%) until the completion of the 1994 competitive season.

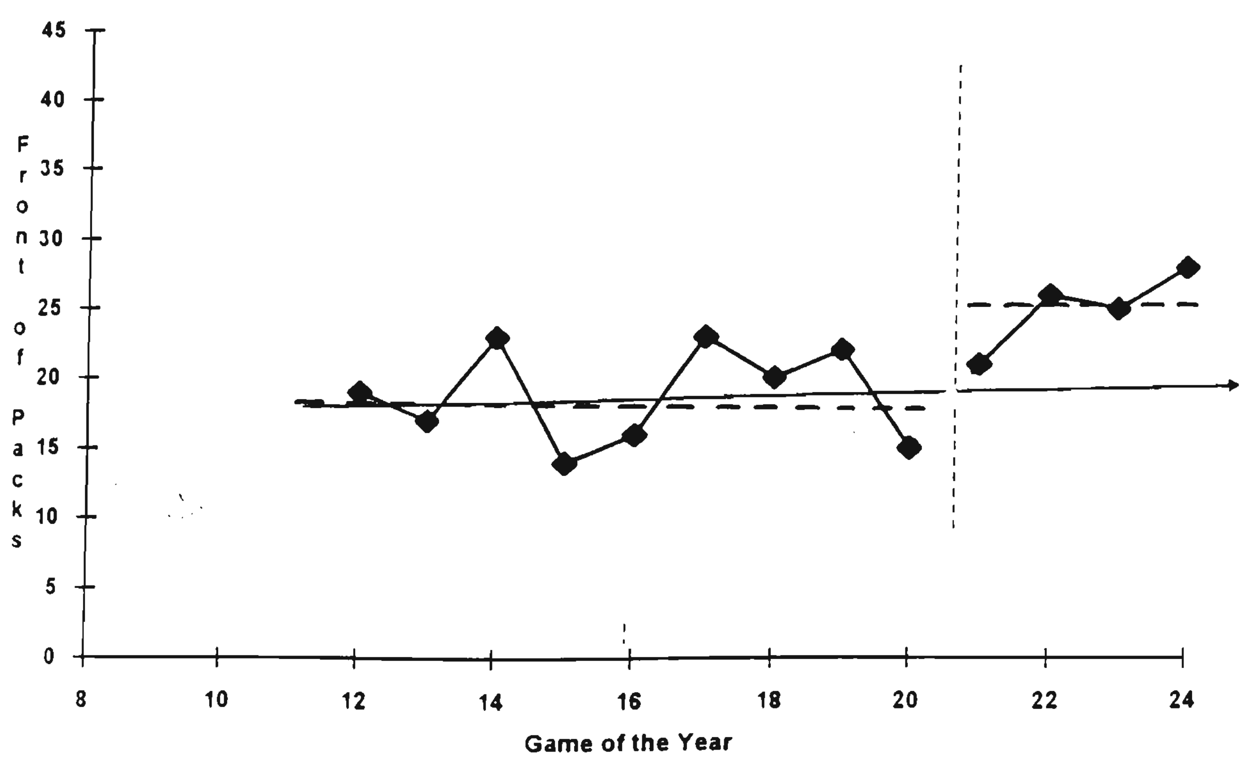


Figure 4.8. Percentage of front positions attained for player 7.

The results for player 8 were graphed and they are shown in Figure 4.9. Except for a score of 18% in the 16th week, it can be seen in Figure 4.9, that, of the baseline scores recorded, there were four reasonably stable baseline period scores, for games 12, 13, 17, and 21 (7%, 8%, 9% and 12%). Player eight missed five games in the baseline period due to injury (i.e., weeks 14, 15, 18, 19, and 20). Consequently, it was difficult to establish a truly representative celeration line. The baseline period was followed by an immediate improvement in the performance of front and centres after the treatment was introduced. The very large jump in week 22 does suggest the influence of an extraneous variable, perhaps motivational, along with a genuine imagery effect. A higher level of performance was consistently maintained for the remaining two games of the competitive season (18%–24%).

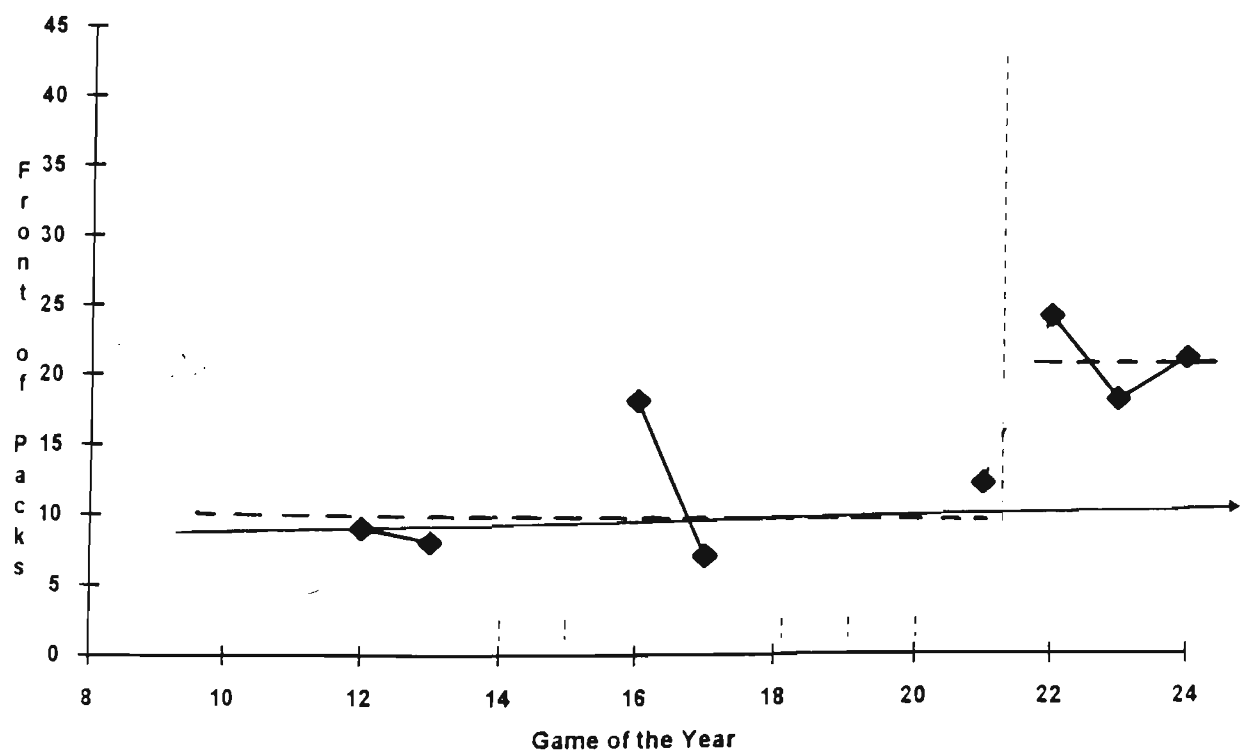


Figure 4.9. **Percentage of front positions attained for Player 8.**

Figures 4.2–4.9 display the graphed results for all players. Players 1, 2, 6, 7, and 8 show a clear and sustained improvement in performance during the treatment phase, with all scores in the treatment phase being above their baseline means. The results for players 4 and 5 display an immediate and substantial elevation of treatment scores for three weeks followed by a fall in scores. The last few games show a level of front and centre performance above the baseline mean, but below the scores of the first three weeks of the treatment. The results for player 3 show an immediate elevation of scores for a two week period (16%, 18%) followed by a large one week fall (9%), with an even higher elevation of scores for a further two weeks (21%, 19%). Week 22 shows another fall (12%) followed by another increase (13% & 16%) in the remaining two weeks of the 1994 season. Compared with baseline period, the treatment period for player 3 represents an improvement. It must be noted, however, that the last baseline data points for players 3, 5, and 8 showed an upward trend which could suggest that some other influence may have contributed to the intervention improved scores as well as the imagery.

The split middle technique (Kazdin 1972) was employed as an inferential test of the hypothesis that the improvements were not due to chance. The rationale underlying this test was described in section 3.3 of Chapter 3. In this procedure, the medians were determined for each half of the baseline period for each player. A trend line was drawn by placing these medians at the 25th & 75th percentile points of the baseline period and connecting these points with a straight line. The line was extrapolated through the treatment period. The median split trend line is shown on the graph of each participant's game by game front and centre performance in Figures 4.2–4.9. The number of points during the treatment phase that were above the trend line was noted, along with the total treatment data points. From these two values, the probability of the number of points above the trend line occurring by chance was determined from a table of values of the binomial distribution for each of the eight participants, using a significance level of p=.05. As was explained in section 3.3 Chapter 3 because of fewer than five treatment period data points for players seven and eight the split middle technique can not be used. Probabilities for all other participants, where applicable, are noted below the individual graphs in Figures 4.2–4.9. This evidence clearly supports the results of study one that an imagery rehearsal intervention has a positive effect on the performance of an open skill in the real competitive setting of elite sport, also supporting the hypothesis that imagery rehearsal would enhance the performance of the front and centre skill in Australian Rules Football.

4.3.2 Self–Efficacy

Each player's self–efficacy was established for making the front position of a pack in each game. Players were asked to rate how confident they were in their ability to make the front of a pack from two times through to more than 30 times per game, as described in section 4.2.4. The baseline self–efficacy rating was conducted at the first session prior to each player's introduction to the imagery rehearsal intervention program. This was because it was not possible to identify the players who would participate, until they were selected just before the treatment started. Subsequent self–efficacy ratings were conducted at the completion of the Saturday morning or pre–game component of the intervention program every week until the end of the season. Table 4.3 shows that mean treatment self-efficacy scores were higher than baseline self-efficacy scores for all participants.

Table 4.3

Mean Treatment Self-Efficacy Ratings Compared to Baseline Self-Efficacy Ratings

Subject	Baseline Mean	Treatment Mean	Difference +/-
1	58.6	72.1	13.5
2	46.8	67.4	20.6
3	48.4	56.2	7.8
4	69.6	74.2	4.6
5	52.8	57.4	4.6
6	59.8	72.9	13.1
7	60.1	63.9	3.8
8	55.0	62.4	7.4

Self-efficacy scores for each player throughout the extent of their involvement in the program were plotted graphically as shown in Figures 4.10 to 4.17. Improved ratings are noticeable for all eight players, with all scores being higher than the initial, pre-treatment self-efficacy rating. The self-efficacy ratings for player 1 were graphed and they are shown in Figure 4.10. The baseline self-efficacy rating is below any rating made during the treatment period. There is one fall in self-efficacy rating before game 18 (72.3 - 62.8). Nonetheless, there is a gradual trend for improved self-efficacy until week 20 (66.3 - 76.6), with a slight fall in week 21 (72.3) and a gradual increase to week 24 (76.6), These changes in self-efficacy ratings are minimal, but sustain a level well above the baseline rating. Self-efficacy ratings tend to plateau for the last six games.

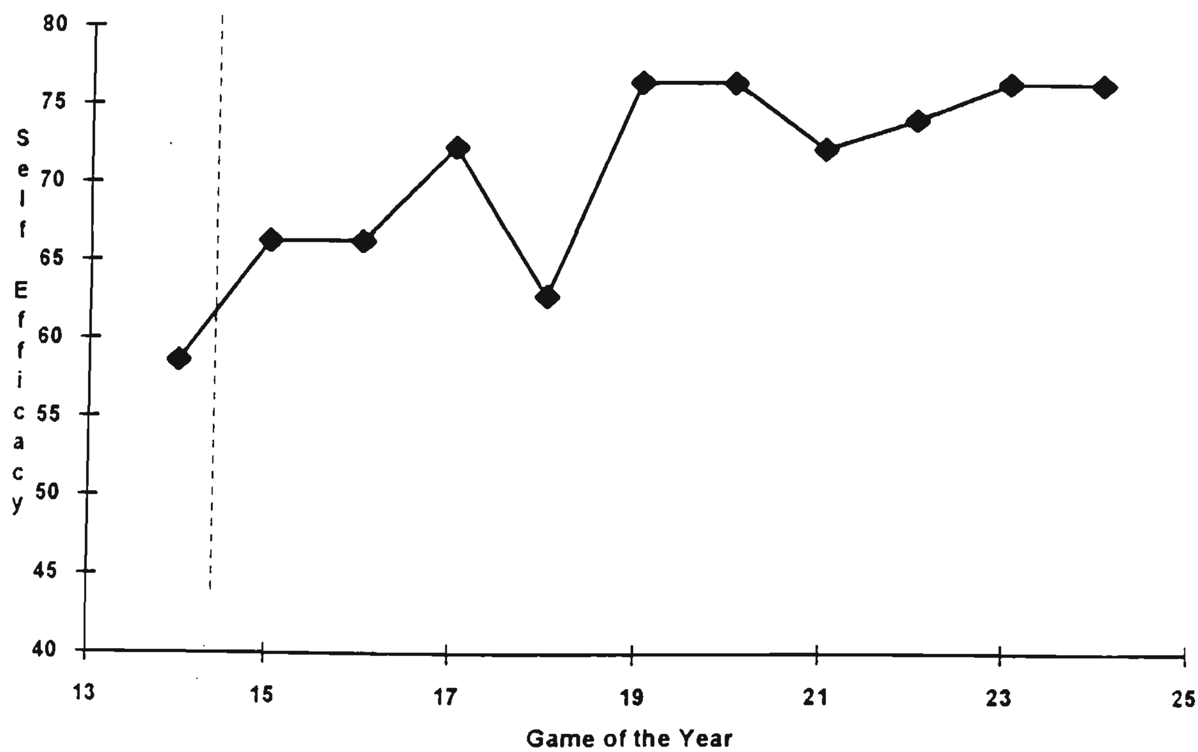


__Figure 4.10.__ **Self-efficacy ratings attained for player 1.**

The self-efficacy ratings for player 2 were graphed and they are shown in Figure 4.11. It can be seen in Figure 4.11, that the baseline self-efficacy rating is below any rating made during the treatment period. There is a minimal but slight fall in self-efficacy ratings for weeks 20 to 22 (59.6) yet they are still considerably above the baseline score (48). The self-efficacy rating rises again to 62.4 for weeks 23 and 24.

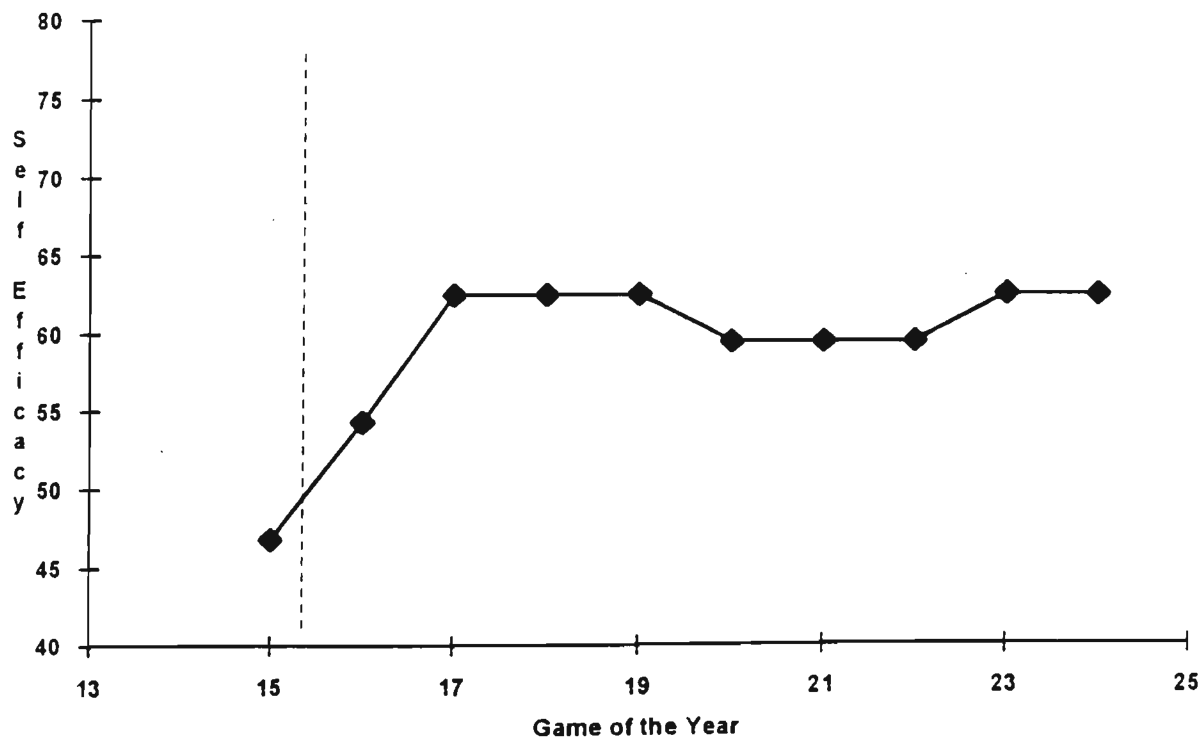


Figure 4.11. **Self-efficacy ratings attained for player 2.**

The self-efficacy ratings for player 3 were graphed and they are shown in Figure 4.12. The baseline self-efficacy rating is below any rating made during the treatment period. There is a slight fall in self-efficacy ratings to 56.3 in weeks 20 and 21, followed by a rise again in week 22 (58.8), and in the final two weeks 23 and 24 a fall in self-efficacy rating to 54.3. Nevertheless, the ratings remain substantially above the baseline rating.

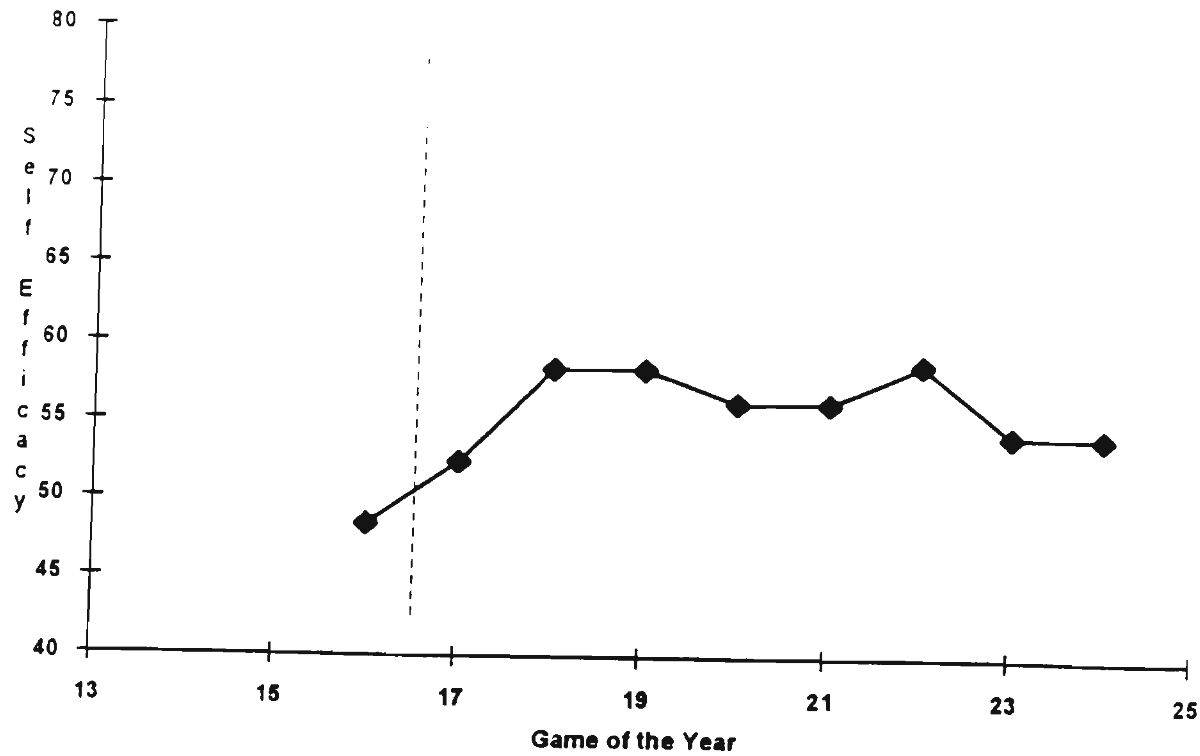


Figure 4.12. **Self-efficacy ratings attained for player 3.**

The self-efficacy ratings for player 4 were graphed and they are shown in Figure 4.13. The baseline self-efficacy rating is below any rating made during the treatment period. It needs to be noted that, the initial treatment period elevated self-efficacy rating is not maintained for weeks 21 to 23 (71, 71, & 71), but increases again for the last game of the year (74.3). The pattern of this graph suggests an initial motivational effect, followed by a temporary decline to a level a little above baseline, and finally a trend for enhanced self-efficacy.

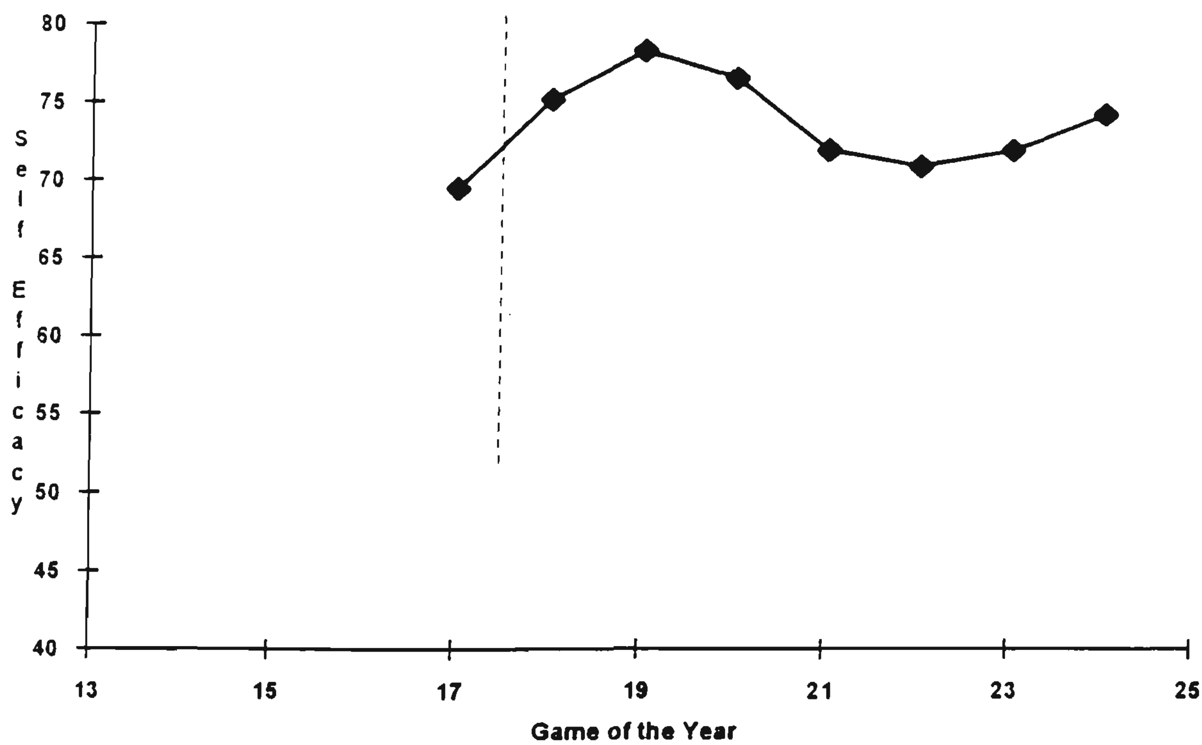


Figure 4.13. **Self-efficacy ratings attained for player 4.**

The self-efficacy ratings for player 5 were graphed and they are shown in Figure 4.14. The baseline self-efficacy rating is below any rating made during the treatment period. The treatment self-efficacy ratings rise to 60.6 in weeks 20 and 21 and stabilise at 56.3 for the remaining three games of the season. As for player 5, the pattern shown in this graph suggests a potential motivational effect, which stabilises at a level midway between baseline and the peak of the self-efficacy scores.

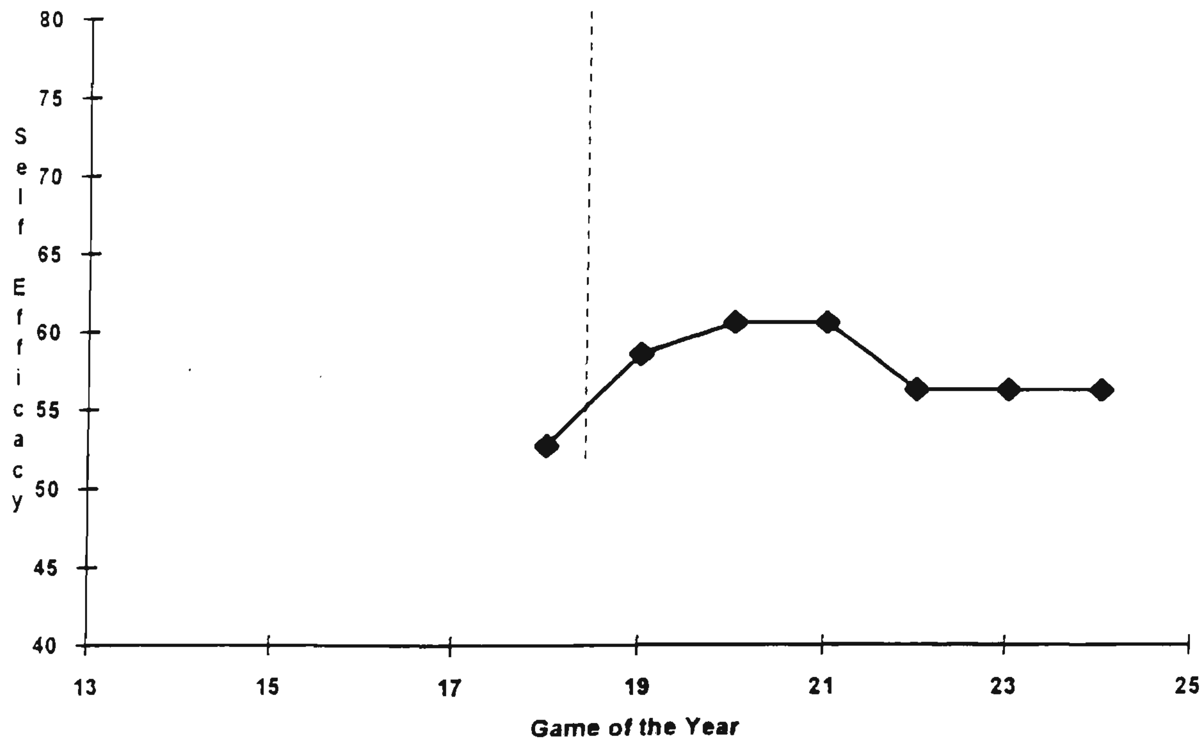


Figure 4.14 Self-efficacy ratings attained for player 5.

The self–efficacy ratings for player 6 were graphed and they are shown in Figure 4.15. The baseline self–efficacy rating is below any rating made during the treatment period. There is a substantial initial rise in self–efficacy rating immediately after imagery is introduced (59.8 to 70.65). This trend of a rise in self–efficacy rating is maintained for another week, game 21 (74.5), followed by a maintenance of that rating for the remainder of the 1994 season.

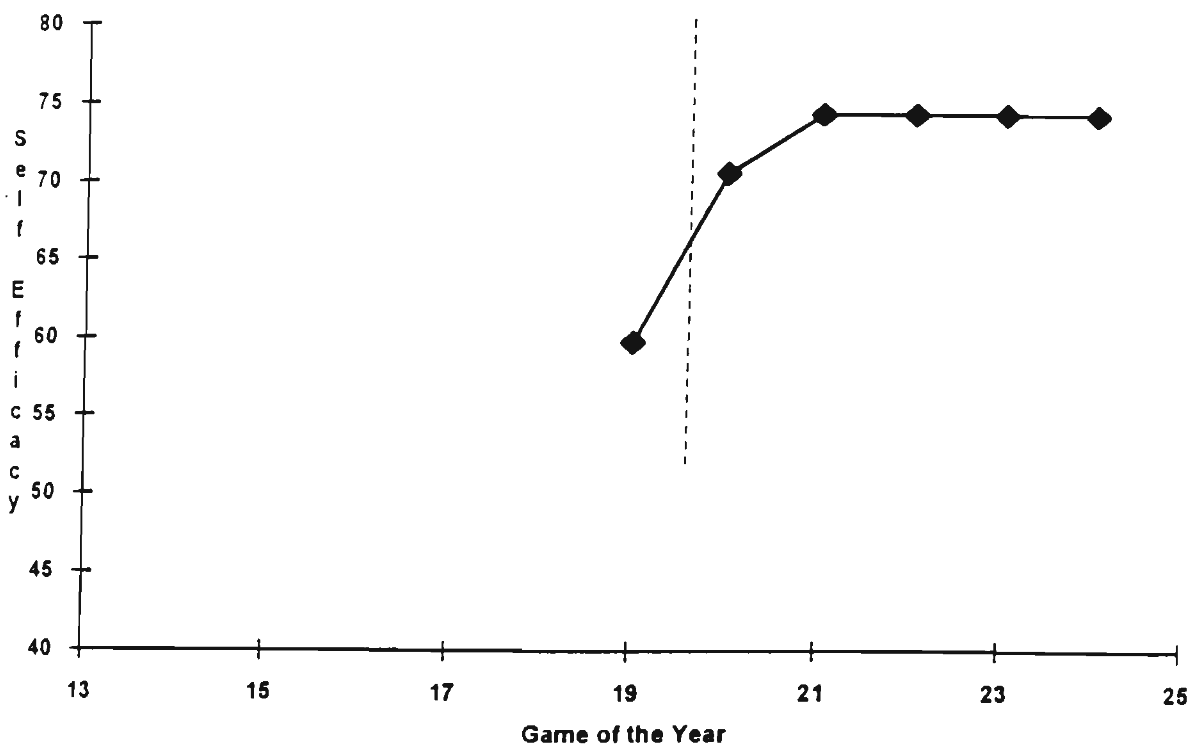


Figure 4.15. **Self-efficacy ratings attained for player 6.**

The self-efficacy ratings for player 7 were graphed and they are shown in Figure 4.16. The baseline self-efficacy rating is below any rating made during the treatment period. The treatment self-efficacy ratings rise from 62.3 in week 22 to 64.7 in week 24.

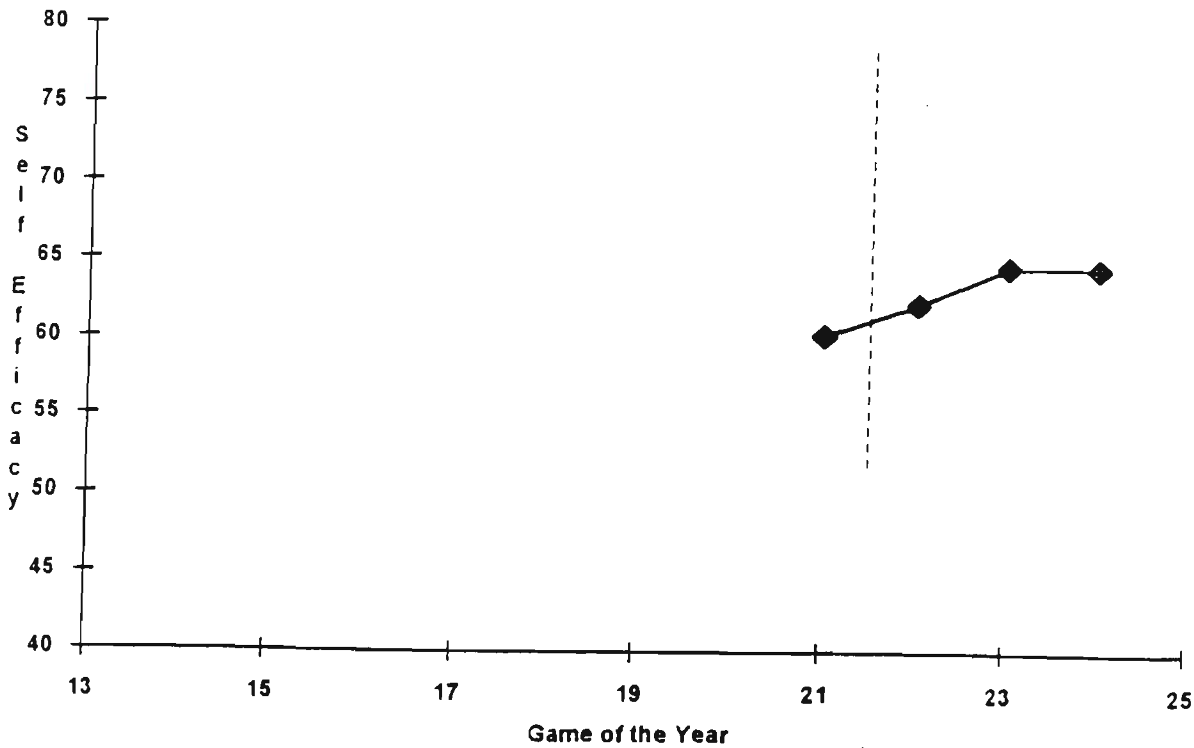


Figure 4.16. **Self-efficacy ratings attained for player 7.**

The self-efficacy ratings for player 8 were graphed and they are shown in Figure 4.17. The baseline self-efficacy rating is below any rating made during the treatment period. The treatment self-efficacy ratings rise in the two weeks of the treatment period from the baseline self-efficacy rating (55.0 – 62.4). This is very limited data, with only three weeks of self-efficacy ratings to consider.

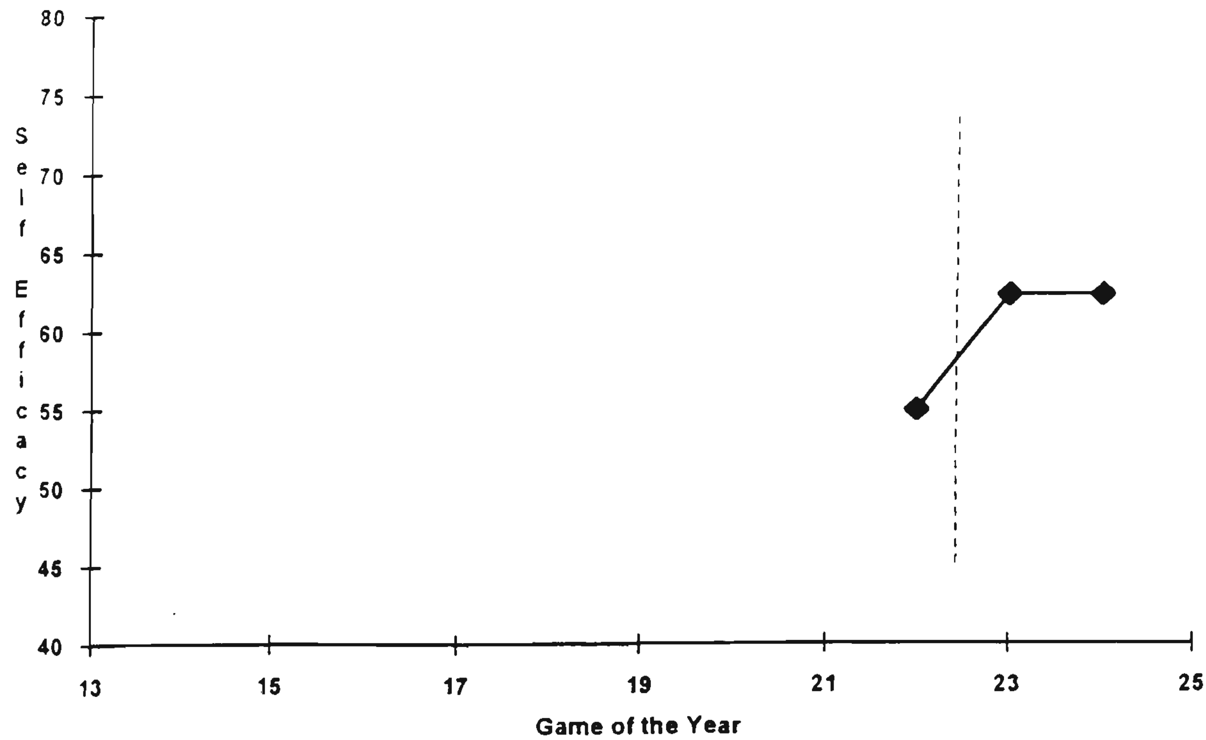


Figure 4.17. **Self-efficacy ratings attained for player 8.**

The self-efficacy results, as depicted in the graphs, for players 2, 6, 7, and 8 (Figures 4.12, 4.16, 4.17 & 4.18 respectively) show a clear upward trend immediately after the imagery rehearsal intervention was introduced, and maintenance of that rise for the remainder of the season. Players 1, 3, 4, and 5 (Figures 4.11, 4.13, 4.14, and 4.15 respectively) also exhibit an initial rise in self-efficacy at the introduction of the imagery rehearsal intervention. The figures for these players do display stages when the self-efficacy ratings drop. These falls, however, are minimal and never at any stage, or for any player, was there a treatment self-efficacy rating that fell to the baseline level for that player.

A split middle analysis was conducted for the front and centre performance. This type of analysis was not conducted on the self-efficacy ratings, because of insufficient baseline ratings from which to calculate celeration or projection lines. Nevertheless, it is clear on observing the self-efficacy data for all individuals that self-efficacy ratings did increase after the imagery treatment.

4.3.3 Social Validation

The players in this study were also asked to comment on their reactions to treatment procedures and outcomes in two ways. Each player was asked to complete a social validation questionnaire anonymously on completion of the study. This was in addition to the log of reactions to the treatment completed by the participants whenever they had done a session during the program. Examination of comments made during and after the season indicated that all the participants generally appreciated the program and felt that the intervention procedures used were helpful and worthwhile. Examples of such comments were " By imaging and focussing on front and centres has helped me gain more front of pack positions in the games", "Not only am I making more front and centres in the games, I'm also getting more possession of the ball". "The imaging has helped me mentally prepare for other aspects of my game as well". Not all comments were favourable, but, the negative ones were few in number. An example was "I'm really struggling to get a kick let alone image front and centres on a Saturday morning." Nevertheless, all players agreed that they would like to continue with the program and to apply imagery rehearsal to other aspects of their individual games. The social validation seemed to suggest that players felt more confident in attempting to position themselves at the front of a pack as a result of the imagery intervention, thus supporting the patterns seen in the self-efficacy assessment using Bandura's microanalytic approach.

4.4 Discussion and Conclusions

The results of this single-case, multiple-baseline study supported the first prediction. Practice of an imagery program enhanced the performance of positioning oneself at the front of the pack for each of the eight players. The results, which support those found in study 1 in terms of the positive effect of imagery on performance, continue to be very encouraging for the use of imagery in several ways. First, they support previous research that suggested imagery is an effective intervention for improving the performance of skills (e.g., Kendall et al.,1990; Kolonay, 1977; McKenzie & Howe, 1991; Weinberg et al., 1979). In the Kendall et al. (1990) study there were a combination of variables, that is, relaxation and self-talk as well as imagery. The single most important influence in the present study was the introduction of the imagery intervention, and no other controlled independent variables were considered. Second, the results demonstrated that a single-case, multiple-baseline design can be an effective research method in the real competitive situation, as advocated by Bryan (1987). Third, the research demonstrated that it is possible to conduct this kind of study on open skills in competition. Fourth, it is clear that players' self-efficacy ratings improved with the introduction of the imagery rehearsal intervention, supporting the second prediction. The actual increase in the number of occasions that players were able to achieve making the front and centre position of packs in games could have been due to performance accomplishment which supported imagery in enhancing self-efficacy. This is inconclusive, however, because the study was unable to isolate imagery as the only source of efficacy information. The self-efficacy trends for players three and five showed a slight drop from their highest levels, by the end of the program, but these slight falls still left self-efficacy well above baseline levels. Furthermore, that slight deterioration in self-efficacy rating for players three and five tended to level out, as can be seen in Figures 4.12 and 4.14.

It is important to compare and contrast the results of this study with theories and the results of previous studies from three perspectives, the influence of imagery on performance, the influence of imagery on self-efficacy, and the relationship between imagery, self-efficacy, and performance. Firstly, this study supported the results of the first study and findings of other research that imagery would impact positively on final performance (Feltz, 1982, 1992; Garcia & King, 1991; George; 1994; McAuley, 1985, 1993; Martin & Gill, 1991; Suinn,1987). Secondly, this study supported and confirmed the social validation comments of study 1, finding that imagery did positively influence self-efficacy which also supported findings from earlier studies (Feltz, 1988a; Feltz & Riessinger, 1990; Gould etal., 1981; Highlen & Bennett, 1979, 1983; Mahoney & Avener 1977; Martin & Hall, 1995). While there was only one baseline score for self-efficacy, the consistent, substantial increases in self-efficacy from baseline throughout treatment, give confidence that it is a genuine effect. Third, while this study adds to mounting evidence that imagery can enhance self-efficacy, as well as performance (Feltz & Riessinger, 1990: Lee, 1990), it does not help to resolve the causal relationships between imagery, self-efficacy, and performance. The results provide further support for the need to study these causal links directly.

Statistical significance is important in research, however, sometimes in the pursuit of statistical significance, two problems could be inadvertently introduced from an applied perspective. Firstly, grouped data from traditional research, which compares an experimental and control group, can obscure effects for individuals, and, secondly, effects of an intervention can have practical value while not showing statistical significance. This is especially important at the elite level of sport, where players are already performing at a very high level or have reached a ceiling in performance, whereby even the smallest of improvements may be enough to influence the result of a competition, but not show a significance from a statistical perspective. The advantage of the single-case, multiple-baseline research design is that the practitioner is able to note significant practical effects for some participants, while others show no change or even portray negative performance results. Where other variables, particularly personal variables have been measured, that the researcher can explore reasons for the selective effectiveness of the intervention.

The results also support the use of social validation techniques in field research. Through written and verbal feedback, the players expressed extremely positive statements about the imagery intervention and observed that they gained in confidence as they used the imagery techniques. All players agreed that they would like to continue the program and to apply imagery rehearsal to other aspects of their individual games. At the same time, the results do not appear to be wholly motivational in nature. Dworetzky (1982) argues that any influence of the Hawthorne Effect is typically shortlived, so an immediate improvement in performance would be observed after an intervention is introduced, but this increase in performance would not be maintained. In the present study, the results did show large initial effects when the intervention was introduced, for most players. For a few players improvements in performance were not maintained. For those, whose performance declined from the high early intervention scores, performance generally stabilised at a level which was still higher than for baseline scores. The most likely explanation is that motivational and imagery effects both operated. The motivational effects were reflected in those high initial performance scores on introduction of the intervention, combined with some genuine effects of imagery. The players' performance later in the intervention phase, often at a level between baseline and early intervention scores, probably reflected the effects of the imagery program, once the motivational influence had dissipated.

In real competition, at the elite level, studying real performance behaviours, and trying to control for some motivational influence, it is always going to be difficult to eliminate Hawthorne effects completely. These performers, however, are highly paid professional athletes who, it could be suggested, are trying their hardest all the times, because as professional athletes their payments are determined by successful on field performance This issue must be considered when conducting such studies, especially at lesser levels of competition, and ways must be sought to endeavour to control for such influences.

Many studies involve short time duration, especially after a treatment has been introduced. Maintaining research observations over a longer time period, as in the present study, is one way in which it is possible to distinguish motivational from genuine intervention effects.

Watkins et al.,(1994) drew attention to the fact that most previous research on self–efficacy had typically involved laboratory experiments, which produced problems of external validity. One strength of the present study is that it examined performance and self–efficacy for real skills in a real competitive environment, thus supporting the concept of ecological validity. It is worth reiterating that the single–case design was important in allowing for individual analysis in a real world setting. This is especially vital, when compared to much of the previous research, which has been conducted in a controlled setting and has depended on establishing a statistically significant group result to support a stated hypothesis.

In the real world it is often difficult to isolate individual components of a total performance, as can be achieved in the controlled environment of the laboratory, but the laboratory raises its own methodological problems, such as whether the real skill is being measured, whether performers are motivated, or whether they are ego–involved. One question that must be asked about isolating the performance of activities in the laboratory is Gestaltist in nature. It is suggested that by breaking down the whole unit into parts, as is often the case in the laboratory or controlled field study, the separate may not be representative of those components performed as a whole in the real world setting. Again, it should be reiterated that players, coaches, and administrators are not primarily interested in statistical significance, but rather in a practical improvement that may help attain competitive success. At the elite level of competition, the winning edge may be gained by a minute, statistically non-significant, but practically important, improvement in performance. The current study was able to identify for the performer, and the coach, that some participants have improved more than others in their ability to make front and centre positions in a game, while all performers appear to benefit from this particular intervention. From this analysis many possible courses of action could be taken, including encouraging individuals who have improved the most to further pursue the treatment, endeavouring to establish why others did not improve at the same rate, or promoting the use of imagery in other aspects of individuals' games.

Recognition of the potential, direct practical value of results from studies undertaken in the applied setting, should not imply any lack of appreciation of the importance of studies which involve a high level of control in order to try and understand underlying mechanisms. A greater understanding of the process by which imagery is effective will lead to advances in the use of imagery in many applied settings.

A further important point about the execution of this study in the real competitive environment of elite football relates to the skill level of the players. The front and centre skill is a basic skill in Australian Football. These elite players, among the very best in the game, have practised and performed this skill in competition and training many times every week for many years. The absolute number of packs each player is able to "make" in a game varies according to a number of influences such as the position played on the ground, and specific roles the coach may ask that player to perform in any particular game. Factors like these account for the range in percentage front of packs achieved by individual players in both the baseline and treatment periods. A physical practice effect cannot account for the increase in performance observed in the games in this study. Like many of the skills in Australian Rules Football, running to the front position of packs is practised in many of the drills in a training session, yet in games as can be seen from most of the baseline scores in Figures 4.4 - 4.11, little lasting improvement is maintained. The motivational and cognitive effect of the imagery program were undoubtedly responsible for the short and longer term improvements seen in performance of the front and centre skill.

Importantly, the social validation responses strongly suggested that elite professional athletes are very positive and prepared to participate willingly in such research. From a statistical and a practical point of view, results in this study supported the proposal that imagery rehearsal can lead to the improvement of open skills, such as the front and centre in Australian Rules Football, and can lead to an increase in self-efficacy for that skill in a non-controlled environment. The results are most encouraging, especially in a sport where psychological intervention is not a commonly used means of improving performance. They support further study in this area. It should be recognised that the researcher was able to gain access to such an elite group of players because he held a unique position within the St Kilda Football Club. At the time of the study being conducted, the researcher also performed a major coaching role as fitness adviser and coordinator to the club. In addition, he performed the message giving role of "runner" in games. The runner's role in a game is to pass the coach's instructions to a player while the game is in progress. Because of these roles, the researcher was able to develop a credibility with players, coaches, and officials, that most other researchers would not be able to benefit from.

A problem with this type of research, that is, research executed in the real competitive environment, is that injury can influence a player's participation in the program. Player 2 missed four games through injury, player 5 missed three games, and player 8 missed five games. This is particularly a problem when players are rehearsing imagery techniques and drills for training and games, but are unable to derive any feedback in the physical setting of the training track or the competitive game. These players required constant assurance that the imagery rehearsal was still relevant for them, during their injuries.

One very important practical implication for injured players, which would be worthwhile studying in future, is that the players needed support to maintain this form of mental training while they were not playing due to injury. Such imagery programs could, perhaps, be extended to many aspects of their games while they were being denied the opportunity to be involved from the physical perspective of training and playing. This experience with injured players, while purely observational, further confirmed the belief of many sport psychologists (e.g., Ievleva & Orlick, 1991) that players who are forced into situations of missing games, whether through injury or because of suspension, should be supported by a formal directed program of psychological intervention which should include imagery rehearsal as an intervention technique.

One area that needs to be addressed in future studies on self-efficacy is when to commence recording self-efficacy of the players. In this study, the first self-efficacy recording for each player was taken in the week before that player had his first imagery session. This was done intentionally, because players were randomly selected for their introduction to the single-case, multiple-baseline design and they were told of their involvement in the study the week prior to their introduction to imagery intervention. Only then was it known which player would begin the intervention in the next week. Testing self-efficacy only in the week before a player started the program, caused some problems for analysis. First it was not possible to establish whether there was a stable baseline, which is usually done by visual analysis across the three or more baseline points. Second, it was not possible to calculate a suitable celeration line or line of progress for a split-middle analysis for the self-efficacy scores (as described in section 3.3, Chapter 3). It was felt by remaining blind to which players would be involved, and when each would start the treatment, my dual roles as researcher and program presenter would be less likely to influence each other. Similarly, it was considered that by informing players of their involvement only when it became essential, there would be less disruption to performance in the baseline period. The split middle analysis was able to be performed on the performance variable, front and centres, because detailed video footage was available from Channel 7, allowing the researcher to score the percentage of front and centres per game for the individual players in the games before the intervention took place. No such information was available on the self-efficacy of players. It is suggested that future study in this area should take at least four baseline self-efficacy recordings to produce a more representative reflection of baseline self-efficacy, as well as to permit calculation of an appropriate celeration line and use of the split middle technique. In future research, this could be possible without giving players cues to when they would be introduced to the program by starting all players on a self-efficacy measurement period, for example, four weeks before anyone commences the program, so that the very first player introduced to the treatment would have a baseline of at least four weeks to establish a celeration line. Because of the single baseline data point, the self-efficacy data was mainly considered using visual analysis, where trends could be observed especially after the imagery treatment was introduced. No split middle analysis could be conducted on the self-efficacy data because there was insufficient baseline data from which to calculate a celeration line. To minimise the effect of the researcher and program presenter, being aware of participants' progress in these conditions, a different person could present the program to the one who collected and collated the data.

A further methodological consideration, related to this, is whether the researcher, who conducted the imagery intervention activities with the players, should also score the front and centres per player from the video. For the present skill this was an objective task, that is, scoring one for every occasion a player was seen on the video in front of a pack that formed in a game. That is, a player is clearly in view in front of a pack or not or not in that position and no subjective assessment is required. If there was any doubt about the objectivity of the assessment, an independent scorer, should be employed in future research so that claims of bias can not be made. If that was not possible a reliability check could be conducted by having an independent expert analyse part of the material, so as to compare the scoring and to run an inter-rater reliability check. Another query could be based on the fact that the researcher introduced the treatment to the players. It could be claimed that the researcher in endeavouring to bring about positive results could also inadvertently promote influences that could act positively on performance, and provide the potential for motivating to work on imagery and to expect it will enhance performance, other than the imagery treatment. This is an interesting issue when considering the importance of conducting research in the real competitive environment.

As stated previously, I was fortunate to be able to gain access to elite athletes because of my professional involvement in implementing other physical training programs with that football club and other similar organisations which also gave me credibility with the coach and players. This is a special situation, where I had direct access to coaches and players and could influence them to provide opportunities to conduct research in the competitive season. Other researchers may not have such opportunities and may not be welcomed into such sporting organisations from an experimental perspective during the competitive season. Thus, to risk not being able to conduct the research, and in particular, not being able to provide the imagery from an external source, it is necessary to accept the results under the present conditions. In future, it would be helpful to be in a position to provide some control by assigning unobtrusive observers to evaluate the role of the researcher when taking the imagery sessions. Another point leading from these comments is that gaining trust and credibility can lead to further opportunities.

It must be noted that trends in self-efficacy ratings, even though showing a definite tendency to rise after the intervention of the imagery rehearsal program, do not necessarily continue in a uniform pattern above the baseline point. This again highlights the great difficulty of completely isolating specific influences in a real world study involving competition at the elite level. For example, other influences that may impact upon individuals' perceptions of their ability to make front and centres in a game may be, the perceived strength of the opposing team that week, and their immediate opponent's ability. The size of the ground also influences the number of packs that form in a game. For example, if the ground is very large, e.g., AFL Park, Waverley, fewer packs form than if a game is played at the much smaller Optus Oval. In addition, the size factor of the field often determines the necessity to run greater distances to make the front and centre position of packs, again, especially on a ground like AFL Park, Waverley. This factor will obviously favour the aerobically stronger player who is able to sustain running performance for greater distances and for longer time periods. Influences such as these may affect perceptions and some players may consider this in evaluating their ability to make front and centres in a game. Fitness capacity, after returning from injury, might also have an impact on players' self-efficacy ratings, because they might believe that at this time they don't have the necessary aerobic capacity to make as many contests, and consequently this would affect the number of front and centres the player believes he could make in the next game. Also, past performance or the number of front and centres achieved by a player for the previous week could influence the self-efficacy rating of a player for the next week. Although, during the study, the players had only their intuitive feeling about the number of packs they made during the games, because they are professional athletes they should have a reasonably accurate feel for their front and centre performances.

The process by which imagery was involved in the improvement in the performance of front and centres is unclear. Self-efficacy ratings increased after the imagery intervention was introduced for each player, while at the same time, in most instances the percentage of front and centres for players attained in a game also increased after the imagery intervention was introduced. It was also evident from the various social validation forms of feedback, and from the improved results of the self-efficacy ratings, that the players' confidence in their ability to perform front and centres of packs increased as the treatment progressed. These findings support the proposal of Bandura (1977) that psychological intervention, whatever its form, alters the level and strength of the self-efficacy or belief that one can successfully execute given activities. In this study, the form of the intervention was imagery rehearsal of the front and centre skill in the competitive environment. Bandura (1977) proposed four antecedents of self-efficacy namely, performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal. Feltz (1992), referring to these antecedents of self-efficacy, extends the category of verbal persuasion to persuasion in general and suggests imagery as a type of persuasion. It could also be argued that, as a reintegration of a reality experience (Suinn, 1976), imagery lies somewhere between two other antecedents Bandura proposes, namely performance accomplishment and vicarious experience. In any event, imaging successful performance would be expected to enhance self efficacy. The results from the present study show that this could be the case, however it cannot be definitively stated. What was clearly observed is that, for every participant self–efficacy increased considerably immediately after the imagery intervention was introduced.

Considerable research has demonstrated the presence of a relationship between self–efficacy and performance (e.g., Feltz, 1982; Garcia & King, 1991). In this study, however, this relationship was not established even though there was a rise in both self–efficacy and performance after imagery was introduced. This study did not set out to establish such a relationship, rather this study was looking at the effect that imagery had on self–efficacy and on performance of the front and centre skill. Putting together the emerging effect of imagery on self–efficacy and the established effect of self–efficacy on performance, from previous research, it is suggested that self–efficacy or task–specific self–confidence might act as a mediator between imagery and performance. Little research has been identified, which was conducted to establish the mediating role of self–efficacy between imagery and performance. For this relationship to be assessed, further research is required to establish if there is a causal relationship between imagery rehearsal, self efficacy and performance. Path analytic techniques were used to examine the prediction of Bandura's self–efficacy model in a study of back diving performances by Feltz (1982). It was established that there was a cause and effect relationship between self–efficacy and back diving. To take the next step to test for a cause and effect relationship between imagery, self–efficacy and performance, causal modelling, through structural equation modelling could be a promising method.

In summary, the present study is one of the first in observing the impact of an imagery rehearsal intervention on the performance of an open skill in a competitive setting. In the first two studies in this thesis, it has been demonstrated that imagery rehearsal had a positive impact on the performance of two different skills in the real competitive world of Australian Rules Football. Continued research is required to further study the imagery rehearsal process in open skills in the competitive setting. It is also vital to understand the mechanism whereby imagery rehearsal is effective and thus to analyse the processes that are involved in bringing about an improvement in performance, as well as establishing a relationship between imagery and performance. The first two studies in this thesis, particularly the present one, have also pointed to the involvement of self-efficacy in the imagery-performance relationship. To test the proposal that self-efficacy mediates between imagery and performance and is, thus, a mechanism whereby imagery effects performance, it is necessary to undertake a causal modelling analysis. To do this, at least two levels of imagery must be employed, while self-efficacy for, and performance of, a skill are monitored and the causal paths are modelled to compare the imagery-self-efficacy-performance paths. This is the aim of the third study, described in Chapters 5 and 6.

Chapter 5 : The Relationship between Imagery Rehearsal, Self-Efficacy, and Performance of a Skill.

5.1 Introduction.

The results of the previous study on the use of imagery rehearsal as an intervention to enhance the performance of gaining front and centre in Australian Rules Football supported the findings from Study 1 on imagery improving disposal skills. Both these studies were conducted on open skills in a real competitive environment. Study 2 also showed that imagery rehearsal, when employed as an intervention where players imaged themselves performing the skill well, enhanced self-efficacy. In that study, players were scored on their ability to make the front position of packs in competitive Australian Rules Football games. They also subjectively rated their confidence (self-efficacy) in their ability to make the front positions of packs in those games. This self-efficacy rating was introduced as an extension of the first study, which found a difference in kicking performance after an imagery intervention was introduced, and established, from informal and social validation feedback, that the players felt more confident in their ability to kick the ball to advantage during a game. From analysis of the self-efficacy ratings in Study 2, it was clear that self-efficacy rose for all eight players, after the imagery intervention and was maintained at a level above the baseline for the remainder of the period studied. Again, as was the situation in Study 1, social validation reports supported the study findings on self-efficacy, with players commenting that the imagery had made them feel much more confident in their ability to perform the skills in the study. Furthermore, the players stated they would incorporate the use of imagery rehearsal techniques into other aspects of their game in an organised and planned manner. The results of Study 2 supported earlier research in finding that imagery rehearsal enhanced self-efficacy (e.g., Feltz & Riessinger, 1990; Lee, 1990; Martin & Hall, 1995). Some of that research, had been conducted outside sport settings, but it established relationships between imagery, self-efficacy, and performance, that may be replicated within sport. As Morris (1995) reports, early research on self-efficacy in sport has been important in examining these potential relationships. For example, research conducted by Feltz (1982, 1988), and Feltz and Mugno (1983) on backdiving stands out among research on performance of sport skills out of competition, not only because it examined the roles of self-efficacy and performance accomplishments, but also for its early use of sophisticated methods and techniques of analysis, including causal modelling.

Feltz predicted that self-efficacy would be the strongest predictor of performance on each of four back dives, and that there would be a reciprocal relationship between self-efficacy and backdiving performance. Results of path analysis, based on multiple regression, revealed that self-efficacy was indeed the major determinant of diving performance on the first dive, but the result of the previous dive became the major predictor on subsequent dives, that is, for attempts two, three, and four. McAuley (1985) examined the relationship of anxiety to performing a high avoidance, dive forward roll onto a gymnastics beam by 39 female undergraduates who were novices at gymnastics and also had high pre-test anxiety. Results of this study showed that both aided and unaided modelling increased self-efficacy, reduced anxiety, and enhanced performance. McAuley also used path analysis to study the relationships between modelling treatments, self-efficacy, and performance. The analysis suggested that self-efficacy was a direct mediating variable between modelling and performance. A number of studies have considered the relationship between self-efficacy and performance in competitive sport (Barling & Abel, 1983; Feltz, Bandura, & Lirgg, 1989; Gayton, Matthews, & Burchstead, 1986; Lee, 1982; McAuley & Gill, 1983; Weiss, Weise, & Klint 1989). As a generalisation, these studies have indicated that higher levels of self-efficacy are associated with superior performance. For example, Weiss, Weise, and Klint (1989) measured self-efficacy and performance in, young, female elite gymnasts and found a significant correlation between self-efficacy and performance.

The social validation results of both studies and the self-efficacy findings of Study 2 stimulate the suggestion that self-efficacy mediates between imagery and performance. That is, it is by enhancing self-efficacy, which then facilitates performance, that imagery increases performance, in some contexts. Feltz and Riessinger (1990) conducted one of few studies that measured the impact of imagery on self-efficacy and performance, but they did not report any evidence for self-efficacy as a mediator between imagery and performance. They assigned college males and females to one of three conditions: in vivo mastery imagery with feedback, feedback alone, or a control condition. These conditions followed a loss to a confederate on a strength task. In another strength task, the participants "lost" to confederates by ten seconds, a clear defeat, on each of two trials. Results indicated that only after the imagery treatment did participants' self-efficacy increase. In the previous study of a front and centre skill, reported in Chapter 4, it was found, that both self-efficacy and performance of the front and centre skill were enhanced with the intervention of imagery rehearsal. That study was not designed to test for a mediating relationship (that self-efficacy mediates between imagery and performance). Thus, for the proposition that self-efficacy mediates between imagery rehearsal and skill performance to be tested, a controlled experiment was required, to which not only could inferential statistical analysis be implemented to test for significant differences in self-efficacy and performance across occasions, but also where causal modelling analysis could be applied to examine the mediating role of self-efficacy.

This study was designed to examine the use of an imagery rehearsal program to enhance self-efficacy for the performance of goal kicking of elite Australian Rules Footballers, outside the game situation. Comparison was made of the results of goal-kicking performance and self-efficacy self rating between an experimental group, which employed an imagery rehearsal intervention, and a control group. Structural equation modelling analysis followed, modelling the causal relationships between imagery rehearsal, self-efficacy, and performance to examine the proposal that self-efficacy mediates between imagery and performance, when the imagery rehearsal involves performing the skill well in the performance context.

Whereas in studies 1 and 2 (Chapters 3 & 4 respectively) predictions were made about the outcomes of single-case studies, here formal hypotheses were proposed for an experimental study. Hypotheses are stated in the alternative form and make one-tail predictions. It was hypothesised that: H1: there will be a significantly greater increase, from-pre imagery treatment goal kicking accuracy to post-imagery treatment goal kicking accuracy, in the imagery group than the control group, H2: there will be a significantly greater increase from pre imagery treatment self-efficacy to post imagery treatment self-efficacy in the imagery group than the control group.

5.2 Methods

5.2.1 Participants

Participants (N=42) were 21 male Australian Football League (AFL) first and second eighteen players, from the Saint Kilda Football Club and 21 elite male under eighteen Australian Rules Football players from three clubs, Calder Cannons, Southern Stingrays, and the Central Dragons. AFL, as described in the first two studies, is the elite league of this football code in Australia. The elite under eighteen competition is made up of individually recruited aspiring young players from all under eighteen football competitions in the state of Victoria, Australia. The players at the SKFC had been recruited from all states of Australia. They had a diverse background of educational and occupational experiences. Their ages ranged from eighteen to twenty seven (mean = 23.1). The participants from the under 18 group had a mean age of 17.4, with a range of sixteen to eighteen years of age. Participants were free to withdraw from the treatment at any time they wished to do so.

5.2.2 Design

This study employed a traditional experimental design. Half the players were assigned to an experimental group, randomly, within the senior and under eighteen groups, and the other half were randomly assigned to a control group. All players were pre-tested on a skill test of kicking accurately at a target (goal). A self-efficacy evaluation, as to how confident the players were in their ability to kick a goal from various positions on a football ground, was administered immediately before, and again after, the kicking assessment. The experimental group players practised an imagery rehearsal program and reported their self-efficacy in their ability to kick accurately at goal on three occasions throughout the treatment stage. At the conclusion of the treatment period, the experimental group players performed a post-test in kicking at goal and a final self-efficacy rating was provided by them after they had completed the post-test kicking assessment. After pretesting, the control group players listened to a relaxation audio tape on three occasions during the treatment stage as a placebo and a reason to retest their self-efficacy. Thus, they also had their self-efficacy monitored on three occasions corresponding in time to the 4th, 8th, and 10th imagery sessions.. At the conclusion of the treatment phase, the control group participants were post-tested on their ability to kick accurately at goal and completed a final post-test self-efficacy evaluation. Two-way Analysis of Variance was employed to test whether there was any change in performance. There was a group factor with two levels, imagery and control, and an occasions factor with two levels, pre-program and post-program. A separate two-way ANOVA was used to identify any differences in self-efficacy. There was a group factor with two levels, imagery and control, and an occasions factor with six levels, pre-goal kicking pre-test, post-goal kicking pre-test, post imagery session 4, post imagery session 8, post imagery session 10, and post goal kicking post-test. Structural equation modelling analysis is reported in Chapter 6.

5.2.3 Treatment

5.2.3.1 Content of Imagery Program

The players in the imagery rehearsal group were provided with a diary and an audio tape. The diary included ten imagery rehearsal response sheets. A response sheet, including questions on how the imagery was helping the participant and asking for suggestions to improve the session, was completed by a player at the conclusion of an imagery rehearsal session (as shown in Appendix W). The tape included ten imagery rehearsal sessions of approximately ten minutes duration each. The audio tape sessions commenced with basic slow controlled breathing exercises for two minutes, to calm the player and help them to focus attention. The first tape session also included imagery of basic mechanics (processes) of kicking an Australian Rules Football accurately at a target. Subsequent tapes gradually introduced greater degrees of difficulty in imaging the processes of kicking at goal from further distances, from wider angles, and under more imaged pressures. (Transcripts of the ten imagery exercises are presented in Appendix X).

The control group players were required to listen to ten minutes of a relaxation tape on three occasions throughout the intervention period. The tape required players to listen in a quiet area, either sitting or lying in a comfortable manner. They were asked to focus on relaxing different muscle groups. This tape was compiled from Jacobson's (1930) Progressive Relaxation technique. This type of relaxation tape was used because the players were experienced with relaxation techniques, having used various relaxation tapes in the past, so it did not represent a novel intervention, but provided a reason for them to complete a self-efficacy rating.

5.2.3.2 Self-Report Imagery Rehearsal Evaluation

Imagery rehearsal group players were asked to evaluate each of the ten imagery rehearsal exercises. The players were required to circle on a five point Likert scale their evaluation of each of the ten exercises in relation to six parameters: understanding of the instructions, seeing oneself, feeling oneself, hearing sounds, controlling the movements, and the value of the exercise just completed (as shown in Appendix Y). The five point Likert scale ranged from 1 = "not at all" to 5 = "very well" in each case. This evaluation method was again based on Vealey's (1986) version of Martens' (1982) SIQ, as well as Betts (1909) QMI.

5.2.3.3 Diary

The participants were asked to enter their reactions to treatment procedures and outcomes in a diary at the completion of every session. This took the form of:

(i) an imagery rehearsal recapitulation of the exercise just listened to onthe audio tape

(ii) a section that allowed for comments on the program

(iii) a request for suggestions of ways in which the program might be improved.

5.2.4 Measures

5.2.4.1 Goal Kicking Performance

Objective goal kicking performance was measured by an independent goal umpire, scoring each of twenty kicks that each participant had at goal. There were five scoring zones on either side of the major goal kicking zone (as shown in Figure 5.1). The player's aim was to attempt to score five points through the central goal (zone) with each of his twenty kicks.

The major or central zone was worth five points, zones immediately on either side of the goal zone were worth four points, the next zones three points, then two points, one point, and zero points if the ball missed all the zones (either passing wide of them or falling short of the goal). The zones were delineated by poles approximately eight centimetres in diameter and three metres high. All the poles were placed in the ground at two metre intervals (see Figure 5.1). An independent umpire scored which zone a ball, after being kicked by a player, went through. This umpire was able to move readily behind the goals to follow the flight of the ball, and thus be able to assign a score for each kick. If the ball hit a post or, in the umpire's view, the ball flew directly above a post the point score for that kick was to the value of the next outer scoring zone. For example, if the ball hit either of the two central goal posts a score of four was awarded for that kick, whereas if the ball travelled clearly between the central goal posts a score of five was awarded. The goal umpire was blind to the nature of the research and the group assignment of players.

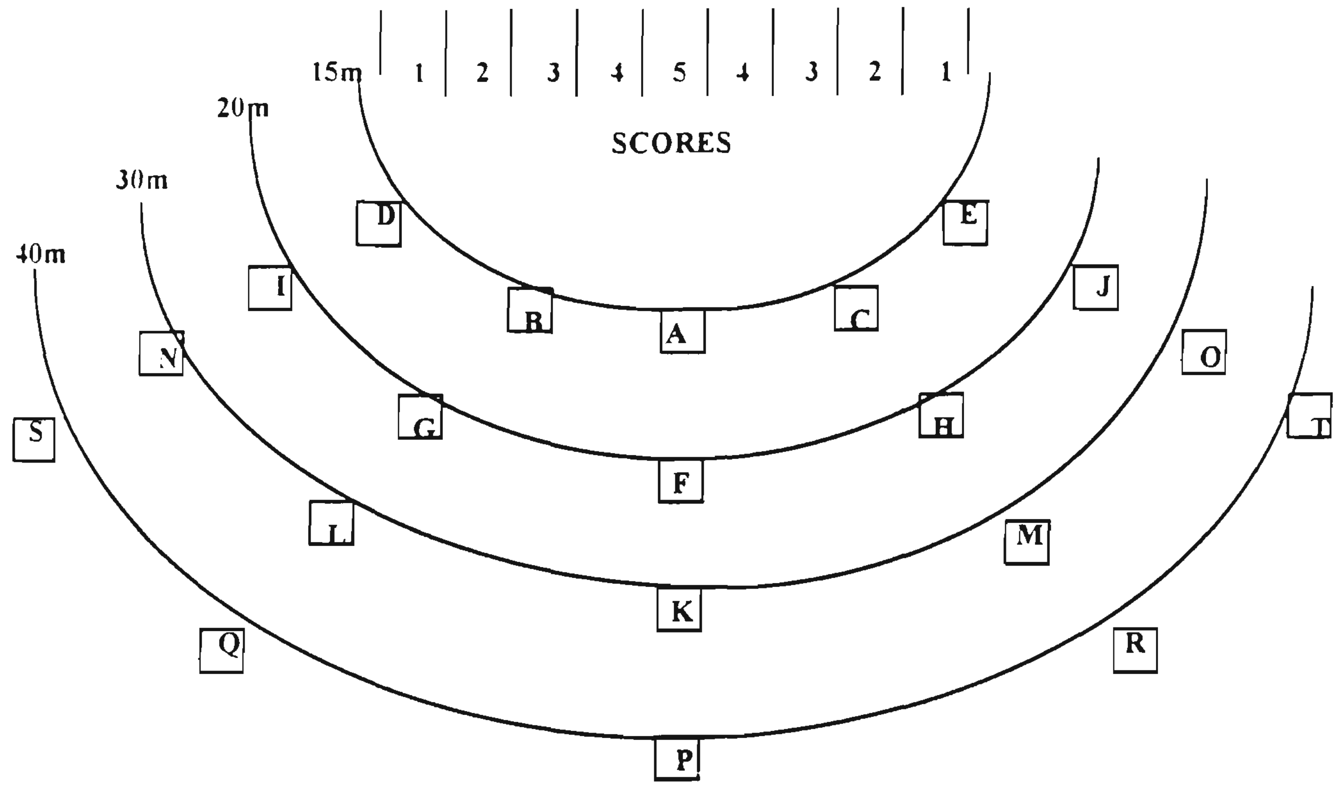


Figure 5.1. **Position and dimensions of goal kicking targets and kicking positions.**

After a physical warm up, which incorporated each player's usual regimen of stretching exercises, the player had ten practice kicks at the other end of the ground away from the goal targets. There was no verbal exchange about the exercise during the warm up. After the warm up, the players were required to kick twenty times at the target, each kick being taken from a different position (marker). The aim and instructions to players were to kick the ball through the five point goal zone (as shown in Figure 5.1). The players had five kicks at the target from four distances away from the centre of the five point goal. The distances were, 15, 20, 30, and 40 metres from the goal. A marker was placed at five different angles to the goal at each of the four distances from the goal. The angles with reference to the goal line were, directly in front (90 degrees), 45 degrees at both the "on" side and the "off" side of the goal and at 20 degrees at both the "on" side and the "off" side of the goal (as can be seen in Figure 5.1). The "on" side was that side of the field whereby players were facing the goal with their preferred (dominant) kicking leg being closer to the middle of the field than their other leg. The "off" side was the side where the preferred kicking leg was further away from the middle of the field. Even though elite players are skilled in kicking the ball with either foot in Australian Rules Football, this exercise allowed for any effect of players having a preferred kicking leg.

Each kick was taken from one of the markers and the order was determined randomly by selecting one of twenty letters, from a box. Each letter drawn from the box represented one of the kicking markers on the field. Once a letter was drawn from the box it was not replaced until all the letters had been selected and a new player was to commence the kicking exercise. The players were told that they were to aim for the central five point goal (target) with every kick. Each kick was scored on a score sheet. After the twenty kicks, all the scores were summed and averaged (as shown in Appendix Z).

5.2.3.2 Self-Report Goal Kicking Self-Efficacy

Bandura (1977) proposed the use of a microanalytic approach to the measurement of self-efficacy, noting that self-efficacy was task specific. In the present study, Bandura's (1977) microanalytic technique was modified to measure level and strength of self-efficacy together, following an approach used by Dzewaltowsky

(1989). Players were asked to rate how positive they were of kicking a goal from the twenty positions on the ground (as shown if Figure 5.1) on a 101 point scale. A zero (0) rating meant that a player was completely certain that he could not kick a goal from that distance and angle. A one hundred (100) rating meant that he was completely certain that he could kick a goal from that distance and angle. This range was chosen following pilot work that determined that it would cover the whole range of players' self-perceived ability. The certainty ratings were then averaged for that rating sheet. The self-efficacy response was conducted before the initial performance (SE1), after the initial performance (SE2), after four imagery sessions (SE3), after eight imagery sessions (SE4), after ten imagery sessions (SE5), and at the conclusion of the final (second) performance (SE6). A copy of this rating sheet is presented in Appendix AA). This approach saves participants completing separate exercises to rate level and strength. The levels which the person feels unable to do at all, simply receive a rating of zero strength. Shaw, Dzewaltowsky, and McElroy (1992) conducted a study of self-efficacy and causal attributions as mediators of perceptions of psychological momentum in throwing free throws at a basketball goal. A free throw self-efficacy questionnaire was used to assess self-efficacy toward competitive free throw shooting. In that study, the level and strength of self-efficacy were determined by summing the participants' confidence ratings in performing each task and dividing the sum by the number of questions. The reliability of the free throw self-efficacy was $r = .80$ to $r = .87$. The same procedure was applied in the present experiment, in that, by summing the certainty ratings and dividing by twenty, (i.e., the total number of kicks), the level and mean strength or certainty could be calculated for each player, while level was especially indicated by a response of zero to some items in the rating scale. Response options ranged from 0 = "totally certain that they could not kick a goal" to 100 =

"totally certain they could kick a goal" (as shown in Appendix AA). The scale used all units from 0 to 100.

5.2.4.3 Social Validation

Participants were invited to contribute their impressions and feelings about the study to the researcher in several ways. Informal comments made by players during the study, whether in general conversation or in telephone discussions of progress, were noted. A formal social validation exercise was completed by participants at the conclusion of the program. Thus the social validation included:

a. Informal Comments. Verbal comments that were made by participants about the value of the imagery program throughout the experiment.

b. Formal Checks. All participants were telephonrd on three occasions throughout the treatment stage to ensure that they were complying with the tasks and to ask for, and monitor, any feedback. Players were provided with my phone numbers and were advised that they could contact me at any time. This was done on several occasions and the topics raised by players were noted.

c. Social Validation. Players completed a social validation questionnaire at the end of the study and discussed their involvement in the program with me. This session performed two major purposes: Firstly, it provided me with the opportunity to gather any information that could help improve the study, and, secondly, it enabled me to debrief the participant and to discuss ways whereby players might employ imagery in other aspects of their sport and life. In this session, the players were asked to reflect on the whole exercise, and to make comments on the program in general terms, as well as being more specific about individual aspects of single sessions. They were also asked to reflect on the value of imagery rehearsal as a training method and to consider ways in which the imagery sessions could be improved. Finally, in this exercise, the players were asked to identify any problems that were encountered during the program, and ways they might suggest to overcome these problems, or suggestions as to how to improve the program.

5.2.5 Procedure

The coaches of all the groups had been informed of the project and agreed to co-operate in the research. The senior coach of the Saint Kilda Football Club (SKFC) was very enthusiastic about this type of research being conducted outside the competitive season. An explanatory meeting was conducted with 50 players of the SKFC. A brief explanation was made about the nature of the study and a request for volunteers volunteers was made. Twenty-one players were finally accepted after excluding those who had been involved in either of the two previous studies. The players were then randomly assigned to either the imagery treatment or control group, after which they were contacted by phone and detailed information about the procedures for their group was mailed to them. The coaches and managers of the three elite under eighteen squads were contacted by phone and asked to volunteer eight players from their respective clubs for the exercise. Each party was most co-operative and furnished the information of names, contact phone numbers, and addresses immediately. Each of the elite under eighteen players was contacted, initially, by phone and given a brief explanation of the exercise. All players, able to be contacted, were willing to be involved and a final number of twenty-one participants was established. Players were randomly assigned from each junior squad so that at least three players from each junior squad were assigned to the imagery treatment group and at least three players from each squad were assigned to the control group. Thus, overall the twenty-one players were randomly assigned to the experimental or control group in such a manner that the resulting groups were balanced for members of these three squads. Each player was then contacted by mail, the letter describing the procedures for their group and providing more detailed information on the program. This communication included details on dates of activities, venues, equipment required, and contact phone numbers.

Thus, the imagery rehearsal and control groups derived were balanced for both the elite, senior St Kilda players and for the elite juniors from each squad. Individual players were assigned to the imagery treatment and control groups at random. Each player was asked for his cooperation in the exercise. They were informed of the nature of the experiment and approximately how much time would be involved. Finally, they were informed that they were free to withdraw at any time, and that their data would remain confidential. Players were told that the coaches would have access to the group findings as they would themselves, but individual results would only be available to the player who had produced them. They then signed a consent form agreeing to participate in the research. Detailed instructions were withheld until a player had completed the initial session, which included a pre-performance self-efficacy rating (see section 5.2.4.2), performance on the goal kicking task (see section 5.2.4.1), and a post-performance self-efficacy rating.

For the first assessment session, players were scheduled to come at half hour intervals. At this time, a player completed an initial self-efficacy rating which involved him stating how confident he was in his ability to kick through the five point posts from twenty different positions on an Australian Rules Football ground. The player was provided with a diagram of the ground showing the twenty positions (see Figure 5.1). The diagram displayed the positions of the goal zones, distances the goal posts were apart, and the scores for each of the goal zones. In addition, the player could walk around the field to where the markers were placed, on the ground at the twenty kicking positions, so that he could gain a feel for the ease or difficulty that each kick would present to him.

When he had completed the initial self-efficacy rating task, the player had five minutes to complete a warm up which also included having at least ten practice kicks of a football at the opposite end of the ground to the assessment goal scoring area. Immediately after the warm up was concluded, the player had twenty kicks at goal, one from each of the twenty positions in random order. Each kick was taken from one of the markers and the order of positions from which the kicks were taken was determined by selecting one number at a time from a box of the numbers one to twenty. The players were told that they were to aim for the central five point goal (target) with every kick. The result of each kick was relayed to the player and was recorded on a score sheet, so that after the twenty kicks the scores could be summed and an average attained for each player's performance (as shown in Appendix Z). At the completion of the kicking exercise the player was provided with a copy of the scores he achieved from each of the kicking positions and asked to fill in another copy of the same self-efficacy rating sheet as to his confidence in his ability to kick a goal from the twenty different positions on the ground. When the player had completed this self-efficacy inventory he was told what was required of him until he was retested, approximately one month later. This depended on whether the player had been assigned to the experimental or the control group. The players were not aware there were two groups, and they were asked not to discuss the exercise with other players. This was a reasonable request at that time of the year, because it was primarily when players, at most, would be training in small groups at different venues, or not training with other players at all.

Imagery treatment group participants were provided with a diary which included an introductory page describing what was required of them for the remainder of the study. In addition, they were provided with an audio tape that contained ten imagery rehearsal sessions of between ten and fifteen minutes duration each. The introduction on the audio tape thanked the player for being involved and requested that the player be diligent in carrying out what was requested of him for each segment. A new segment on the tape was to be listened to every second day. Each session on the tape commenced with the words "This is the commencement of session .... (number of session)" and concluded with "This is the end of session ...(number of session). You are required to complete the next response sheet in your diary. The next session to be listened to in two days time commences on the tape in thirty seconds. Turn the tape off now." The player was required to complete a response sheet that included eight questions. The first five questions required scoring on Likert scales with five possible responses ranging from 1 = "not at all" to 5 = "very well". Question one assessed the player's ability to understand the instructions on the tape. Question two evaluated the player's ability to image seeing himself in the situations described. Question three assessed the player's ability to image the emotions of the situations described.

Question four assessed the player's ability to image hearing sounds in the situations described. Question five assessed the player's ability to image himself controlling the movements in the situations described. Question six asked the player to rate how valuable the session was for him on a five point Likert scale ranging from 1 = "not at all valuable" to 5 = "very valuable". Question seven was an open-ended item, which asked the player for any comments to be written about the program. Question eight, also open-ended, asked for suggestions of ways to improve the program. Thus, questions 1 to 6 were rating scales, and questions 7 and 8 involved open-ended responses. Players were not required to respond to questions seven and eight, if they had no views on either issue. In addition, after completing the response sheet for the forth, eighth and tenth imagery rehearsal sessions, players filled in a self-efficacy sheet that was the same as that used in all the self-efficacy assessments.

When players had completed the imagery rehearsal intervention exercises they were asked to attend a final performance test of kicking at goal from the same twenty positions. The order of the kicks was again randomly determined by drawing letters from a box, as used in the initial performance assessment. Immediately after he had completed the goal kicking, each player completed a final self-efficacy rating and filled in a Social Validation form assessing the player's feelings about the program and any comments he would like to make about the whole procedure (as described in section 5.2.4.5). This provided the opportunity for a general debriefing to resolve any outstanding issues about the player's involvement and to discuss the program in general terms. The player then returned the diary and tape to the researcher. This final session took approximately thirty minutes per player.

Control group participants were provided with a diary which asked them to complete a self-efficacy rating on a weekly basis, which corresponded approximately to the treatment groups forth, eighth, and tenth self-efficacy rating. They were asked to listen to a relaxation tape prior to completing each of the three self-efficacy rating tasks. Participants from the control group, like those from the experimental group, were asked to attend a final assessment which followed the same procedure as described earlier for the final session of the experimental group, involving self-efficacy after a goal kicking performance test, and finally the Social Validation questionnaire. After the conclusion of the exercise, each player was debriefed, their results discussed, and for the experimental group, ways were suggested that they might incorporate imagery rehearsal into other aspects of their training. The players in the control group were not provided with any imagery involvement. Their only task during the study was to listen to the relaxation tape on three occasions. The control group players were also contacted by the researcher during the treatment period, to ensure that they were complying with the tasks of listening to the relaxation tapes and filling in their self-efficacy ratings at the appropriate times.

5.3 Results

The results are presented in three sections. The first section pertains to goal kicking performance analysis. The second section reports self-efficacy results. Information gleaned from the social validation process is then discussed in the third part of the results section. Originally, forty-two players were contacted and randomly assigned to the experimental and control groups, twenty-one players per group. These players commenced the initial assessment of goal kicking performance and self-efficacy evaluation. In the final analysis, however, only the results of twenty players in the experimental group and eighteen players in the control group were considered. Four players had to drop out of the experiment after the initial assessment of goal kicking performance and self-efficacy evaluation due to sickness, major surgery, and one player taking an overseas holiday.

5.3.1 Goal Kicking Performance

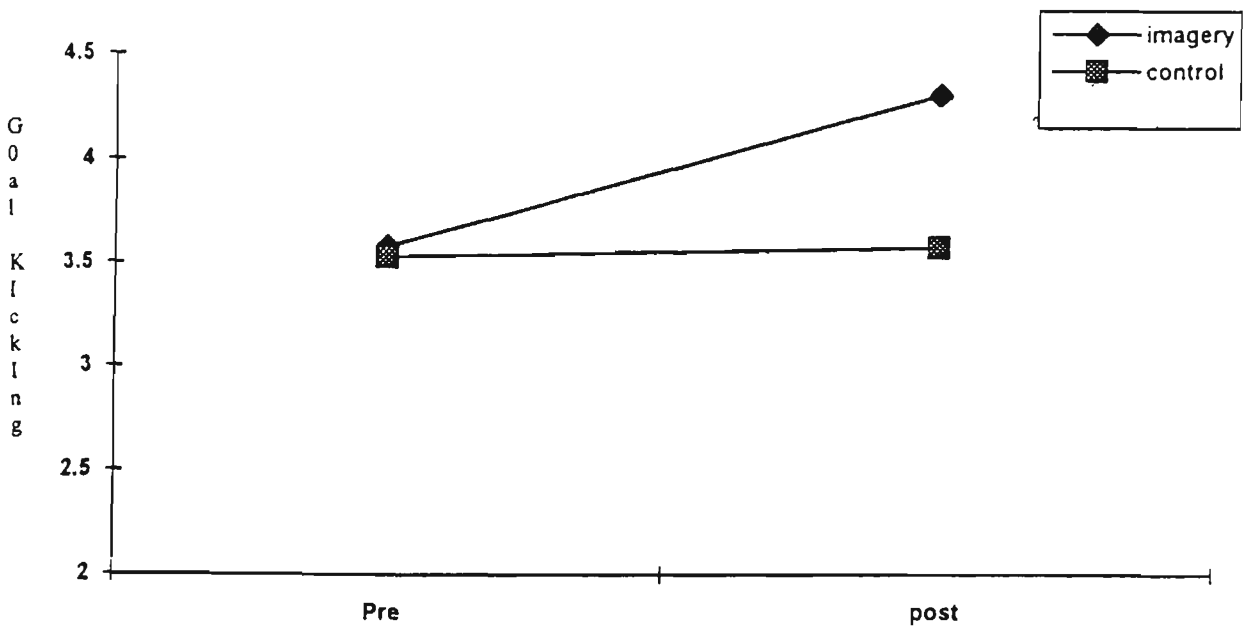
The individual means and standard deviations for goal kicking performance are shown in Table 5.1. The group means and standard deviations, for the treatment and control groups can be found at the bottom of the table. There was very little difference between the pre-intervention scores for the imagery treatment and control groups (3.58 to 3.53). Inspection of the means indicates that the imagery rehearsal intervention group mean increased by 0.72, from pre-intervention to post-intervention. For the control group, the difference of 0.04 was much smaller, between pre-intervention and post-intervention group mean scores. When comparing the differences in mean goal kicking performances for pre- and post-intervention between the imagery treatment and control groups, it can be seen that the pre-intervention difference was 0.05, compared to a post intervention goal kicking difference of 0.73 between the two groups. The point this highlights is that there was essentially no difference in goal kicking scoring between the randomly selected imagery rehearsal and control groups on the initial test, but there was a substantial difference in favour of the imagery treatment group after the intervention had been completed.

Table 5.1
Means of Goal Kicking Performance for Participants in the Experimental and Control Groups

Participant	Experimental Group Pre-Test Mean	Experimental Group Post-Test Mean	Control Group Pre-Test Mean	Control Group Post-Test Mean
1	3.65	4.25	3.45	3.70
2	3.40	4.20	2.95	3.00
3	3.55	4.25	3.10	3.25
4	3.70	4.25	3.70	3.65
5	4.05	4.91	3.80	3.60
6	3.15	4.25	4.49	4.33
7	3.80	4.25	4.10	4.10
8	3.34	4.02	3.75	3.75
9	3.65	4.25	3.35	3.25
10	3.70	4.25	3.55	3.50
11	3.35	4.30	3.55	3.55
12	3.85	4.45	3.60	3.25
13	3.65	4.40	2.75	3.30
14	3.15	4.25	3.55	3.70
15	3.65	4.05	3.60	3.70
16	3.20	4.50	3.20	3.60
17	3.60	4.05	3.15	3.15
18	3.40	3.85	3.95	3.80
19	3.65	4.05		
20	3.65	4.30		
Total	71.60	86.00	63.54	64.26
Mean	3.58	4.30	3.53	3.57

Comparison can also be made for individual players' improvements for both the imagery rehearsal and control group by inspecting Table 5.1. This table clearly indicates that every player in the experimental group improved their goal kicking performance. The greatest individual improvement of 1.3 points per kick was for participant 16 and the smallest individual improvement of 0.4 points per kick was for participants 15 and 19. In practical terms, this minimum value represents an improvement of 11%, which is still worthy of note.

A 2 x 2 Two-way Analysis of Variance (ANOVA) was conducted on goal kicking accuracy. The first factor was a between groups factor, treatment condition, with two levels, imagery rehearsal and control group. The second variable was kicking performance measured twice, namely pre-imagery rehearsal goal kicking accuracy and post-imagery rehearsal goal kicking accuracy. There was a significant main effect of the imagery condition upon goal kicking accuracy, $F(1, 36) = 15.97$, $p < .001$. The main effect for the repeated measure of occasion (pre and post) was also significant, $F(1, 36) = 92.46$, $p < .001$. There was also a two-way interaction for group by occasion, $F(1,36) = 76.81$, $p < .001$. Examination of the means and consideration of Figure 5.1 indicate that all three significant effects are accounted for by the increase in performance in the imagery rehearsal group at post-imagery rehearsal intervention.



Pre and Post Intervention Conditions for Goal Kicking

Figure 5.1 Imagery and control group player means for goal kick scoring by occasion.

Table 5.1 also indicates that for six out of 18 control players, their final goal kicking performance scores decreased when compared to their initial goal kicking scores. The control group mean improvement was 0.04, the greatest improvement being for players 4 and 13 (0.55) and the greatest decrease being for player 12 (0.35).

5.3.2 Self-Efficacy for Goal Kicking

The group means and standard deviations for self-efficacy are shown in Table 5.2. Players were asked to rate how certain they were in their ability to kick a goal from twenty different distances and angles from goal. The further away from goal and the smaller the angle from which the player kicked, the greater the objective difficulty in kicking a goal. Strength was calculated using a one hundred point probability scale. Response options ranged from 0 = totally certain that they could not kick a goal to 100 = totally certain they could kick a goal. Inspection of the overall self-efficacy group means indicates that the experimental group self-efficacy mean increased by 27.8 from the initial self-efficacy rating (46.11) to the final self-efficacy rating (73.91). The control group mean increased by 1.1, from the initial self-efficacy rating (53.6) to the final self-efficacy rating (54.7). Thus, the difference between the two groups in overall self-efficacy change was 26.7 (27.8−1.1). It must be noted that the initial self-efficacy rating by the imagery rehearsal group was notably lower than that for the control group. No explanation for this difference was evident after the first kicking performance. The imagery rehearsal group rating (52.12) compared more evenly with the control group rating (54.35). This suggests that the original rating was an underestimate, which was corrected once the players had actual experience of performing the task. It does not explain why the imagery rehearsal group underestimated, while the control group did not.

The impact of the imagery rehearsal program on self-efficacy was examined by comparing the imagery rehearsal and control group self-efficacy scores after pre-intervention performance (SE2), the self-efficacy scores during SE3, and SE4, and at the completion of SE5, the intervention period. The main experimental comparisons were, thus, based on equivalent scores prior to the intervention. The overall change of self-efficacy scores, for the imagery rehearsal group was 20.19 from the pre-intervention program self-efficacy mean (52.12), to the mean for self-efficacy at the end of the intervention program (73.30). The control group results, over the same period, remained within a range of 0.5. It is clear that the treatment group, exposed to the imagery rehearsal intervention, increased their self-efficacy in their ability to score goals substantially (20.9), whereas in the same period, the control group self-efficacy rating remained the same (-0.04).

The group mean self-efficacy changes throughout the imagery rehearsal intervention program can be derived from Table 5.2. The change in self-efficacy for the two groups from SE2 to SE3 was, for the imagery rehearsal group, an increase of 13.64, and for the control group an increase of 0.03. This represents the most substantial change for the imagery rehearsal group at any time. Other increases for the imagery rehearsal group were 1.91 from SE3 to SE4, 4.63 from SE4 to SE5, and 1.6 from SE5 to SE6. During the corresponding periods, the self-efficacy ratings of the control group remained virtually unchanged.

Table 5.2

Means and Standard Deviations for Self-Efficacy across Six Repeated Measures

	Experimental Group (n = 20)		Control Group (n = 18)	
Trials	M	SD	M	SD
SE 1	46.10	19.43	53.58	16.19
SE 2	52.12	11.68	54.35	12.28
SE 3	65.76	14.22	54.48	12.09
SE 4	67.67	13.16	54.38	12.00
SE 5	72.30	12.09	54.31	11.97
SE 6	73.9	12.69	54.73	10.95

Figure 5.2 shows the mean self-efficacy ratings on six occasions for both conditions. A 2 x 6 Analysis of Variance (ANOVA) was conducted on self-efficacy ratings. The first factor was a between groups factor, treatment condition, with two levels, imagery rehearsal and control group). The second variable was a within groups rating of self-efficacy, with six levels, namely initial self-efficacy (SE1), post-initial performance self-efficacy (SE2), post imagery session 4 self-efficacy (SE3), post imagery session 8 self-efficacy (SE4), post imagery session 10 self-efficacy (SE5) and final self-efficacy (SE6). There was a significant main effect of the treatment condition upon self-efficacy rating $F (1,36) = 4.78$, $p < .05$, and a significant main effect of occasion upon self-efficacy rating $F (5,180) = 32.97$.$p < .001$. There was also a significant two-way interaction between treatment condition and rating occasion, $F (5,180) = 29.59$, $p < .001$.

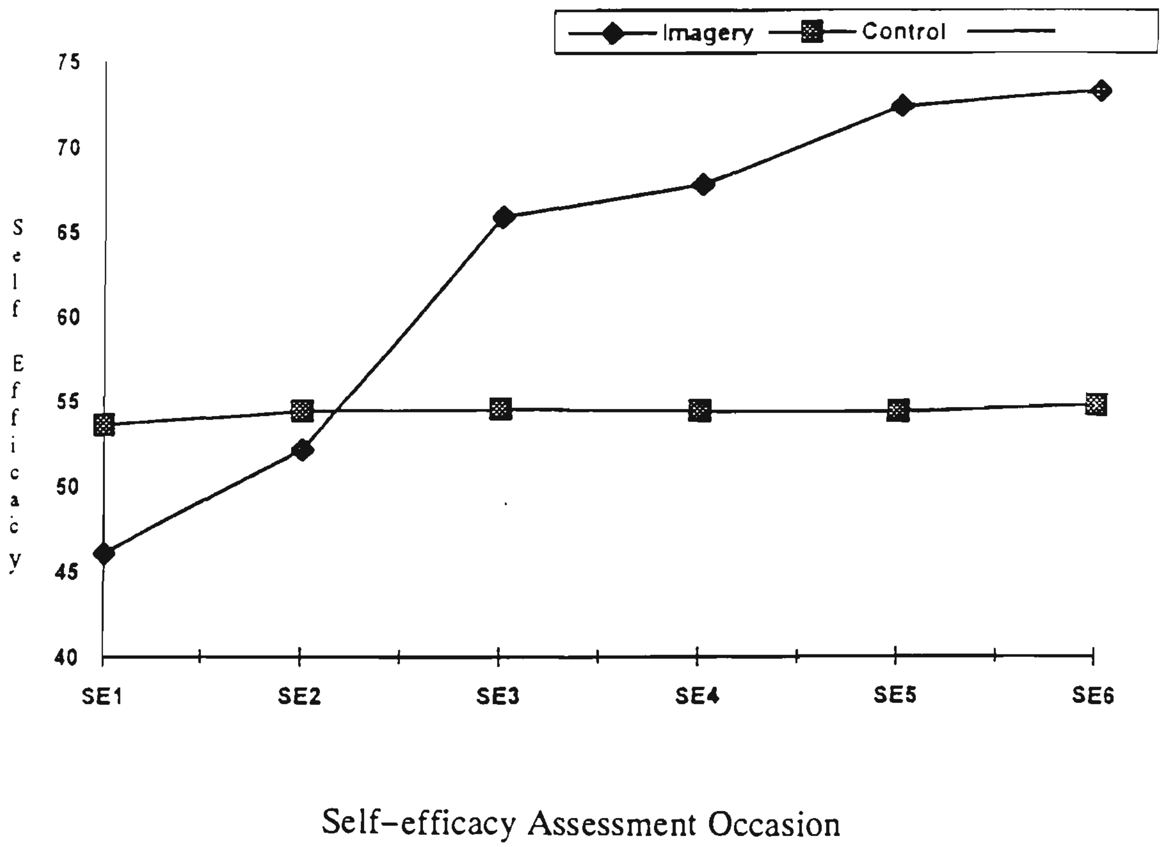


Figure 5.2 Imagery and control group player means for self-efficacy by occasion

An analysis of simple main effects was conducted to identify the basis of the significant interaction between treatment condition and rating occasion. A Newman Keuls post hoc analysis indicated that there was no significant difference in self-efficacy rating between the imagery and control conditions at the first rating occasion (SE1), and the second rating occasion (SE2). The self-efficacy ratings were significantly higher for the experimental condition than the control condition at the other occasions. Rating occasions 1 and 2 were before intervention and rating occasions 3 to 6 were after some or all of the imagery intervention for the experimental group and some or all of the "neutral" intervention to the control group. This indicates that, prior to the imagery intervention, there was no difference in self-efficacy rating between the experimental and control groups. Further Newman-Keuls post-hoc analysis revealed a significant effect of rating occasion upon self-efficacy rating for the imagery condition, but no significant effect of rating occasion upon self-efficacy rating for the control condition. These analyses are shown in Table 5.3.

Table 5.3.

Newman-Keuls Post Hoc Analysis for the Imagery Rehearsal Group

		SE 1	SE 2	SE 3	SE 4	SE 5	SE 6
	Mean	46.11	52.13	65.77	67.68	72.31	73.91
	SD	19.44	11.69	14.22	13.16	12.09	12.69
SE 1			6.02*	19.66**	21.57**	26.20**	27.80**
SE 2				13.64**	15.55**	20.18**	21.78**
SE 3					1.91	6.54*	8.14**
SE 4						4.63	6.23*
SE 5							1.60

* significant at .05 level = 5.90

** significant at the .01 level = 6.97

The post hoc analysis showed a significant difference between the imagery and the control group at pre-test, because of the imagery participants' underestimate. This difference disappears after initial performance. A significant difference between the imagery and the control groups was recorded for all self-efficacy ratings after the imagery program had commenced (SE3 to SE6). For the imagery group, a significant difference was revealed between self-efficacy after initial performance (SE2) and all ratings that followed. For this condition there were also significant differences between self-efficacy after imagery session 8 and after the final performance. This indicated that, although the largest increase in self-efficacy occurred by the end of session 4, self-efficacy continued to increase for the imagery group, but not on every consecutive occasion of measurement. For the control group, no comparisons between occasions, consecutive or not, were significant.

5.3.3 Social Validation Results

The results again supported the use of social validation techniques in field research, backing up similar findings on social validation in studies one and two. Through written and verbal feedback, the players expressed extremely positive statements about the imagery intervention. They commented on gains in confidence as they used imagery techniques. Typical comments made by all players invoved in the treatment group, both over the phone and at the final kicking assessment, were, "I'm learning to concentrate on the process rather than the outcome of the kick now" (the instructions for all imagery sessions, when considering the kick were to image the process). "By imaging the kick before kicking at goal I make myself slow down rather than rushing the kick". "I feel I am taking control of the situation by imaging the processes before kicking". "By imaging the target well behind the goal, I feel much more confident in kicking a goal". "There is no reason why I can't kick a lot more goals from any place on the ground so long as I image the basics before kicking". These frequently expressed views provide support from a social validation perspective for the use of imagery in helping the performance of goal kicking skills. No negative comments were made by any participants from the experimental group to the researcher, nor were there any from this group in the written responses. Some members of the control group queried the relevance of the relaxation program, and its contribution to improving goal kicking.

Another aspect of support for this type of research, is that the research gained approval from the coaching staff, because it was conducted in the non competitive part of the year, and therefore was not seen to be encroaching on more "important" aspects of preparation in the pursuit of winning games.

5.4 Discussion and Conclusion

This study examined the use of an imagery rehearsal program for performance and self-efficacy of a goal kicking task, by elite Australian Rules Footballers outside the game situation. Comparison was made of the results of an experimental group, which employed an imagery rehearsal intervention, with a control group. To determine whether the intervention was effective, the data were subjected to ANOVA analysis. The study also examined the impact of imagery on a performance task that was closed and skill based in nature, whereas in the previous two studies, the performance tasks were open, and skill-based (kick-passing in a game), or open, and endurance-based (making the front and centre of packs in a game). The traditional research design was employed in the present study to establish the impact that an imagery rehearsal intervention would have upon self-efficacy and performance of a goal kicking skill in a controlled non-competitive environment. Importantly the current design allowed the assessment of whether self-efficacy mediated between imagery and performance. Examination of these paths was conducted using structural equation modelling in Chapter 6.

The previous two studies, which employed a single-case, multiple-baseline design, found when implementing imagery rehearsal as an intervention, that the performance of the two different skills in the competitive environment of Australian Rules Football improved significantly. The second study also found support for the positive influence of the imagery program on self-efficacy, which supported other research (e.g., Feltz & Riessinger, 1990; Martin & Hall, 1995). Very little research has been conducted to establish the mediating role that self-efficacy plays in the imagery, self-efficacy, and performance paradigm. McAuley (1989) found a mediating role for self-efficacy in influencing performance, but the intervention in his study was modelling, not imagery. Also, self-efficacy in the McAuley study was found to be the major predictor of performance only after the first self-efficacy recording. Thereafter, previous performance was found to be the major predictor. As stated earlier, the mediating role of self-efficacy will become a major thrust in the structural equation modelling analysis of the data from this study in Chapter 6.

The results of the present study supported the hypothesis that imagery rehearsal would significantly ($p<0.05$) enhance the performance of goal kicking for the imagery treatment group, when comparing pre-intervention mean scores with post-intervention mean scores. Furthermore, the comparison between the mean pre- and post-intervention goal scoring of the experimental and control groups demonstrated that the experimental group was statistically and numerically far superior in goal kicking performance at the end of the imagery rehearsal period compared to the control group, whereas there was no significant difference between the groups on pre-test. This evidence supports the impact of imagery rehearsal on the performance of a goal kicking skill. When examining the results for the experimental group, it can be seen that all 20 players improved in their mean goal kicking scoring. Furthermore, 15 of the 20 players improved their mean goal kicking performance by at least 0.5. These are remarkable results for a basic and central skill, when it is noted that the participants were elite players at the senior and nursery level of Australian Rules Football. Admittedly, not all these players, when participating in a game, play in the primary goal kicking positions. Still, they would be regarded as some of the best exponents of goal kicking in the land.

While statistical findings are important from a research perspective, the results also provide encouragement from an applied viewpoint, because all players in the imagery rehearsal group benefited noticeably from the imagery intervention. This result would be most impressive to the coaches and players. In comparison, for the control group, only seven players improved their mean goal kicking scores, with only two of these seven players improving by even 0.5. Furthermore, the control group had six players whose scores actually deteriorated from their initial goal kicking performance to their final goal kicking performance. Another telling statistic was the rather large difference between the means for the two groups. The mean goal kicking improvement for the imagery rehearsal group (0.72) compared to the control group (0.04), further supported the claim that the imagery program was effective. It is important not to devalue the practical importance of this result, because if this improved goal kicking accomplishment was able to be transferred to the game situation across the players involved in the study, then it could make the difference between winning and losing. These results support similar findings in earlier research (e.g., Blair et al., 1993; Hall & Erffmeyer, 1983; Kolonay, 1977), that used traditional research design to assess the impact of employing imagery rehearsal as an intervention on the performance of closed skills in controlled environments.

The results further supported the hypothesis that self-efficacy would significantly improve with the use of imagery rehearsal. There was a significant improvement ($p < 0.05$) in the experimental group's strength of self-efficacy scores after the imagery intervention was introduced, whereas no differences were detected in the self-efficacy scores over the same period of time for the control group. The real strength of the influence of imagery rehearsal on self-efficacy was shown when self-efficacy was scored following the initial four sessions of the imagery intervention (SE3). There had been no significant difference in self-efficacy ratings between the two groups up to the second self-efficacy score, that is, prior to the initial intervention period. The third self-efficacy score showed a significant difference between the imagery rehearsal group and the control group. This is an important result in support of imagery enhancing self-efficacy, especially, when in the same time period, the self-efficacy rating for the control group showed no change. Subsequent self-efficacy scores for the imagery rehearsal group were all significantly different to the control group self-efficacy scores.These results are consistent with the results of Feltz and Riessinger (1990), who found that imagery rehearsal participants had significantly higher self-efficacy scores than participants in a control group.

The results again supported the use of social validation techniques in field research, supporting similar findings on social validation in studies one and two. Through written and verbal feedback, the players expressed extremely positive statements about the imagery intervention. They commented on gains in confidence as they used imagery techniques. Interestingly, no negative comments were made by any participants from the imagery rehearsal group to the researcher. In this case, social validation supported the conclusions drawn from inferential statistics.

An important consideration to acknowledge here that may have had a unique influence on the study is the relationship that existed between myself and the senior St. Kilda players which may have contributed to the level of compliance shown by these players with the requirements of the study. As a former senior player with that club and as the current fitness coordinator, I had a unique contact with the players that was probably closer than for any other coach in the football club. This fact no doubt gave credibility to the research being carried out and also instilled in the players the thought of some loyalty to me and wanting to "do the right thing" by me. The elite under eighteen players might have had a similar response to the various requirements but their diligence may have been more motivational in nature. These junior players are hopeful (and, for many, single-minded) about becoming senior AFL players. Knowing my background, from a playing perspective, and, more importantly, my current official role at a senior AFL club that they were aspiring to join, they would be enthusiastic to do all requested of them to impress, and increase their chances of being drafted. Having noted that there could have been reasons for all the players to try hard, it must still be recognised that in this study the research was conducted out of the competitive season, so the players were not in constant contact with me, as they were daily in studies 1 and 2.

It is worth noting that, approval from the coaching staff for such research was on the condition that it had to be carried out in the non-competitive part of the year, because of the nature of the research, employing traditional research design with a control group. Gaining access to participants in most sports in the competitive season could pose a major problem in conducting traditional research design programs. This was not an issue in studies one and two, where the coaching staff were prepared to accept a single-case, multiple-baseline design, during the competitive season. In their minds, research of this type would not have a dramatic "disruptive " effect on the whole team, if it was conducted during the competitive season.

The current study produced positive results concerning the effects of imagery rehearsal on the performance of the closed skill of kicking at goal in a non-competitive situation. Furthermore, it was observed that self-efficacy increased with the introduction of the imagery intervention for the experimental group, when there was no increase in self-efficacy for the control group. What is not understood is the impact that self-efficacy has on final performance, and, thus, whether it performs a mediating role between imagery and final performance. Based on the results of findings from other studies (e.g., Feltz, 1982, 1988; McAuley, 1985; and Weiss, Weise & Klint, 1989), as well as on experience and intuition, the belief that self-efficacy leads to an improvement in performance seems reasonable. The present study established that there was a significant increase in self-efficacy and performance with the introduction of an imagery rehearsal intervention package over a substantial period of time (that is, a month). The analyses in this chapter did not examine whether self-efficacy helped to significantly improve the performance of goal kicking by playing a mediating role between imagery and performance. To examine this issue, it is necessary to establish if there are significant causal paths between the variables imagery, self-efficacy, and performance, by conducting a modelling analysis on the present data. This is done in the following chapter.

Future research is required to establish if the finding of this study can be transferred to the same skill execution in the real world environment. This is vital for the credibility of theory being transferred to practice. Another aspect that needs to be considered is the conditions under which imagery is most effective for influencing self-efficacy and/or performance.

Chapter 6 : Causal Modelling Imagery, Self-Efficacy and Performance

6.1 Introduction

Bandura's (1977) Social Cognitive Theory predicts that a treatment such as imagery will have a direct effect on self-efficacy and an indirect effect on performance through self-efficacy, that is, self-efficacy acts as a mediating variable between imagery and performance. In addition, George (1994) supported Feltz (1988) and Gill (1986) who stated, that self-confidence was one of the most frequently cited psychological factors thought to affect athletic performance and that it had been called the most critical cognitive factor in sport. There has been other support for the self-efficacy – performance relationship found in controlled settings (e.g., Feltz, 1982; Feltz & Mugno, 1983; McAuley, 1985). As well, research has provided correlational support for the self-efficacy performance relationship, in studies conducted in sport settings (Barling & Abel, 1983; Gayton Et al., 1986; Lee, 1982). In research that provided important external validity for the causal and directional elements of Bandura's (1986) self-efficacy theory, George (1994) studied the relationship between self-confidence and baseball performance. George used path analytic techniques in a study of 53 male intercollegiate and interscholastic baseball players. They completed self-report measures over a nine game period during the baseball season. It was found that stronger self-efficacy predicted greater effort in six games and higher hitting performance in five games. An important aspect of this study that must be noted is that it is one of first to be conducted in a real competitive setting.

The second study in this thesis, which was described in Chapter 4, demonstrated that an imagery rehearsal program enhanced both performance and self-efficacy, for highly skilled football players, who were already performing at the elite level and had relatively high self-efficacy levels at the start of the study. Those results were consistent with the proposition that imagery affected performance through its effect on self-efficacy. The nature of that data, however, precluded causal modelling of the paths from imagery rehearsal to self-efficacy, from imagery to performance, and most importantly for testing the possible mediating role of self-efficacy, from self-efficacy to performance. The third study in this thesis, described in chapter five, aimed to examine the use of an imagery rehearsal program to enhance self-efficacy for, and the performance of, goal kicking of elite Australian Rules Footballers outside the game situation. Comparison was made between the results of an experimental group, which employed an imagery rehearsal intervention, and a control group. The results once more, and with greater statistical support than in study two, demonstrated using Analysis of Variance (ANOVA), that imagery significantly enhanced both performance and self-efficacy. The ANOVA results, while again being consistent with Bandura's prediction, could only be suggestive. At the same time, an experimental design was employed because it permitted a modelling analysis to be conducted. This chapter presents a structural equation modelling analysis of the causal relationships between imagery rehearsal, self-efficacy and performance.

Because it has been little used in the field of sport psychology, it is appropriate to first describe the nature of structural equation modelling in general.

Then the nature of the model to be tested in this specific analysis is developed. Results of the structural equation modelling analysis are then presented and discussed.

6.2 Structural Equation Modelling

6.2.1 General Principles

Structural equation models are often used in attacking many substantive problems in the social and behavioural sciences. In methodological terms, the models have been referred to as simultaneous equation systems, linear causal analysis, path analysis, and structural equation models, among other less widely used terms. The structural equation model is used to specify the phenomena under study in terms of cause and effect variables and their indicators. The LISREL model was introduced by Joreskog (1973) and followed up by Joreskog and Sorbom (1986, 1993). LISREL is a general computer program devised for estimating the unknown coefficients in a set of linear structural equations. The LISREL program finds the values of parameters which minimises the discrepancy between the theoretical variance covariance matrix and that , that was observed for observed variables. The variables in the equation system may be either directly observed variables or unmeasured latent variables which are not observed, but are related to observed variables (Byrne, 1989). Latent variables are also called factors as well as constructs. In its most general form, the model assumes that there is a causal structure among a set of latent variables. The latent variables appear as underlying causes of the observed variables. Latent variables can also be treated as caused by observed variables or as intervening variables in a causal chain. Since latent variables are not directly observed, they can not be directly measured. Thus, the researcher must operationally define the latent variable of interest in terms of behaviour believed to represent it. Assessment of the construct, then, is obtained indirectly through measurement of some observed behaviour (Byrne, 1989). Observations may include self-report responses to an attitude scale, coded response to interview questions, or, in the case of the current study, objective scores on goal kicking and self-reports on self-efficacy, that is, self reports on the confidence that one has in performing a particular task. These scores are considered to represent the underlying construct of interest.

Causal modelling statistical models are a convenient way of describing a structure underlying a set of observed variables, that is, they are a diagrammatic way of presenting how the observed and latent variables are related to one another. Typically, a researcher postulates a statistical model based on knowledge of the related theory, on findings from other research conducted in the area, or on some combination of both. The researcher then sets out to test the model by collecting data on all variables specified in the model. The primary statistical problem is to examine the goodness of fit between the hypothesised model and the sample data that comprise the observed variables. Byrne (1989) contends that it is highly unlikely that a perfect fit will exist between the observed data and the hypothesised model, thus, there will be a differential between the two, known as the residual. In other words the residual represents the difference between the hypothesised model and the observed data.

The LISREL model consists of two parts: the measurement model, and the structural equation model. The measurement model specifies how the latent variables or hypothetical constructs are measured in terms of the observed variables and is used to describe the measurement properties (validities and reliabilities) of the observed variables. The structural equation model specifies the causal relationships among the latent variables and is used to describe the causal effects and the amount of unexplained variance. In other words, it describes which latent variables directly or indirectly influence changes in the value of other latent variables in the model. It is therefore important, in specifying the structural model, that distinction is clearly made between exogenous latent variables and endogenous latent variables. Exogenous latent variables are synonymous with independent variables, they cause fluctuations in the value of other latent variables in the model. Fluctuations in the values of exogenous variables are not explained by the model; rather they are considered to be influenced by other factors external to the model. Examples of other factors, which are often external or typical exogenous variables are age, sex, and socioeconomic status. Endogenous variables are synonymous with dependent variables; they are influenced by the exogenous variables in the model, either directly or indirectly. Fluctuation in the values of the endogenous variables is said to be explained by the model since all latent variables that influence them are included in the model specification. In the LISREL model all exogenous variables are termed "X-Variables"; endogenous variables are termed "Y-Variables".

Path analysis is a technique to assess direct causal contribution of one variable to another in a non-experimental environment. Path analysis assumes that observed variables are linear combinations of some underlying source variables or factors. That is, it assumes the existence of a system of underlying factors and a system of observed variables. Path analysis readily allows for the visual portraying of the underlying causal relationships among factors and observed variables, the path diagrams are used as a means of expressing these linear relationships. The first step of path analysis involves an investigation of the interrelationships among these variables, by considering correlation coefficients as a measure of association. The problem is estimating the coefficients of a set of linear structural equations, representing the cause and effect relationships hypothesised by the investigator. The researcher builds a basic model incorporating the independent or cause variable(s) and dependent or effect variable(s), which are linked by arrows that are directed from the cause to the effect. There are two major types of model, recursive and non-recursive or interdependent systems. In recursive models, paths show one-directional cause and effect relationships, whereas the paths in non-recursive models include paths representing relationships which act in both directions. The technique consists of solving the structural equations for the dependent variable(s) in terms of the independent variable(s). LISREL considers all the equations and paths together, represents the model as a system of equations, and estimates the structural coefficients directly. From the initial, basic model built, the researcher expands the model to include additional factors and paths to establish the path coefficients from the independent variables to the dependent variables, that is, as it establishes and refines the cause and effect relationship between the independent and dependent variables, the more detailed the path analysis model becomes.

6.2.2 Assessment of fit

One important aspect in the application of LISREL is the assessment of the fit and the detection of the lack of fit of the data collected to the model proposed. LISREL provides several powerful tools for this purpose. The first and most obvious way of assessing the goodness of fit of the model is to examine the results of the analysis paying particular attention to parameter estimates, standard errors (for Maximum Likelihood (ML) only), squared multiple correlations, coefficients of determination and correlations of parameter estimates (for ML only). If any of the above has an unreasonable value, this is an indication that the model is fundamentally wrong and that it is not suitable for the data. Examples of such unreasonable values in the parameter estimates are negative variances, correlations that are larger than one in magnitude, covariance or correlation matrices which are not positive definite, squared multiple correlations or coefficients of determination which are negative. This means that the model is non identified and that some parameters can not be determined from the data. The program gives a squared multiple correlation for each observed variable separately and a coefficient of determination for all the observed variables jointly. It also gives squared multiple correlations for each structural equation and coefficients of determination for all structural equations jointly. The squared multiple correlation is a measure of the strength of relationship, and the coefficient of determination is a measure of the strength of several relationships jointly. The measures show how well the observed variables serve, separately or jointly, as measurement instruments for the latent variables. These coefficients are between zero and one, large values being associated with good models.

In addition, the model evaluation concerns the assessment of the goodness of fit of the model to the data. The goodness of fit of the whole model may be judged by four measures of overall fit. One of these measures is the overall Chi Squared (χ^2) measure and its associated degrees of freedom and probability level (for ML only) χ^2 is not regarded as a test statistic but rather as a goodness or badness of fit measure in the sense that large χ^2 values correspond to bad fit and small χ^2 values, which are not significant, correspond to good fit. Sample size has an important influence on judging the meaning of the χ^2. Large sample sizes tend to increase the χ^2. Byrne (1989) proposes using the degrees of freedom (df), rather than sample size itself, to moderate chi squared producing what is called the Chi–Squared ratio. In this formulation, Byrne suggests that χ^2 divided by df should be less than 2.0 for a good fit. The other three measures of overall fit are the Goodness of Fit Index (GFI), the Adjusted Goodness Of Fit Index (AGFI) and the Root Mean Square Residual (RMSR). All of these measures should be between zero and one. GFI is a measure of the relative amount of variances and covariances jointly accounted for by the model. Unlike χ^2, GFI is independent of the sample size and relatively robust against departures from normality. Because the GFI examines variance/covariance accounted for, a value close to 1.0 signifies good fit. The Goodness of Fit adjusted for the degrees of freedom is called the Adjusted Goodness of Fit Index. Again, a value close to one signifies a good fit. The AGFI is usually a little lower than the GFI. The RMSR is a measure of the average of the residual variances and covariances. The RMSR can be used to compare the fit of two different models for the same data. Because it measures the residual, an RMSR value close to zero represents a good fit.

It must be mentioned that the χ^2, GFI, AGFI, and RMSR are measures of the overall fit of the model to the data and do not express the quality of the model judged by any other internal or external criteria. For example, if any of the overall measures indicate that the model does not fit the data well, this does not indicate what is wrong with the model or which part of the model needs to be adjusted. It should also be noted that many experts, including Joreskog and Sorbom (1979) stress that goodness of fit indices should not be considered to be absolute indicators of fit. Rather Joreskog and Sorbom (1979) emphasise that these measures reflect better or worse fit, so such modelling techniques often evaluate the comparative fit of alternate models. Even when the best model in terms of fit is determined, that does not make it the "best" model possible, just the best of these models included for testing. Recently, more sophisticated measures of fit have begun to emerge (e.g., Bollen, 1989; Mulaik, James, Van Alstine, Bennett, Lind, & Stillwell, 1989) For the present purposes, these were not considered.

6.3 Structure of the Model

The structural model relating imagery, self-efficacy, and performance in the goal kicking study was developed on the grounds that one exogenous (independent) variable, the imagery rehearsal intervention, provided to the experimental group, and two endogenous (dependent) variables, self-efficacy and kicking performance, were linked as shown in Model 1, Figure 6.1. This model reflects the basic associations between imagery and performance directly and between imagery and performance mediated by self-efficacy, that is, one path from imagery to self-efficacy and another from self-efficacy to performance. In this, and all the following models, imagery is a dummy variable, where the experimental condition was given a dummy value of 2 and the control condition was given a dummy value of 1. All models are recursive, that is, they consider only one-directional, causal relationships, that direction being determined by temporal flow. In other words, the causal paths reflect variables which follow each other in time. Visually they are presented from left to right across the page to reflect that flow.

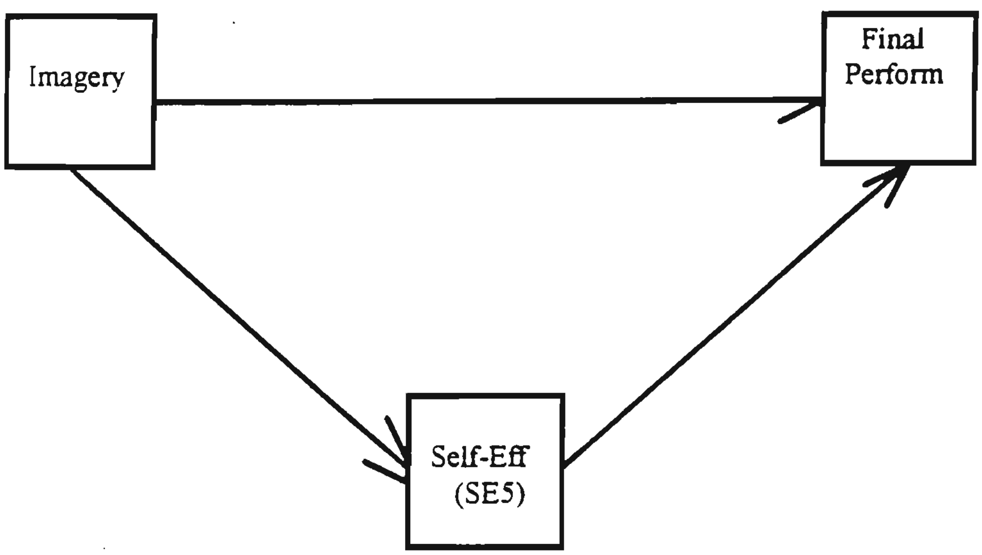


Figure 6.1. Model 1, the basic LISREL structural equation model.

Model 2, as shown in Figure 6.2, incorporates the basic model, but the endogenous variable, self-efficacy, is expanded to three components in this model, because self-efficacy was measured on three occasions during the treatment; self-efficacy after four imagery sessions (SE3), self-efficacy after eight imagery sessions (SE4), and self-efficacy after ten imagery sessions (SE5). A score for each was gained by recording participants' self-reported self-efficacy, that is, their confidence to score goals from various positions on an Australian Rules football ground, after the fourth, eighth and tenth imagery sessions. Causal links are studied as in model 1 but also include the paths from SE3 to SE4, SE4 to SE5, and SE5 to final goal kicking performance (Pf).

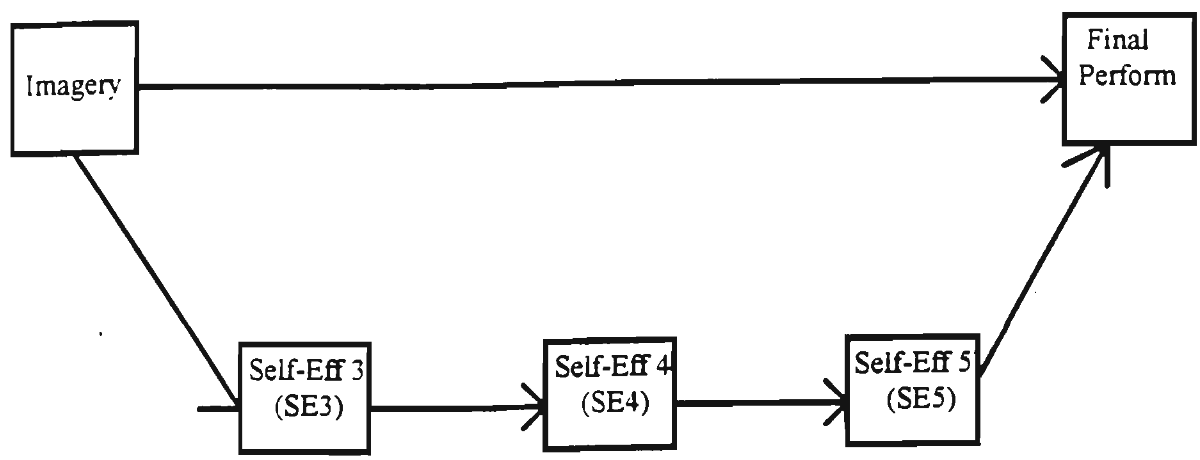


Figure 6.2. Model 2, the LISREL structural equation model including SE 4 and SE 5.

Model 3, as shown in Figure 6.3, expands the basic model to include recording an initial self-efficacy assessment (SE1), which was done before the players performed the task, to establish the players' initial self-confidence in their ability to kick goals from twenty different positions on an Australian rules football ground. It should be noted that SE1 is an exogenous variable, since it is not proposed that the model explains it through stated variables. It enters as a given value. This was immediately followed by an initial performance test (Pi) of the player's goal kicking ability. The kicks were taken from the twenty positions, for which players were asked to rate their self-efficacy. A post initial goal kicking performance self-efficacy rating (SE2) was conducted, so that players could reconsider their self-efficacy assessment after performing the task. Causal links are studied as in model 2, but also including the paths from SE1 to SE2, SE2 to SE3, SE3 to SE4, and from SE4 to SE5. Additional causal links are included between SE1 and initial goal kicking performance (Pi), between initial goal kicking performance and final goal kicking performance (Pf), and between initial goal kicking performance and post initial goal kicking performance self-efficacy (SE2). Imagery in all models from model 3 to model 5 refer to imagery as IM.

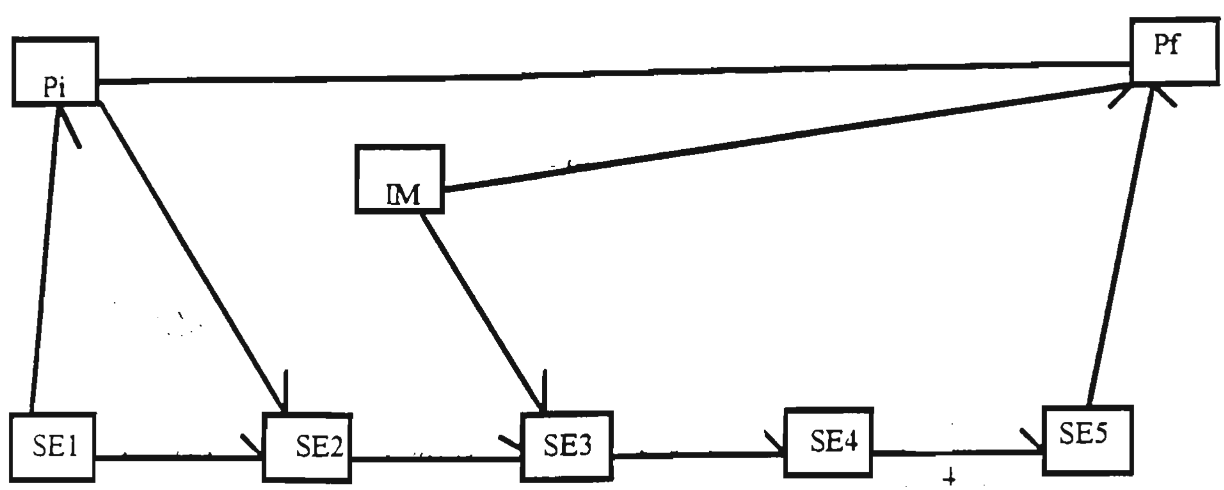


Figure 6.3. Model 3, the LISREL structural equation model including initial goal kicking performance and the first five self-efficacy ratings.

Model 4 as shown in Figure 6.4, includes all links as in model 3 with the elimination of variables initial self-efficacy (SE1) assessment and post-initial goal kicking performance self-efficacy (SE2) assessment. Causal links are included, to establish if there is an influence, between intervention period self-efficacy ratings and final goal kicking performance scores, that is, self-efficacy assessment after the fourth session (SE3) and final goal kicking performance, self-efficacy assessment after the eighth imagery session (SE4) and final goal kicking performance, and self-efficacy assessment after the tenth imagery session (SE5) and final goal kicking performance.

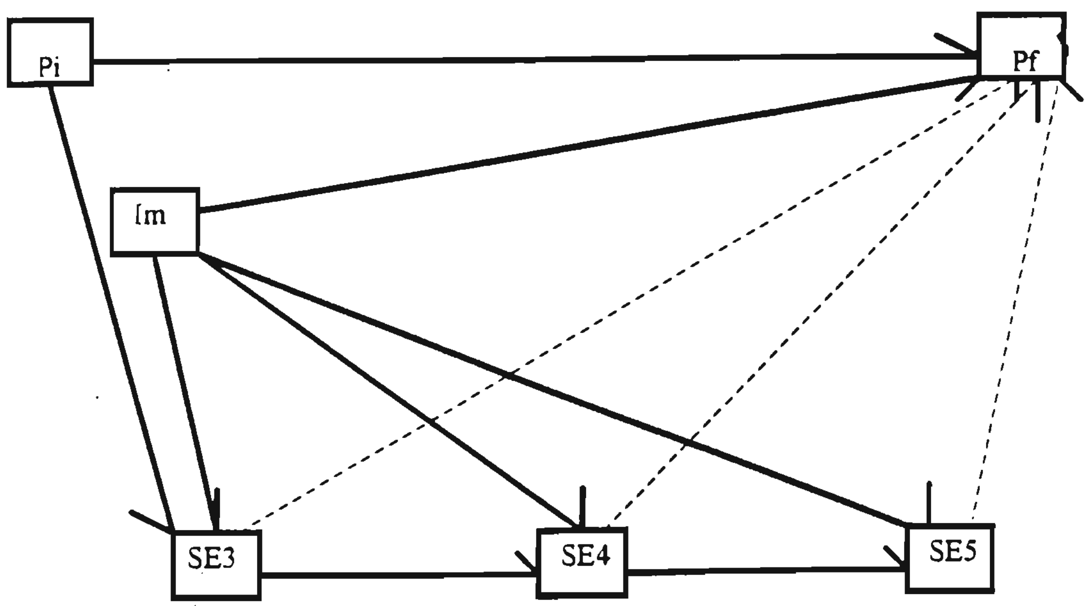


Figure 6.4. Model 4, the LISREL structural equation model including imagery, intervention period self-efficacy and final performance.

Model 5, as shown in Figure 6.5, incorporates all variables with the inclusion of a final self-efficacy assessment (SE6), which was conducted after the final goal kicking performance. Causal links are studied as in model 4, with the inclusion of paths between the independent variable, imagery intervention, and self-efficacy assessment after the fourth imagery session (SE3), imagery intervention and self-efficacy assessment after the eighth imagery session (SE4), and imagery intervention and self-efficacy assessment after the tenth imagery session (SE5). Additional causal links are included between SE5 and the final self-efficacy assessment (SE6), and between the final goal kicking performance and the final self-efficacy assessment (SE6).

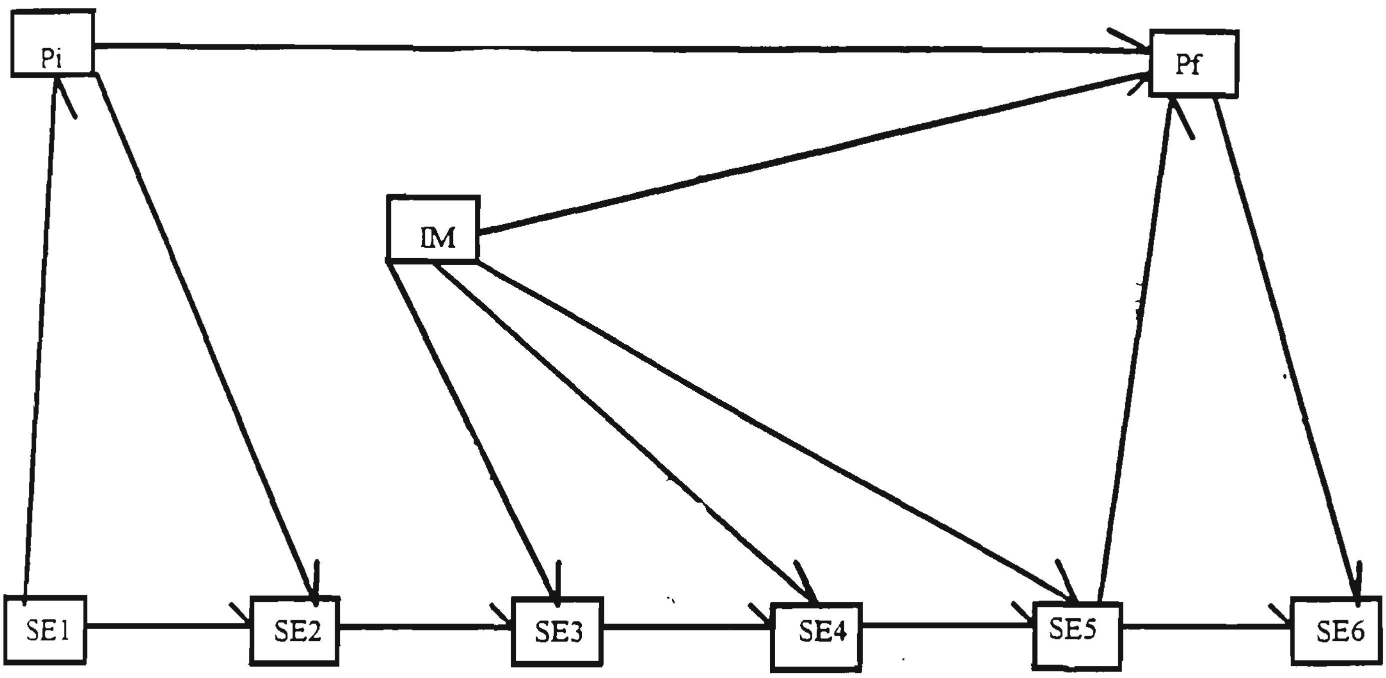


Figure 6.5. Model 5, the fully expanded LISREL structural equation model.

Structural equation modelling also permits the testing and comparison of partial models which build to form the final model. The advantage of this is that it can identify paths which are significant only when more potent influences are not considered. Conversely, paths which remain significant, despite the addition and removal of other variables, can be considered to display a degree of robustness. Thus, the five models proposed here were subjected to LISREL structural equation modelling to examine the causal relationship among imagery, self-efficacy and goal kicking performance in this non-competitive but challenging context.

6.4 Methods

6.4.1 Participants, Treatment, Measures and Procedure for Data Collection.

The participants, treatment, measures and procedure for data collection were those reported in sections 5.2.1 to 5.2.5.

6.4.2 Structural Equation Modelling Methods

The version of LISREL used in the structural equation modelling was 7.20 by Joreskog and Sorbom (1986). The variables employed and their relationships for the structural equation modelling analysis are as presented in section 6.3. There was one exogenous (independent) variable, imagery rehearsal and two endogenous (dependent) variables, self-efficacy and goal kicking performance, although SE1 which was the first variable recorded in the study was not influenced by any variables within the study. The structural equation model reflects the association between imagery and performance directly and between imagery and performance mediated by self-efficacy. As described in section 6.3, the structural equation modelling procedure applied here starts with a basic model considering only three paths, from imagery to final performance, from imagery to self-efficacy, and from self-efficacy to final performance. The last two paths reflecting self-efficacy as a mediating variable. This develops via three intermediate models, through to a final recursive model, which considers all potential temporal paths, which include initial performance, six separate self-efficacy recordings, imagery rehearsal as a dummy variable, and final goal kicking performance. The statistical analysis of the five structural models considered path coefficients, t-tests, p values and goodness of fit measures.

6.5 Results

The results section presents the models described in section 6.3 in the same sequence, considering path coefficients, t-test values and probabilities as well as goodness of fit statistics, for each model. Figure 6.6 depicts Model 1 with path coefficients (Maximum Likelihood) and t-values.

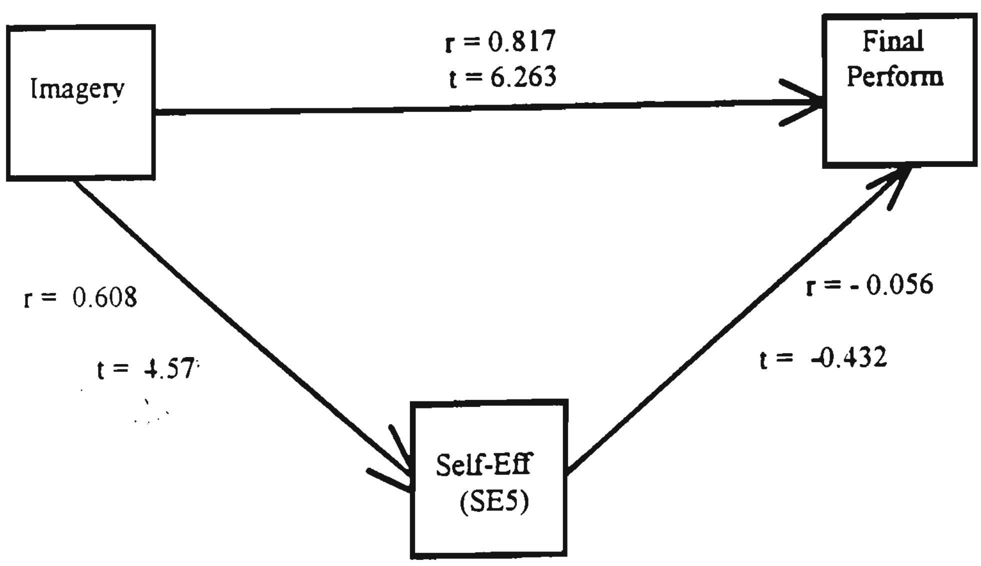


Figure 6.6. Basic model relating imagery, self-efficacy and performance, including path coefficients and t-tests.

The path coefficients in Figure 6.6 show that imagery had a strong and highly significant direct influence on final performance (r=.817, t=6.263, p<0.001), and also a significant direct influence on SE5 (r=.608, t=4.57, p<0.05). No significant effect was found for the path between SE5 and final performance, that path approaching zero (r=-.056, t=-0.432, p>0.10).

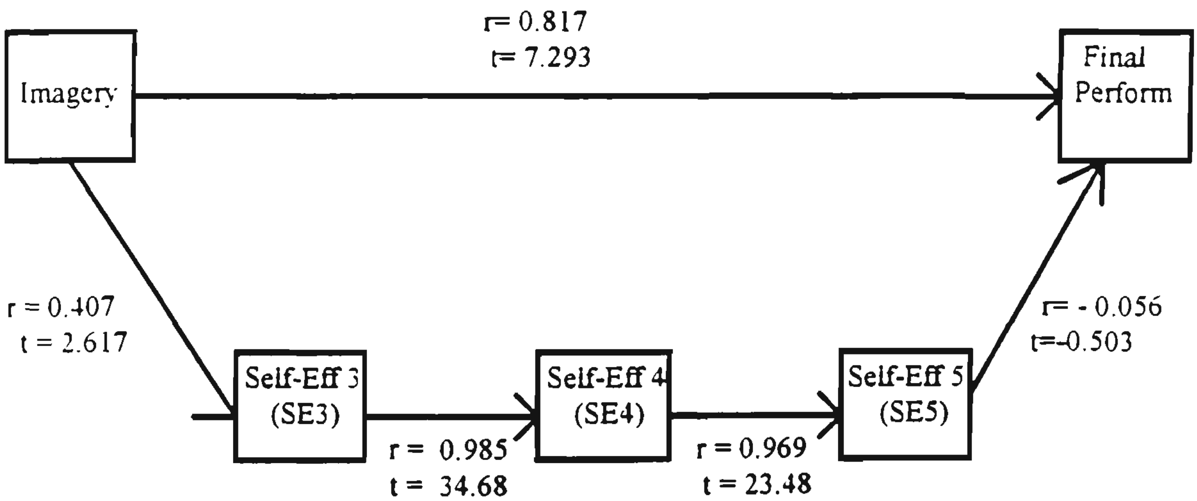


Figure 6.7. LISREL path coefficients and, t-test values for Model 2, including three self-efficacy measures.

The results of the structural equation modelling analysis for model 2 are presented in Figure 6.7. The path coefficients in Figure 6.7 show that imagery had a strong and highly significant direct influence on final performance (r=.817, t=7.293, p<0.001) as in the basic model, and also a significant direct influence on SE3 (r=.40, t=2.617, p<0.05). In addition, strong and highly significant causal links were found between SE3 and SE4 (r=.985, t=34.68, p<0.001), and between SE4 and SE5 (r=.969, t=23.48, p<0.001). Again, as in the basic model, no mediating effect was found for the path between self-efficacy and final performance which approached zero (r=-.056, t=-0.503, p>0.10). In this model, the path is again from

SE5 to final performance, that is, it is from the self-efficacy rating taken prior to final performance.

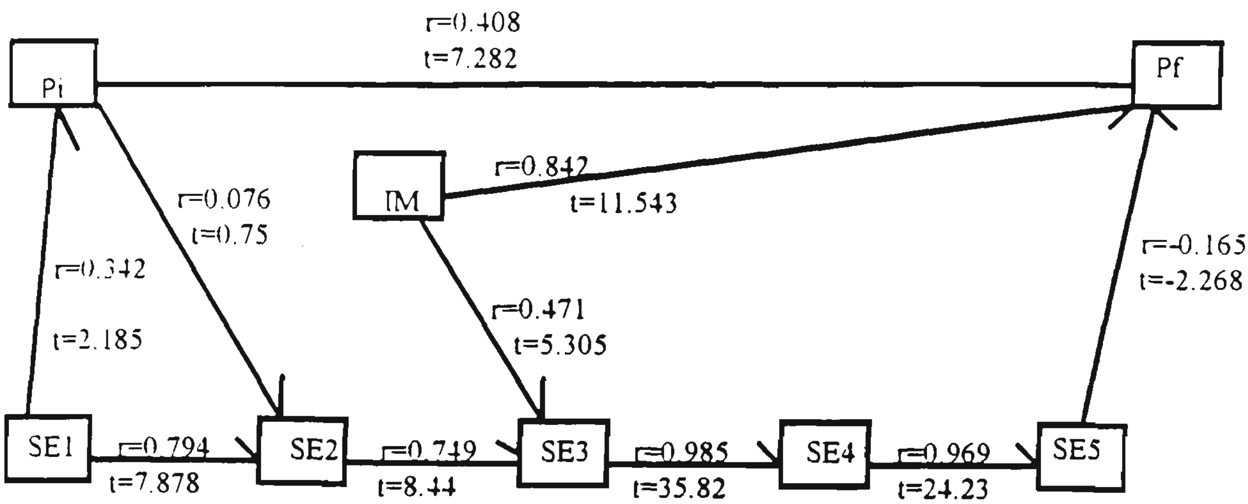


Figure 6.8. LISREL path coefficients and, t test values and probabilities for Model 3 including initial performance and the first five self-efficacy ratings.

The results for model 3 are shown in Figure 6.8. The path coefficients in Figure 6.8 show that imagery again had a highly significant direct influence on final performance (r=.842, t=11.543, p<0.001), and a highly significant direct influence on SE3 (r=.471,t=5.305, p<0.001). Also, strong and highly significant causal links were found between SE3 and SE4 (r=.985, t=35.82, p<0.001), and between SE4 and SE5 (r=.969, t=24.23. p<0.001). In addition, strong, significant causal links were found between initial self-efficacy (SE1) and post initial performance self-efficacy (SE2) (r=.794, t=7.878, p<0.001), and SE2 and SE3 (r=.749, t=8.441, p<0.001). In model 3, a direct link, was found between SE1 and initial performance (Pi) (r=.342, t=2.185, p<0.05) as well as a significant link from initial performance (Pi) to final performance (Pf) (r=.408, t=7.282, p<0.001). In this model, however, no direct link was found between initial performance and post initial performance self-efficacy (SE2) (r=0.076, t=0.75, p>0.05). Finally, in model 3 a causal link, which just reached significance, was established from SE5 to final performance (Pf) (r=-.165, t=-2.268, p<0.05).

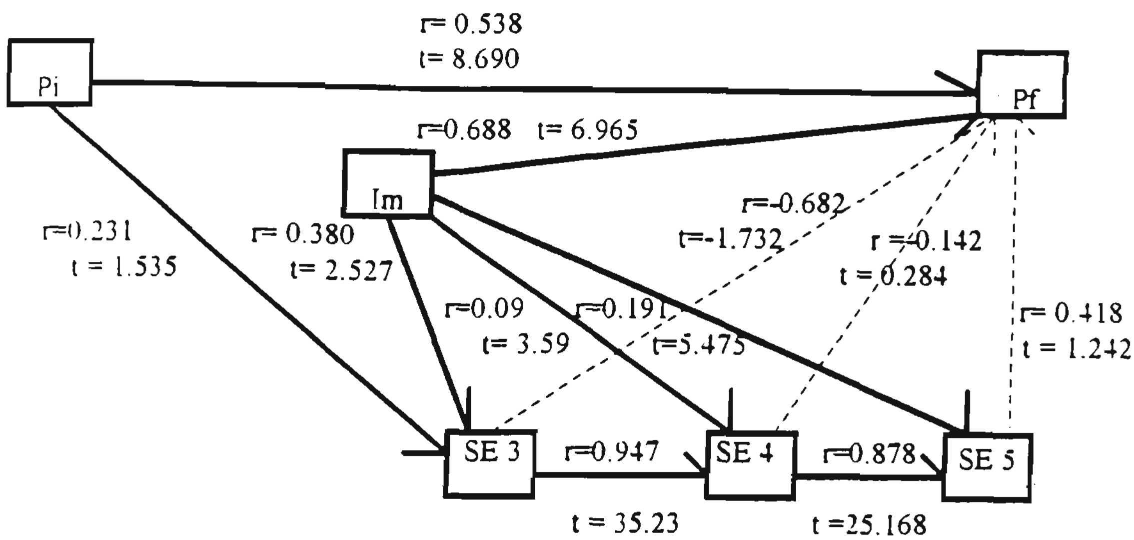


Figure 6.9. LISREL path coefficients and t test values for Model 4.

The results for model 4 appear in Figure 6.9. The path coefficients in Figure 6.9 show that imagery had a strong significant direct influence on final performance (r=.688, t=6.965, p<.001), and a significant direct influence on SE3 (r=.380, t=2.527, p<.05). In addition, imagery was found to have a significant direct influence on SE4 (r=.096, t=3.59, p<.05), and a significant direct influence on SE5 (r=.191, t=5.475, p<.001). Also, strong, significant causal links were found between SE3 and SE4 (r=.947, t=35.228, p<.001), and SE4 and SE5 (r=.878, t=25.158, p<.001). A significant direct link was found from initial performance to final performance (r=.538, t=8.690, p<.001). Finally, in this model, no direct link was found between, SE3 and final performance (r=−.682, t=−1.732, p>.05), SE4 and final performance (r=.142, t=0.284, p>.05), or SE5 and final performance (r=.418, t=1.272, p>.05).

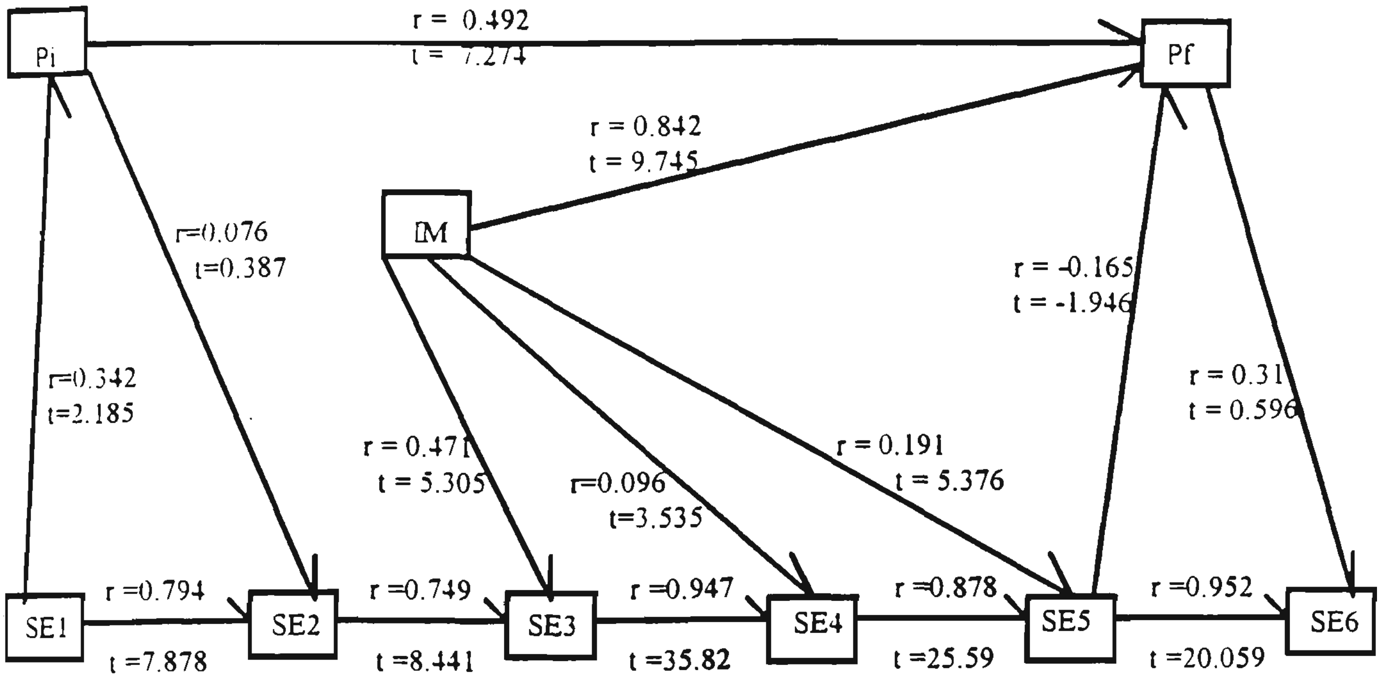


Figure 6.10. LISREL path coefficients and, t test values and probabilities for Model 5.

The results for model 5 are shown in Figure 6.10. Model 5, included all variables with the inclusion of final self−efficacy. The path coefficients in Figure 6.10 show that imagery had a strong and highly significant direct influence on final performance (r=.842, t=9.745, p<.001), and a highly significant direct influence on SE3 (r=.471,t=5.305, p<.001). In addition, imagery was found to have a significant direct influence on SE4 (r=.096, t=3.535, p<.05), and a highly significant direct influence on SE5 (r=0.191, t=5.376, p<.001). Initial performance had a highly significant influence on final performance (r=0.492, t=7.274, p<.001), however, initial performance did not have a significant influence on SE2 (r=0.076, t=0.387). Initial self-efficacy (SE1) was found to have a significant influence on initial performance (Pi) (r=0.342, t=2.185, $p<.05$) and a highly significant influence on SE2 (r=0.794, t=7.878, $p<.001$). Also, strong significant causal links were found between SE2 and SE3 (r=0.749, r=8.441. p=<.001), SE3 and SE4 (r=0.947, t=35.82, $p<.001$), and SE4 and SE5 (r=0.878, t =25.49, $p<.001$). Additionally SE5 was found to have a highly significant influence on final self-efficacy (SE6) (r=0.952, t=20.059, $p<.001$). When considering the causal link between SE5 and final performance (Pf) (r=−0.165, t=−1.946, $p>.05$), it can be seen from the t value that the link just failed to reach significance. Finally, no significant causal relationship was found between final performance and final self-efficacy (SE6) (r=0.31, t=0.596. $p>.05$).

6.5.1 Goodness of Fit

Many factors are taken into account in assessing the adequacy of a hypothesised model. Firstly, the adequacy of the measurement model must be considered. The squared multiple correlation, R−Squared (R2), is an indication of each observed measure with respect to its underlying latent construct. In Model 1, the Squared Multiple Correlation for Structural Equations from the LISREL data for final performance was R2 = .614, suggesting the explained variance in performance by the model is 61%, with 39% not yet accounted for. The variable with the largest direct effect was imagery rehearsal (beta = .817). The least contributory variable to final performance was self−efficacy (beta = −.056). For self−efficacy, 39% of the variance in self−efficacy derives from the influence of imagery rehearsal, with 61% of the variance in self–efficacy not yet accounted for. The co–efficient of determination was 0.698 suggesting that the variables when combined provide a fair model through model 1. The goodness of fit of the overall model is ($\chi^2(0) = 0.00$, $p = 1.00$)). The Goodness of Fit Index is 1.00 which suggests a good fit between the hypothesised model and the observed data. The Root Mean Square Residual indicates the average discrepancy between the elements in the sample and the hypothesised covariance matrices. For a good fit, the value should be less than .05. In the case of model 1, the RMSR is .000 which is highly significant. The result that there was no substantial relationship between self–efficacy and final performance needs to be particularly noted. The value of 0.0 with a probability of 1.0 for χ^2 and the values of 1.00 and 0.0 for Goodness of Fit and RMSR respectively, are artificial, occurring because the program cannot differentiate between the variables when only three are specified, one for each latent variable.

In model 2, the Squared Multiple Correlation for Structural Equations from the LISREL data for final performance was R2 = .622, suggesting that the explained variance in performance by the model is 62% with 38% not yet accounted for. The variable with the largest direct effect is imagery rehearsal (beta = .817). The least contributory input to performance came from self–efficacy (beta = –.056). The model shows that 94% of the variance in SE5 derives from the influence of SE4, 97% of the variance in SE4 derives from the influence of SE3, and that 16% of the variance in SE3 derives from the influence of the imagery rehearsal with 84% of the variance in SE3 not yet accounted for. In model 2, the most reliable measure was for SE4 (R2 = .971), while the least reliable was SE3

($R2$ = .160) with SE5 ($R2$ = .939), and final performance ($R2$ = .622), also showing good reliability. The co-efficient of determination was 0.657, suggesting that the variables when combined provide a fair to good model through model 2. The goodness of fit of the overall model is ($\chi^2(5) = 38.24$, p =.000). The χ^2 ratio is 38.24/5 = 7.46 suggesting that the model does not represent a good fit to the data. The Goodness of Fit Index (GFI) is .714 which suggests a fairly good fit between the hypothesised model and the observed data. The Adjusted Goodness of Fit Index, however, equals .142 which is a very poor fit. This degree of discrepancy between GFI and AGFI is very unusual. It is not clear why it emerged. It does signal caution in interpreting this model. The Root Mean Square Residual for model 2 is .081, which is not below, but does approach 0.05. Again, it must be noted that there was no substantial relationship between SE5 and final performance.

In model 3, the Squared Multiple Correlation for Structural Equations from the LISREL data for final performance was $R2$ = .842, suggesting the explained variance in performance by the model is 84% with 16% not yet accounted for. The variable with the largest direct effect on performance is imagery rehearsal (beta = .781). There was also a significant contribution towards final performance from initial performance (beta = .408). The least contributory variable to final performance was self-efficacy (beta = –.056). The model shows that 94% of the variance in SE5 ($R2$ = .942) is accounted for by the model, with the major influence derived from SE4 (beta = .967). The model shows that 97% of the variance in SE4 ($R2$ = .973) is accounted for by the model, with the major contributor being SE3. It is also shown that 73% of the variance in SE3 is accounted for by the model ($R2$ = .734), with the major significant influence derived from the initial self efficacy

(SE1) (beta = .749). In addition, there is a significant influence on SE3 from the imagery intervention (beta = .471). Model 3 further shows through the Squared Multiple Correlations for Structural Equations a post initial performance self-efficacy (SE2) multiple correlation, R2 = .677, meaning that 68% of the variance is caused by the model, with the most significant influence being initial self-efficacy (beta = .816) and the least influence coming from initial performance (beta = .076). In model 3, the most reliable measure was for SE4 (R2 = .973), while the least reliable was initial self-efficacy (SE1) (R2 = .000), with SE5 (R2 = .942), final performance (R2 = .842), SE3 (R2 = .734), post initial self-efficacy (R2 = .677), all showing noteworthy influences, while initial performance (R2 = .117) and initial self-efficacy (R2 = .000) were weak variables. The co-efficient of determination was 0.844, suggesting that the variables when combined provide a very good model through model 3. The goodness of fit of the overall model is ($\chi^2(18) = 62.71$, p = .000). The χ^2 ratio is 62.71/18 = 3.48, suggesting that the model is not a good fit to the data. The Goodness of Fit Index (GFI) is .722 which suggests a fairly good fit between the hypothesised model and the observed data. The Adjusted Goodness of Fit Index equals .443, however, which is not as good a fit. The difference between the GFI and AGFI, while not as extreme as for the previous model, is still large, suggesting caution once more. The Root Mean Square Residual is .091 which is not a good fit.

In model 4, the Squared Multiple Correlation for Structural Equations from the LISREL data for final performance was R2 = .833, suggesting the variance in performance explained by the model is 83%, with 17% not yet accounted for. The variable with the largest direct effect on performance is imagery rehearsal (beta =

.842). There was also a significant contribution towards final performance from initial performance (beta = .492). The least contributory variable to final performance was self-efficacy (beta = -.121). A final self-efficacy evaluation (SE6) was introduced to this model. Ninety-Four percent of the variance in final self-efficacy is accounted for by the model (R2 = .938), the variable with the largest direct significant effect on final self-efficacy (SE6) being SE5 (beta = .952), however, there was no significant influence on final self-efficacy from final performance (beta = .31). In model 4, the paths from imagery to SE3, imagery to SE4 and imagery to SE5, were also examined. Whereas, in the previous model only the path from imagery to SE3 was considered. Seventy- Three percent of the variance in SE3 is still accounted for by the model (R2 = .734). In the case of SE4, 98% of the variance can be accounted for by the model (R2 = .980), with the major significant influence being SE3 (beta = .947). But there is also a significant influence from imagery (beta = .096). A similar situation occurs for SE5, where 97% of its variance can be accounted for by the model (R2 = .969), with the major significant influence coming from SE4 (beta = .878), but also a significant influence arising from imagery (beta = .191). In Model 4, the most reliable measure was for SE4 (R2 = .980), while the least reliable was initial self-efficacy (SE1) (R2 = .000) with SE5 (R2 = .969), final self-efficacy (SE6) (R2 = .938), final performance (R2 = .833) showing good reliability, SE3 (R2 = .734) and post initial performance self-efficacy (SE2) (R2 = .677), showing moderate reliability, and initial performance (R2 = .117) and initial self-efficacy (R2 = 0.000) showing poor reliability. The co-efficient of determination was 0.874 suggesting that the variables when combined provide a very good model through model 4. The goodness of fit of the overall model is ($\chi^2(22)$, = 50.51, p =0.01). The χ^2 ratio is

50.51/22 = 2.29, which approaches the value of 2 considered to represent a good fit (Byrne, 1989). The Goodness of Fit Index (GFI) is .801 which suggests a moderately good fit between the hypothesised model and the observed data. The Adjusted Goodness of Fit Index equals .594, however, which is not as good a fit. The Root Mean Square Residual (RMSR) is .084 which is not below .05, the level considered to reflect a good fit.

In model 5, the Squared Multiple Correlations for Structural Equations from the LISREL data for final performance was R2 = .878, suggesting the explained variance in performance by the model is 88% with 12% not yet accounted for. The variable with the largest direct effect on performance is imagery rehearsal (beta = .688). There was also a significant contribution towards final performance from the initial performance (beta = .538). In addition, the paths from SE3 to final performance, SE4 to final performance, and SE5 to final performance suggested that none of these variables had a significant influence on final performance, with the least contributory variable being SE4 (beta =.142), followed by SE5 (beta = .418), and SE3 (beta = −.682). Only 21% of the variance in SE3 is accounted for by the model (R2 = .213), with the major significant influence being imagery (beta = .380), while initial performance did not have a significant influence on SE3 (beta = .231). In the case of SE4, 98% of the variance can be accounted for by the model (R2 = .979), with the major significant influence being SE3 (beta = .947), but there is also a significant influence from imagery (beta = .096). A similar situation occurs for SE5, where 97% of its variance can be accounted for by the model (R2 = .967), with the major significant influence coming from SE4 (beta = .878), but also a significant influence arising from imagery (beta = .191). In model 5, the most reliable measure was for SE4 ($R2$ = .980), while the least reliable were initial self-efficacy ($R2$ = .000) and initial performance ($R2$ = 0.000), with SE5 ($R2$ = .969), final self-efficacy ($R2$ = .938), and final performance ($R2$ = .820) showing good reliability, SE3 ($R2$ = .734), and post initial performance self-efficacy (SE2) ($R2$ = .672) showing moderate reliability, and initial self-efficacy (SE1) ($R2$ = 0.000) showing poor reliability. The co-efficient of determination was 0.848 suggesting that the variables when combined provide a very good model through model 5. The goodness of fit of the overall model is (χ^2 ((26) = 59.95, p = .000). The χ^2 ratio is 59.95/26 = 2.3 which is close to the suggested level for a good fit of 2.0 (Byrne, 1989). The Goodness of Fit Index (GFI) is .773 which suggests a moderately good fit between the hypothesised model and the observed data. The Adjusted Goodness of Fit Index equals .607, however, which is not as good a fit. The Root Mean Square Residual is .122 which does not suggest a good fit.

6.6 Discussion and Conclusion

Before considering the influences and relationships of the variables, it is important to consider the validity of the fit of the models to the data analysed. If a reasonable fit is unable to be established, there is little point proceeding with subsequent analysis of other results. Having mentioned the relevance of goodness of fit, it should also be noted that many experts, including Joreskog and Sorbom (1979) stress that goodness of fit indices should not be considered to be absolute indicators of fit. Rather Joreskog and Sorbom (1979) emphasise that these measures reflect better or worse fit, so such modelling techniques often evaluate the comparative fit of alternate models, and if any of the overall measures indicate that the model does not fit the data well, it does not indicate what is wrong with the model or which part of the model needs to be adjusted. Therefore χ^2 GFI, AGFI, and RMSR are regarded as measures of the overall fit of the model to the data and do not express the quality of the model judged by any other internal or external criteria. In the case of the present study, the four measures mentioned are considered to reflect the goodness of fit. For model 1, which is the very basic foundation for further development, it must be noted, that, due to the inadequate number of specified variables, there is no valid analysis for goodness of fit to be considered. All subsequent models, however, that develop from model one are able to be considered for goodness of fit. For model 2, the χ^2 and the χ^2 ratio do not suggest a good fit to the data, however, the GFI and the RMSR do suggest that the data approaches a reasonable fit. In the case of model three, again like model two, the χ^2 and the χ^2 ratio do not suggest a good fit to the data, however, the GFI does suggest that the data approaches a reasonable fit, but the RMSR is not such a good fit. For model four the χ^2 and the χ^2 ratio are more representative of a good fit to the data, and the GFI continues to suggest that the data approaches a reasonable fit, but the RMSR is still above the level required to reflect an ideal fit. Finally in the case of model five the χ^2 and the χ^2 ratio are representative of a good fit to the data, and the GFI continues to suggest that the data approaches a reasonable fit, but the RMSR although higher than the RMSR in model 4 is still above the level required to reflect an ideal fit. It is important to recognise that, even though all parameters of goodness of fit were not ideal for all models at any one time, as the models became more detailed and considered more variables, goodness of fit indicators were generally becoming stronger. Thus, it was with a moderate degree of confidence that detailed path analysis was carried out to ascertain the influences and relationships that occurred in this study. This could be expected to raise suggestions as to how a superior model could be generated.

The major findings, from the causal modelling analysis, indicated that imagery rehearsal had a strong, significant, causal influence on the closed skill of kicking at goal in a controlled environment for Australian Rules Football outside of the competitive arena. In all five models, a direct path from imagery to final performance was clearly shown, with significant path coefficients being presented on each occasion from LISREL analysis. This significant causal relationship continued to be established as the LISREL models became more detailed and considered a larger number of potential influences. It would thus appear, as was found in previous studies (e.g., Blair et al., 1993; Hall & Erffmeyer, 1983; Kolonay, 1977), that imagery rehearsal can be an important determinant in improving the performance of physical skills. In fact, in each of the five models presented, imagery was found to be the major influence on performance. It was thought, with the introduction of initial kicking performance to the model, as was the situation in models 3, 4 and 5, that previous performance, as asserted by Bandura (1977), would be the major influence on subsequent performance and self-efficacy. Feltz, (1982), however, proposed a respecified model, including previous performance, as well as self-efficacy, as dual predictors of motor performance. This received considerable support (e.g., Feltz, 1988a; Feltz & Mugno, 1983; Fitzsimmons et al.,1991). Imagery, however, was not a variable involved in these studies of self-efficacy and performance. The results in models 3, 4 and 5 clearly show that previous performance did have a significant influence on subsequent performance, but that imagery had a greater influence on final performance, suggesting that the two main predictors of final performance were imagery and previous performance.

It is difficult to explain the finding of the present study, that imagery had a greater impact on performance than did previous performance, although one of the major points of the thesis is to establish that imagery would affect performance and this was strongly supported. The finding that imagery had the greatest effect on performance of all variables tested might have been due to the fact that imagery was the dominant controlled influence on the participants from the initial goal kicking performance to the final goal kicking performance. Furthermore, there was a large time span between the initial goal kicking assessment to the final goal kicking assessment (approximately three weeks), so that the imagery treatment had sufficient time to make a notable difference to performance. Feltz, (1988a) proposed a similar possibility, when looking at the influences of performance trials that are close together. Feltz proposed that the closeness of the impact of the trials may have overridden the effects of self-efficacy. The reverse could have been the situation in the present study, that is, the long intervention period between initial and final goal-kicking tests could have enhanced the clarity with which the imagery effect was shown. In designing the study, it was decided not to include progressive tests of performance during the intervention period specifically because of the strong influence of performance accomplishments on self-efficacy and subsequent performance (e.g., Feltz, 1982; Feltz & Mugno, 1983). Repeated performance measures might have saturated the imagery effect of the model. This could be established in future research, because LISREL considers the whole model when assigning path coefficients, and future studies could consider imagery intervention and physical goal kicking practice concurrently. The introduction of these additional variables would not have been appropriate in this study because a major aim was to establish the mediating role of self-efficacy between imagery and performance.

Path coefficient findings, in addition, supported the proposal that imagery rehearsal had a major influence on the players' self-efficacy in their ability to kick goals from twenty different positions on an Australian Rules football field. Self-efficacy evaluation occurred on three occasions during the ten sessions of the imagery treatment period, that is, after the fourth imagery session (SE3), the eighth imagery session (SE4) and the tenth or final imagery session (SE5). It can be seen in models 3 and 4 that the imagery treatment had a significant influence on the players' evaluation of self-efficacy after four imagery sessions, the first self-efficacy rating within the treatment period. Importantly, it can be observed from models 3 and 4, for the path coefficients from imagery to the three self-efficacy ratings, that the imagery not only maintained the initially increased self-efficacy evaluation, but also elevated it to higher levels, as signified by increasing path coefficients and significance for SE4 and SE5. This suggests that the players continued to develop greater confidence in their ability to score goals, as they repeated imagery sessions in which they imaged experiencing successful goal kicking. This might have resulted from a practice effect of the imagery sessions, so that, by the end of the treatment period, the players were very adept at performing the imagery tasks. This was shown to be the case when analysing the data from the players' diaries. The diary accounts showed positive comments to their involvement in using imagery as well as demonstrating improvements in participant's imagery vividness and controllability, In addition, the imagery sessions developed the theme of successful goal-kicking progressively, so that by the last session the players were imaging concrete examples of situations that occurred in the real game. This factor could have ensured, furthermore, that an interest was maintained in the imagery exercise, especially when there was no physical performance feedback to support the effects of the imagery treatment tapes. On the other hand, the control group participants continued to listen to the same relaxation tape throughout the treatment period. Because there was no progression or association with goal kicking in what they were listening to, they could easily have become bored especially when there was no physical practice. This factor could certainly have affected their motivation. It was observed from the self-efficacy evaluations in the results section in chapter 5, that self-efficacy remained approximately constant throughout for the control group. Also, control group players' verbal comments support the claim that there was a lack of motivation throughout the treatment period. Examples of such comments were "how is listening to relaxation tapes going to improve my goal kicking ", and "are we doing anything else?" There were also positive comments, about enjoying the notion of applying the relaxation sessions for an extended period when in the past they had been given relaxation tapes by "motivationists" in one off sessions and then were left to their own devices to follow up any further relaxation application. Those players involved in the imagery treatment group could have artificially increased their self-efficacy ratings because of a perceived expectation to do so. This notion was not conveyed to them explicitly, but it may have been an association that they made, because they were repeatedly questioned on their confidence in kicking goals from the twenty positions in the performance test, that is, it could have been an effect of the demand characteristics of the situation. To reduce such effects, future research could be conducted whereby the control group is provided with a variety of relaxation tapes that would help maintain interest. Another proposal is that control participants be exposed to an imagery program related to the skill being performed, but not concerned with improving the skill or performing it successfully. As a result a comparison could be made between the treatment group and the control group, as to whether the involvement in an intervention employing a technique like imagery, and asking about confidence to perform the imaged task itself caused a change in self-evaluation, or whether it was the specific content of the imagery, or the type of imagery, that produced the improvement in self-efficacy evaluation. At this point, it appears most likely that the strong enhancement in self-efficacy, repeated over several imagery-self-efficacy path coefficients, and supported by the very strong path from imagery to final performance, reflects a genuine increase in players' self-efficacy for the kicking task.

It is also clear from analysis of many of the models, generated in this study, that the path from self-efficacy to performance was unable to produce a significant result, that is, that self-efficacy, during or after the treatment period, did not significantly impact on final performance. In the models (3 and 5) which considered initial self-efficacy and its impact on initial performance, a significant influence was found, and this finding was similarly mixed for any of the self-efficacy ratings on final performance except for model 3 where the relationship just reached significance, and model 5 where significance was closely approached. This overall finding was hard to understand because intuitively one would suggest that the more confident one was in their ability to perform the skill, then the greater the likelihood of better performance of that skill. This kind of relationship between confidence and performance has been shown repeatedly in the self-efficacy and sport literature (e.g., Barling & Abel, 1983; Feltz, 1982; Feltz & Mugno, 1983; George, 1994; McAuley, 1985). The LISREL structural equation modelling analysis did not show such a causal relationship in any of the models. Furthermore, this was a surprising result in light of Bandura's (1977) theory which can be applied to suggest that self-efficacy will perform an important mediating role in sport performance. It was, thus, thought that imagery would have a direct effect on self-efficacy and an indirect effect on performance through the direct path between self-efficacy and performance. That is, self-efficacy would act as a mediating variable between imagery and performance. This proposal had previously been given some credence by Feltz (1982) who used path analysis techniques to examine the predictions of Bandura's (1977) self-efficacy model on back diving. That study produced results that showed a reciprocal cause and effect relationship between self-efficacy and diving performance, providing support for Bandura's model. The present analysis reflected Feltz's respecified model which included self-efficacy and previous performance as dual predictors of current performance. Unlike the Feltz (1982) study, one major variable was missing in the present study that may have assisted self-efficacy to become an influential determinant of future performance. That variable was performance feedback, presented throughout the treatment period. As discussed earlier, however, more frequent performance assessment throughout the imagery treatment period may also have influenced self-efficacy during that period, which then would have confused the impact of imagery on self-efficacy and final performance, the major area under study. Recognising from Feltz's (1982, 1988a) work that a close reciprocal relationship was likely to exist between performance accomplishment and self-efficacy, it was anticipated that repeated tests of performance during the intervention period would have been likely to confound the imagery self-efficacy relationship, so performance of the task was measured only before and after the treatment period.

The major conclusion, restated, from this study is that self-efficacy was not a mediator between imagery and performance of a goal kicking skill in Australian Rules Football. The models showed that imagery rehearsal had a major influence on the improved performance of goal kicking in this study, as well as having a significant influence on self-efficacy, but self-efficacy did not perform a significant mediating role between imagery and performance. Imagery produced a significant increase in self-efficacy during the treatment period which is clearly supported by the causal path analysis. As stated earlier, imagery also produced significant increases in performance and very clear causal paths supported this, but the path from self-efficacy to performance was not significant.

It is claimed that one very influential factor in this study was the influence that the nature of the imagery treatment had on self-efficacy and performance. The researcher placed great emphasis on imaging the process of skill performance, as opposed to imaging the outcome. This was intentionally made a focus of the program, because it is clear that many sports persons are able to execute skills in the training environment but cannot reproduce these same skills, when performing in the real competitive setting. I have twenty-five years of being involved at the elite level as a player, adviser, and coach, which has involved many experiences, observations, and discussions. These experiences suggest reasons for players' inability to transfer their training skills to the game might be that they tend to focus on the outcome in games, or to introduce negative distracting thoughts in their minds prior to performing the task, so that before kicking for goal the player is not focussing on the process of kicking, which will enable the outcome, kicking the goal, to be positive. In Australian Rules Football, for example, if a player is having his first kick at goal in a match, thoughts such as "what if I miss" tend to distract from the process and attention tends to be focussed on the outcome. This situation can be compounded for the individual for subsequent kicks, if he misses the first goal, so that the player is concentrating more and more on negative thoughts which tend to distract from rehearsing the required process of the kick production. A similar distraction can occur if a player is having to kick for goal at a crucial time of the game, such as in the final minutes, where the result of the player's kick might determine the outcome of the game. Consequently, the goal is often not kicked because the serial organisation and temporal patterning of executing the skill are not performed in the correct manner. Because of these pressures in Australian Rules Football, and other elite, competitive sport, the emphasis of the imagery procedures in the treatment in this study was directed to imaging the process of execution and not the outcome. In fact, the participants were constantly being reminded on the tape that, if they imaged the process of execution, the outcome, that is the goal kicking, would take care of itself. Because of this emphasis, that is, the strong influence of consciously yet systematically imaging the kicking process before executing the kick, it was more likely that imagery would be the major influence on the final kiking performance, and this might be a reason why self-efficacy did not perform the mediating role as had been envisaged, even though imagery enhanced self-efficacy and performance. In future studies consideration could be given to including specific imagery of enhanced self-efficacy (e.g., "you feel confident, excited, ready to perform") as well as, or instead of, specific imagery of the technical process of performing the task.

A challenge which could have been directed at this study was that performance should have been tested throughout the imagery treatment period to examine issues, such as, whether performance impacted on self-efficacy, or if performance affected imagery, and if self-efficacy influenced imagery. Future research could be conducted which examines these issues, however, in the current study the major aim was to observe whether self-efficacy played a mediating role between imagery and performance. If any of the other variables, just mentioned, had been introduced, they could have influenced the major relationship being studied, that is, the relationship between imagery, self-efficacy and performance. For example, if kicking skill performance had been evaluated throughout the study period, it would have been difficult to establish if it was the imagery that was influencing self-efficacy or if it was the performance that was influencing self-efficacy.

Employing LISREL analysis, nevertheless, in such research in the future would be very beneficial in further advancing understanding of the relationships and processes whereby imagery is effective. The most encouraging aspect of this study is that there appears to be a very strong causal relationship between imagery and the performance of a goal kicking skill in Australian Rules Football in a controlled field study. A natural extension of this study is to apply it to the real competitive environment as was the case in studies 1 and 2. This is considered to be a vital progression, so as to continue to narrow the gap between theory and practice. A major difficulty, of course, would remain, as no doubt has been the case in the past, of gaining access to a suitable number of goal kicking players from a range of AFL teams, so as to have a large enough number of participants to conduct traditional research, which incorporated an experimental and control group, in the competitive season. As was stated in earlier chapters, coaches would be reluctant to provide their players to make up the numbers in a control group. They would be more receptive to their players being involved, if their players were part of the treatment group but may baulk at providing them as a control player. Consequently, we must endeavour to provide alternative yet valid research designs to cater for this real world situation. A major aim of this chapter, employing structural equation modelling as the analytical tool, was to establish causal relationships between imagery rehearsal, self–efficacy and performance of a goal kicking skill. The major overwhelming finding, from the causal modelling analysis, indicated that imagery had a highly significant influence on performance of a goal kicking skill. In addition, imagery had a highly significant influence on self–efficacy evaluated throughout the treatment period. There was no evidence, however, to support the claim that self–efficacy would be a dual predictor with previous performance of future performance, as advocated by Feltz (1982). Indeed, self–efficacy was found to have no significant influence on future performance in this study, suggesting further research is required using structural equation modelling to find if, firstly, imagery directly influences performance and self–efficacy and, secondly, if self–efficacy plays a mediating role in improving performance.

A major aim of the present study was to investigate the process that improved performance of a skill, and in particular to establish, if imagery improved the performance of a skill in an Australian Rules Football context. Furthermore an aim was to establish if self–efficacy acted as a mediator between imagery and performance. Causal modelling analysis proved to be an excellent method of analysing the strength of the relationships between the various variables, and must be considered as an ideal instrument to evaluate cause and effect relationships between interventions and performance in sport, especially in the non–competitive season. It must be remembered, however, that coaches are often reluctant to allow researchers to employ traditional research designs required by causal modelling analysis. It is vital that players and coaches devote time, energy, and resources to training and treatment that is going to augment performance, rather than resorting to traditional "corrective drills", to defer to hearsay 'evidence', or to follow blindly that which others are currently doing because it is the fad of the month. Too often, sporting organisations, coaches and players have been deceived by exorbitant and outrageous claims by so called 'experts' who have the panacea to improved performance or participation. Causal modelling analysis offers a real possibility that, in theoretical and applied research, these outlandish claims can be challenged because no research has been conducted to perform any worthwhile analysis to support excessive claims in the past. It is suggested, therefore, that much future research needs to be conducted, utilising path analysis, to further the development of imagery use in sport psychology and its credibility in sport.

Another finding which was consistently and strongly supported by the models, especially, models 2 through 5, was that previous levels of a variable were a major influence on the next level of that variable. This was very clear for self-efficacy, except for the path between the first two occasions when performance occurred between the two measures of self-efficacy. It was also true for the pre-program and post-program measures of performance, but to a lesser extent. This is not surprising since a substantial imagery program intervened between these two measures.

Chapter 7: Thesis Conclusion and Final Comments

7.1 Introduction

The final chapter of this thesis will be presented in several parts, including a summary of the conclusions of the three studies and the structural equation modelling analysis, leading to general conclusions to be derived from the thesis. This will involve a discussion of the theoretical issues raised, as well as the relationship of current work to previous research. Methodological concerns will then be considered, followed by issues that the thesis indicates should be examined by future research on imagery in sport. Finally, consideration will be given to implications for the practice of applied sport psychology with respect to imagery..

7.2 Conclusions from Studies 1, 2, 3, and Structural Equation Modelling

The major finding of this thesis was that imagery rehearsal significantly influenced the performance of skills in Australian Rules Football. There were three independent studies, as well as a structural equation modelling analysis conducted in this thesis, that studied the impact of an imagery rehearsal intervention treatment on three different, basic skills of Australian Rules Football.

The results of the first single–case, multiple–baseline study supported the hypothesis that an imagery program would significantly enhance performance of the disposal of a ball by foot, in Australian Rules Football, as well as promoting the use of social validation techniques in field research. Study two was instituted because the social validation, from the first study, suggested that self-confidence for the task was enhanced. This raised the possibility that self-efficacy, that is, task specific self-confidence, could be a mediating link between imagery and performance. The results of this second single-case, multiple-baseline study, again, established the positive effect of imagery on performance, this time for the front and centre skill. The study also found that self-efficacy ratings increased significantly after the imagery intervention was introduced. Study three was, conducted in an attempt to better understand how imagery rehearsal was effective in improving performance, examining the role self-efficacy played in this relationship. A traditional experimental design was employed using a closed skill, goal kicking, in a field study setting. The results of this study, comprehensively supported the hypothesis that imagery rehearsal would enhance the performance of goal kicking in a controlled environment. The study also provided strong support for the use of imagery to enhance self-efficacy. Furthermore, study three, like studies one and two, supported the use of social validation techniques in field research.

To establish if there was any causal relationship between imagery rehearsal, self efficacy, and performance, with self-efficacy acting as a mediator, structural equation modelling was employed. The structural equation modelling analysis showed strong paths from imagery to performance and from imagery to self-efficacy, but, the path from self-efficacy to performance was not significant. Self-efficacy did not significantly impact on performance, so there was no evidence that it played a mediating role. Structural equation modelling indicated that imagery independently enhanced performance of, and self-efficacy for, the goal kicking task.

7.3 Implications for Theory and Research

Research examining imagery has been conducted for a considerable time, as a form of mental practice (e.g., Corbin, 1972; Feltz & Landers, 1983; Richardson, 1967a & b for reviews). It has been used as a means of enhancing athletic performance, employed widely in the sporting domain (Gould et al., 1989; Jowdy et al., 1989). Imagery, also, has produced many positive research findings on analogue tasks to support its use (Perry, 1939; Sackett, 1935; 1977; Smyth, 1975), on closed skills, not in the real competitive environment (Blair et al., 1993; Hall & Erffmeyer, 1983; Kolonay, 1977; Koop & Martin, 1983; Woolfolk et al., 1985), or when combined with other components, such as relaxation (e.g., Kim & Tennant 1993; Suinn, 1976; Weinberg, Seaborne & Jackson, 1981, 1987). Little research has been conducted on open skills in a real competitive environment (Kendal et al., 1990; McKenzie & Howe, 1991). Furthermore, there is little strong evidence concerning the use of imagery in performance enhancement with elite performers (Kendall et al., 1990).

A point worth noting, about all the research that has been conducted on imagery, over more than sixty years, is that, measurement of imagery has always been a problem. Because of the inherent difficulty of measurement, psychologists have largely ignored this aspect of imagery. The major difficulty with measurement, as with many aspects of psychology, is that imagery is a mental process and is not observable or tangible. It is thus difficult to quantify or measure imagery with demonstrated validity. Attempts to measure self-efficacy have mainly relied on self-report methods, through the use of questionnaires that ask participants to rate how proficient they are at the various components of imagery. The notion of components of imagery further complicates the issue of measurement, because the researcher has to decide which sense-modalities and dimensions to measure. Furthermore, there has been little clarification as to how imagery enhances performance. It has not been possible to draw clear conclusions about the underlying mechanisms of imagery, through which performance is enhanced. Four main theories, the Psychoneuromuscular, Symbolic Learning, Bio-Informational, and Activation/Arousal theory, have been proposed to explain how imagery enhances performance of physical skills. None of these theories, has been subjected to rigorous investigation, although much of the research on imagery reflects on one or more of them.

Because of the paucity of research on the impact of imagery on the performance of open skills in real competition (Kendall et all., 1990; McKenzie & Howe, 1991), and that very little known research exists on the use of imagery rehearsal in the game of Australian Rules Football, the first study was implemented. This single-case, multiple-baseline study supported the hypothesis that an imagery program would significantly enhance performance of the disposal by foot. The results of this study were encouraging and contributed to research, for the use of imagery in several ways. They supported findings from previous research which also suggested that imagery is an effective intervention for improving the performance of skills (e.g., Hall & Erffmeyer, 1983; Kendall et al., 1990; Kolonay, 1977; Mckenzie & Howe, 1991; Wrisberg & Anshel, 1989). The results showed that a single-case, multiple-baseline design can be effective in the real competitive situation, as advocated by Bryan, (1987), Kendall, Hrycaiko, Martin and Kendall, (1990), and Wollman (1986). Comments from both the senior coach and players suggested that a single-case design, a design which is experimentally valid, is an acceptable non-intrusive method of research that is appropriate to the competitive setting in elite sport. The results demonstrated that it is possible to conduct this kind of research on open skills in their natural context, supporting the limited amount of previous research on open skills in a competitive context (Kendall et al., 1990; McKenzie & Howe, 1991). Finally the results supported the use of social validation techniques in field research. Social validation corroborated the patterns observed by measuring performance. The social validation results also stimulated further study particularly by suggesting the effect of imagery on self-confidence.

The process by which the improvement occurred in this study was unclear, and the study was unable to contribute to the explanation of how imagery works. What became apparent, from social validation feedback, was that the players' confidence in their ability to perform the skill increased as the treatment progressed. This social validation finding was in keeping with claims made by Watkins et al., (1994) that one's knowledge of past performance will govern estimates about efficacy to perform the behaviour in the future. Because this first study did not monitor self-confidence or self-efficacy, no conclusion could be drawn about any role it might play as a mediating variable. The study raised the issue of the role that self-efficacy might perform, in combination with imagery, in enhancing performance. The fact that this research was conducted in the real situation must be reiterated, especially when most previous research on imagery had been conducted utilizing analogue tasks or in laboratory settings.

Study two was instituted because the descriptive data, from study one, suggested that self-confidence for the task was enhanced. This raised the possibility that self-efficacy, that is, task specific self-confidence, could be a mediating link between imagery and performance. Before testing this directly it was necessary to examine whether imagery of a skill enhanced self-efficacy as well as performance of that skill. As with study one, a single-case, multiple-baseline study examined the impact an imagery rehearsal program had on the performance of a different skill, that is, the skill of positioning oneself at the front of the pack for elite Australian Rules Football players, in games, in the real competitive environment. This is a positioning skill as was the case with the defensive basketball positioning skill used in the Kendall et al. (1990) study. The results, as with study one, established the positive effect of imagery on performance, as well as showing that a single-case, multiple-baseline design was an effective research method in the real competitive situation, as advocated by Bryan (1987) and Kendall et al. (1990). The players' self-efficacy ratings were seen to increase notably for most players with the introduction of imagery rehearsal. The study once more demonstrated that research can be conducted on an open skill in the real competitive environment.

Support for previous research findings were further promoted by the results and findings of study 2. The performance activity in this study was open and measured in a real competitive environment, as was the case in the previous study. It must be recognised, that the front and centre skill is more endurance based. than skill based. The player is expected to take up this position many times throughout a game, after having to run substantial distances quickly to be in position when the ball arrives. Increased effort, based on a motivational influence is a more likely explanation for improvement of such an action, than for improvement of a highly skill-oriented task.

Study two found that self-efficacy ratings increased after the imagery intervention was introduced, as has been shown in previous research on imagery and self-efficacy (Feltz & Riessinger, 1990; Lee, 1990). The players also commented that the imagery had made them feel much more confident in their ability to perform the skill. This suggested, strongly, that further specific research was warranted in studying the imagery-confidence-performance relationships.

A third study was, thus, conducted, in an attempt to better understand the mechanism by which imagery rehearsal was effective in improving performance, as well as further testing the relationship between imagery and performance, and, finally, examining what role self-efficacy played in this relationship. To achieve this goal, a traditional experimental design was employed using a closed skill, in a game related context, and in a field study setting, so that differences in performance could be studied between an experimental group and a control group, as well as allowing study of relationships that causal modelling might uncover. Feltz (1982, 1988) has applied causal modelling to examine self-efficacy. She proposed that self-efficacy would be the strongest predictor of performance on each of four back dives, and that there would be a reciprocal relationship between self-efficacy and backdiving performance. Using path analysis, based on multiple regression, Feltz found, that self-efficacy was a stong predictor of performance especially when combined with past performance. The effect was stronger for females than males. Feltz and Riessinger (1990) conducted one of the few studies which measured the impact of imagery on self-efficacy and performance. They found that imagery rehearsal did enhance self-efficacy, but no causal modelling was used to test the strength of the paths. To test the proposition that self-efficacy mediates between imagery rehearsal and skill performance, a controlled experiment was conducted.

This study, found that imagery rehearsal enhanced performance again, comprehensively supporting previous research (e.g., Blair et al., 1993; Hall & Erffmeyer, 1983; Kolonay, 1977; Wrisberg & Anshel, 1989). The results further supported the hypothesis that self-efficacy would improve with the utilisation of imagery rehearsal as a treatment. This is a most important result in support of imagery enhancing self-efficacy, particularly because it involved a non-endurance skill central to the game. Self-efficacy scores for the experimental group, taken on several occasions after the imagery treatment was introduced, were significantly superior to self-efficacy scores for the control group, which showed no change from pre-intervention scores.

What cannot be inferred from Analysis of Variance, in examining the proposition that self-efficacy mediates between imagery and performance, is the impact that self-efficacy had on final performance, and also whether it performed a mediating role between imagery and final performance. Intuitively, and also based on results from other studies (e.g., Feltz, 1982, 1988; McAuley, 1985; Weiss, Weise & Klint, 1989), there is support for the belief that self-efficacy leads to an improvement in performance. Structural equation modelling of the present study established that there was a significant increase in self-efficacy and in performance. with the introduction of an imagery rehearsal intervention package over a substantial period of training However, there was no support for the proposition that self-efficacy was an important mediating influence between imagery and final performance, because no significant causal link existed from self-efficacy to performance.

It was expected that imagery would enhance self-efficacy, because much previous research had demonstrated the presence of a relationship between self-efficacy and performanc (e.g., Feltz, 1982, 1988; Garcia & King, 1991; Martin & Gill, 1991). Nonetheless, little if any research has been conducted expressly to establish if a causal relationship exists between imagery, self-efficacy, and performance. Feltz and Riessinger (1990), Lee (1990), and McKenzie and Howe (1991) showed that imagery does affect self-efficacy, but Feltz and Riessinger (1990) studied an endurance task, Lee (1990) studied bent knee sit-ups, and McKenzie and Howe (1991) studied a tackling task. None of these studies executed a causal modelling analysis.

Thus, examination of causal relationships between imagery rehearsal, self efficacy and performance represents an important addition to research findings. Structural equation modelling, an analytical technique recently introduced in the field of sport psychology, was employed to study this relationship. Structural equation modelling had been used in attacking many substantive problems in the social and behavioural sciences. It was felt important, from both a theoretical and an applied perspective, for sport and sport psychology, to test the causal links between imagery, self-efficacy, and performance, so that future practice in these areas of performance enhancement in the real world can concentrate on those approaches that are going to produce positive outcomes, rather than wasting resources unnecessarily on techniques that do not produce improvements in performance.

As was found in previous studies and in earlier research (e.g., Blair et al., 1993; Hall & Erffmeyer, 1983; Kolonay, 1977), structural equation modelling revealed that imagery rehearsal was an important determinant in improving the performance of physical skills. The two main predictors of final performance were imagery and previous performance. Path coefficient findings, in addition, supported the proposal that imagery rehearsal had a major influence on the players' self-efficacy in their ability to kick goals from twenty different positions on an Australian Rules football field. It was clear from analysis of the five models, generated in this study, that the path from self-efficacy to performance rarely achieved significance, that is, that self-efficacy during or after the treatment period, did not significantly impact on final performance. A significant relationship between confidence and performance has been shown repeatedly in other studies in the self-efficacy and sport literature (e.g., Barling & Abel, 1983; Feltz, 1982; Feltz & Mugno, 1983; George, 1995; McAuley, 1985), yet was unable to be demonstrated in the present thesis. This was a surprising result in light of Bandura's (1977) theory which suggests that self-efficacy performs an important mediating role between psychological intervention and behaviour.

This thesis could not provide support for the mediating role of self-efficacy. This finding might be explained by Watkins, Garcia et al., (1994), who proposed that self-efficacy can be addressed from two perspectives, a motivational efficacy, and a skill efficacy. They contend that conceivably efficacy is more likely to predict behaviour in the case of coping performance, where the crucial element is the extent to which a person is motivated to perform a particular behaviour and believes in their ability to perform it. The activity performed in study two was primary but not entirely endurance based and there was a high motivational component to make the front and centre of packs in order to have the greatest opportunity to gain access to the ball if it was not marked by a player in the pack. In the Feltz and Riessinger (1990) study, where imagery led to an increase in self-efficacy which was associated with an increase in performance, the task was strength based, so again increased effort based on enhanced motivation, is a viable explanation. The finding of study three, suggesting that self-efficacy was not related to performance could be explained by the fact that the activity, goal kicking, was skill-related and not endurance based or otherwise one that was motivational in nature. This proposition could be tested by conducting a study like study three with an endurance/effort activity involving little skill and an equivalent skill-based activity that does not require much effort,to see if structural equation modelling shows no significant path from self-efficacy to performance for the high skill activity, but does show a significant path from self-efficacy to performance for the primarily endurance-based activity. For practical purposes, imagery has been shown to enhance performance of skill-based and endurance-based tasks. What is not yet clear is through what mechanism(s) this occurs. The proposition that the mechanism differs depending on whether an increase in motivation is likely to affect task performance is worthy of further study. Many tasks in sport, and in other areas involve combinations of effort and skill, so the question would not be critical to the practical application of imagery in such tasks.

In conclusion, findings from three studies in this thesis, together support the proposition that imagery of successful performance is a potent technique for enhancing both performance and confidence. It was found that the enhancement occurred independently, that is, imagery enhanced performance and self-efficacy through separate processes. It is still not clear what these processes were.

7.4 Methodological Considerations

There are several methodological considerations arising from this research. Four specific areas of methodological issues will be considered. These are: measures, single-case research, modelling, and general aspects. Each will be developed in some detail.

The first measure to consider is the performance measure, which involved scoring kick disposals in study one, and scoring the ability to make front positions of packs in study two. In study one, three independent judges were used to evaluate the kicking performance. Consistently high correlations, (over 0.9), did suggest that there was a high level of agreement between judges. The order of games from the baseline and intervention periods was randomised, and with the large number of games and kicks to score, it is unlikely that raters recalled their original location in the season and based responses on this. It is concluded that the expert rater method was demonstrated to be sound in this study, but support from a different type of performance measure, such as measured accuracy, would be useful in the future. This is not to suggest that one method is inadequate, but that in any situation concurrence of evidence from two or more independent measures is more convincing.

In study two, the scoring was performed by the researcher because of the objective nature of the scoring task. The measurement in study two could require modification in future research, because the researcher, who conducted the imagery intervention sessions with the players, also scored the front and centres per player from the video, after the end of the season. This appears to be an objective task, that is, scoring one for every occasion a player was seen on the video in front of a pack that formed in a game; a player is either in the front and centre position or he is not.

Nonetheless, the person making this assignment must make judgements about just how wide and deep the front and centre position should be. This could vary were there to be any motivational influences, that is, if he wished to ensure that the findings of the research supported their predictions. The researcher knowing which games were being scored and which player could have varied his responses unconsciously in a way which favoured, during the intervention period, players who appeared to be benefitting from the intervention. The involvement of scorers blind to the research hypothesis, and expert in football, so they know what front and centre means, who are presented with the material in random sequence, would remove even the slight potential for motivated scoring.

A difficulty with measurement in the case of studies one and two could occur, for analysis of performance at levels other than at the elite level in the Australian Football domain. This could occur because television facilities and film footage would not be available from games, through television stations. This would necessitate the researcher conducting their own filming. Filming would probably be done from only one camera and with much less expertise due to costs and lack of facilities. At the elite levels of competition in Australian Rules Football games, as was the situation for studies one and two, television stations cover all games, have many cameras, filming from a range of positions around the ground and with expert professional camera operators. This enables easy scoring of performance in games, because the relevant activity is always centre screen, it also permits analysis of each pack to be made from a variety of angles, which ensures that all possibilities are covered. Having access to such video was a great advantage for the present research.

In study three, the goal kicking task was not an exact duplication of the scoring system that occurs in the real competitive game. Instead posts were erected with 2 metre widths, moving out from a central 2 metre "goal". This precluded exact conversion of the study scores to the real point scores from the game context, because the inner three areas covered six metres in width and the next two covered 10 metres in width, whereas the AFL main goal is 7 metres wide. The reason for using this scoring system was that it was felt that using the seven metre goal and seven metre behind or minor score posts might not lead to detection of improvements in accuracy for expert performers, as these senior and junior players clearly were. It was feared that a ceiling effect might obscure improvements if the usual scoring system with wider goal and behinds was employed. A more fine grained system could pick up increased accuracy within the goal area. While this might not appear to be critical in practice, because the same number of goals is scored, a coach will prefer players who kick 80% of their goals in the central 4 metres of the goal to one who kicks 80% in the overall, 7 metre goal area. This is because if a coach is selecting a player for an important kicking position, the more accurate kicker would be chosen. A more accurate consistent kicker would inspire more confidence than one who sprays the ball over the goal area. In future research additional feedback that more closely corresponds to the game may be useful in influencing coaches to provide their players as participants. On the other hand, it is felt that coaches would be greatly impressed by the accuracy of the current scoring system.

The measurement of self-efficacy might also raise some criticism. Bandura (1977) proposed an unusual approach to measure self-efficacy. He called this the microanalytic technique. In it, the level and strength of self-efficacy are assessed by creating a graded list of levels of the specific task and asking participants to judge which they believe they can and cannot do giving yes/no responses. This determines level of self-efficacy. Then, for the grades they believe they can do, participants rate their confidence or strength of self-efficacy on a scale from 10, corresponding to little belief(confidence) to 100, representing total belief. Bandura only used 10 point ratings, that is participants could only score 10, 20, 30,....up to 100. Dzeweltowsky (1989) noted that an assessment of "no" is equivalent to a rating of 0 on the strength scale. He thus, combined level and strength into one rating for each grading from 0-100. This saves time, as well as giving a score for all gradings for every participant.

A problem with the microanalytic technique, however it is scored, is validation. First, there is a general issue, namely the question of what should be validated, the general technique or its application to each task. Researchers appear to have assumed that early work validated the technique, so they have applied it to their situations. There are also some specific problems. For example, because the items are different levels of grading the task, measures of internal consistency are not appropriate. Also, because self-efficacy is situation specific, the relevance of using test-retest reliability is often doubtful. With respect to validity, internal validity, probably the least equivocal, depends on there being another measure of belief in one's ability to complete a specific task. These are not evident in the literature, although it does support assesssment of related concepts, such as perceived ability (e.g., Nicholls 1984), and perceived competence (e.g., Harter, 1978), as well as measures of more general state sport confidence (e.g., Vealey, 1986).

Microanalytic measures of self-efficacy were used in the second and third studies in the present thesis. They were different in content because they referred to self-efficacy for different tasks, front and centre and goal kicking accuracy, respectively. They were generated according to the same process of grading based on expert judgement. They both used scales from 0–100, combining assessment of level and strength of self-efficacy, and using the 101 points on the 0 –100 scale, rather than 10 point intervals. The evidence from the two studies supports the use of the modified microanalytic technique. Results were highly stable in study 3 for the control group when no change would have been expected. In the second study, as predicted, scores increased when the intervention was introduced, although only one self-efficacy measurement was taken during baseline. Also, compared with the very low variability of the control group in study 3, the self-efficacy for the intervention group in that study, moved quite dramatically in the predicted direction.

Another issue that has to be overcome is the nature of the experimental design which has to accommodate the needs of the researcher, the coach, and the player in the real competitive environment. In this thesis, two coaches gave their blessing to research being conducted during the season, the first for study 1 at Richmond Football Club, and the second for study 2 at St Kilda Football Club. This was largely because, when it was explained what a single-case, multiple-baseline design involved, they understood that it could well be of advantage to the players involved, but it would not encroach upon other players who would have been involved as members of a control group, if a traditional research design had been used. The use of a traditional experimental design in study 3 was not problematic to the coach because it was not done in the playing season or the pre-season training period.

From the experience of the three studies, described in this thesis, it is clear that the single–case, multiple–baseline design is ideally suited to in–season competition research, and that traditional experimental design studies are more suited to research conducted out of the competitive season. Certainly, conducting traditional research studies from an out of season perspective is much easier for the researcher to plan and implement. There are fewer external factors, weather, form, time constraints, team practice, competition, and pressure from coaches and others, which all can influence the player's skill performance, or his ability or motivation to comply with the intervention activities. The ecological validity of such studies is uncertain, that is, it is not clear whether the results would be replicated in the real competitive environment. Assessment of the efficacy of an intervention for game performance can usefully employ the single–case design.

Another advantage of the single–case, multiple–baseline design is that it enabled the researcher to consider both the statistical significance of the players' improvement, and equally, if not more important in the applied field, the practical significance of their improvement in performance. This practical improvement, for the individual, might have been masked by averaging, if a traditional research design had been implemented. The importance of the single–case, multiple–baseline design is that, because each player is examined individually, it can identify certain individuals who may repond more positively to specific interventions than other individuals. This leads to a greater likelihood of identifying the variables / characteristics of these individuals that may have caused the more positive influence on performance. This might point to variables worth examining in further research, to identify differences between those who do and those who do not respond positively to a particular intervention.

It is vital not to devalue this practical importance factor. For example, if research on a skill like goal kicking, was conducted during the season, utilizing a single-case design and positive results were found, then it could be argued, that the treatment might have been the difference between winning and losing. Similarly some players in the experimental group in study 3 increased their performance by as much as twenty points. While this study was done out of season, it would convert to a big effect in many games. As noted earlier, performance in non-competitive contexts often do not convert to the real competition performance, where the pressure of opponents, officials, and spectators, as well as perceived nature of the competition intervene. It would be interesting to examine the influence of imagery on the important skill of goal-kicking in real competition conditions. Statistical significance is important in research, but in applied research, the practical impact of any change needs to be considered, whether or not statistical significance is attained. This is especially important at the elite level of sport where players are already performing at a very high level or have reached a ceiling in performance, whereby even the smallest of improvements may be enough to influence the result of a competition. It must be remembered that these participants have typically attained ceiling levels of performance using training techniques that they had been exposed to over many years, that is, their performance is no longer improving from week to week.

One area that needs to be addressed in future studies on self-efficacy is when to commence recording self-efficacy of the players. In study 2, the first self-efficacy recording for all players was taken in the week before they had their first imagery session. This was done intentionally, because players were randomly selected for their introduction to the single-case, multiple-baseline design and they were only told of their involvement in the study the week prior to their introduction to the imagery intervention. Only then was it known which player would begin the intervention in the next week. Testing self-efficacy only in that week when a player knew he would start the program soon, meant that it was not possible to establish a baseline of self-efficacy scores from which to calculate the celeration line or line of progress for a split-middle analysis for the self-efficacy scores. In future single-case research, self-efficacy should be measured from the start of the study for all participants, to provide a large enough sample of baseline points to establish a clear trend for comparison with actual performance during the treatment period. It was argued that the rreasults for self-efficacy in study two are still noteworthy, firstly because a variable like self-efficacy was likely to be stable among elite performers receiving no treatment. This proposition was supported for the control group in study 3. Secondly, there was a clear and substantial increase from the baseline reading for all eight players, providing a very consistent pattern of results. Still, prolonged baseline study is advised.

A further issue regarding self-efficacy in study 2, is when to actually measure it, if it is to be measured on a weekly basis during the treatment period. In study two, the self-efficacy response was recorded once a week, at the conclusion of the last imagery session of each week, that is, on the eve of the game. There are many other options available as to when and how often to measure self-efficacy. The advantage of measuring self-efficacy more regularly, for example, at the conclusion of games and after each treatment session is that the impact of game performance on self-efficacy and the impact of each treatment could also be monitored. A major disadvantage with constant measurement of this type, is that players tend to tire of the repetitious nature of the the self-efficacy evaluation sheet and difficulties with compliance could arise. For this reason, it was decided to monitor self-effficacy at the conclusion of the last treatment session of each week.

Path analysis is a technique used to assess the direct causal contribution of one variable to another. It assumes the existence of a system of underlying factors and a system of observed variables. The first step of path analysis involves an investigation of the interrelationships among these variables, by considering correlation coefficients as a measure of association. A potential problem exists because the researcher identifies the variables to consider and is unable to be precise about the identity of the latent variables. Nevertheless, the variables still build into a basic model incorporating the independent or cause variable(s) and dependent or effect variable(s), with paths directed from the cause to the effect. Greater use of more models, to examine the robustness of causal paths, may provide a solution more answers to this problem.

In addition, in study 3, equal attention was not given to the experimental and control groups throughout the treatment period. The experimental group was required to go through ten imagery sessions on audio-tape in the treatment period, whereas, the control group had three placebo relaxation sessions on audio-tape in the same time. It could be argued that the control group should have been exposed to an equal number of treatment sessions of relaxation. This was intentionally avoided, and those in the control group were only asked to complete a relaxation exercise around the time that the treatment group were completing their fourth, eighth and tenth imagery sessions. This ensured that participants in both groups conducted their self-efficacy ratings at the same time. To have the control group participate in ten relaxation sessions run in conjunction with the ten treatment group imagery sessions , it was believed may have caused a difficulty with compliance. As it was, some members of the control group expressed queries as to how the relaxation tapes might improve their goal-kicking.

In much of the previous research that has taken place, that post baseline performance scores have been recorded for only a short period in time. This situation leaves the possibility of challenge because the substantial initial improvement in scores observed immediately after intervention was introduced could have been due to motivational effects. This was not the situation in the present single-case studies that showed results did improve immediately after the treatment, but more importantly scores were recorded long enough to highlight a maintenance of the elevated scores. Future research must guarantee that the length of the treatment is sufficient to minimize any motivational influences. Nevertheless, in real competition, at the elite level, studying real performance behaviours, it is always likely to be difficult to eliminate motivational effects completely. It may be suggested that because these performers are highly paid professional athletes who are highly motivated. They will tend to respond favourably to many supposed performance enhancement techniques offered to them, if there is an opportunity that they may gain a competitive advantage. This issue must be considered when conducting such studies and ways must be sought to control for such influences, to maximise the probability that any effects are the result of the particular intervention.

Watkins et al., (1994) drew attention to the fact that previous research on self-efficacy had typically involved laboratory experiments, which produced problems of external validity. This applies to some extent to study three, whereas, the strength of studies one and two is that they examined performance and self-efficacy for real skills in a real competitive environment, thus supporting the concept of ecological validity. Nonetheless, while it was conducted outside the competitive game environment, with all its attendant pressures, study three was a field study in which players of an elite level performed a closed skill, which is often closed in matches. They kicked from a range of positions on the pitch in random sequence, as they would in matches, and the task was made more demanding, because of the accuracy required. It would appear that the scoring method adopted did not change the players' strategy, as they would always aim to put the ball through the centre of the goal, as instructed.

The conditions under which imagery is most effective for influencing self-efficacy and/or performance are important to consider. For example, it is uncertain whether the results would have been the same with novice athletes with potentially much lower levels of self-efficacy? It must be remembered that the current thesis dealt with elite athletes, with high levels of self-confidence, using a skill at which they were already reasonably proficient. Because they were elite and very experienced in skill execution, the participants in the present studies may have reached a ceiling level of self-efficacy in their ability to score goals. Their goal kicking record might have remained stable for some time. On the other hand the non-elite athlete's initial self-efficacy for goal kicking would not have reached a ceiling having a much lower starting self-efficacy, would allow for more substantial increases in self-efficacy and performance.

Another methodological point worth considering is the time devoted to the research period. Each of the three studies in this thesis, as previously mentioned, was conducted over at least a month, whereas much other research studying similar variables has involved each participant completing the study within a single day or over a couple of days. This factor raises the issue of the ability of participants to image properly in such a short period of time. Furthermore, it introduces the concept of the influence of motivational effects if scores are only taken immediately after the treatment.

An important consideration to acknowledge, that may have had a unique influence on the thesis, is the relationship that existed between myself and the senior players at the Richmond and St Kilda football clubs. This may have contributed to the players' compliance with the requirements of the study. It should be recognized that the I was able to gain access to such an elite group of players because I held a unique position within the Richmond and St Kilda Football Clubs. At the time of the second study, for example, I also performed a major coaching role as fitness adviser and co-ordinator to the St Kilda club. In addition, I performed the message giving role of "runner" in games. These contacts may have established an influence that would be very difficult to replicate in most research. What must be recognised, however, is that the background and experience of the researcher enabled access to be gained to elite performers in the competitive environment in these studies. Such research has never been conducted before at this level of Australian Rules football.

In this section several methodolical issues have been identified that this research has dealt with. Other issues of concern, however, have also been raised that continuing research needs to consider in furhthering the imagery, self-efficacy, performance relationship.

7.5 Future Research

The series of studies and analyses comprising this thesis provide clear support for the application of imagery rehearsal in elite sport, for the enhancement of performance and confidence. Many issues remain to be resolved with respect to the use of imagery in sport. Some of the major priororities in imagery research, raised or highlighted by the present research, are now briefly considered.

A major aspect of imagery that requires detailed examination is definitional, that is, there needs to be a greater clarity about what imagery is. Questions need to be addressed concerning the way imagery is used and definition of the type of imagery employed by the individual so that a range of aspects of imagery, such as ease of establishing images, vividness, quality, and controllability, are all considered. In the studies in this thesis, an imagery rehearsal perspective was adopted, based on Suinn's (1984) definition. That is, imagery was considered to be a covert activity whereby a person experiences sensory–motor sensations that reintegrate reality experiences. These include neuromuscular, pysiological, and emotional involvement.

. In the three studies in this thesis a non–validated questionnaire on imagery ability was used to monitor imagery using a multi modal approach. Participants' responses to this questionnaire were observed but no formal analysis was conducted using this data. Future studies could consider analysing this information, and thus, possibly, identifying more clearly the way individuals image and what senses, if any, are moreimportant for performing imagery.

.In studies 1 and 2 imagery performance was facilitated with introductory breathing exercises and video modelling in the last of the weekly sessions. It is important to note that this was an imagery program for maximising effective imagery in real world imagery training. Just what the extent of the contribution of relaxation breathing, and vdeo-modeeling is the role of other research to determine. The issue of the what constitutes an imagery program must be addressed. Future research is needed that isolates the imagery treatment to clearly establish its influence on performance, as well as continuing to study imagery influence when combined with other factors, such as, relaxation and video modelling.

The studies in this thesis were conducted over a number of weeks, whereas, much other research, has been carried out over shorter duration, for example, in a single day. Greater consideration must be given to the length of time researchers and coaches employ their "imagery" programs. In studies 1, and 2, based on multiple base-line intervention, all participants were exposed to three treament sessions a week, over, at least, five weeks of treatment. The first participants introduced to the treatment were involved for ten to twelve weeks. In study three, all players were involved in ten treatment sessions spread over over a month. Future research must address the concern, that programs of lesser amounts of time might not constiute adequate imagery interventions. More attention needs to be applied to, the time taken to train participants to image, the duration of individual treatment sessions, and the total time allocated to imagery program, especially in real sport contexts.

While it is clear from description of the studies that the formal structure of training and practice sessions in imagery, was substantial, the players were also encouraged to practice on their own. Observation, informal comments made by the players, and examination of their logs, indicated that they did practice further in their own time. It is not clear whether this level of adherence to individual practice was influenced by the status I had, based on my formal position in the club, credibility I gained from my football background, or some aspect(s) of the work environment. The issue of adherence is an important one for future research. No psychological skills training (PST) program can be effective unless the skills are practised regularly. Often it is not possible to allocate the amount of time assigned in the studies in this thesis to formal sessions, so there is a greater reliance on individual practice. Bull (1991) considered personal and situational factors which affect adherence to PST. It is important to examine this issue more specifically with reference to imagery, especially because of the ephemeral nature of this mental process.

In the studies in this thesis, particularly studies one and two, substantial imagery programs were developed, in which training and instruction were employed, participants for imagery were carefully chosen in the early stages to elicit vivid imagery and other suport was given to stimulate rich imagery of the important aspects of performance of the skill being studied. Consideration must be given to these aspects of imagery programs for effective application in practice. It is important for future research to examine, not only the nature of training, but also the training time, and the nature of instructions and guidance given. Consideration also needs to be given to such factors as mode of delivery of instructions (e.g., through videotapes, audiotapes, or by the researcher in person). The credibility of the person delivering the instructions or conducting the research , and the belief in the imagery program on the part of the participants must also be taken into account. Participants need to be trained in imagery use and to be allowed sufficient time to practise imagery techniques. Utimately they must be taught how to apply the techniques to the management of their performance.

In the studies in this thesis, elite players were used. Other factors that must be examined, in future research, when considering the impact of imagery on performance are, at what stage or stages of skill development imagery is important, and whether different types of imagery interventions, length of imagery sessions, frequency of imagery sessions, interact with the stage of skill development. For example, if imagery is to improve performance for the beginner, research consideration needs to be given to determine optimal lengths of time for imagery practice, as well as spacing or massing practice of imagery sessions, that is, determining optimal frequency of sessions. Future research needs to be directed at examining the impact imagery has on participants at a broad range of ability levels.

This research considered only male participants at an elite level of participation. This immediately raises the issue of what impact the same treatment would have on female participants with similar levels of sporting expertise. Of course this research relied on participants from Australian Football, a sport played only by males at the elite level of participation. There are many sports, for example, basketball that are played by both males and females at all levels that would allow any gender influence to be assessed.

The first two studies, in this thesis, provide important information on the use of imagery to enhance the performance of open skills. Study 3 provides further information on imagery for closed skills. Imagery programs of a similar nature were effective in the enhancement of the open and closed skills as identified in this thesis. Nonetheless, comparison of imagery usage must be recognised when considering its impact on open and closed skills. Imagery of a skill which operates in most open settings must be conducted some time prior to the skill performance. Firstly, the player is unable to predict exactly when they will be called on to perform that skill in a game situation, and secondly, there is little opportunity to image an open skill just prior to its execution. For closed skills, however, the player can usually stop and image immediately prior to the performance of the skill, because they are in control of the situation with no immediate external physical influences acting on them. For example, a player could image just prior to execution, even if it is only for a few seconds, a free throw in basketball, a serve in tennis, a golf shot, and a free kick at goal. Future research needs to be conducted, so that results and the content of programs from imaging closed skills are compared with other closed skills studies, and results and content of programs from imaging open skills are compared with other open skill studies. This would tend to eliminate impacts other than the imagery being the major influence on the performance.

It is claimed that the results indicate that, this aspect was accounted for by the length of the treatment period. With sufficiently long periods of measurement the immediate, substantial effects tended to settle to a smaller, but noteworthy improvement, which could be more confidently be attributed to imagery enhancing the skill. Future research must guarantee that the length of the treatment is sufficient to ensure diminishing any motivational influences. This was the situation in the present thesis which did show initial results that suggested a motivational component. Future research must continue this trend.

Study 3, which was conducted in the non-competitive season, found that performance and self-efficacy improved with the introduction of imagery treatment for the experimental group. Future research should establish whether the findings of study three can be transferred to the same skill in competition. This is vital to show that controlled studies can be transferred to the practical situation. The important issue of how much one can generalise from research to practice remains largely unanswered, although this thesis and other recent work (e.g., McKenzie & Howe, 1991) suggest results from studies in real competition are similar to those in artificial contexts.

Australian Rules football is a game peculiar to the Australian culture. Its uniqueness stems from aspects like, the number of players on the ground (36), the size and shape of the field, its disposal skills by hand and foot, and many of its rules. Certainly, some of the skills resemble skills of other sports such as rugby, and Americn football. But, it must be recognised that the number of times that a skill, such as kicking, is used in Australian football, and the type of kick performed are very different to the other types of football mentioned. Even though some generalization of results from these studies should be possible, future research needs to be conducted representing a broad cross section of sports. Examination is required of the effect of imagery on a variety of skills in each of these different sports. This research should include studying the impact of imagery on the performance of open and closed skills, as well as endurance and other fitness type performance activities.

Another aspect that needs to be considered in future research is the conditions under which imagery is most effective for influencing self-efficacy and/or performance. For example, consideration should be given to the initial levels of self-efficacy that a participant may exhibit. Self-efficacy was not seen to be a major influence on performance in the present study, but the results might not have been the same with athletes who had much lower initial levels of self-efficacy. A greater increase in self-efficacy as a result of an imagery treatment might be expected when self-efficacy is initially low. It might also be associated with a gretaer impact of self-efficacy on performance. There is a greater likelihood that low skill individuals would have lower self-efficacy levels. It would seem, therefore, that low skill individuals, would demonstrate considerable increase in performance and self-efficacy, if exposed to an imagery treatment, because it is easier to raise something that is low than to raise something that is already high as was the case for the participants used in the studies in this thesis. At the same time, it should be reiterated that the increase in self-efficacy for elite seniors and juniors, noted in study 3, was substantial.

In the three studies in this thesis the players were asked to prepare themselves for the imagery treatment by performing limited deep breathing activities to induce a moderate level of relaxation. In studies 1 and 2 examples of good personal performance on video were also incorporated in a specific form to assist imagery in one of the treatment sessions each week, so that the participant could image perfect performance of the task. The contribution that relaxation breathing, and examples of good personal performances on video, played in assisting the imagery treatment could not be determined. Further exploration is required of the possibility that, for more effective imagery functioning to occur, it might be combined with other processes or techniques, for example, incorporating relaxation, or examples of good personal performances on video. Future research should conduct studies that will account for the influence of these variables. In these future studies, there is a need for the precise manner of inclusion of other elements to be recorded. For example, there could be a great difference between inclusion of a brief breathing exercise and a full progressive muscle relaxation routine, in the effect on imagery and subsequent performance.

Based on study 1, it appeared that confidence might be a mediator helping to explain the mechanism underlying imagery. Study 2 suggested that this was a reasonable proposition, as it found that performance, and self-efficacy were both enhanced. This was replicated in study 3, but structural equation modelling did not support the mediating role, finding no significant causal path from self-efficacy to performance. It, thus, appears that the self-efficacy-performance relationship probably occurs under some circumstances and not under others McAuley(1985). An important issue for future research is establishing the mechanisms underlying the imagery process. This should clarify when, or under what conditions, it is effective and when it is not.

Many issues have been identified, in this thesis, that remain to be resolved with respect to imagery in sport. In all three studies, in this thesis, the use of imagery generated great interest for player, coach, and researcher from a practical perspective. Studies 1 and 2 used open skills in the real competitive environment, and study three was conducted in a non-competitive situation to observe goal kicking as a closed skill. Goal kicking is often a closed skill in competition, although it also occurs as an open skill. The results of these studies are all of great interest to the practitioner. But also, from a theoretical perspective, this fascinating field of imagery still provides, to the psychologist and others, great challenges, especially in addressing issues raised in this thesis.

7.6 Implications For Practice

Performance by experts of three basic football tasks in Australian Rules Football was found to improve with the introduction of imagery rehearsal. These tasks included a closed skill task of goal kicking in a non competitive environment, an open skill task of kick passing, and an open skill endurance task of making front position in packs. Both open skills were examined in a competitive context. These findings are of great value to the practising sport psychologist, who can use imagery in the sporting context more confidently knowing that research has been conducted in settings similar those where they practise. The results with reference to open skills are most valuable, because few skill studies have examined imagery for open skills (e.g., Kedall et al., 1990; McKenzie & Howe, 1991).

It is important to draw the attention of the applied practitioner to the point that interventions such as imagery may have a greater influence on some performers than others. One advantage of the single-case studies is that the researcher is able to identify individuals who respond more favorably to treatment. In practice, therefore, care needs to be taken to ensure that players are ready for a psychological skills training intervention such as imagery.

The experience of the researcher and the findings from the studies support the further introduction of such psychological interventions into into the Australian Rules Football domain, Furthermore, reports of players in the social validation aspects of the studies suggest, not only did the players feel more confident and competent in their ability to perform the tasks that were imaged, but, they also enjoyed their involvement and expressed interest in such training being introduced to other aspects of their game performance. The impression given by the players was that they believed that the imagery rehearsal program was helpful. This is an important aspect of working in the field.

Another relevant observation for practice was that, after a month of formal imagery work, many players still required direction to continue using such interventions. Again, this is an important consideration for the practioner and personnel in sports clubs. Treatments, such as imagery, require time and effort to be initially learned and then put into practice. This requires supervision by experts who must be given time to ensure that the treatments are being applied correctly. In Australian Rules Football, in the past, many of the "psychological skills " sessions have been one off, and coaches have expected their players to have learnt all that is required of them in that session.. This conclusion has been arrived at from observations over 25 years of Australian Rules Football involvement.

This research established that imagery improved performance by males at the elite senior levels of Australian Football in studies 1 and 2. Improvement was also found by males at the elite senior and U/18 levels of Australian Football in study 3. Consideration needs to be given from a practical perspective as to whether similar results can be replicated for open skills in other sports that would include females and males, from a variety of age groups, and ability levels. Three skills were evaluated in the studies in this thesis which showed imagery was influential on their performance. Still similar research on other skills would be of value from a practical perspective.

Finally, relaxation and examples of good personal performances on video were used to assist the players with their imaging of the tasks to be performed. From a practical perspective, these two techniques, as explained in prevous chapters, even though used in basic forms compared to the imagery intervention, with the purpose of supporting it in specific ways, seemed to have appeal to the players in helping them with their imagery activities. Certainly there is no evidence that either created any problems, so it is reasonable to include them in applied programs, while we await the outcome of research specifically designed to examine their roles.

In conclusion, the findings from the studies in this thesis supported the use of imagery rehearsal as a treatment for enhancing performance of skill and endurance tasks. They provided much evidence to suggest that imagery can be an important intervention in producing practical task improvement, and in raising self-efficacy, for both open and closed skills. The present research suggests that imagery programs need to be carefully and thoroughly planned and excuted over the long term, with substantial training and practice, if they are to be effective.

7.7 Concluding Remark

The major findings from this thesis were that imagery had a substantial influence on performance and self-efficacy. The structural equation modelling analysis suggested that imagery affected performance and self-efficacy independently. These are important findings in a competitive sport utilizing elite participants. Single-case, multiple-baseline design was effective in the two studies in this thesis, which employed that design. This supported the limited amount of previous imagery research using single-case design (Kendall et al., 1990). In the real competitive environment, at the elite level, single-case multiple-baseline design had great practical appeal to the two elite Australian Rules Football coaches involved in studies 1 and 2. This was a most important finding because single-case, multiple-baseline design as well as being experimentally valid, was also found to have credibility for use in practice.

It is important, from both a theoretical and applied perspective, to establish causal links between performance enhancement techniques and improved performance, enhanced confidence, increased motivation, or reduced anxiety. The findings of this thesis support the continued use of imagery rehearsal as a means of enhancing both performance and self-efficacy or confidence in Australian Rules Football. The superior performance of participants in the three studies, was robust and was sustained across various manipulations of tasks and experimental designs. Much further research is required to discover the precise personal and environmental variables that affect the application of imagery in sport. It is equally vital to continue studying the mechanisms whereby imagery rehearsal is effective, and to analyse the processes that are involved in bringing about an improvement in sports performance, by using imagery techniques, as well as establishing the relationship between imagery and performance.

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Appendix A   Imagery Assessment

The is an exercise to assess the vividness and controllability of imagery by players being used in the study on imagery rehearsal and Australian Rules Foootball players.

The player will be given thirty seconds to imagine a situation that is read out to him, employing as many of the senses possible, seeing, hearing, feeling, and emotions. He then will have twenty seconds to rate his imagery skills.

Vividness

The content of session one was as follows, "Close your eyes, take five long, deep slow breaths as you feel your whole body relaxing. As you are relaxing try to image yourself in the situations that are read out to you. That is, image yourself seeing the situations, feeling the emotions of the situations, hearing the sounds of the situation.
I will read the first scenario to you now. (pause)
It is match day and you have driven from your house to the RFC. car park. Drive into the RFC car park, picture the curbing, (pause) the old red bricked stand its gates and windows, (pause) feel the rough ride over the car park surface, (pause) sense everything else that is around you in the car park, other familiar cars, the steel fencing, (pause) park the car in the usual place, (pause) get out of the car lock the doors and remove your bag from the boot." (pause).

"Walk along the asphalt path to the MCG and observe, the caretaker's residence, (pause) the large gums with the shining possum protectors around them, (pause) hear the trains and road traffic, (pause) see people walking along with RFC scarves and beanies, (pause) change your carry bag to the other hand, feel the muscles relax in the hand and arm that was carrying the bag (pause) check in your mind that you have not left anything behind, (pause) feel the stones of the unmade path through the soles of your shoes, (pause) acknowledge someone who calls out to you."(Pause).

"As you approach the players and officials entrance notice the food vans, (pause) picture the colour and signs on the vans, (pause) smell the aromas of the chips, (pause) vinegar, (pause) taste the salt on the chips, (pause) taste the sweet, warm jam on a donut." (Pause).

Walk to the ticket entry and exchange pleasantries with the attendant in the blue coat, (pause) see and hear your ticket being snipped, (pause) walk down the concrete ramp to the thoroughfare under the stands, see the cold concrete walls, (pause) work your way through the throngs of people, (pause) notice people pointing at you, (pause) acknowledge those who call out, (pause) sign some autographs. (Pause). Reach the change rooms and exchange greetings with the doorman. (Pause) This is the end of this session you may open your eyes.

This exercise is designed to assess how vividly you were able to image the description. You will rate yourself on how well you saw the image, heard any sounds, smelt any aromas, felt body movements and felt moods and emotions.

The rating system is keyed as follows:

1 = very clear and vivid image.

2 = moderately clear and vivid image.

3 = not clear or vivid, but recognizable.

4 = vague image.

5 = no image present.

Assessment on question 1.

1. Rate how well you saw yourself in this situation. 1 2 3 4 5

2. Rate how well you felt yourself making the movements. 1 2 3 4 5

3. Rate how well you heard the sounds in this situation. 1 2 3 4 5

4. Rate how well you felt the emotions of this situation. 1 2 3 4 5

Assessment on question 2.

1. Rate how well you saw yourself in this situation. 1 2 3 4 5

2. Rate how well you felt yourself making the movements. 1 2 3 4 5

3. Rate how well you heard the sounds in this situation. 1 2 3 4 5

4. Rate how well you felt the emotions of this situation. 1 2 3 4 5

Assessment on question 3.

1. Rate how well you saw yourself in this situation. 1 2 3 4 5

2. Rate how well you felt yourself making the movements. 1 2 3 4 5

3. Rate how well you heard the sounds in this situation. 1 2 3 4 5

4. Rate how well you felt the emotions of this situation. 1 2 3 4 5

Assessment on question 4.

1. Rate how well you saw yourself in this situation. 1 2 3 4 5

2. Rate how well you felt yourself making the movements. 1 2 3 4 5

3. Rate how well you heard the sounds in this situation. 1 2 3 4 5

4. Rate how well you felt the emotions of this situation. 1 2 3 4 5

Appendix B Imagery Assessment Controllability

The four controllability situations included, examining a ball, removing the stitching from the ball, kicking for goal and performing an extraordinarily long kick (as described below).

Controllability

Examining a ball.

Q.1. "Picture holding a football with your hands at either end of the ball, (pause) twist the ball around and see the stitches, and brand name as the ball completes a full rotation, (pause) twist the ball further until you hand covers the brand name, (pause) hold the ball to kick a drop punt." (pause)

Fill in the rating.

Removing the stitching.

Q.2. "Hold a football in your hands and watch stitch after stitch being broken as the ball is being over inflated, (pause) see the bladder forcing itself out of the ever enlargening hole (pause) see the ball explode into small pieces." (pause)

Kicking for goal.

Q.3. "You are kicking for goal on the MCG. from the fifty metre line and directly in front, (pause) watch the ball leave the side of your boot and fly towards the behind post, (pause) ten metres before the ball reaches the behind post see it change direction in flight, at almost ninety degrees, and go through the middle of the goals." (pause)

A long kick.

Q.4. "You are to kick out from fullback, (pause) you attempt a long kick straight down the ground, (pause) see the ball leave your boot, (pause) and start to rise into the sky going twenty metres above the outstretched arms waiting for the ball in the centre of the ground, (pause) see the ball continue over the centre half forward position, (pause) watch the fullforward stare in amazement as the ball sails well above him, (pause) see the ball finally complete its flight spinning straight through the goals." (pause).

In each situation the player was asked to rate, on a five point Likert scale (1 = very clear control, 5 = unable to control) how well he could control the situation and how well he could control the imagery of the movements (as shown below).

SPORT IMAGERY QUESTIONNAIRE

CONTROLLABILITY

This exercise is designed to assess how well you were able to control the image of the description. You will rate yourself on how well you controlled the image, sounds, smells, body movements, moods and emotions.

The rating system is keyed as follows:

1 = very clear control.

2 = moderately clear control.

3 = partially clear control.

4 = vague control.

5 = unable to control.

Assessment on question 1.

1. Rate how well you controlled this situation. 1 2 3 4 5

Assessment on question 2.

1. Rate how well you controlled this situation. 1 2 3 4 5

Assessment on question 3.

1. Rate how well you controlled this situation. 1 2 3 4 5

Assessment on question 4.

1. Rate how well you controlled this situation. 1 2 3 4 5

Appendix C Imagery Session 2

The content of session two was as follows, "Imagine you are standing on the boundary line of the MCG., in front of the player's race, facing towards the centre pitch, (pause) feel the colour and texture of the grass, (pause) picture the mowing patterns of the arena." (pause)

"Walk towards the centre of the arena and feel the texture of the surface through your boots, (pause) see the slope of the arena. (pause). Walk over the centre square line and feel the change of texture of the ground surface through your boots, (pause) jump up and down on the hard surface feel the jarring." (pause).

"Picture yourself standing in the centre circle, (pause) step out how many steps it is from the centre square line at the scoreboard end of the ground, (pause) to the goal square." (pause) Jog from the centre circle towards the goals at the scoreboard end, feel the surface in the centre pitch, (pause) do some evasive baulks in the pitch area, feeling your hard, studded, boots slip, (pause) jog on to centre half forward feeling the different texture of the surface, (pause) baulk again, notice it is much easier to feel sure footing as you baulk again, (pause) jog on to the goals." (pause).

"From the goal square, sprint to the practice cricket pitch area, (pause) when you reach the pitch change directions quickly, (pause) feel your feet slip and slide as you fall to your knees and all fours, (pause) sense the sticky black mud in your fingers and hands, (pause) try and wipe it off on your shorts, (pause) feel annoyed about having tried to change directions quickly in this area." (pause). "Jog back to the change rooms. (Pause) This is the end of the session open your eyes."

Appendix D Imagery Sessions 3

"Stand in front of the exit door of the change rooms on match day ready to enter the arena, (pause) hear the coach demanding a big effort, (pause) feel that you just want to get out onto the ground, (pause) notice the hard, sloped, slippery asphalt of the race compared to the firm rubber matting of the change room." (pause).

"Hear the crowd roar as you file onto the ground, (pause) picture the large run through with the support poles, (pause) guy ropes, (pause) people leaning back and using all their strength as they drag on the ropes to ensure that the run through will not blow down, (pause) sense the closeness of the players encouraging one another as you face the run through, (pause).

"Attempt to crash through the run through, (pause) feel yourself momentarily become entangled in the tape as you desperately fight to break through, (pause) curse at the tape as it eventually breaks." (pause).

"Regroup to commence your runs, (pause) hear the encouragement, (pause) feel your heart pounding, (pause) feel a very dry mouth as you try to produce more saliva." (pause).

"See Dale win the toss and watch him jog back to the group to issue some instructions, (pause) see the wild stare in his eye as he works himself into a frenzy, (pause) jog from the group to take up your position, (pause) feel determined, (pause) strong, (pause) positive as you rehearse your goals for the day, to get in first, (pause) to tackle ferociously, (pause) to attack the ball, (pause) to kick to advantage and not to contests ie where an opponent could punch the ball away, (pause) to stay on your feet, (pause) to run to encourage your teammates, (pause) excited for the contest. (pause).

"Take a couple of slow deep breaths to finish the session, open your eyes."

Appendix E Imagery Session 4

"Its ten minutes into the first quarter and you see the ball on the ground on the wing. Feel yourself, charge into a pack that has formed with your eyes fixed firmly on the ball, (pause) brush aside two opponents, (pause) tenaciously grab the ball and shrug off a tackle, (pause) accelerate and deviate with the ball to break free from the pack as you hear your teammates yelling that you are clear, (pause) see a leading teammate fifty metres away from you and three metres in front of his opponent, (pause) visualise passing the ball in front of him so that he can mark the ball without altering direction or pace, (pause) elect to kick, watch your foot kick the ball knowing that you must place the ball twenty metres in front of your teammate, (pause) watch the spinning ball in flight and finally being marked cleanly in your teammate's hands."(pause).

"Picture again how far in front of your teammate you had to kick the ball, (pause) see the ball being snapped up in his outstretched hands." (pause).

"Again picture a leading teammate fifty away but now your teammate's opponent is along side him, (pause) elect not to short pass but to kick long toward the goal, (pause) picture your teammate doubling back, breaking clear of his opponent, picking the ball up cleanly off the ground and kicking an easy goal, (pause) feel your emotions as the coach sends out a message of congratulations, (pause) hear the tumultuous applause from the very parochial supporters, (pause) feel great as your teammates rush over to compliment you and slap you on the back." (pause).

"Take a strong mark near the wing, (pause) get back quickly off the mark while looking around for disposal options, (pause) notice a teammate making a hard, fast and loud lead down the centre of the ground with an opponent on his tail,(pause) refuse to pass to him, (pause) rather elect to kick long to a space, (pause) notice a teammate running to the ball and picking it up cleanly." (pause).

"Gather the ball from a centre bounce and feel an opponent chasing you, (pause) accelerate and deviate to make space, (pause) take a couple of steps to balance yourself and straighten up your run, (pause) execute a long low pass to a leading forward straight down the ground, (pause) feel satisfied with what you have done and tell yourself that is how it must always be." (pause).

"Focus on the coaches after match address as he makes positive comments on your correct choice of options and the perfect execution of the passes. We will conclude the session here open your eyes."

Appendix F Imagery Session 5

The instructions to the player were, "You will watch each disposal on the video one at a time. After a disposal is shown and the tape is stopped you will sit in a relaxed manner in the chair, lightly close your eyes and use imagery rehearsal to feel playing that disposal segment. You are to try and experience each kicking skill at normal playing speed and time. You will rehearse each skill two times before opening your eyes, pausing for fifteen seconds and moving onto the next skill.

Session 5 Imagery Rehearsal Response Sheet

The player will view at least ten of his own deposals. These will have been compiled from games of the 1991 season.

The disposals will be shown to the player one at a time, the tape will be stopped after each disposal and the player will make any modifications in his mind that may make the disposal better .He will then rehearse the situation that he saw on the tape with modifications, three times at the playing speed.

The instructions to the player will be, "you will watch each disposal on the video one at a time, after a disposal is shown and the tape is stopped you will sit in a relaxed manner in the chair, lightly close your eyes and use imagery rehearsal to feel playing that disposal segment. You are to try and experience each disposal skill at normal playing speed and time. You will rehearse each skill three times before opening your eyes, pausing for fifteen seconds and moving onto the next skill."

You are asked to complete a response sheet at the completion of each session. This will include, answering direct questions and offering any personal thoughts on the session as well.

Response Sheet

At what time did you conduct this session?

What length of time did the session take?___________minutes.

Was this an adequate length of time?

Did you imagine the skills at normal playing speed?________.

If no, circle the speed at which you imagined Faster/slower/varied

Do you feel these sessions are helping you in improving your performances? -

____

____

Are there any ways in which you feel this exercise could be

improved?____

____

Other comments.).....

Appendix G **Imagery rehearsal recapitulation vs.** ____________ /_/91

Name_______________

1. You are to remember five very good disposals that you were involved with in the (name of the team played the previous week) game. Close your eyes and go through each one at the speed and timing that it occurred during the game.

You are to classify the most important attribute of each of these skills;

i) you kicked the ball; well in front,
in front,
to a space,
long to advantage,
to a moving player,
to a teammate by himself,
other.

ii) you kicked the ball; well in front,

in front,
to a space,
long to advantage,
to a moving player,
to a teammate by himself,
other.

iii) you kicked the ball; well in front,

in front,
to a space,
long to advantage,
to a moving player,
to a teammate by himself,
other.

iv) you kicked the ball; well in front,

in front,
to a space,
long to advantage,
to a moving player,
to a teammate by himself,
other.

v) you kicked the ball; well in front,

in front,
to a space,
long to advantage,
to a moving player,
to a teammate by himself,
other.

2. Remember any disposal options that you could improve on. Imagine each option but with making a better choice of disposal at the appropriate speed.

3. What aspect(s) do you mainly need to work on?

to kick the ball; well in front,

in front,
to a space,
long to advantage,
to a moving player,
to a teammate by himself,
not centering too quickly
other.

4. Imagine yourself doing these things at training this week.).....

Appendix H Wednesday _/_/91 Imagery Training Session

1. Five/seven point handball.

Start off the hand ball activity at half pace lead out for the ball calling loudly and pointing for your teammate to see where you want the ball, (pause) take the ball in your hands sightly change direction and go a little faster as you take the ball cleanly in your hands, (pause) balance yourself and handball in front of you teammate as he runs to take the ball on the fly, yell go to him as he takes the ball and you push to the end of the line after you have handballed off to your teammate. (pause).

2. As for 1 but at full pace.

3. Picture yourself at the end of the line as you check that you performed everything in the appropriate way, calling loudly, pointing, take the ball in your hands, accelerating and deviating, steadying to dispose of the ball in front of a team mate, pushing to the end of the line. If you omit to do any one of these thing immediately do a push up for each omission.

4. As for 3 but in all kicking activities, end to end, circle work, down the middle of the ground, etc.

5. Picture how far you kicked the ball in front to a player
50 metres away from you and leading straight at you.

i) how hard did you kick the ball?

ii) watch the ball hit your foot.

iii) picture how far in front the ball had to go.

iv) see the ball hit your teammate in the hands as he continues on at full pace

6. As for three but the player is leading to the side.

7. Go through exercise three again.

8. At AFL park on Saturday see yourself laying a ferocious tackle on Dermott Brereton from behind, (pause) watch the ball get knocked to the ground as you throw him off balance, (pause) charge to get the ball first as your lungs start to burn, grab the ball shrug a Garry Ayre's tackle as you accelerate away from him, (pause) see Alistair Scott leading straight down the ground, 80 metres away from you know that you can kick the ball 30 metres in front of him so that he can take a clear mark, (pause) see the ball hit your foot watch the ball fly through the air and land beautifully in to his fast non stop lead with out-stretched hands, (pause) hear the crowd erupt and applaud.

9. Do the same at training.)....

Appendix I Imagery Rehearsal Session Saturday morning

The player will view at least ten of his own deposals. These will have been compiled from games of the 1991 season.

The disposals will be shown to the player one at a time, the tape will be stopped after each disposal and the player will make any modifications in his mind that may make the disposal better .He will then rehearse the situation that he saw on the tape with modifications, three times at the playing speed.

The instructions to the player will be, "you will watch each disposal on the video one at a time, after a disposal is shown and the tape is stopped you will sit in a relaxed manner in the chair, lightly close your eyes and use imagery rehearsal to feel playing that disposal segment. You are to try and experience each disposal skill at normal playing speed and time. You will rehearse each skill three times before opening your eyes, pausing for fifteen seconds and moving onto the next skill."

You are asked to complete a response sheet at the completion of each session. This will include, answering direct questions and offering any personal thoughts on the session as well.

Response Sheet

At what time did you conduct this session?

What length of time did the session take?__________minutes.

Was this an adequate length of time?

Did you imagine the skills at normal playing speed?_______.

If no circle the speed at which you imagined Faster/slower/varied

Do you feel these sessions are helping you in improving your performances? -

____

____

Are there any ways in which you feel this exercise could be

improved?____

____

Other comments.).....

Appendix J Imagery Rehearsal Introduction Chapter 4

Most great athletes in all sports use **imagery rehearsal** to assist them in improving and maintaining performance in their sports.

Imagery Rehearsal is a form of mental practice performed away from the physical arena, whereby, you try to live the real situation in your mind, so that when you are confronted by the real situation in a match your mind will be automatically conditioned to make the right decision. As you know the training track does not simulate the pressured setting of the real game. Performing imagery rehearsal of skills **whilst under pressure**, at the right playing speeds, will help you identify with the competitive match situation.

On the training track you can not kick a pass 20 metres in front of a fast leading Tony Lockett with Chris Langford pursuing him, while Ben Allan is ferociously chasing you. So where can you practise such scenarios? You can not physically experience such situations until they occur in the real competition. **However you can set up and practise, in your mind**, at the appropriate playing speed, that possible real scenario, at any time away from the track.

Where do you practise bursting through a pack to pick up a ball? Accelerating and deviating? Shrugging off a tackle? Balancing and disposing of the ball to a space? Manning up an opponent at a centre bounce? Being on the move at a boundary throw in? Talking to a teammate when the ball is at the other end of the ground? Laying a great tackle on an opponent? Being in the front and centre position of packs? Or............?

You can do all these things and many more using imagery rehearsal, as long as you are professional enough to take time out and rehearse them in your mind. You tailor make the activities and settings to suit your individual needs ensuring that they are positive.

Jack Nicklaus used imagery rehearsal and visualised the arc of the ball in flight, where the ball landed on the green, how many bounces it would take until rolling to the cup. Having rehearsed the above path of the ball he would choose a club, image the swing, image the club head making contact on the ball and finally play the shot. He rehearsed all his shots in his mind days before, the evening of, the morning of, and moments before actually executing the stroke. He performed all his shots in his mind at the normal playing speed.

DO YOU???

Daley Thompson, the great decathlete, regarded imagery rehearsal as a vital component to his athletic performances.

Most of you possibly use imagery rehearsal in some shape or form to assist your performances. The exercise in particular that I want you to concentrate on, with me, is Making the front position of packs that occur in an Australian Rules Football game. What we wish to achieve is to increase the number of St Kilda players who make the front position of packs so that if the ball falls to the ground a St Kilda player is there to "crumb it". As well I would encourage you to use imagery rehearsal to improve all the skills in your game of football.

Vast improvement will not, more than likely, appear overnight. However like all other exercises training is required before the results become automatic. I encourage you to practise as often as you are asked and that you fill in the appropriate response sheets at the end of formal sessions.

Appendix K Imagery Preparation

At the introduction to each session participants were instructed as follows.

"In a moment I will ask you to sit comfortably on this chair, lightly close your eyes, and take four, deep, slow, breaths. When that is completed I will read a series of accounts that you are to try to image using as many of your senses as possible so as to experience each account, that is, hearing, seeing, smelling, tasting, feelings and emotions. You are to attempt to perform each of the activities in real life times. At the completion of each session you will be asked to rate how well you feel you used imagery to sense the experiences, you will have sixty seconds to do so.")

Appendix L Imagery Assessment

The is an exercise to assess the vividness and controllability of imagery by participants being used in the study on imagery rehearsal and Australian Rules Football players.

The player will be given thirty seconds to imagine a situation that is read out to him, employing as many of the senses possible, seeing, hearing, feeling, and emotions.

He then will have twenty seconds to rate his imagery skills.

Vividness

Session 1

Prepare as in the introduction.

"It is match day and you have driven from you house to the Waverley car park. Drive into the Waverley car park. Drive into the Waverley car park, picture the traffic lights, the pipe barriers and ticket attendant (pause) feel the rough ride over the car park surface (pause) sense everything else that is around you in the car park, other familiar cars, the flags flapping, (pause) park the car in the usual place (pause) get out of the car lock the doors and remove your bag from the boot."

"Walk between the cars across the driveway to watch people milling around the first entrance, (pause) see and hear flags fluttering on the huge flag poles (pause) hear a boy selling footy records (pause) see people walking along with St Kilda scarves and beanies, smile at some (pause) change your carry bag to the other hand, feel the muscles relax in the hand and arm that was carrying the bag (pause) check in your mind that you have not left anything behind, (pause) acknowledge someone who calls out to your." (pause).

Walk to the ticket entry and exchange pleasantries with the attendant in the blue coat, (pause) see and hear your ticket being snipped, (pause) walk along the cold concrete hall passing the food outlets, smell the aromas of the chips, (pause) vinegar, (pause) taste the salt on the chips, (pause) taste the sweet, warm jam on a donut, (pause) see the cold concrete walls, (pause) work your way through the throngs of people, (pause) notice people pointing at you, (pause) acknowledge those who call out, (pause) sign some autographs." (pause).

"Reach the restricted area that allows entry to the change rooms and exchange greetings with the gate keeper. This is the end of this session, you may open your eyes."

Entering the boot room.

Q.1."It is a training evening, you have changed all your gear except for your boots, I want you to see yourself entering the boot room at the Moorabbin ground, (pause) feel the gritty floor on you bare feet, (pause) hear Cliff complaining about someone asking for new socks, (pause) smell the nugget brushes lying on the bench, (pause) picture the racks holding all the boots." (pause)

Fill in the rating.

<u>Entering on to the arena.</u>

Q.2."It is quarter past five and you are ready to descend the player's race towards the arena on a cold wet night, picture the plastic strips and hear them flapping in the wind (pause) feel how heavy they are as you push your way through them (pause) walk down the race and feel the piercing southerly breeze bite into your face and arms as you go down the player's race, (pause), (pause) feel the slushy surface of the ground as you enter on to the arena, (pause) feel your feet being sucked into the mud as you attempt to jog, (pause) hear the squelching of your steps in the mud, (pause) how do you feel about training on a cold, wet dirty night?" (pause)

Fill in the rating.

<u>Taking a mark.</u>

Q.3. "You are playing in a match, imagine yourself at full forward, at AFL. Park, (pause) feel yourself accelerate and establish a break on your opponent as you lead for a pass from Robert Harvey, (pause) picture the ball leave Rob's boot, (pause) watch the ball fly low ,hard and perfectly into your outstretched hands, (pause) hear the crowd cheer as you take the mark." (pause)

Fill in the rating.

Playing on after the mark.

Q.4."After you have taken the mark, at Centre Half Back at AFL Park, run back quickly from your opponent, turning around to look for options (pause) see Danny Frawley charging out wide screaming for a handball, (pause) accelerate in his direction and handball to him so that he can take the ball in front and maintain his speed, (pause) yell at him to take a bounce as you prepare to shepherd him from behind, (pause).

Fill in the rating.

Controllability

Examining a ball.

Q.1. "Picture holding a football with your hands at either end of the ball, (pause) twist the ball around and see the stitches, and brand name as the ball completes a full rotation, (pause) twist the ball further until you hand covers the brand name, (pause) hold the ball to kick a drop punt." (pause)

Fill in the rating.

Removing the stitching.

Q.2. "Hold a football in your hands and watch stitch after stitch being broken as the ball is being over inflated, (pause) see the bladder forcing itself out of the ever enlargening hole (pause) see the ball explode into small pieces." (pause)

Fill in the rating.

Kicking for goal.

Q.3. "You are kicking for goal on the MCG. from the fifty metre line and directly in front, (pause) watch the ball leave the side of your boot and fly towards the behind post, (pause) ten metres before the ball reaches the behind post see it change direction in flight, at almost ninety degrees, and go through the middle of the goals." (pause)

Fill in the rating.

A long kick.

Q.4. "You are to kick out from fullback, (pause) you attempt a long kick straight down the ground, (pause) see the ball leave your boot, (pause) and start to rise into the sky going twenty metres above the outstretched arms waiting for the ball in the centre of the ground, (pause) see the ball continue over the centre half forward position, (pause) watch the fullforward stare in amazement as the ball sails well above him, (pause) see the ball finally complete its flight spinning straight through the goals." (pause).

Appendix M Sport Imagery Response Sheets

VIVIDNESS

This exercise is designed to assess how vividly you were able to image the description. You will rate yourself on how well you saw the image, heard any sounds, smelt any aromas, felt body movements and felt moods and emotions.

The rating system is keyed as follows:

1 = very clear and vivid image.

2 = moderately clear and vivid image.

3 = not clear or vivid, but recognisable.

4 = vague image.

5 = no image present.

Assessment on question 1.

1. Rate how well you saw yourself in this situation. 1 2 3 4 5

2. Rate how well you felt yourself making the movements. 1 2 3 4 5

3. Rate how well you heard the sounds in this situation. 1 2 3 4 5

4. Rate how well you felt the emotions of this situation. 1 2 3 4 5

Assessment on question 2.

1. Rate how well you saw yourself in this situation. 1 2 3 4 5

2. Rate how well you felt yourself making the movements. 1 2 3 4 5

3. Rate how well you heard the sounds in this situation. 1 2 3 4 5

4. Rate how well you felt the emotions of this situation. 1 2 3 4 5

Assessment on question 3.

1. Rate how well you saw yourself in this situation. 1 2 3 4 5

2. Rate how well you felt yourself making the movements. 1 2 3 4 5

3. Rate how well you heard the 1 2 3 4 5

sounds in this situation.

4. Rate how well you felt the

emotions of this situation. 1 2 3 4 5

Assessment on question 4.

1. Rate how well you saw yourself in 1 2 3 4 5

this situation.

2. Rate how well you felt yourself 1 2 3 4 5

making the movements.

3. Rate how well you heard the 1 2 3 4 5

sounds in this situation.

4. Rate how well you felt the

emotions of this situation. 1 2 3 4 5

Appendix N Session 2

"Imagine you are standing on the boundary line of Waverley Park, in front of the player's race, facing towards the centre pitch, (pause) feel the colour and texture of the grass, (pause) picture the mowing patterns of the arena." (pause)

"Walk towards the centre of the arena and feel the texture of the surface through your boots, (pause) see the slope of the arena. (pause).

"Walk over the centre square line and feel the change of texture of the ground surface through your boots, (pause) jump up and down on the hard surface feel the jarring." (pause).

"Picture yourself standing in the centre circle, (pause) step out how many steps it is to the centre square line at the scoreboard end of the ground, (pause) to the goal square." (pause)

"Jog from the centre circle towards the goals at the scoreboard end, feel the surface in the centre pitch, (pause) do some evasive baulks in the pitch area, feeling your hard, studded, boots slip, (pause) jog on to centre half forward feeling the different texture of the surface, (pause) baulk again, notice it is much easier to feel sure footing as you baulk again, (pause) jog on to the goals." (pause).

"From the goal square, sprint to the practice cricket pitch area, (pause) when you reach the pitch change directions quickly, (pause) feel your feet slip and slide as you fall to your knees and all fours, (pause) sense the sticky black mud in your fingers and hands, (pause) try and wipe it off on your shorts, (pause) feel annoyed about having tried to change directions quickly in this area." (pause).

"Jog back to the change rooms. This is the end of the session open your eyes."

Appendix O Session 3

"Stand in front of the exit door of the change rooms on match day ready to enter the arena, (pause) hear the coach demanding a big effort, (pause) feel that you just want to get out onto the ground, (pause) notice the hard, sloped, slippery asphalt of the race compared to the firm rubber matting of the change room." (pause).

"Hear the crowd roar as you file onto the ground, (pause) picture the large run through with the support poles, (pause) guy ropes, (pause) people leaning back and using all their strength as they drag on the ropes to ensure that the run through will not blow down, (pause) sense the closeness of the players encouraging one another as you face the run through, (pause).

"Attempt to crash through the run through, (pause) feel yourself momentarily become entangled in the tape as you desperately fight to break through, (pause) curse at the tape as it eventually breaks." (pause).

"Regroup to commence your runs, (pause) hear the encouragement, (pause) feel your heart pounding, (pause) feel a very dry mouth as you try to produce more saliva." (pause).

"See Danny win the toss and watch him jog back to the group to issue some instructions, (pause) see the wild stare in his eye as he gets really worked up, (pause) walk from the group to take up your position, (pause) feel, determined, (pause) strong, (pause) positive as you rehearse your goals for the day, to get in first, (pause) to tackle ferociously, (pause) to attack the ball, (pause) to kick to advantage and not to contests, (pause) to stay on your feet, (pause) to run to encourage your teammates, (pause) excited for the contest. (pause).

"Take a couple of slow deep breaths to finish the session, open your eyes."

Appendix P Session 4

"Its ten minutes into the first quarter and you see the ball on the ground on the wing feel yourself, charge into a pack that has formed with your eyes fixed firmly on the ball, (pause) brush aside two opponents, (pause) tenaciously grab the ball and shrug off a tackle, (pause) accelerate and deviate with the ball to break free from the pack as you hear your teammates yelling that you are clear, (pause) see a leading teammate fifty metres away from you and three metres in front of his opponent, (pause) visualise passing the ball in front of him so that he can mark the ball without altering direction or pace, (pause) elect to kick, watch your foot kick the ball knowing that you must place the ball twenty metres in front your teammate, (pause) watch the spinning ball in flight and finally being marked cleanly in your teammate's hands."(pause).

"Picture again how far in front of your teammate you had to kick the ball, (pause) see the ball being snapped up by his outstretched hands." (pause).

"Again picture a leading teammate fifty away but now your teammate's opponent is along side him, (pause) elect not to short pass but to kick long toward the goal, (pause) picture your teammate doubling back, breaking clear of his opponent, picking the ball up cleanly off the ground and kicking an easy goal, (pause) feel your emotions as the coach sends out a message of congratulations, (pause)
hear the tumultuous applause from the very parochial supporters, (pause) feel great as your teammates rush over to compliment you and slap you on the back." (pause).

"Take a strong mark near the wing, (pause) get back quickly off the mark while looking around for disposal options, (pause) notice a teammate making a hard, fast and loud lead down the centre of the ground with an opponent on his tail,(pause) refuse to pass to him, (pause) rather elect to kick long to a space, (pause) notice a teammate running to the ball and picking it up cleanly." (pause).

"Gather the ball from a centre bounce and feel an opponent chasing you, (pause) accelerate and deviate to make space, (pause) take a couple of steps to balance yourself and straighten up your run, (pause) execute a long low pass to a leading forward straight down the ground, (pause) feel satisfied with what you have done and tell youself thats how it must always be." (pause).

"Focus on the coache's after match address as he makes positive comments on your correct choice of options and the perfect execution of the passes. We will conclude the session here open your eyes."

Appendix Q Session 5

You are to view ten instances of good front and centres. These have been compiled from games of the 1994 season.

The front and centres will be watched by you one at a time, the tape is to be stopped after each front and centre segment and you will make any modifications in your mind that may make the front and centre better. You are then to image the situation that saw on the tape with modifications, three times at the playing speed.

You are to sit in a relaxed manner in a chair, lightly close your eyes and use imagery rehearsal to feel playing that front and centre segment. You are to try and experience each front and centre at normal playing speed and time. You are to rehearse each skill three times before opening your eyes, pausing for fifteen seconds and moving onto the next front and centre segment."

You are asked to complete a response sheet at the completion of each session. This will include, answering direct questions and offering any personal thoughts on the session as well.

Appendix R Session 5 Response Sheet

At what time did you conduct this session?__________

What length of time did the session take?__________minutes.

Was this an adequate length of time?

Did you imagine the front and centres at normal playing speed?________.

If no circle the speed at which you imagined the front and centres. Faster---slower---
-varied

Do you feel these sessions are helping you in improving your performances? -

____

____

Are there any ways in which you feel this exercise could be
improved?____

____

Other comments.

Appendix S Imagery rehearsal recapitulation vs. Date____________

1. You are to remember five very good front and centres that you were involved with in the __________ game. Close your eyes and go through each one at the speed and timing that it occurred during the game.

You are to classify the most important attribute of each of these skills;

1. You:

   i) took the ball from the front of a pack and accelerated and deviated.

   ii) you had to hurt yourself to cover the distance to make the front and centre position.

   iii)had to use physical strength to demand the front and centre position in front of your opponent.

   iv) were on your toes in the ready position to move to take the ball if it fell from the pack.

   v) were initially out of position but forced yourself to get to the front and centre position.

   vi) ran from behind the pack to take the front and centre position.

2. Remember any occasions that you should have made the front and centre position but did not. Imagine each instance but ensuring now make the front and centre position.

2a. How many times did you make the front and centre position in this game?___

2b. How many times could you have made the front and centre position in this game but did not go for it?____

(Using the definitions in question 3 as the guidelines for effectiveness).

3. What aspect(s) do you mainly need to work on to ensure that you make the front and centre of every pack that forms if you are to be the best AFL player at making front and centres in the league?

To:

i) take the ball from the front of a pack accelerate and deviate.

ii) you have to hurt yourself to cover the distance to make the front and centre position.

iii) have to use physical strength to demand the front and centre position in front of your opponent.

iv) be on your toes in the ready position to move to take the ball if it falls from the pack.

v) if initially out of position force yourself to get to the front and centre position.

vi) run from behind the pack to take the front and centre position.

4. Imagine yourself doing these things at training this week.

Appendix T Wednesday Training Imagery

1. End to end kicking

Start off the end to end kicking exercise, see Darren Bourke running to kick the ball to the pack at your end, (pause) make your mind up to push to the front of the pack, (pause) see the ball hit the outstretched hands of the players in the pack, (pause) feel pleased that no-one has marked the ball, watch the ball fall into your waiting hands,(pause) accelerate away with the ball and kick it to the other end. (pause).

At half pace lead out for the ball calling loudly and pointing for your teammate to see where you want the ball, (pause) see him ignore you and decide to kick the ball to the pack, (pause) feel annoyed about being ignored, (pause) decide to turn around quickly and race to the front of the pack in case the ball falls to the ground, feel your heart and lungs burning, (pause) see the ball fall to the ground and you are there to take the ball in your hands feel that surge of extra strength as you are rewarded and accelerate away from the pack, (pause) balance yourself and handball in front of you teammate as he runs to take the ball on the fly, yell encouragement to him as he takes the ball and you return to position yourself again, (pause).

2. Image, as you reposition yourself, checking that you performed everything in the appropriate way, calling loudly, pointing, turning back into the play, feeling the burning lungs, taking the ball in your hands, accelerating and deviating, steadying to dispose of the ball in front of a team mate, pushing to the end of the line

3. As for 2 but in all kicking activities, end to end, circle work, down the middle of the ground, etc.

4. Image:

i) take the ball from the front of a pack accelerate and deviate.

ii) you have to hurt yourself to cover the distance to make the front and centre position.

iii) have to use physical strength to demand the front and centre position in front of your opponent.

iv) be on your toes in the ready position to move to take the ball if it falls from the pack.

v) if initially out of position force yourself to get to the front and centre position.

vi) run from behind the pack to take the front and centre position.

Appendix U Saturday Session

You are to view ten instances of good front and centres. These have been compiled from games of the 1994 season.

The front and centres will be watched by you one at a time, the tape is to be stopped after each front and centre segment and you will make any modifications in your mind that may make the front and centre better. You are then to image the situation that saw on the tape with modifications, three times at the playing speed.

You are to sit in a relaxed manner in a chair, lightly close your eyes and use imagery rehearsal to feel playing that front and centre segment. You are to try and experience each front and centre at normal playing speed and time. You are to rehearse each skill three times before opening your eyes, pausing for fifteen seconds and moving onto the next front and centre segment."

You are asked to complete a response sheet at the completion of each session. This will include, answering direct questions and offering any personal thoughts on the session as well.

Response Sheet

At what time did you conduct this session?

What length of time did the session take?___________minutes.

Was this an adequate length of time?

Did you imagine the front and centres at normal playing speed?________.

If no circle the speed at which you imagined the front and centres. Faster---slower----varied

In what way do you feel these sessions are helping you in improving your performances? -

____

____

Are there any ways in which you feel this exercise could be improved?____

____

Other comments.

THE ACTIVITIES QUESTIONNAIRE (FRONT AND CENTRE)
FRONT AND CENTRE

In a game as an on ball player it is important to make the front and centre position from a pack that is contesting the ball in the air. Rate how certain you are as to reaching front and centre of packs in a game of Australian Rules Football for each of the number of front and centres below.

	CERTAINTY RATING (0 to 100)
I could make the front and centre position of a pack 2 times in a game.	______
I could make the front and centre position of a pack 5 times in a game.	______
I could make the front and centre position of a pack 10 times in a game.	______
I could make the front and centre position of a pack 15 times in a game.	______
I could make the front and centre position of a pack 20 times in a game.	______
I could make the front and centre position of a pack 25 times in a game.	______
I could make the front and centre position of a pack 30 times in a game.	______
I could make the front and centre position of a pack more than 30 times a game.	______

Appendix W Imagery Response Sheet

In what ways do you feel these sessions are helping you?

Are there any suggestions you could make to improve the exercise?

Other comments

Appendix X Transcript of Imagery Tapes

Introduction

Thanks for volunteering to be involved in this training program using mental intervention as opposed to the normal acceptable means of physical training to improve skills.

This is a research method and it is important that you apply all that is asked of you from listening to recordings and filling out the booklet that has been provided for you.

You will be asked to listen to this tape every second day at a time and place that is convenient for you where you can be in a relaxed position and try and image all that is put before you. Imagery is an exciting new method of training which some of you may have used in the past. Either consciously or sub-consciously or others of you have not used it at all. Imagery involves you actually thinking and imaging using all the senses to try and play out situations your mind. Physical situations that may arise, especially under pressure which you cannot apply in the training situations. So it may be the sense of feel, of hearing, of sight, of touch, of emotions, that you use to practice these settings. My contention is that people find it hard to practise pressure until they are in that real situation. At the training track you can practise skills but you can't practise real pressure. Perhaps, imaging situations and especially pressure situations in your mind which may arise in games will give you the competent skills to perform them when they do occur in competition that is what this research is trying to establish.

You will be required to listen to a tape for approximately ten minutes every second day. On the tape there will be some instructions which you will apply in a relaxed manner to try and image yourself, again using all your senses to try and be in that situation. You will then at the completion of the tape leave it at that point, so that in two days time you will put the tape on again and it will run without sound for approx 30 seconds until the next session commences.

Each segment on a tape will commence with the number of the session and at the conclusion of that tape the statement will be "You have completed this session, please fill in the sheet in your booklet and make sure you put both the tape and booklet away so it will be readily available in two days time". I will be ringing you at regular intervals, to ensure that you are able to follow the instructions. It is extremely important that you be honest. If it so happens that for some particular reason you miss one of the exercises don't just fill in the form for the sake of doing that acknowledge in the form that you have missed out on that particular session. This is very important.

We will commence tape 1 in 15 seconds.......

SESSION 1

You are to sit down or lie down in a very comfortable position with your eyes closed where you feel that you can breathe very comfortably. Make sure your arms are either hanging by your side and that you feel that all muscles in your body relaxing. You can do this by concentrating on relaxing muscle groups from the neck down to your feet.

As you are starting to relax your muscles make sure that you consciously breathe in and out in a relaxed manner very deeply very controlled and very slowly 5 times. When you are breathing large deep breathes, ensuring that your lungs expand, your diaphragm and stomach expand, and when you are exhaling that you blow consciously through your mouth in a controlled manner.

Do this now 5 times to relax.

As you continue to breathe slowly I will put to you the instructions that are required.

You will in every exercise be conscious of the fact of dealing with kicking skills. What is interesting about kicking is that people are able in a unpressurised situation on a training track kick nearly perfectly backwards and forwards to one another and with seemingly no real effort as far as strength and power is concerned. And yet we see people, those exact same people, in pressure situations perform the wrong processes of kicking when either kicking to a teammate or indeed kicking towards goal. Perhaps the pressures of playing in a match, of kicking a goal and focussing on the outcomes tend to influence our performances.

So as you are relaxing I want you to try and image this situation.

You are playing kick to kick with a mate in a park. And you constantly kick the ball with perfect 40 to 50 metre drop punt passes straight into his hands, over the next ten seconds I want you to image yourself doing that.

I want you now to consider perhaps what you did and indeed we do have different techniques, but the basic principles are the same. I wonder if you image yourself as you are in that non pressure situation, you see yourself, feel yourself, hear the sounds and sense the emotions. For instance image this - before you even kick the ball feel how light and relaxed the ball is in your hands. Feel the grip is very relaxed but it has got beautiful touch on the ball. Pick the line that you are going to run on to kick to your mate. Take 5 or 6 really light steps, but balanced steps as you are running towards him before kicking. Feel how effortlessly your leg and foot tend to come through to kick the ball. You don't force it, it just seems to happen, it is very relaxed. See the ball hit the foot, see and feel yourself follow through at your mate as the target. Be conscious of kicking through the ball. And automatically follow through again at him. Now watch the ball fly perfectly and directly through the air to him. And he doesn't have to move.

Watch that ball again fly directly to him. And that is the conclusion and that is the outcome of the processes of doing everything right. It is the process that you need to concentrate on not the outcome. Hey, and what about feel that warm glowing pride and satisfaction as you do another perfect kick to your mate in the park. And then move back to your original position. And what about ribbing him as he kicks another one off the side of the boot and you know you've done it perfectly every time.

And why don't you image yourself saying to him, thats another one in the bag to me... I'm one more up on you.

I want you again to image the lightness of the ball in your hands the deft touch. I want you to image picking the line on which you are going to run to kick to your mate. I want you to image perhaps the elbows slightly bent, the shoulders relaxed, the knees slightly bent, the light steps that you take towards your mate. I want you to feel the foot hit the ball with a nice tight instep and see the ball fly magnificently and perfectly through the air to your mate. I want you to feel how easy it was to do that kick because it was relaxed and controlled but not tight and taut and stiff and awkward.

Again, think of the processes. The outcome took care of itself.

One more time we will go through these things and I will give you five seconds to image each one.

The grip, the lightness of grip. Picking the line, pick that line. Slightly bent at the knees as you lightly run on your feet. Shoulders and arms relaxed. The effortless ease at which you are moving in to kick the ball. Watch the ball hit your foot. You seem to kick within yourself and yet still managed to kick the ball a good distance. See your leg following through after you do kick the ball. And it follows through at the target. See the ball fly through the air into his hands and you have followed through towards him after kicking the ball. Image again the outcome taking care of itself. The process is what we need to practice.

You have completed this session. Fill in the next response sheet and make sure you put the tape away until two days time .

Thank you and good luck.

SESSION 2

You are going to image situations described to you trying to use all the senses. I cannot impress too much upon you the importance of endeavouring to use all your senses, your sight, your hearing, your smell, your taste, your feel, to really live the situations that occur. Because if you live them through all your senses when they actually do occur, hopefully you some how or another will have etched into your brain responses that are important. But first relax, in a comfortable position, close your eyes, breathe in slowly five times being conscious again of your lungs and stomach expanding and contracting as you relax in all parts of the body. I will give you thirty seconds to relax yourself.

Now that you are relaxed, I would like you to try and image the following situations. The first situation however is a negative one. A negative observation on my behalf of kicks that some of you performed in the initial assessment. It is not my wish to actually speak about negatives however, I think an awareness on your behalf is important about some of your kicking. Especially from the close in ranges towards goal. Where many take one or two steps only, stabbed at the ball, or didn't follow through with the foot towards the target, or didn't follow through for a few steps after kicking the ball again towards the target. Furthermore you didn't appear to image, take your time, or rehearse the kick in your minds before you actually kicked the ball.You may have felt the pressure or the need to get through your twenty kicks therefore you rushed them. What I want you to do is actually to take time to resist the pressure from external factors. When you have a free kick wherever you may be, remember you are in total control. I remind you of the great Jack Nicholas who used imagery all the time. Before every shot he would step back behind the ball, close his eyes, image the process of playing the shot. Image actually playing the shot, image the flight of the ball as it went through the air, image where the ball should land and then how far it would travel after landing. Just like a free kick he was totally in control.

Well, this exercise is to turn a negative to positive. And you will concentrate on imaging your kick before performing it. Teach yourself to do that in this exercise. Take your time, image it then actually see yourself, feel yourself, and using the other senses perform that kick. The person to whom you will be kicking in this exercise will be your mate but he is now standing in the middle of the goals. And he will be approximately 40 meters away again from where you kick. So just like in the previous exercise you are just kicking the ball totally in control to your mate who now stands between the two goal posts that are two metres apart as is the case in the initial kicking exercise.

Again I say time is on your side. Image the processes required before you go through the physical kick. Remember if you have your own little techniques, image these, because you will believe they work. But basically the fundamentals still apply with you holding the ball, lightly in your hands, picking a line on which to run, run up, a relaxed body as you kick through the ball, a follow through with the leg towards the target and a follow through of the body, if that is what you do. You are in control. Relax don't rush it.

So, image yourself 40 metres out from goal and your mate is standing straight in front and in between the two goal posts. And remember these goal posts are only two metres apart.

Begin with visualising a target and not the general goal area. You must be specific when you kick.

Visualise this for ten seconds. Your mate standing in the middle of the goals to whom you are going to kick the ball.

See the running line, or the path that you will have to take from where you stand to where you are going to kick from. Be conscious of holding the ball and staying on that line. You have 10 seconds.

Again, before you kick. Feel how comfortably the ball fits into your hands. It is not a tight, rigid holding an inflexible possession of the ball, it is light, you are in control. Take ten seconds.

Picture the run up of at least six steps. And see as you get to the last of those steps you have dropped the ball and you see the ball hit your boot as it swings through towards your mate who is the target. It follows through at him, not across him. Take ten seconds to see that. The run up, the ball hitting the foot, the nice co-ordinated body action.

Now see yourself after having kicked the ball you move forwards towards the target who is your mate. See yourself kicking the ball, then landing, then moving forward. Take ten seconds.

See the beautiful direct flight of the ball as it lands straight into your partner's hands who doesn't have to move from where he is standing between the goal posts. You must kick a goal.

I want you to image that whole process five times, taking twenty seconds per attempt so that you really are conscious of the process required. Image yourself when you have a free. Stop, take time out, saying to yourself I am going to image this kick before I do it. Then take twenty seconds to image the processes as they come together to ultimately perform the kick. You have 1 minute and 40 seconds to do this. Image well.

Feel and experience the pride as you see the ball land each time in his hands. Knowing full well that you have hit a specific point as opposed to kicking at a general target. Again I emphasise image the process and the outcome will take care of itself.

You have completed this session. That is session 2. Fill in the next sheet in your booklet as to how you are able to perform the imagery task. The next session in two days time will start after fifteen seconds on this tape. Good Luck.

SESSION THREE

Session three is about to commence. Again I ask you to relax in a comfortable position either lying or sitting down. Close your eyes and breathe easily and deeply ensuring that your lungs and stomach expand and contract as you inhale and exhale.

Take twenty seconds to do this.

Now that you are relaxed I am going to remind you to even when you are playing and kicking at goals or kicking at a specific target to teach yourself to actually image the process before you kick the ball. Because part of this exercise is that you are teaching yourself imagery and ensuring that you are concentrate on the process and not the outcome. That is, pick the target in your mind. See your running line, how you hold the ball, the run up you use, the kicking of the ball, the leg following through at the target, and more specifically the foot following through at the target, and finally taking steps towards the target to ensure that the perfect kick occurs. The outcome, that is seeing the ball travelling to the target will take care of itself.

In this exercise you are to image yourself kicking for goals from 15 metres out from goals. And you are directly in front. Again you image the whole process before you kick. Again I tell you that some of you actually matched the short kicking distance in the pre trials by stabbing at the ball, taking one or two steps and kicking at a general area, not at a specific target.

Now I want you to imagine and image the mate to whom you have been kicking standing back from the goals perhaps twenty or thirty metres. So you are 15 metres out from goal but he is 30metres behind the goals and you are going to kick that normal 45 or 40 to 50 metre distance. But you're kicking directly to him. So that the flight of the ball will go through the goals anyway because you know the ball if he is on line with the middle of the goals and you that the ball must go through the goals if the ball goes to him. In other words again you are kicking to a specific target.

I am going to give you 10 seconds to picture next time you're 15 metres out from goals. You image looking at a person or a target, a sign, a seat, a tree, a post to which to actually aim to have the ball finish. Take 15 seconds to image that possibility.

So now instead of just seeing and thinking I must kick the ball through the goals and if it goes one metre from the post, one centimetre from the post or right through the middle, it doesn't matter. Because your thinking a specific task at a specific target the ball actually should go straight through the goals every time. Image you have the ball 15 metres out. You are going to kick to a mate or a target 30 metres on the other side of the goal. To do that you follow the same process. Now I will give you 10 seconds to image each process before you put them all together. Firstly, stand where you are going to make your line so the line goes from you directly through the centre of the goals to your target or mate. Image that line. I want you to image how you hold the ball in your hands. Image taking a couple of deep breaths to ensure that you don't rush the kick, to ensure that you think I must put the processes together. To image the holding of the ball and what you're doing to image to hold the ball. And the thought must be positive. That is the ball will go eventually to my mate.

Image the run that you require. That is six steps, six steps to ensure you're balanced, to ensure that you are going to be on the right foot that you require so that you can kick with your kicking leg right through the ball. Image you taking the run.

(Just as an aside. As the runner and the observer of both Kevin Bartlett and Stan Alves, I can tell you that I was sent out many times when fellows missed goals that they hadn't taken enough steps. So again I ask you to image taking six steps.)

Image yourself being relaxed as you take those six steps. Not stiff and holding the ball rigidly over your foot, but relaxed just like as if you were kicking to your mate in the park.

See the ball hitting the foot, see it again, don't look at the target, don't look at something else don't be distracted. See the ball actually hit your foot, hit your boot.

And now see your leg follow through directly at the target so that your foot actually follows through and if you had a line of sight from your eyes over the top of your boot to the target person and through the middle of the goals thats where your boot should be. Not pulling it to the side, and not stopping short, it should be on that line of vision. Image this happening.

And finally image you taking two or three steps towards the target after you kick the ball. Image that happening.

These are the processes that finally will lead you to see the outcome. The ball actually flies straight through the middle of the goals into the hands of your mate or hitting the target. The process again has ensured that the outcome occurs. But how many of us in the past think I mustn't miss this goal, I've got to kick the goal. There's nothing more certain that 50% of the time you will miss that goal if you think that way. Think of the process and we will see if the outcome will take care of itself.

And finally, feel the real satisfaction, feel the pride as the ball lands directly where you want it to go.

Finally, I want you now to image yourself kicking that goal from 15metres out. Imaging the action before you do it and then imaging yourself actually doing it as you kick a magnificent goal to your mate who is 15 or 20 metres or so further on through the goals. Image that happening 5 times. But image the process that is how you made it happen. Take 30 seconds to do that.

This is the end of section 3. Ensure that you fill in the appropriate page as to how well you were able to perform this mental rehearsal. Be honest. And the next session will start 15 seconds further on in the tape to be heard in two days time. Again I wish you good luck.

SESSION FOUR

Exercise four is to commence. Again sit yourself down in a quiet and relaxed manner. Breathe deeply and slowly ensuring that you inhale and filled your lungs to their capacity pushing out your stomach as you breathe in a diaphragm as you breathe in. And as you breathe out slowly do so ensuring that you push all the air out of your lungs. Do this five times.

Hopefully now that you are relaxed we can commence the exercise.

But before doing so I would like to explain to you again actually why we do these relaxation exercises. One of the real problems of pressure is that it hastens up our actions. To get it over and done with. However, what I advise is when under pressure try and slow down. For example talking to people and assisting them in presenting public addresses I say to them think of key words and present them slowly. Because what tends to happen as you find yourself under pressure you want to speak much more quickly .... When we are under pressure we tend to want to speak much more quickly and thereby put ourselves under pressure and trip ourselves up. However if you slow the process down you have time to concentrate on the task and process at hand. By speeding things up all you want to do is arrive at the end... And the end in our exercise is goal kicking. But by speeding the processes up you don't perform them correctly and therefore the goal or the outcome is not achieved. Take one more deep slow breath relaxing every part of the body from where you set off.

I want you again imaging yourself in a situation that you finished from last tape. That is being 15 metres out from goals, having to kick directly through the goals to a mate standing at the other side of the goals in a straight line that bisects the middle of the goals. Go through the usual pattern, the grip, the lie, the run up, kicking the ball, the follow through of the foot, and the follow through of the body and seeing the ball lodge in your teammate's hands.

I want you to see the ball again flying directly to your mate or target as it lodges in his hands. See the ball take a straight path as it goes towards that specific target. You want it to end with him and the ball does end with him.

Now we are going to increase the degree of difficulty by moving you around onto a 45 degree angle. So that in actual fact the amount of goal that you can see is now halved. So you cant afford to blaze away at the ball and kick and hope. I believe that you need to be even more specific now at kicking the ball directly at your mate or target. So picture yourself image yourself, only about 15 metres out from goal and from a 45 degree angle. Picture the line that the ball needs to take to land in your mate's or targets hand if you kick the ball straight. Picture the ball going pass through the goal and much how less there is now for error. But if you kick the ball direct and accurate to your mate there is still quite some distance on either side of the ball between the goals. Picture that situation.

I want you now to turn the tape over and play it from exactly the spot you turn it over to. Don't rewind it.

I want you now to picture the situation, to image the situation that actually occurred in a real session. You are standing about 15 metres out from goal on a 45 degree angle. In your mind you might say if I miss it doesn't not matter too much because its a hard shot. You have to turn that around, If I and when I kick the ball directly at a target or a mate who stands beyond the goals and on a straight line from me to the middle of the goal to him I can and will kick the ball through the goals 100% of the time. I want you firstly to picture the path the ball must take and when you have done that picture the run that you must take before kicking the ball.

I want you now to go back to be in position where you are kicking the ball at goals. Don't kick. Take time out in your mind to image what you have to do. Image the process. Picture the line, picture your run, image how you are holding the ball, be prepared to run up in a controlled and relaxed way. Watch the ball hit your foot. Ensure that the ball, the foot follows through at the target, not aiming it towards the goals but actually at the target. And you indeed follow through at the target having kicked the goal. Image that situation for 30 seconds. Etch it into your mind. Etch the process into your mind.

Lets go through that exact same scenario again. Don't accept by doing it once you are trained. This action must become automatic because what tends to happen in a real game setting under pressure we succumb to thinking only of the outcome. Go through and kick that goal again. But by going through and rehearsing the processes. Firstly and most importantly you are aiming at a target beyond the goals, a specific target. Go through it again. Image it.

You should be learning to image properly and clearly now. Part of the process is that the clearer you can image the more likely when you do come under a pressure situation you will take time out to perform the imagy process. Now move to the offside where in the past we believe there has got to be a reason for perhaps missing because its on our non preferred side of the ground. That is not good enough at the elite level of Australian Rules Football. You must have a belief that you kick a goal from any position on the ground as long as you follow the process. Move your mate around so again he is the end of line from you to the middle of the goals and he receives the ball. Again it looks a narrow area, to kick the ball through. Forget about the area of the goal. Concentrate on the line and the path of the ball it specifically takes. Go through our usual process. Pick the line. Hold the ball in a relaxed manner. Take your six steps or more if you need it, kick your foot through at the target. Follow through after kicking the ball seeing the path and the flight of the ball. Do that.

The easy option is mediocrity. That is to say I shouldn't miss them from straight in front but I might miss them if I'm on an angle. The professional would say, I can score a goal from every kick if I follow the process. You might even think of practising the imaging in your spare time. This is the end of exercise four. Fill in the response sheet on your ability to use imagery. But in addition you have the next sheet as well which is the Self Efficacy scale which is called the Post Fourth session of self efficacy. Fill that in as well. That is the end of this tape. I will be contacting you to gain a report from you and also send out or deliver to you an additional tape.

TAPE 2

SESSION 5

You are going to now complete six more approximately 10 minutes sessions on this particular tape. And I ask that on every second day, you listen, you image the description and instructions on the tape and you fill in the relevant forms in your booklet. Hopefully I will be able to contact you and speak to you about your progress.

You are about to commence session 5.

Make sure you are sitting down or lying down in a relaxed position. Closing your eyes, feeling relaxed in all parts of the body as you breathe in slowly and exhale slowly 5 times. Take 20 seconds to do so.

Again, I ask you when imaging to try and use all the senses that are appropriate for you. The sight, the touch, the smell, the taste, the feel the emotions. I want you to image kicking for goal at a ground that is familiar to you. For those that have played league football they would pick a league ground, for those who are involved mainly with junior football pick a ground where you will be able to pick out specific objects that are familiar to you. Because you are going to be kicking at goal from various positions approximately 25 to 30 metres out from those goals. If I can remind you again of the importance and impact of imagery to certain sports people. For instance down hill skiers, those who ski the giant slalom which takes approximately 1½ min - 2 mins, before they ski even days before because they are so rehearsed and practised at the hill, they turn away from the actual real setting, image to the split second, every hill, every mogul every turn, every pole, from when they start to when they complete their particular run or ski to within a split second of what they will physically actually do. Of course the only thing which would interrupt that is if they fell. So imagery is believed in other sports to be a very powerful tool. In Australian Rules Football this is what we are trying to establish.

So you are kicking at your ground and to a familiar object through the goals, through the middle of the goals. I want you also to position your mate at that particular target. So that you know that he is going to receive it and just like when you kick in the park, you are kicking for goal but not through the general area of the goal but at your specific target and mate.

For example as I remember playing league football and playing many games at the MCG I could pick out many positions if I was kicking towards the Punt Road or Richmond goal objects which I know that I would aim at if I had a shot for goal at approximately those distances out from that goal. It may have been a particular seat, it may have been an old time clock, it could have been a path that led to seats, it may have been in those days where the horses came out onto the ground and so on but I know I could use them.

We will go through five different positions from goal and I will give you a chance to image and visualise each of these before commencing. If you can't see or image a particular point try and image just a mate standing at that place. And that's where the ball is eventually going to finish. Again take two slow controlled deep breathes before you start.

The first position is 25 to 30 metres out on your ground and you are directly in front. In the past you have probably just kicked directly through the areas of the goals. The opening, that area in general. I want you to be standing where you would start your run up to kick. I want you to image a target on your ground that you know you should kick to. I want you to put your mate there and I want you to say to yourself, and feel yourself and see yourself and saying this is where I am going to kick to. Hhe maybe 15 to 20 metres through the goals. Put yourself in that real situation. Take a deep slow breathe and don't feel pressured to kick. Again picture your target.

Relax and see him there. You are kicking to him or that target. Now image the process again that you'll have to rehearse. The holding of the ball, the run up of at least six steps, the line that you've picked to run on, the sweep kick of the foot onto the ball, seeing the ball hit your foot, seeing your foot follow through at your target, and you following through for at least 3 or 4 steps to the target. Do all those things.

Again see the ball hit your foot..... Feel the sweetness of the timing, you haven't kicked hard at it is just readily timed...... See the ball flying beautifully through the air and landing directly in the hands of your mate. And of course it must have been a goal because you kicked directly to him. Believe in the process. Kicking the goal will take care of itself. The process ensured that you kicked the goal. Take 20 seconds and image that whole situation again. Image what you had to do before the kick. Seeing yourself actually doing it and eventually see the goal being kicked. Take 20 seconds.

Image the ball going right through the middle of the goals and landing in your mates hands. See it kicked there. The ball has gone perfectly straight. Often in the past when you kick at the general goal the ball can go off the side of your foot, you try and kick to hard. But when you position your mate for a good kick it will all happen. Image that goal again.

I want you now to image that process but you have moved to a 45 degree line on the on side. In other words your kicking foot is towards the inside. Image actually instructing your mate to move around on your favourite ground. So he is standing in front of a rubbish bin, he is standing near some particular object that is familiar to you. And you know with your most comfortable of kicks the ball will land right in his hands. So image, from the 45 degree mark on the onside from where you are going to kick from, to your mate to whom you are going to kick. See that the goal is now narrower, and actually image that narrow goal. Don't worry about the goal, see your mate. If the ball goes to your mate it must go through that narrow opening of the goal.

Again, image the process. This is what you will do every time you have a kick at goal from here on. Take time to rehearse. Image the hand on the ball the line you run on, your run up, the ball sweetly striking your foot, your foot following through, you seeing the ball hit the foot, you following through towards your mate, and again if you follow all the processes the ball will go through that narrow opening of the goal straight into your mates hands. Image the process again, take 30 seconds to really etch it into your mind. Image the process and the eventually see the goal be kicked as the ball goes to your mate. Take 20 seconds to do so.

I want now to see you becoming more skilled at this imagery process to put yourself right out onto the boundary line on about 25 to 30 metres out on the boundary line and you can hardly see through the goals. Move your mate around. You take one minute to image the whole process that you must go through to see the ball being kicked to your mate. There is a fair chance that if you kick straight to your mate it must go through the goals, but now you are on the off side. Image the situation, image yourself performing the kick.

Image the narrow opening of the goal that you see from where you are standing. Think to yourself if I miss this one it doesn't matter, there is no pressure on. However good players will image their mates and kick straight to him and have got a much better opportunity of kicking the goal.

Relax, take a few deep breaths again. We are going to finish this exercise. Fill in the sheet and again in 15 seconds and two days time the tape will be ready to run for the next session. Work hard at the imagery, I'm sure it will work.

SESSION SIX

Session six is about to commence. In this exercise you are going to be kicking goals from what is your kicking distance limit. Again my observation is, in the past when we try to kick long goals we either hook the ball because in trying to exert force onto the ball we drag the leg around, or indeed we lean back and kick the ball up in the air. This exercise will try and control in your mind what you should do in this situation.

Again, sit down, lie down, relax, take 5 deep breaths as you relax.

What we will try and do when kicking goals from greater distances is image how you are going to produce greater force onto the ball. You can't just kick at it, and simply rely on your leg strength. The important thing here is that you must have a longer run up. But it must be a balanced run up. Some players even prefer a slightly curved run up, some theorists say that's not right. But if you have a curved run up the important thing is your foot must, on impact on the ball, follow straight through at the target. The most important thing with a run up is that you have a run up, what is controlled relaxed. Image kicking a goal from directly in front on your ground from 40 metres out. This time I want you to picture your mate standing either behind the goal umpire or just on the fence behind the goal umpire, because you are kicking to him. If you follow the processes the ball will dissect the goal and go straight to your mate. But if you just kick to the general goal area, there is a fair chance that it won't go through the goals. Again you kick to your mate.

You are to picture yourself on your ground, standing back where you start your run up, feeling relaxed, imaging feeling relaxed, image seeing you mate, he is your mate in the park, say "I'm kicking 40 to 45 metres to my mate". Not necessarily kicking at goal, I'm kicking to my mate, and if I reach him the ball will go through the goals. Feel the ball light in your hands. Feel your shoulder relaxed, how many times do you see players when kicking for goal appear to be tto tense when kicking over long distances. They are too tight and kick the ball as hard as they can, that's the worst thing to do. Feel relaxed, know that on impact the leg is going to go straight through to the target so we go through the process again. Feel the ball in your hands and relax, shoulders relaxed, have a little bit of a bounce in your legs before you start your run up. Picture the line of your run, where you are going to run and how many steps perhaps 10 steps, because you require momentum of your body, that will ensure your leg will kick harder at the ball not just your leg muscles kicking hard at the ball. As you are running in you are feeling balanced, you are running towards the target, you see the ball drop and hit your foot, you see your foot also nicely taught, the instep taught as you drive through at the target, see yourself driving through at the target and your mate behind the goal umpire. See it three times, take 15 seconds to do so.

If you kick through at the target you will see the ball go straight off your foot, because you have watched it hit your foot and fly through the air to land at your mates hands over 40 metres. Image that whole situation again, kicking to your mate, but ensuring that the ball goes that longer distance. Take 30 seconds to do so.

I want you to image yourself now kicking a 40 metre goal from a 45 degree angle on the offside so your kicking leg is towards the boundary line. And I want you to imagine yourself in a game having that kick. There is a lot of pressure on you. But you are to imagine yourself going back, holding the ball in your hands, and saying to yourself I've got to kick it a bit longer but it has to be straight. What do I need to do? Question yourself. What do I need to do? And go through the process. Be relaxed, take a deep slow breath. Ignore your opponents comments. You are in control. Hold the ball lightly. Picture your line. Put your imaginery mate where you want to kick to, ie. your specific target. Great players kick most of these goals. Pick your target. Six or seven steps run up. Nice and relaxed. As you know you have got your body momentum going forward. Watch the ball hit your foot. Watch your foot go through at the target. Feel the control. No jarring you haven't kicked hard at the ball, you haven't pulled off the ball but you've timed it perfectly and the ball flies straight through the goals to land in your mates hands. It is perfectly controlled and it wasn't too much effort. Picture all that happening and go and do your kick. Take 30 seconds to relax yourself to image the whole process and perform the process and kick the goal.

I want you to go to the 45 degree point on the other side of the ground. Where you are now on the on side. You have free kick at goal. I want you to picture yourself holding the ball. In the past you thought, I've got to kick goals, I must kick goals, I've got to kick it hard, I'm under pressure. The team is depending on me. Then image yourself, say to yourself to kick this goal I need to do what. Go through it. Don't feel pressured into taking the kick. Think to yourself I'm going to relax, two or three breaths. Feel in control. Picture the line that you are going to run on. Put your mate behind the goal umpire and kick to your mate. Get the feel of the ball in your hands. A seven or eight step run up again which relaxes you and balances but gives you body momentum. See the ball hit your foot and its timed perfectly. See your foot following through at the target see and feel yourself following through at the target. See the ball spiralling through the air and landing straight in your mates hands. That's all you've got to do. You're in control. Now do it yourself. Take 30 seconds to image it and then to do it. You're in control.

You're in control. You're in control of the process. The outcome will take care of itself. See yourself like this in a game. And just feel yourself saying, I'm going to take control here, I'm going to think about this kick before I kick the ball. And that's what you must do before you have a kick at goal from here on.

Relax again, this is the end of session six. You are in control. Fill in your answer sheet and in 15 seconds time on this tape you will listen to session seven in two days time. Good luck.

SESSION SEVEN

Session seven is about to commence. As is usually the case, take control, sit down or lie down. Relax the whole body. Breathing deeply for 30 seconds.

Now you have at your disposal the necessary psychological and mental strength to apply skills of relaxation and imagery to kick a goal from any position on the ground and up to your greatest distance that you can kick the ball.

But it just doesn't happen as a matter of course. You really have to image the situation over and over again. Because when you are under pressure what you tend to want to do is quicken the process up thinking I want to do this as quickly as I can....And get it out of the way....That's the worst approach remember when under pressure you take control. You slow the process down, you breathe in deeply, whether it be at work, whether it be at play, whether it be at football, whether it be in competition. If you're in control slow it down. Think about the processes before you try and perform too quickly that which is required of you. So lets rehearse the imagery process again. And remember this, with a free kick you can take time out to image the process before you actually kick the ball in a game. You can take the time out to image the process. If you rush it you are letting yourself down. And in actual fact when you're practising every kick at goal from now on at training or at any other time, image the processes that you have been learning.

You must image the processes. Don't image the outcome. It will take care of itself. So I challenge you to do that. To image the process before kicking from now on. Sure when you are casually training you just want to kick the ball. But in mucking around you still should be training for the real situations in the game. The stages are pick a target or a mate behind the goals. Move your mate, move your target, find a different target. Make sure wherever he or it is it will bisect the goal that is, the point from where you are to the middle of the goals and your mate is a straight line. And if you do that you should be able to competently kick a goal from any distance, from any position on the ground. See the target, image the run up of at least six steps, image the ball comfortably in your hands feel your kicking leg coming through at the ball and see the ball hit your foot. If you see the ball hit your foot, it is not going to come off the side but if you're looking at the target there is a fair chance the ball won't might do a little poke kick at it. But now image placing your mate in the park back 25 metres behind the goals. Image kicking to him. Picture your line, picture your hands, picture the ball hitting the foot, picture the foot following through at the target, picture you following through at the target and see the ball go straight into your mate's hands. You have kicked a decisive kick, a straight and trace kick towards your mate because you followed the process. Picture yourself in that pressure situation and picture yourself and image yourself taking control. Take 30 seconds to do so.

Again, you have imaged the process and again the outcome has taken care of itself. An interesting observation just to conclude this session. Looking at the scores at the forty plus players in the first twenty kicks they had, more players kicked more goals from the 30 metre line and on 45 degree angles than when they were on the 15 metre line. I ask you the question why? My main observation was that when you are on the 15 metre line you tend just to kick and poke at the ball and don't see anything specific to kick to. You kick generally at the target. Whereas when you are 30 metres out you know you have to take a run up. You know you have to follow through with your leg. You know you have to follow through to the target and the kicks are much truer. In other words the process should be very similar for shorter kicks as is the case for longer kicks. When you are closer to the goals move your mate further back into the stand. If you are further out move your mate closer to the goal umpire. But execute a normal kick.

So I'm encouraging you the next time you have your 20 kicks at goals, image the process whether you are only 15 metres out or 40 metres out and follow the process and you will kick the goals. Again relax one more time take a couple of deep slow breaths this session has concluded. Fill in the booklet on session 7 and in 15 seconds time and in 2 days time you will commence the next session. Good Luck.

SESSION EIGHT

Session eight is about to commence. You are in a position now to have have completely mastered the use of imagery when kicking for goal.

Relax, take 5 deep slow breaths, close your eyes and be ready for the next session. Because we are going to introduce real pressure, pressure which tends to undermine the processes which we know that are right but are distorted under pressure. Take your 5 deep relaxed slow breathes.

Real pressure makes you want to think only of the outcome, kicking the goal, I must kick the goal. When you may have kicked already three, four or five straight points and all I want to do is kick a goal. Real pressure is when you haven't had a kick for the game. And your first kick is one when you are kicking for goal. A chance to redeem yourself. Real pressure is when you have the last kick of the game and the result depends upon you. Real pressure is any situation that is when you have control of the ball and you must do something positive with it when you know that the result of the game is hinging on the success of the kick. If you don't wish to succumb to real pressure, that is to give in to the real pressure, take control of the situation, slow it down and follow the process. I want you know to just take again 3 deep slow breaths to take control of the situation.

I want you to image this situation. It may not have happened to you personally but you have certainly seen it happen to others. Where you may have had in the first quarter three or four kicks at goal and only scored behinds. You get another chance from 30 metres out on a 45 degree angle on the on side and the thought goes through your mind, thank goodness I've got another kick at goal, I've must kick the goal. You miss the other kicks because somehow in the process something has failed. You have to image all aspects of the process to make sure you don't fail again. But to be more positive, image all aspects of the process to ensure and to know that all is right. Have a belief that the processes are important and then under real pressure have faith in your belief. Because what we typically do is throw processes out the window when we are under pressure. So you have missed a few shots, and you get the ball again. You think I want to do is kick a goal. Go back, on that particular 45 degree angle and image the processes.

Image holding the ball, image picturing the line you need to run on. Image taking quite a few steps, image seeing the ball sweetly hit the middle of the foot, image seeing the ball and your foot follow the ball towards the target. And image having picked out your target somewhere behind the goals, picture you are going to do a good 40 metre kick that you are not going to poke at it. You are going to kick through at the target. Image the ball flying through to the target and the goal must have been kicked. Image that whole process, take 30 seconds to do so.

Image the relief that you feel when you have kicked the goal. But the eliminate that relief because image the confidence and belief in the imagery that you had in following the process that kicked the goal. Image yourself standing tall as you feel more confident and you firm your belief in that process. The outcome will take care of itself. I want you to image that whole situation again. That you have missed three or four straight, you get another chance. Image the processes, take 20 seconds to do so.

I want you all to try and image yourself playing on the MCG in front of 100,00 people and you have to kick the last kick of the day at goals from 40 metres out which is stretching the distance you can kick but you know and believe you can do it if you follow the processes the right way. You are directly in front, 100,000 people, people and their opponents standing around you. Umpires directing you to line up. Follow what the umpire does and then take your starting position, relax, go through the processes, don't hear the crowd, focus on the imaging process. Image holding the ball again, image the line on which you are going to run. Even run a couple of more steps because you do need to kick the ball further, so image this is where I need to start. And just say to yourself as you relax your shoulders, I'm in control of this before I kick the ball, If I follow the processes everything will take care of itself.

Image taking that light relaxed run, there should be heaps of pressure on you, pressure will only make you fail, eliminate the pressure, image the pressure out. And take that run up and see the ball hit your foot and see your foot follow through at the target and remember you put your man in the park just behind the goal umpire, and see the ball following through at the goals at your target as you move towards them as well. You followed every aspect of the process and you've kicked the goal. And feel again the roar of the crowd. And feel jubilant, contented and satisfied, you've followed the process and the outcome took care of itself.

Image that whole process and at the end of it you will fill in the next section in the booklet, booklet number 8 also you will fill in the following page on the self efficacy rating in your ability to kick goals from the 20 points of the ground and then at the end of this tape you will turn it over.

As is usually the case before you do anything as far as controlling and fix possession I want you to stop relax, sit down comfortably, lie down comfortably, breathe slowly, relaxing your body as you are breathing for 30 seconds. Take control of your breathing.

In these last two sessions you are going to image positioning a person always at a target point. So that wherever you may be on the ground you are to put this specific target point or person in a place where you know when the ball eventually goes through the goals it will land in their hands. For example, if you are 15 metres out with a fixed shot a goal, you position a person so they are comfortably a kick away from you, it maybe 35 to 45 metres depending on how comfortably and how far you will kick. Remembering if you perform the process of actually positioning that person you are setting the scene for a good kick. You are now very competent at imaging. For this session I will help you reverse the process every second time so you are learning to control the process yourselves. In other words I will go through the kick with you, go through the process and the next time I will suggest a kick to you and then its up to you to image the whole process before you perform the kick.

It is believed that you are developing a firm belief in yourself that if you follow this process you should and will be able to kick more goals. Under pressure you must take your time, you must eliminate external influences, what tends to happen under pressure is that we start to question yourselves, can I kick it, will I kick it, what if I miss it? When you are imaging before a kick what you do is eliminate all those external influences. I remind you of the golfer. When I play golf with people when I want to con them I say don't hit towards that bunker. And invariably that is where they hit it. The better golfer will eliminate the negative and say to himself I must hit to the other side in other words they have focussed on a positive direction. If you're kicking at a target or a goal and you are thinking negatives, invariably you will perform that kick not as well as you would ideally like to do.

So I'm going to move you around the ground as if you have come back for the final kicking exercise.. You are fifteen metres out directly in front. You can see 12 posts set up all at two metres apart. Can you see the goals. See the goals.

I want you to position your mate so that from 15 metres out you are going to kick to him as a specific target so that the ball must go through the goals. Picture, image the line of the flight of the ball after it leaves your foot to landing in your mate's hands, also see the ball going straight through the middle of the goal.

A lot of you, when you first had kicks from 15 metres out you took only one step, you just jabbed at the ball, and invariably the ball could go off the side of the foot because you didn't follow through at the target with your foot, you didn't follow through at the target after you'd kicked the ball. So now even though you are only 15 metres out go back six or seven steps. Feel yourself walk back that six or seven steps. And as you are now back that distance I want you to picture the line that you are going to run. I want you to picture the ball as it is nice and relaxed in your hand. I want you now to picture and image taking the run, being conscious of being relaxed as you are running in to kick the ball. Then when you are balanced and have reached the spot you are going to kick from you see the ball hit your foot, you see your foot travel right through at your target point, your mate, and the ball flies directly through to him. You don't just poke it through the goals, you kick it to the target and it is strong and true to the target and you've kicked a goal.

I want you to image that whole process again knowing that when you come to the next kicking exercise in a few days time you are going to do this every time. You will image the kick, you will perform the kick. So image that kick again from 15 metres out from directly in front. You have 30 seconds to image the whole process and then see the outcome.

I now want you to image kicking at goal from 30 metres out on a 45 degree angle on the onside. So your kicking leg is towards the middle of the ground. 30 Metres out on the on side. You step back, image the process then perform the process. You have got 40 seconds to see and feel and do that whole thing. You are now totally in control.

Lets review that process that you can now control. Did you walk back six or seven or eight paces? Did you take control and image the kick before you actually performed the kick? Did you put someone behind the goals that you are going to kick to? Did you feel relaxed? Did you pick a line? Did you eliminate external influences? Did you run on the line towards the target? Did you see the ball hit your foot? Did you see your foot follow through at the target? Not at the goals but at the target. Did you see and feel yourself moving on towards the target after you kicked the ball. Eventually did you see the outcome of the ball going straight through the middle of the goals and landing at the target or in your mates hands?

So I ask you again, go through this process on the offside on the boundary line and 30 metres out. In the past you've thought what a tough angle, if I miss it doesn't really matter because it would be a fluke, but that's not true. If you pick your specific target and perform the processes and see and image it all happening it will happen. So you now take control of the situation, you've got a free kick, on the boundary line, on the offside, 30 metres out from goal, kick that goal. Before you do it image the process. Take 40 seconds to do that now.

Lets go through that situation again. But now image yourself in a game. You have too kick that goal from 30 metres out on the boundary line, on the offside to win a game. There are people standing all around you. There are people in the crowd abusing you, there are people you know in the crowd who are desperate for you to kick the goal. Go through the process, eliminating all those thoughts. Stand back, take control of your emotions, take control of imaging the process and go through it again. Take 20 seconds to do so.

You are fifteen metres out on the onside at a 45 degree angle. In the past when I have seen you kick from here all you've done is take one step and a poke kick at the ball or tried to steer it. You have kicked at the general area of the goals. No longer will you do that. Image this situation and perform the kick the way you know you have to do it. Image the processes then perform the kick. You have got 30 seconds to go through everything that is required so that you are totally in control.

Finally in this session try and image yourself in any position in kicking for goals. You must stop, take control, perform the imaging in your mind then perform the kick. Practise the kick in your mind before you perform the kick, because you know you've practised the process then you will perform the process. But if you rush into the kick then some component of the process will be lost. Take a minute. In conclusion perform 5 different kicks from different positions on the ground going through that which is required, kicking at a specific target, positioning a specific target, performing the process in your mind then kicking. You have one minute.

I want you now to fill in your booklet sheet number 9 and as you are doing so try and remember that under pressure you want to rush things but in the future when your under pressure you are going to take control. The ball is in your hand, the game doesn't start until you decide the game will start. Don't be influenced by external factors. Good Luck.

SESSION 10

Session 10 will start in 2 days time and 15 seconds into this tape.

Session 10 and our last session is about to commence. I wonder if you have the confidence to kick to goals because you follow the process now that I believe you should have. I wonder whether under pressure some of you will succumb to that pressure and just kick at a general area or I wonder if you will have strength of character and mind to lock into the process to ensure that you're conversion rate of kicking goals is much greater than ever before. I wonder how confident you are after having completed this exercise.

Again, relax yourself, shoulders, knees, hips, ankles, every joint of the body. Breathing slowly, exhaling slowly, relaxing your face muscles to be able to finally believe that you have mastered imagery as a process to improve your performance of this skill and indeed hopefully any other skill. Take 20 seconds to relax yourself.

You are kicking from 15 metres out on the on side and on the boundary line. Picture you are in that position. 15 metres out on the on side on the boundary line. But in addition there is a wind blowing directly down the ground towards the goal. The process does not change. You still pick a line, you don't try and hook the ball through, you pick a target to which you kick initially knowing full well that after kicking the ball it will be drawn through the goals and to your mate because you had a belief and a line that your chose. What many of us do is to choose a target and a line and then in the run up you want to alter it. The use of imagery in this situation ensures that you have confidence in the process and you must stick with it. So image on a 15 metre point on the boundary line. Image your mate standing somewhere between the goals and probably 20 metres or 30 metres through. But now stand back six or seven steps and image another target to which you have to kick because you know the ball is going to be pulled around by the wind. Image that point. It could be a tree, could be a rubbish bin, could be a letter in the stand, could be anything, image to which you will now kick.

Image feeling confident that if you kick to that point the ball will come through and eventually land in your mates hand. Feel the ball relaxed in your hands. Feel confidence in taking the run up. Don't lean to the side you are going straight to the target that you've chosen. See the ball hit your foot. See your foot follow through at the target. Not hooking around at your mate, not hooking around at the goals but going through to the target. The wind will do the hooking. But most importantly follow through at the target. Don't try and bend your body around in the path that run towards your mate. The wind is going to do it for you. You've chosen the process to kick at a target. See the ball going through the air at the target initially. Then the wind influencing it and pulling it around and finally going through the middle of the goals and landing in your mates hands.

I want you to take 30 seconds to image that whole process again, because I'm sure that many of you have kicked at goals with the wind influencing that kick you have just kicked at a general area and hoped that it would go through. Have courage of your convictions and pick a target.

We are finally going to rehearse four kicks from directly in front from various positions on the ground that perhaps are the same as when you kicked in the first kicking assessment. From directly in front from the 15 metre mark, 20 metre mark, 30 metre mark, 40 metre mark. You are going to image the process every time. You are going to image the kick. You then have the confidence no matter where you are on the ground. If you go through that process you will kick a goal, you must develop a belief in the process and then perform that process every time. Relax yourself again, take two breaths because now finally in this last session you are going the etch into your mind, I must do this every time I have a kick at goal.

You are 15 metres out directly in front. You go back six or seven steps. You picture the line. You place your mate in the crowd, as a target, to which you kick the ball. He is your mate in the park. Even though only 15 metres out you must perform the process to kick at a target and not at a general area. Feel the ball in your hands. Feel the run that is required, the relaxed controlled run, see the ball hit your foot. See your foot follow through at the target. See and feel yourself follow through towards your mate after you have kicked the ball. Feel great that the ball has lobbed straight into his hands and you have kicked another goal. Image that process again from 15 metres out, and believe I must do this every time.

You are 20 metres out, directly in front and etching into your mind the process required. Put your mate in the relevant position in the crowd somewhere or in the stand. You are kicking to him. Go back off the mark. Say to yourself I've got time here, I'm going to go through the process, I'm going to image it then I'm going to image it in my time. See the line and flight of the ball, feel the ball in your hands. Relax in the body before you start your run. Take your six steps as the ball feels fantastic in your hands. Feel your kicking leg coming through and see the ball being struck by your foot. See your foot follow through straight at the target and follow through yourself after you have kicked the ball. And see the ball take a perfect path because it hasn't hit the side of your foot, you've seen it hit straight in the middle of your foot so it must take a perfect path and go straight into your mates hand. You've kicked another goal. See that process again.

You are 30 metres out. Again you are directly in front. And again it is so easy supposedly that you kick it every time. Now these days you image the process. So you are positioning your mate back in the crowd. So that it becomes a 40 to 45 metre kick and just like kicking to him in the park you are relaxed, you are back off the mark. You see the line of your run. You feel the ball in your hands. You feel relaxed and comfortable. Confident in the process you jog in. You take the 6 or 7 steps. You see your foot hit the ball. You see your foot follow through at the target. And you follow through at the target. And again the outcome takes care of itself. See and feel it happen from 30 metres out.

And finally. You are kicking at goals from 40 metres out. There could be a tendency or temptation to kick hard at the ball, the process doesn't require that. You go back off the mark. You picture where you are going to kick from. You put your mate behind the goal umpire because thats where the ball will finish. Thats where it definitely will finish if you image the process. Again feel and see the ball in your hands. Not tight but relaxed and in control. See the run up seven or eight steps which are controlled and relaxed. You are running on the line. See the foot strike the ball and it strikes the ball right in the middle of the foot so it can't go off the side of the boot it must go straight and true. See the foot go through towards the target. Follow through at the target after you have kicked the ball and see the ball travel that 40 metres and land right into your mates hands. Because your mate is a specific target. Image that whole process again and kick for goal.

You have now concluded the imagery exercise of a mental intervention to see if that improves your ability to kick goals.

The real test will be when you are in a pressure situation if you take time out to perform the imagery. When I speak to people I say to them be master or mistress of your own destiny. Never let anyone say to you that you are not in control. If you're in control you're master of your own destiny. If you let external influences and factors put pressure on you and you succumb to that pressure you have not controlled your destiny. This exercise requires that everytime you have a free kick that you now image the process. It will take time, it will take courage. Do it and you will take control.

Thank you for your participation. Fill in the relevant forms now, the booklet number 10, the self efficacy score again and next time you come bring in the letter that I have accompanying this tape I explained a time and a date that I would like you to participate in another kicking exercise, bring your booklet with you so that we can fill in the forms again and then go through the kicking exercise.

I do appreciate your involvement and hopefully the research that you have been involved in will assist you and others in improving their performance of their skills in any sport no matter what pressure they may be under. Good Luck.

Appendix Y Imagery Tape Session Evaluation

Start Time: ____________________

Name: ____________________ Finish Time: ____________________

Date: ____________________ Duration: ____________________

In the questions below circle the appropriate rating.

1. How well did you understand the instructions on the tape.

not at all	a little	somewhat	well	very well

2. Rate how well you saw yourself in the situation described.

not at all	a little	somewhat	well	very well

3. Rate how well you felt yourself in the situation.

not at all	a little	somewhat	well	very well

4. Rate how well you heard the sounds in the situation.

not at all	a little	somewhat	well	very well

5. Rate how well you controlled the movements in the situation.

not at all	a little	somewhat	well	very well

6. Rate how valuable this exercise was for you?

not at all valuable	a little valuable	somewhat valuable	valuable	very valuable

7. Are there any other comments you would like to make about the program?

____

____

____

8. In what way could the program be improved?

____

____

____

Appendix Z Goal Kicking Score Sheet

Players will kick once from each of the positions listed below. Each kick will be scored from five points for a perfect score to one point for an outer most score as shown in figure 1.

Positions to kick from will be randomly selected by selecting from a bag one of twenty marbles each with a letter from A to T on it. The player will kick from the point that is indicated on the marble. This will continue until all twenty kicks have been completed.

			Score
1st	15m	A	
2nd	15m	B	
3rd	15m	C	
4th	15m	D	
5th	15m	E	
6th	20m	F	
7th	20m	G	
8th	20m	H	
9th	20m	I	
10th	20m	J	
11th	30m	K	
12th	30m	L	
13th	30m	M	
14th	30m	N	
15th	30m	O	
16th	40m	P	
17th	40m	Q	
18th	40m	R	
19th	40m	S	
[illegible]	[illegible]	T	

[redacted] for Goal Kicking

NAME: ______________________

GOAL KICKING

If you had a free kick at goal from twenty different points. Five kicks would be taken from points acros the ground at each of the 20m, 30m and 40m lines as shown in the diagram. Rate how certain you are that you realistically could perform a kick at the target a score of 5 points called a goal. (Remember this target is 2 metres wide, not the normal 7 metres) Select a number between 0 and 100 best represents how you feel, using the scale below. (Apply the opposite ground positions if you are a leftfoot.)

0	10	20	30	40	50	60	70	80	90	100
Completely certain that I can not		Moderately certain that I can not			Uncertain		Moderately certain that I can		Completely certain that I can	

CERTAINTY RATING
(0 to 100)

I could kick a goal from the 15m line and directly in front (A) ______

I could kick a goal from the 15m line and on a 45° angle on the <u>on</u> side (B) ______

I could kick a goal from the 15m line and on a 45° angle on the <u>off</u> side (C) ______

I could kick a goal from the 15m line and on the <u>on</u> side (D) ______

I could kick a goal from the 15m line and on the <u>off</u> side (E) ______

I could kick a goal from the 20m line and directly in front (F) ______

I could kick a goal from the 20m line and on a 45° angle on the <u>on</u> side (G) ______

I could kick a goal from the 20m line and on a 45° angle on the <u>off</u> side (H) ______

I could kick a goal from the 20m line and on the <u>on</u> side (I) ______

I could kick a goal from the 20m line and on the <u>off</u> side (J) ______

I could kick a goal from the 30m line and directly in front (K) ______

I could kick a goal from the 30m line and on a 45° angle on the <u>on</u> side (L) ______

I could kick a goal from the 30m line and on a 45° angle on the <u>off</u> side (M) ______

I could kick a goal from the 30m line and on the <u>on</u> side (N) ______

I could kick a goal from the 30m line and on the <u>off</u> side (O) ______

I could kick a goal from the 40m line and directly in front (P) ______

I could kick a goal from the 40m line and on a 45° angle on the <u>on</u> side (Q) ______

I could kick a goal from the 40m line and on a 45° angle on the <u>off</u> side (R) ______

I could kick a goal from the 40m line and on the <u>on</u> side (S) ______

I could kick a goal from the 40m line and on the <u>off</u> side (T) ______