Evaluation of a Mental Skills Training Programme for the Western Australia Baseball Academy

Peter Norton, B.A.

A dissertation submitted to the Faculty of Science at The University of Western Australia as partial requirement for the degree of Master of Science

November 15, 1996

Abstract

This study evaluated the impact of a 7-week mental skills training programme delivered to 29 elite youth baseball players attending the Western Australia Baseball Academy. The mental skills training programme focused primarily on six mental skill areas: Planning and Analysis; Control of Nerves and Tension; Emotional Control; Self-Confidence; Use of Imagery; and Concentration. Delivery of the mental skills training programme was conducted through weekly group sessions, cassette-based homework exercises, on-field assistance by mental skills consultants, and the development of baseball drills designed to foster the use of specific mental skills. Evaluation of the mental skills training programme was based on numerous methodological suggestions evident in the literature (e.g., Greenspan and Feltz, 1989; Vealey, 1994). Between-group analyses examined changes over time for the treatment group and a placebo control group (n = 26) of age-matched baseball players. Within-group analyses explored factors and changes that related to levels of compliance to the mental skills training programme. Results from the between-group analyses indicated a significant positive shift by the treatment group along the Stages of Change model towards adoption of mental skills training as part of their overall baseball training programme, but no such change for the control group. Few significant changes were observed in either group, however, when ability to perform specific mental skills was examined. The within-group analyses revealed that compliance with the mental skills training programme was significantly correlated with Conscientiousness as measured by the NEO Personality Inventory. In addition, ratings by the

coaching staff indicated significant improvement in Concentration Ability, Use of Imagery, Self-Confidence, and Planning and Analysis, following the mental skills training programme. Responses to a Social Validity questionnaire indicated strong support for the mental skills training programme by the Western Australia Baseball Academy coaching staff.

Acknowledgements

The author gratefully acknowledges the vast contributions by Dr. J.R. Grove in all aspects of this dissertation. The author also acknowledges the contributions of P. Heard, M. Paccagnella, H. Ross and S. Sanderson of The University of Western Australia, and N. Bienvenu, D. Kyle, and B. Pettit of the Western Australia Baseball Academy, for their assistance in designing and implementing this study. As well, the author acknowledges M. Kingdon and B. Eklund of The University of Western Australia for comments regarding style and editing.

Table of Contents

CHAPTER ONE: INTRODUCTION AND LITERATURE REVIEW

Mental skills training is an important area of applied sport psychology that is receiving increased attention from the sporting community. Indeed, the process of learning and practising psychological techniques in order to improve performance and enhance personal growth, is becoming an accepted part of training protocols in a variety of sports.

Numerous mental skills training programmes have been presented and evaluated in the sport psychology literature (e.g. Straub, 1989; Kendall, Hrycaiko, Martin & Kendall, 1990; Bakker & Kayser, 1994). Recent critical analyses of mental skills training programme evaluations have uncovered methodological weaknesses and shortcomings in many of the intervention studies (Greenspan & Feltz, 1989; Vealey, 1994; Weinberg & Comar, 1994). These weakness and shortcomings draw into question the reliability of the results and thus the effectiveness of mental skills training in general. Using recommendations derived from these critical analyses, this study outlines a mental skills training programme, and examines its impact on a sample of elite youth baseball players.

Mental Skills for Sport

Numerous techniques for enhancing the mental aspects of sport have been proposed, and these techniques have been evaluated in both laboratory and

field settings. In an examination of the content of 27 psychological skills training books, for example, Vealey (1988) noted the frequency with which certain mental skills had been incorporated into these books. Imagery training was present in all 27 of these psychological skills training guides, while relaxation and thought management techniques were each incorporated into 93% of the books. Goal-setting, attention control, arousal control and self-confidence were each presented as suggested techniques in more than half of the books analysed. For the purposes of this study, particular attention was paid to the following six frequently used skills and techniques: Goal-setting, Arousal Regulation, Concentration and Focusing, Self-Confidence, Mental Rehearsal, and Emotional Control.

Goal-Setting. Setting goals is one of the most frequently applied mental skills in performance enhancement. Orlick (1980) succinctly states that the "ability to set specific goals and pursue them in a systematic way separates those who want to excel as athletes, from those who actually do" (p. 50).

Based on considerable research, Locke and Latham (1985) have concluded that for goal-setting to be effective, several requirements should be fulfilled. These requirements for effective goal-setting, based on Locke and Latham (1985), and reiterated by Weinberg (1994), Cox (1990) and Gould (1993), are provided below:

1) Goals should be specific rather than general;
2) Goals should be difficult to attain, yet within the limits of the athlete's abilities;
3) Both long term and short term goals should be set;

4) Goals should be measurable, so that feedback regarding progress or goal attainment can be gathered;
5) Goals should focus on processes or on performance, rather than on outcomes;
6) Goals should be positively phrased, and recorded for future reference.

Chouinard (1982) feels that goals should not only be set with respect to skill performance, but also with respect to physical conditioning, knowledge acquisition, and behavioural aspects of sport and life. Orlick (1980) adds that goals regarding psychological preparation should also be set, while Grove (1985) advocates the setting of daily practice goals prior to training sessions, followed by a post-practice evaluation of the level of goal attainment.

Hardy and Jones (1994) suggest that there are three distinct types of goals: outcome goals, performance goals, and process goals. Outcome goals are based on the end result of competitions and are based on a comparison to the performance of other competitors. An instance of an outcome goal would be a baseball pitcher setting a goal of 10 wins in a season. Typically, performance goals are based on an end result as well, but they focus on events within the athlete's direct control. "Zero fielding errors" is an example of a performance goal. Finally, process goals relate to processes within the performance. For a batter, a goal of swinging only at good pitches is representative of a process goal.

Research tends to support the setting of performance and process goals as opposed to outcome goals, although little research into process goals has

been conducted (Hardy & Jones, 1994). On the other hand, Orlick (1986) feels that outcome-oriented goals, (e.g., dream goals) are an important and acceptable part of goal setting. According to Orlick, setting dream goals allows one to "remove some psychological barriers that currently limit your possibilities" (Orlick, 1986; p. 6).

In a study performed with collegiate swimmers, Burton (1989) examined the effect of performance based goal-setting. In comparison to collegiate swimmers not receiving a goal setting programme, male swimmers given a season-long goal setting programme showed greater self-confidence, concentration, perceived ability and success, and perceived effort. Furthermore, male swimmers in the goal setting programme displayed lower pre-competitive cognitive anxiety. With respect to actual performance in competition, however, no significant differences were noted. In the female group, swimmers that received the goal setting programme displayed lower pre-competitive cognitive anxiety and superior performance in competition than did female swimmers not receiving the programme. A trend toward increased self-confidence was also noted although it did not reach statistical significance. Further comparisons were conducted, examining differences between swimmers classified as having high or low goal setting accuracy. High accuracy goal setters performed significantly better than did low accuracy goal setters in competition.

A similar goal-setting programme was implemented with a sample of collegiate lacrosse players (Weinberg, Stitcher & Richardson, 1994). Players were randomly assigned to one of two conditions: a goal-setting condition, or a "do your best" condition. Long-term and

short-term goals were assigned to each player in the goal-setting condition, based upon performance in two previous games. Although goals were assigned, the researchers attempted to obtain player input and agreement. An expert in lacrosse was recruited as a blind evaluator of four lacrosse skills: defensive ground balls, defensive clears, offensive ground balls, and assists. No significant differences between the goal-setting condition and the control condition were noted for any of the performance measures. Examination of group means and tests of statistical power suggested moderate group effects, which did not achieve statistical significance due to the small samples used.

Hughes (1990) reported that the goal setting component of a mental skills training programme delivered to high school basketball and football athletes resulted in significant improvements in sport skills development. Unfortunately, interpretation of these results is difficult because no explanation was given regarding the measures used to assess sport skill development or the research design utilised. As well, no control or comparison group was utilised in the study, creating difficulty in inferring that the intervention caused the resulting changes in sport skill ability.

Arousal Regulation. Relaxation and energising, two primary components of arousal-regulation, are common components of numerous mental skills training programmes and are considered by many to be the foundation of performance enhancement through mental skills training (Weinberg & Williams, 1993). Vealey (1988) considers the control of physical arousal and the control of mental arousal to be two of the three key skills used in

mental skills training.

Gould and Udry (1994) examined the literature involving arousal control methods and noted that arousal reduction interventions typically fall into four categories: biofeedback based interventions, relaxation strategies, cognitive behavioural interventions, and mental preparation routines. The current research does not provide a definitive recommendation for any one technique over the others; however, Gould and Udry (1994) conclude that all of the interventions have the potential to help athletes achieve an ideal state of arousal and enhance performance.

An investigation by Terry, Coakley and Karageorghis (1995) examined the impact of arousal reduction strategies on somatic and cognitive anxiety levels. The results of the study indicated that centering (physical relaxation), mental rehearsal (cognitive relaxation), and a combined centering/mental rehearsal strategy all produced significant decreases in both somatic and cognitive pre-competitive anxiety levels in tennis players, as compared to a non-relaxation control group. A study by Greer and Engs (1986) found, however, that relaxation training programme delivered to tennis players did not significantly impact upon tennis skill acquisition.

Prapavessis, Grove, McNair and Cable (1992), found that a self-regulation training programme that included several arousal control techniques (stretching, progressive muscular relaxation, and biofeedback) resulted in substantially decreased arousal during small-bore rifle shooting performance. More specifically, the participant in their case study displayed decreased somatic and cognitive arousal as measured by the CSAI-2, decreased urinary catecholamine

levels, and reductions in gun vibration prior to shooting after the intervention. An increase in shooting accuracy coincided with the decrease in anxiety following the intervention.

Concentration and Attention. Nideffer (1993) believes that concentration "is almost universally recognized as the most important key to effective performance in sport" (p. 243). This sentiment is echoed by Schmid and Peper (1993) who state that "concentration is essential for performing one's best" (p. 262). With this in mind, it is not surprising that concentration strategies are common aspects of mental skills training.

In a study of female golfers undertaken by Boutcher and Crews (1987), the use of a pre-shot attentional routine corresponded with a significant increase in putting accuracy and a decrease in putting error, measured as inches from the hole. Dorfman and Kuehl (1989) recommend the use of pre-performance routines to assist in achieving optimal concentration. This recommendation is supported by testimonials and quotes from numerous elite baseball players, such as Major League outfielder Fred Lynn who states that proper concentration is "the difference between hitting .298 and .339" (Dorfman & Kuehl, 1989; p. 160).

Schmid and Peper (1993) suggest several strategies for developing and maintaining concentration, such as employing mental and physical rehearsal, attentional cues and triggers, and performance routines. With respect to baseball, Grove (1991) suggests three techniques for improving concentration skills for infielders: mental preparation, isolating performance cues, and developing an ability to refocus. Refocussing

involves a three-step thought management process beginning with the use of a cue word such as "STOP", while performing a physical action such as snapping the fingers or tapping the bat on the plate. This step is followed by the athlete taking a deep centering breath. The final step involves using task-relevant cue words or phrases.

Finally, Nideffer and Sharpe (1978; Nideffer, 1985) stress that concentration requires an ideal arousal level. If an athlete is over or under-aroused, concentration is unlikely to be at its optimal level.

Emotional Control. Controlling one's emotions is an important aspect of successful baseball performance. Emotional swings and negative thinking are major obstacles to achieving mental discipline in baseball (Dorfman & Kuehl, 1989). Nideffer (1985) discusses how negative thoughts can elevate an athlete's arousal, resulting in physical tension and hindered concentration.

Negative emotion, however is not always detrimental, and positive emotion is not always an asset. A study of ice hockey players by Hanin and Syrja (1995) demonstrated that athletes have optimal levels and intensities of positive and negative emotions. Performance quality tends to be greatest when an athlete's emotions are within their individual optimal zone.

Grove (1988a) recommends the use of thought stoppage techniques to assist in emotional control. This technique is similar to techniques used for developing and maintaining attentional focus. It involves using physical action (e.g., snapping or tapping fingers, squeezing a fist, etc.) and cue phrases

(e.g., "breathe", "relax", "see the ball") to replace the negative thoughts. Bunker, Williams and Zinsser (1993) also suggest that phrases, such as "STOP", as well as physical actions, are effective in terminating negative thoughts.

Self-Confidence. Dorfman and Kuehl (1989) suggest that confidence is a primary factor relating to success, while a lack of confidence is strongly related to failure in baseball. As well, they suggest that a lack of confidence is often associated with sub-optimal concentration and increased anxiety. Vealey (1986) defined the concept of sport-confidence as "the belief or degree of certainty individuals possess about their ability to be successful in sport" (p. 222). Hardy and Jones (1994) report that the available literature supports the notion that confidence and performance are inter-related in a cyclical fashion. They state "that confident performers set more difficult goals with which they persist until achievement, thereby gaining feelings of competence and increased self-confidence" (Hardy & Jones, 1994; p. 79).

In the development and testing of a measure of sport-confidence, Vealey (1986) noted that gymnasts who exhibited high trait sport-confidence tended to perform significantly better in competition than did those gymnasts with low trait sport-confidence. Martin and Gill (1991) noted that state sport-confidence was related to superior distance running performance by teenage males. Gayton and Nickless (1987) reported that both state and trait sport-confidence predicted performance in marathon runners.

Orlick (1986) suggests that a lack of confidence frequently results from inappropriate perceptions of

one's ability. He contends that many athletes lacking in confidence are holding on to old images of their abilities, and that athletes should re-structure their thoughts. More specifically, he advises athletes to "stop looking for proof that you aren't that good, and start looking for proof that you are" (1986; p. 88). Bunker, Williams and Zinsser (1993) provide alternative techniques for improving confidence. These techniques are based on the notion that negative self-talk is a primary factor involved in decreased confidence. Thought stoppage techniques, involving the identification of negative thoughts and their replacement with positive task-relevant thoughts, and the development of positive affirmations are techniques suggested by Bunker and colleagues (1993), and supported by the relevant scientific literature (e.g., Hardy & Jones, 1994).

Millar (1982) provided a confidence training programme to a sample of eight North American archers, and examined its perceived impact on the athletes. The archers were supplied with audio cassette tapes which consisted of exercises in relaxation, mental rehearsal, and confidence development. Unfortunately, the authors did not provide specific information detailing the nature of the confidence development segment of the audio cassettes. Results of the study indicated that roughly 87% of the participants felt that their confidence improved or at least remained constant following the confidence training programme. Furthermore, 75% of the participants reported that they were better able to cope with poor shots due to increased confidence. No control or comparison group was utilised in this study, however, so it was not possible to confirm that the intervention caused these

changes.

Mental Rehearsal. Mental rehearsal, sometimes referred to as visualisation, imagery or mental practice, is perhaps the most frequently used mental skill and research topic. Murphy (1994) suggests that the number of articles on mental imagery in the scientific and academic literature is well into the hundreds.

In a meta-analysis of 60 research studies examining mental imagery, Feltz and Landers (1983) noted an overall positive effect of the use of imagery. The results of the study showed an average effect size of .48, suggesting moderate improvements in performance resulting from mental imagery training. Only one of these studies measured the performance of a baseball skill, however. Clearly, mental imagery use in baseball is an area of research needing greater attention.

Rodgers, Hall and Buckolz (1991) provided a 16-week imagery training programme to a sample of figure skaters in Canada, and assessed its impact upon performance, imagery use, and imagery ability. The study utilised a pretest/posttest design with three groups: Imagery Group, Verbalisation Group, and a no-contact Control Group. Participants in the imagery condition showed a significant improvement in visual movement imagery ability. Participants in the verbalisation and control conditions did not show any change in visual movement imagery ability. Results also indicated that participants in the imagery condition tended to employ imagery techniques more following the intervention. Analysis of performance data did not indicate any significant changes for any of the three groups.

Blair, Hall and Leyshon (1993) conducted an

investigation on the effects of mentally rehearsing a complicated soccer performance drill on actual performance of the drill. Participants in the treatment group were given instructions on mental rehearsal for a 6-week period. The control group participants were required, as a placebo strategy, to devise pre-competition and competition strategies for the upcoming season. Results revealed a significant group by time interaction for response time on the soccer drill. The treatment group showed a substantial decrease in total time required to complete the drill, while the control group did not show any significant change.

Imagery skills can be used to learn new plays, to program performance, to review performances, and/or to anticipate specific situations (Grove, 1989). Orlick (1986) further suggests that imagery can be used to motivate and to refocus one's attention.

As with a good number of mental skills, many suggestions for optimising the benefits of imagery exist throughout the scientific literature. Vealey and Walter (1993) recommend that imagery should utilise as many sensory processes as possible. Incorporating visual, auditory, tactile, kinaesthetic, olfactory and gustatory sensations will serve to improve the vividness of the images. Murphy (1994) concurs by stating that the vividness of images strongly relates to the positive effects of imagery on performance.

Another aspect of imagery that is believed to be of importance is the controllability of the images, which has been associated with improved performance (Vealey & Walter, 1993; Murphy, 1994). Murphy (1994) further states that the outcome of performance-related images (positive vs. negative outcome) has a strong impact on the outcome of actual performance, although Murphy

explains that the theoretical reasoning behind this is not completely understood.

Orlick (1986) has suggested several benefits of using mental imagery in sport:

1) Imagery allows the athlete to see the successful completion of a skill or routine, which can have a positive impact on self-confidence;
2) Imagery can serve to motivate athletes towards improvement and goal attainment. Orlick (1986) states, "It can vividly remind you of your objective, which can result in increased intensity in training" (p. 114);
3) Skill learning and performance can be augmented through the use of mental imagery;
4) Mental imagery can assist in familiarising athletes in several ways, such as the competition site, the audience, specific tactics, and so forth;
5) Imagery can help an athlete regain proper focus if concentration begins to lapse.

An area of uncertainty regarding mental rehearsal relates to the speed of the images; that is, should the images occur at a real-time speed or should they occur at a decreased or slow-motion speed. A study examining the impact of rate of imagery on skill acquisition indicated that there were no significant differences between those mentally rehearsing in real-time and those mentally rehearsing in a decelerated, or slow-motion pace (Andre & Means, 1986). The study however also showed no differences in skill acquisition between those participants who were mentally rehearsing and participants in a motivational control group. Clearly

more research is needed to help clarify questions regarding the speed of images during mental rehearsal.

Anecdotal support for the use of imagery in baseball comes from an interview of Hank Aaron by Hanson (1992). In the interview, Aaron reported frequent use of visualisation as part of his pre-game and pre-pitch routines. As well, Dorfman and Kuehl (1989) illustrate that numerous other exceptional baseball players reported the use of mental rehearsal.

Mental Skills Training

The roots of psychological training and preparation for sport can be seen as far back as the early North American Indian and Asian cultures (Williams & Straub, 1993; Oxendine, 1988; Duncanson, 1986). These peoples regularly performed spiritual and psychological rituals when preparing for sporting competitions. Regarding the psychological preparation by North American Indians, Oxendine (1988) states:

> In traditional Indian cultures, major athletic contests were usually characterized by physical, psychological, and spiritual preparation... short term psychological and spiritual preparation were practised immediately before an important event (p. 10).
>
> Though differing on form and extent, most traditional Indian communities devoted serious attention to some form of pre-contest preparation of players (p. 14).

The modern use of mental training skills in North America is seen by some (Vealey, 1994; Williams & Straub, 1993) as stemming from the work of Coleman

Griffith in the 1920's. Griffith created the first North American sport psychology laboratory, and served as a sport psychology consultant for the University of Illinois Fighting Illini and the Chicago Cubs baseball team. It is also documented that Griffith discussed coaching psychology and motivation issues with Knute Rockne, then the head football coach of the University of Notre Dame Fighting Irish (Williams & Straub, 1993).

Williams and Straub (1993), among many others, consider Bruce Ogilvie to be "the father of applied sport psychology in North America" (p. 2), due to the many contributions and advances that he and Thomas Tutko provided to the field. Ogilvie and Tutko are credited with the popularising of applied psychology in North American sport. This popularity lead to a vast increase in the development and application of psychological training programmes during the 1970's (Williams & Straub, 1993). Although formal mental skills training is relatively new in North American sport, it is now known that many former elite baseball players such as Hall-of-Fame baseball star Hank Aaron, used mental skills regularly in their training, pre-competition preparations and performances (Hanson, 1992; Dorfman & Kuehl, 1989).

Modern Applications of Mental Skills Training

Over the past 10 years, mental skills training has expanded beyond just elite and professional sport, and a growing number of amateur sport coaches and clubs are incorporating mental skills into their overall training package (Gordon, 1990; Prapavessis, Gordon & Grove, 1990; Williams & Straub, 1993). There has been a strong emphasis by various national sport governing bodies and coaching associations to train coaches and athletes in

the development of effective mental skills training programme's (e.g. National Coaching Certification Program, 1990; Martens, 1987). Furthermore, numerous books and guides to mental training in sport are now available for coaches and athletes (e.g. Orlick, 1980; Orlick, Partington & Salmela, 1983; Gauron, 1984; Nideffer, 1985; Orlick, 1986; Dorfman & Kuehl, 1989; Cox, 1990; Rushall, 1992).

Recent Mental Skills Training Programme Evaluations

The importance of effectively documenting and evaluating mental skills training programmes to ensure public accountability, has been a prominent issue in the field of applied sport psychology (Dishman, 1983; Bryan, 1987, Smith 1989). As a result, mental skills training programmes for a variety of sports have been critically examined recently in the scientific literature. Because of the exceptionally vast body of literature documenting the effects of individual mental skills on performance in different sports, this review focuses on the reported impacts of recent multi-component interventions.

Individual Sports. Daw and Burton (1994) examined the impact of a mental skills training programme delivered to a sample of American college level tennis players. Intra-team results suggested that those participants who complied highly with the mental skills training programme, as determined from daily journals, committed significantly fewer double-faults than did those who complied to a lesser degree. In addition, high compliers rated all aspects of the mental skills training programme as more beneficial than did those participants who demonstrated low levels of compliance to the mental skills training programme. Inter-team

analyses showed that the participants in the mental skills training programme reported significantly higher pre-competitive self-confidence and had a significantly lower post-season double-fault percentage than did a control sample of tennis players who did not receive any mental skills training.

Prapavessis, Grove, McNair and Cable (1992) examined the effectiveness of a self-regulation training programme, undertaken by a rifle shooter, as a method of reducing anxiety and improving performance. Various physiological and behavioural measures of anxiety such as urine catecholamine levels, heart rate, electromyographic activity, and gun vibration were utilised, as well as the Competitive State Anxiety Inventory - 2 (CSAI-2). The results of the study indicated an improvement in shooting accuracy following the self-regulation training programme, as well as significant decreases in catecholamine levels, gun vibration, and both the cognitive and somatic anxiety subscales of the CSAI-2. Self-confidence, as measured by the CSAI-2 confidence subscale, was also found to have increased significantly following the self-regulation training programme.

The effectiveness of visuo-motor behaviour rehearsal (VMBR; imagery combined with relaxation) in decreasing competitive anxiety and enhancing karate performance was examined by Weinberg, Seabourne and Jackson (1981). Four intervention conditions were examined: VMBR, relaxation only, imagery only, and a placebo control group. Results indicated that subjects in the VMBR group, as well as the relaxation only group, showed significantly lower competitive state anxiety following the intervention. Furthermore, the VMBR group performed significantly better in sparring competitions

than did participants in any of the three other groups.

Neumann (1995) implemented and evaluated a two-week mental skills training programme designed specifically for equestrian athletes. It was found that the intervention resulted in increases in perceived importance of mental skills. Furthermore, the riders' knowledge of goal setting, relaxation, imagery, cognitive restructuring and mental preparation increased significantly following the intervention. No significant changes in dressage performance were observed, however. Finally, after examining the social validity of the intervention, it was revealed that generally the athletes felt that the mental skills training programme was valuable and worthwhile.

Straub (1989) conducted a study examining the performance enhancement effectiveness of three commercial mental skills training programmes on dart throwing accuracy. The study utilised five randomly assigned groups:

a) Participants receiving the Unestahl (1983) mental skills training programme;
b) Participants receiving the Gauron (1984) mental skills training programme;
c) Participants receiving the Bennett and Pravitz (1982, 1987; cited in Straub, 1989) mental skills training programme;
d) Participants in a physical practice only condition;
e) Participants in a no-practice control condition.

Dart throwing accuracy was assessed based on the distance of the dart from the centre of the dart board.

The study revealed that those participants receiving the Unestahl programme and those participants receiving the Bennett and Pravitz programme demonstrated significantly greater improvements in accuracy during the posttesting than did the participants in the control condition. No other differences reached statistical significance.

Gould, Petlichkoff, Hodge and Simons (1990) evaluated the impact of a psychological skills workshop on wrestling performance. Two separate samples of wrestlers participated in the psychological skills workshop. Both samples showed significant increases over time in their expected use of visualisation, expected use of relaxation skills, and expected use of mental preparation techniques. As well, both samples of wrestlers also showed a significant increase in knowledge of relaxation skills and importance of using these skills. Only one of the two groups sampled showed an increase in expected use of goal-setting.

Team Sports. In a study of the effectiveness of mental skills in basketball, Hamilton and Fremouw (1985) employed a multiple baseline design to examine the effects of a mental skills intervention on three male basketball players. Following the intervention, free-throw percentage improved significantly for all three participants. Furthermore, participants showed a significant change from negative or irrelevant thoughts during games to positive thoughts. Unfortunately the authors provided only a cursory overview of the mental skills training programme, stating that it was comprised of deep muscle relaxation, identification of negative self-statements, development of positive self-statements, and in vivo rehearsal during team practice.

A more comprehensive evaluation of the effects of

mental skills on basketball performance was conducted by Kendall, Hrycaiko, Martin and Kendall (1990). Using a multiple baseline design as well, three female collegiate basketball players were assessed following a mental skills program covering a 33-game season. The intervention consisted primarily of visualisation, positive self-talk, and relaxation training, delivered during five-day sets between each of the games. Performance was measured as the percentage of correct occurrences of a specific defensive skill per game. Results showed a definite increase in performance for all three participants. Positive results from a Social Validity Questionnaire and the Vividness of Visual Imagery Questionnaire further supported the efficacy of the intervention.

Meyers and Schleser (1980) evaluated a single subject intervention, and reported substantial improvements in basketball performance following the mental skills training programme. The participant's field-goal percentage improved from 42.0% to 65.6% following the intervention, and his scoring average rose from 11.3 to 15.3 per game. The nature of this intervention did not allow for experimental control, thus a number of external factors were reported as potentially influencing the results of the study. One extraneous factor that the authors suggested may have influenced the results, was a noticeable difference in the talent of the opponents faced before and after the intervention.

Savoy (1993) conducted and evaluated a single-subject intervention with an elite female collegiate basketball player. The mental skills intervention, which was implemented during the off-season and continued throughout the pre-season and regular season,

consisted predominantly of imagery, focusing, energising, and centering. Weekly CSAI-2 measurements of cognitive and somatic anxiety tended to show a decrease throughout the intervention, while self-confidence tended to increase. Baseline measures of anxiety, performance and self-confidence were not available, however, because the subject and her coach were interested in implementing the intervention prior to the regular season. The subject reported increased self-confidence which she attributed to the mental skills intervention. The increased confidence was seen by both the athlete and her coach as a major reason behind improvements in performance during the season. The methodology employed in evaluating the intervention however, cannot effectively rule out other variables as potential factors mediating the improvements in performance and confidence.

Brewer and Shillinglaw (1992) found that following a two-week mental skills training program, lacrosse players rated their knowledge and the perceived importance of mental skills as being significantly higher than they had prior to undertaking the mental skills training programme. The mental skills training programme consisted of sessions focusing on goal setting, relaxation imagery and self-talk. No performance measures were included in this evaluation.

Bakker and Kayser (1994) conducted a comprehensive evaluation of a mental skills training programme for a sample of Dutch field hockey players. The mental skills training programme consisted of listening to audio cassettes that presented relaxation, concentration and imagery exercises. Results from multiple testings with the Competitive State Anxiety Inventory (CSAI-2) indicated that the intervention did not result in

significant reductions in cognitive or somatic anxiety as compared to a control group and a placebo/motivational group. Interestingly, the treatment group showed significantly lower self-confidence following the intervention than the placebo and control groups. Analysis of performance data revealed a significant interaction effect, showing a substantial treatment group improvement with no change in control group or placebo group performance.

Although a number of mental skills training programmes have been published in the scientific literature, it is unclear if the programmes would prove beneficial if applied to athletes with different needs or to different sports. To explore this question, Seabourne, Weinberg, Jackson and Suinn (1985) compared the impacts of individually tailored interventions, pre-constructed interventions, and interventions which were designed for another athlete, to each other and a control group. The results of the study indicated that superior performance resulted following the individualised intervention and the pre-constructed intervention, as compared to the control participants and those receiving an intervention tailored to another athlete's needs.

Critical Reviews of MSTP Evaluations

Greenspan and Feltz (1989) and Vealey (1994) critically reviewed numerous evaluations of psychological interventions in sport. They concluded that positive behavioural changes, such as enhanced performance, could not be attributed solely to the intervention in roughly 55% of the studies (Greenspan & Feltz, 1989; Vealey, 1994). In most cases, this was due to weaknesses in the evaluation procedures.

Specific criticisms of mental skills training programme evaluation literature were fairly consistent between Greenspan and Feltz (1989) and Vealey (1994). Poor research design was frequently cited as a shortcoming of evaluations. Almost one-third of the studies examined by Greenspan and Feltz (1989) did not utilise either a control group to which treatment effects could be compared, or a sound single-subject design. Vealey (1994) has shown that this aspect of mental skills training programme evaluations is improving since the publication of Greenspan and Feltz's (1989) paper, with 92% of the evaluations employing a control group or a reliable single-subject design. Of the studies reviewed by Greenspan and Feltz (1989) employing a control group, only five employed a motivational component for the control group in order to rule out any placebo effects resulting from unequal experimental exposure. This aspect was not addressed in the study by Vealey (1994).

It is also suggested by Greenspan and Feltz (1989) and reiterated by Vealey (1994) as well as Weinberg and Comar (1994), that intervention studies should employ manipulation checks to assess the degree to which participants complied with various components of the intervention. Only 18% of the studies examined by Greenspan and Feltz (1989) and 50% of those in Vealey (1994) conducted a manipulation check which was deemed to be adequate by the authors.

Psychological Aspects of Baseball

Baseball is a sport which lends itself very well to the use of mental skills training. The intermittent nature of the game provides ample opportunity for the players to utilise mental skills between pitches and

innings. As well, the high-speed nature of the game and the reflexive actions required for optimal performance seem to support the need for mental skills use in baseball.

The performance of a pitcher is one of the most important factors in determining the outcome of a baseball game, and pitchers face a number of psychological challenges during play. Kindall (1988) shows the importance of the pitcher in overall team performance by stating:

> There is no question that good pitching is the single most important requirement for a baseball team's success. Conservative estimates place the outcome of a baseball game as anywhere from 60 to 75 percent dependant upon pitching (p. 145).

Because of the importance of pitching in the outcome of a baseball game, it is imperative that pitchers maintain unwavering confidence in their ability to be effective (Alston & Weiskopf, 1972; Baseball Canada, 1986; Dorfman & Kuehl, 1989; Jordan 1988; Shaw, 1972).

Another important mental aspect of baseball relates to the player's level of physical arousal. The mechanics of a proper pitch, for example, require that a great number of movements be performed in sequence, smoothly and fluidly. Shaw (1972) contends that "if you are tense, control and timing are impossible" (p. 111). This notion is supported by other experts on baseball (Alston & Weiskopf, 1972; Dorfman & Kuehl, 1989). It is also essential that batters have the ability to remain physically relaxed. Dorfman and Kuehl (1989) explain that elevated arousal will negatively impact a batter's

swing and timing by increasing muscular tension, thereby impairing batting performance. Thus, the ability to detect signs of arousal and moderate that arousal, is a critical skill for all baseball players.

The ability to concentrate effectively is also paramount to hitting a well-thrown baseball. A pitch thrown at a velocity of roughly 145 kilometres per hour reaches the batter within 0.4 to 0.5 seconds (Dorfman & Kuehl, 1989; Williams & Underwood, 1986). During this brief moment, the batter must recognise the style of the pitch (i.e., fastball, slider, curveball, etc.), predict its location within the strike zone, decide whether or not to swing, and then initiate the batting movements so that optimal contact is made between the bat and the ball. Perennial Major League Baseball All-Star, Wade Boggs, suggests that a batter should assess the type of pitch within roughly three meters from the point of release (Boggs & Brisson, 1990). According to calculations by Williams and Underwood (1986), this would occur within less than 0.1 seconds from the release of the pitch. With regard to making contact with the ball, a deviation of the timing of the batter's swing by as little one hundredth of a second is sufficient to cause the baseball to be hit into foul territory (Adair, 1990). Concentration is also a pre-requisite for effective fielding in baseball. Russo, Landolphi and Gershberg (1985) contend that the ability to concentrate is one of the primary skills needed to succeed as an outfielder.

Emotions and negative thoughts also have a powerful effect on batting performance. Pitchers, by varying the type, location and speed of their pitches, attempt to "keep the batter mentally off stride" (Jordan, 1988; p. 113). To maximise their chances for a successful at-

bat, hitters must attempt to stay mentally calm, and not let emotions or counter-productive self-talk interfere with their concentration or their state of relaxation (Alston & Weiskopf, 1972).

Mental Skills Training in Baseball

As noted above, Coleman Griffith worked closely with the Chicago Cubs baseball team in the first half of the 20th century (Williams & Straub, 1993). Hanson (1992) reports that several former baseball stars, such as Hank Aaron, regularly used and practised mental skills. Aaron, for example, regularly used visualisation, goal setting, problem solving, concentration and focusing skills during his remarkable 23 season professional career. Dorfman and Kuehl (1989) further outline mental skills usage by a substantial number of elite baseball players.

Interestingly, however, very little literature exists which outlines mental skills training, or evaluations of mental skills training programmes for baseball. Dorfman and Kuehl (1989), Grove (1988a,b,c; 1989; 1991), Anshel, Gregory, and Kaczmarek (1990), Perry (1990), Richard and Wheeler (1991), and Hanson (1992) all present information on the use of psychological techniques in baseball. However, only Anshel and colleagues (1990) present empirical evidence supporting positive benefits of mental skills training in baseball, and their intervention was limited to stress management strategies. Dorfman and Kuehl (1989) and Hanson (1992) present anecdotal evidence of the benefits of mental skills training based on testimonials by professional baseball players, but they do not provide any other data to support their claims.

Justification of the Study

Importance of Evaluations. Psychological consultants, whether sport-based, clinical or otherwise, have an obligation to conduct regular on-going evaluations of their interventions (Kenney, 1986; Vealey, 1988; Smith, 1989; Strean & Roberts, 1992; Weinberg & Williams, 1993; Hardy & Jones, 1994). The provision of psychological counselling and/or mental skills training is a service, in much the same way that prescribing medication or treating an injury is a service. While the psychological impact of these interventions is not directly observable, it can be inferred from changes in behaviour. For this reason, it is necessary to conduct objective evaluations to determine if:

(a) Behaviour has in fact changed;
(b) The behaviour change has been positive or desirable;
(c) The intervention is the direct cause of the behaviour change.

When providing such services, mental skills consultants have an ethical obligation to evaluate the impact of the intervention on their clients (Vealey, 1988; Prapavessis, Gordon & Grove, 1990; Weinberg & Comar, 1994).

Numerous sport psychology researchers state that evaluations of programme effectiveness provide the mental skills consultants and coaches with important information regarding the intervention (Boutcher & Rotella, 1987; Heyman, 1987; Weinberg & Williams, 1993). Primarily, an evaluation offers information regarding improvements that could be made to enhance the

effectiveness of mental skills training programmes. Secondly, evaluations give the programme recipient an opportunity to comment about positive and/or negative aspects of the programme. Finally, mental skills training programme evaluations need to be conducted to ensure that the programme has met its objectives, whether these pertain to personal growth or to performance enhancement.

Desirable Aspects of MSTP Evaluations. According to Greenspan and Feltz (1989), Vealey (1994), and Weinberg and Comar (1994), effective evaluations should address several major areas. Primarily, adequate methodology must be utilised. For example, a one group pretest/posttest design does not provide evidence of causality. There is an important need for an adequate control group to compare against the intervention group (Greenspan & Feltz, 1989; Wollman, 1986). To control for the possible effects of the mere presence of experimenters, equal time and attention should be given to the control group participants to eliminate possible placebo effects. Intervention evaluations should also measure other aspects of sport rather than merely focusing on changes in performance.

Other recommendations made by Greenspan and Feltz (1989), Vealey (1994), and Weinberg and Comar (1994) include sampling individuals from a variety of social and cultural backgrounds, providing accurate descriptions of the intervention components, and the publication of evaluations that do not show positive effects of an intervention.

Statement of the Problem

Mental skills training programmes, being

essentially a service to consumers, should be regularly evaluated to ensure that those using the programmes learn the skills and abilities which will help improve their performance and enhance personal growth. Bryan (1987) states:

> It is not enough simply to say that performance has improved, therefore the treatment worked. It must be demonstrated that our interventions produced the observed changes in performance (p. 283).

This study evaluated the impact of a mental skills training programme on the athletes attending the Western Australia Baseball Academy. The evaluation examined differences between the intervention group and a control group not receiving the mental skills training programme. Secondly, the evaluation examined differences within the intervention group to determine factors that may influence compliance to the programme as well as the effects of participants' compliance on the effectiveness of the programme.

Research Questions

The evaluation of this mental skills training programme aimed to provide answers to several questions regarding the impact of the mental skills training programme:

Between-Group Comparisons.

(A) Does participation in a mental skills training programme have a beneficial effect on motivation/readiness to use mental skills training within the overall baseball training programme?

(B) Does participation in a mental skills training programme have a beneficial effect on self-reported ability in six broad mental skill areas (ie: planning/analysis, use of imagery, control of nerves/tension, emotional control, concentration, self-confidence)?

(C) Does participation in a mental skills training programme have a beneficial effect on self-perceived competence in dealing with specific psychological challenges in baseball?

(D) Does participation in a mental skills training programme have a beneficial effect on psychological ability as measured by the 28-Item Athletic Coping Skills Inventory?

Within-Group Comparisons.

(A) Do the personality constructs of Conscientiousness and High Personal Standards (a component of perfectionism) predict the extent of compliance with a mental skills training programme?

(B) Is compliance with the mental skills training programme related to changes in perceived competence to deal with specific psychological challenges in baseball?

(C) Do the coaches perceive changes in their players' abilities in the six general mental skill areas as a result of participation in the mental skills training programme?

Social Validity.

(A) Do the WABA coaches believe the mental skills training programme was logical, enjoyable, worthwhile, and effective?

(B) What specific aspects of the intervention do the WABA coaches feel are strengths, and are there any aspects which could be improved?

Hypothesised Research Results

It was expected that participation in the mental skills training programme would have beneficial effects on readiness/motivation for behaviour change. It was also expected that participation in the Mental Skills Training Programme would result in perceived improvements in the six general mental skills areas as well as increases in perceived ability to deal with specific psychological challenges in baseball. Greatest improvement was expected to occur amongst players who showed the greatest degree of compliance with the training protocols, and compliance, in turn, was expected to be greater amongst players who scored high on the Conscientiousness and High Personal Standards scales. Finally, it was expected that coaches would perceive improvements in the mental skills of the players, and that their responses on the social validity questionnaire would be generally favourable.

CHAPTER 2: INTERVENTION AND EVALUATION METHODS

Participants

The participants in this study were athletes in the Western Australia Baseball Academy (WABA) Elite Development Programme (n=29). Participation in the mental skills training programme was a mandatory component of the WABA training, but participation in the study was voluntary. None of the WABA baseball players declined to participate in the mental skills training programme however. The average age of the treatment group participants was 15.62 years (SD = 0.62). All but one of them had at some point either represented their state in national competition, or represented Australia in international competition. During the previous season, 51.7% had represented their state in national competition, 3.4% had represented Australia in international competition, and the remainder had played for local clubs. Treatment group participants practised baseball an average of 7.9 hours per week for 40 weeks of the year. Nearly two-thirds of these individuals had played baseball for 4 to 6 seasons, and 14.3% reported playing for 7 to 9 seasons.

A control group of baseball players (n=26) was selected from those baseball players who received invitations to try out for the WABA development squad but were not selected. Control group participants averaged 14.69 years of age (SD = 0.62). All of the control participants played the previous season at the

club level and only 20% had ever represented their state in national competition. None of them had ever represented Australia in competition. Control group participants averaged 7.5 hours of training per week for 31 weeks per year. 41.7% of the control participants had participated in baseball for 4 to 6 seasons, and 29.2% had participated for 7 to 9 seasons.

All participants in this study were citizens of Australia. One participant reported his ethnicity as "Australasian", and the remainder were Caucasian. All participants receiving the mental skills training programme and participants in the control group were male.

Materials

All players in the mental skills training programme received a mental skills training manual (Grove, 1996). This manual contained a mental skills training diary (Appendix 4) within which all participants were required to record their completion of mental skills practice sessions. The manual also contained worksheets for mental skills exercises (e.g., goal-setting, and performance routine exercises) that were completed during weekly group sessions. Finally, a series of instructional articles on the use of mental skills use in baseball were included in the mental skills training manual (Grove, 1985; 1988a,b,c, 1989).

The participants in the mental skills training programme also received an audio cassette which contained mental training exercises by Unestahl (1982) and Nash, Solin and Solin (1989). These cassette-based exercises covered basic relaxation, development of a relaxation/concentration trigger, mental rehearsal, and the use of positive self-talk. Each segment was between

7 and 15 minutes in length, and focused primarily on one of these mental skill areas.

Control group participants received a strength and conditioning manual. This manual explained the principles of weight training for strength, endurance and power. The manuals also contained weight training diaries that the control group participants were required to complete during supervised strength and conditioning sessions.

Intervention

Structure of the Intervention. The training programme included weekly group meetings that focused on six specific mental skills (Grove, 1988a,b,c, 1989, 1991). Homework, in the form of cassette-based practice (Unestahl, 1982; Nash, Solin & Solin, 1989), was completed by each of the athletes between group sessions and recorded in the mental skills training journal. Mental skills consultants attended training sessions and intra-squad games to provide guidance in the on-field use of specific strategies. The consultants also assisted the coaching staff in implementing training drills that emphasised mental skills usage. These drills were developed jointly by the mental skills consultants and the WABA coaching staff.

The six major components of the mental skills training programme delivered to the Western Australia Baseball Academy are summarised in Table 1.

TABLE 1: Components of the Intervention	
Area 1	Control of Nerves and Tension
Area 2	Concentration
Area 3	Emotional Control

Area 4	**Use of Imagery**
Area 5	**Self-Confidence**
Area 6	**Planning and Analysis**
Review	**Review of Mental Skills in Baseball**

Control of Nerves and Tension. During the weekly group session focussing on the control of nerves and tension, progressive relaxation (Harris & Williams, 1993) and centering (Nideffer & Sharpe, 1978; Grove, 1988b; Harris & Williams, 1993; Australian Institute of Sport, n.d.; Bond, n.d.) were discussed and practiced. Progressive relaxation is "a series of exercises that involve contracting a specific muscle group, holding the contraction for several seconds, then relaxing" (Harris & William, 1993; p. 190). Centering is a process of consciously using deep breathing to reduce arousal. A deep abdominal breath is inhaled, held for a brief moment, then released. Following the teaching of these skills, the players practiced an abbreviated form of progressive muscular relaxation as well as centering. Mental rehearsal and pre-performance routines, which have found to be effective in regulating arousal (Harris & Williams, 1993; Gould & Udry, 1994), were also incorporated into the mental skills training programme. The audio cassette homework exercise consisted of progressive muscular relaxation and centering exercises. This homework was completed a minimum of five times during the week following the group session.

Several drills, developed in consultation with the WABA coaching staff, were designed to foster the control of arousal. Pre-pitch routines, pre-fielding routines, and pre-batting routines were used in practice sessions. The routines involved using a muscle-based, squeeze-

release procedure as well as a centering breath. For example, before entering the batting box, batters were instructed to take a deep inhale while gripping the bat tightly. After a couple of seconds the grip was loosened and the breath was released. Similar routines were used with pitchers and fielders. A second drill was designed to facilitate the proper use of breathing during batting. This drill involved inhaling during the pitcher's wind-up then forcibly exhaling during the swing and contact with the ball.

Concentration. Concentration skills were taught during the group sessions using a three-step thought stoppage technique (Bunker, Williams & Zinsser, 1993). This technique involved the athletes first squeezing their fist tightly while taking a deep breath, then released the breath and fist simultaneously. During the release of the fist and breath, the athlete recited a task relevant phrase or word to refine or refocus his attention appropriately. Considerable time was spent in the weekly group sessions developing and discussing appropriate task-relevant cues for batting, fielding and pitching. An example of a cue phrase used by several players when batting was: "See the fat part". This cue phrase helped focus the batter on the middle of the baseball (i.e., the widest part) which assists in framing the pitch and detecting the spin and trajectory of a pitch (Boggs & Brisson, 1990). The audio cassette homework programme, which was practiced at least five times, reinforced this thought-stoppage procedure.

Modifications were made to a number of the drills used by the WABA coaching staff in order to emphasise concentration skills. An example of such a drill involved team defence, where a coach would first call

out a situation (e.g., "runner on first, none out") and then quickly hit the ball to one of the fielders. Players were encouraged to verbally rehearse their responsibilities as soon as the situation was identified, and then react accordingly after the ball was hit. In addition, considerable time during practice sessions and intra-squad games was spent incorporating the relaxation/focusing trigger and cue phrases into each player's own pre-pitch routine.

Emotional Control. In the weekly group sessions, the thought stoppage technique (Bunker, Williams & Zinsser, 1993) was developed into a post-error routine for the participants. As an example of using thought-stoppage to control emotions, infielders were instructed, following an error, to turn to the outfield, use the centering technique to compose themselves, and then review the current game situation (e.g., "Two out, runner on first") before turning to face the next batter. Similar thought-stoppage routines were used with batters after a poor performance at the plate, and with pitchers after a difficult period on the mound. These strategies were designed to help the athletes attend to the game situation rather than their emotions and to reduce excessive arousal that an emotional response to the error might have caused.

The mental skills consultants attending the practice sessions regularly prompted the players to use their refocussing and arousal control techniques in situations where their emotions might negatively affect their performance. This prompting was especially prevalent during intra-squad games where, at least initially, players frequently exhibited frustration and negative emotions concerning their performance.

Use of Imagery. In the weekly group session, the players were given a simple imagery scenario which emphasised using as many different senses as possible. Following this, the players listened to an imagery programme from an audio cassette. Supplementary instructions as well as feedback were given to the players during the session. Furthermore, the group session emphasised the various benefits of imagery training, and provided numerous examples of how imagery could be utilised in training and competition. Finally, incorporation of mental imagery into the athletes' pre-performance routines was discussed. The athletes were given audio-tape homework exercises containing a 12-minute imagery training programme developed by Unestahl (1982). The athletes were required to listen to the complete imagery programme at least five times following the group session focussing on imagery.

During the regular training sessions, practice of these routines was prompted by the mental skills consultants. When hitting off of batting tees, the batters were encouraged to visualise a pitcher's wind-up and release, and the flight of the ball. Pitchers visualised different batters (left or right handed) of different styles (slugger or percentage hitter) during bullpen sessions, allowing them to develop experience in selecting and delivering appropriate pitches in different situations.

Self-Confidence. The primary method used in the weekly group sessions for fostering and maintaining self-confidence involved the development of positive self-statements. These affirmations were used in a similar manner to the cue words used in enhancing

concentration. Examples of affirmations were provided and the players were then instructed to develop at least three positive affirmations of their own. These affirmations were recorded by the players and kept for future reference in their mental skills training journal. An example of an affirmation developed by an athlete in the mental skills training programme was: "I can hit anything the pitcher throws into the strike zone". The athletes were instructed to regularly recite and review their affirmations, especially in situations where their confidence was low.

Two confidence-related cassette exercises were assigned to the athletes as part of their weekly homework exercises. Both homework exercises were to be completed at least five times over a 2-week period. In addition, the personal affirmations developed by the players were reinforced by coaches and consultants at the on-field practice sessions.

Planning and Analysis. The goal setting component of the mental skills training programme involved setting long-term dream goals, yearly outcome goals, performance goals for both offensive and defensive aspects of the game, mental skills training goals, and daily training goals. Goal setting work-sheets were provided to the players and completed during one of the weekly group sessions. Each athlete kept their work-sheet in their mental skills training journal for future reference. Important aspects of goal setting (e.g., specific, measurable, and positively phrased) were discussed during the group session, and baseball-specific examples were given. Players were asked to publicly state one of their goals during the group session, and players were encouraged to offer comments on the extent to which the

stated goals conformed to the suggested guidelines.

As an ongoing homework exercise, the players were instructed to prepare daily training goals for each training session. This homework was not formally checked, but the mental skills consultants frequently asked players about their training goals for a training session. Suggestions were then offered to clarify the goals if necessary. The WABA coaching staff assisted in the goal setting process by suggesting areas which each player needed to emphasise during practice sessions, and also provided feedback to the players regarding improvement and goal attainment.

Measures

Motivation/Readiness for Change. This questionnaire is based on the Transtheoretical Model of behaviour change. The Transtheoretical Model assumes that behaviour change should not be envisioned as a changed-unchanged dichotomy, but rather as a series of stages towards permanent behaviour change (Prochaska & DiClemente, 1986; Prochaska & Marcus, 1994). This model has been successfully applied to both the cessation of negative behaviours such as smoking (Fava, Velicer & Prochaska, 1995), as well as to the acquisition of positive behaviours such as regular exercise (Cardinal & Sachs, 1995, 1996; Gorely & Gordon, 1995). This measure has been shown to reliably differentiate individuals based on their readiness for behaviour change (Cardinal, 1995a,b,c; Cardinal & Sachs, 1995; 1996; Prochaska & Marcus, 1994; Prochaska & DiClemente, 1986). The stages of change are:

a) Pre-Contemplation, where the individuals are not considering any attempt at changing their

behaviour;

b) Contemplation, where the individuals are considering changing their behaviour, but have not taken any steps towards that goal;
c) Preparation, where the individuals are taking preliminary steps towards changing their behaviour;
d) Action, where the individuals are regularly engaged in the new behaviour, but for less than six consecutive months;
e) Maintenance, where the individual has engaged in the new behaviour for a period of six months or longer.

The behaviour examined in the current study was the participants' use of mental skills training as part of their overall baseball training regimen. Appendix 3 contains the Stages of Change Questionnaire. Participants in this study were categorised into a stage based on a simple algorithm from Marcus and Simkin (1993).

Self-Assessed Mental Strengths. The Self-Assessed Mental Strengths, or Baseball Mental Skills Questionnaire (Grove, 1988c; Grove & Hanrahan, 1988) requires participants to rank-order their ability in six general mental skills areas from 1 (The thing I do best) to 6 (The thing I do worst). A copy of the Self-Assessed Mental Skills Questionnaire is provided in Appendix 1. The six mental skill areas are:

a) Control of Nerves and Tension
b) Concentration
c) Emotional Control
d) Planning and Analysis

e) Use of Imagery
f) Self-Confidence

These six mental skill areas were selected based on research by Vealey (1988) who noted that they were among the most frequently emphasised mental skills and techniques in the mental skills training literature.

Perceived Competence Questionnaire. The Perceived Competence Questionnaire, developed for this study, consisted of 12 items focussing on self-perceived ability to adequately cope with specific psychological challenges in baseball. For each item, participants rated their perceived ability on a scale ranging from 0 to 10, with 0 representing "Unable to do it" and 10 representing "Perfectly able to do it". These psychological challenges were suggested by experienced baseball players and coaches as specific applications of the six general mental skills addressed in the Self-Assessed Mental Skills Questionnaire. Sample items from the Perceived Competence Questionnaire are shown in Appendix 2.

Athletic Coping Skills Inventory. The Athletic Coping Skills Inventory (ACSI-28; Smith, Schutz, Smoll & Ptacek, 1995) is a 28-item scale that contains 7 psychological skill subscales (Appendix 6). The seven subscales are:

a) Peaking Under Pressure
b) Freedom From Worry
c) Coping With Adversity
d) Concentration
e) Goal Setting and Mental Preparation

f) Confidence and Achievement Motivation
g) Coachability

Smith and colleagues (1995) report that internal consistency values for these subscales range from .62 to .78. Baseball-specific validity has been demonstrated by Smith and Christensen (1995), who found that the ACSI-28 significantly predicted performance as well as survival in minor league baseball. Selected subscales of the ACSI-28 have also been shown to differentiate between high school athletes who were identified by their coaches as over-achievers, normal achievers, and under-achievers (Smith, Schutz, Smoll & Ptacek, 1991).

Adherence to the MSTP. Adherence to the mental skills training programme was determined by counting the number of times mental skills homework exercises were independently practised each week. This compliance information collected by conducting weekly checks of each player's Mental Skills Training Journal (Grove, 1996; Appendix 4). All athletes in the WABA were required to record their training activities in a physical training journal and a mental skills training journal.

Personality Measures. Two personality factors were assessed as potential correlates of adherence to the mental skills training programme. The first of these, Conscientiousness, was assessed with a subscale from the NEO Personality Inventory. The Conscientiousness subscale of the NEO Personality Inventory (NEO-C) has demonstrated high construct validity (McCrae & Costa Jr., 1989; Parker, Bagby & Summerfeldt, 1993) and has been shown to have a strong inverse correlation with

trait procrastination, "the predisposition to postpone that which is necessary to reach some goal" (Schouwenburg & Lay, 1995). Furthermore, Conscientiousness has also been found to be a significant predictor of compliance with psychological treatment programmes (Muten, 1991).

Two subscales from the Frost Multidimensional Perfectionism Scale (MPS; Frost, Marten, Lahart & Rosenblate, 1990) were used to measure the second personality factor. Specifically, the "High Personal Standards" (HPS) and "Concern Over Mistakes" (COM) subscales of the MPS were used in this study to examine aspects of perfectionism that might be related to mental skills training programme compliance. The Concern over Mistakes subscale is comprised of nine items, while the High Personal Standards subscale is comprised of seven items. All items are rated on bipolar scales ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

High Personal Standards and Concern Over Mistakes have demonstrated strong correlations with Self–Oriented Perfectionism and Socially-Prescribed Perfectionism respectively, which are subscales of Hewitt and Flett's (1989) Multidimensional Perfectionism Scale (Frost, Heimberg, Holt, Mattia & Neubauer, 1993). Both Multidimensional Perfectionism Scales have demonstrated high degrees of validity and reliability (Frost *et al.*, 1990; Hewitt & Flett, 1991; Hewitt, Flett, Turnbull-Donovan & Mikail, 1991). Frost and Henderson (1991) have examined the HPS and COM subscales in relation to athletic behaviour and found a number of significant relationships.

Coaches' Perceptions Scale. The WABA coaching staff (n=3) were asked to rate each treatment group player in

six general mental skill areas. These mental skill areas were the same as those on the Self-Assessed Mental Strengths Questionnaire, and the coaches were given specific examples of each type of mental skill. Coaches made their ratings on bipolar scales ranging from 0 (Unable to do it) to 10 (Perfectly able to do it). They made separate ratings for each player on each of the 6 categories of mental skills.

Social Validity Questionnaire. The Social Validity Questionnaire, adapted from Shambrook and Bull (1996; Appendix 5) was completed by the WABA coaching staff. This questionnaire assesses the coaches opinions of the mental skills training programme across seven dimensions, on a 0 (Not at all) to 10 (Very much so) scale. As well, two open ended questions allowed the coaches to indicate what they perceived to be the strengths and shortcomings of the mental skills training programme.

Research Procedure

Pre-treatment data for the intervention group were collected at the initial group meeting. Control group participants were contacted by mail and asked to complete the same questionnaires as the treatment group. The questionnaire packages consisted of four measures:

a) Self-Assessed Mental Strengths Questionnaire (Grove, 1988c; Grove & Hanrahan, 1988);
b) Perceived Competence Scale;
c) Stages of Change Questionnaire (Prochaska & DiClemente, 1986; Prochaska & Marcus, 1994; Appendix 3);
d) 28-Item Athletic Coping Skills Inventory

ACSI-28 (Smith, Schutz, Smoll & Ptacek, 1995; Appendix 6).

Control participants received instruction in conditioning and strength training for baseball, to control for potential placebo effects stemming from an imbalance of exposure to the experimenters. The strength training program consisted of seven sessions, which was the same number of mental skills sessions undertaken by the treatment group (Appendix 9).

Post-intervention data were collected in a similar manner to the collection of the pre-intervention data. The intervention group completed the same questionnaires at the conclusion of the final group session. Control group participants received their questionnaire following the final weight training session.

WABA coaches assessed the mental skills of each athlete both prior to the mental skills training programme and shortly after the conclusion of the programme. Each of six general mental skills areas was rated by the three primary coaches on a 10-point scale. The coaches also completed a social validity questionnaire at the end of the training programme (Appendix 5). The two personality measures, the Multi-Dimensional Perfectionism Scale (Frost, Marten, Lahart & Rosenblate, 1990; Appendix 8) and the Conscientiousness subscale of the NEO Revised Personality Inventory (Costa & McCrae, 1992; Appendix 7) were previously collected during the WABA player selection camp, and explored possible personality correlates of programme adherence.

CHAPTER 3: RESULTS

Between-Group Comparisons

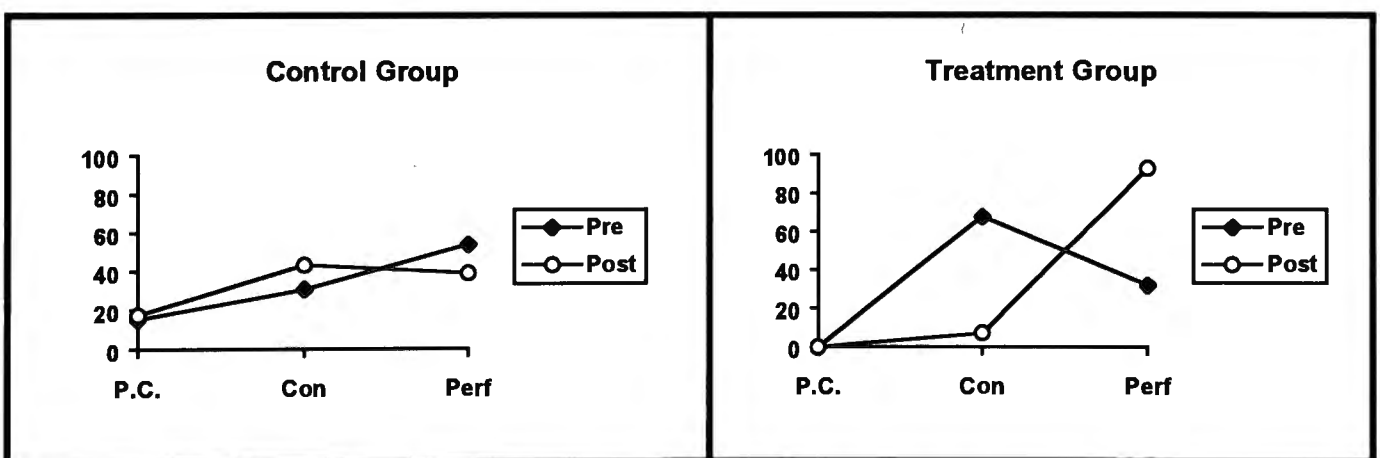
Shift in Stages of Change by Group. Three-way frequency analysis (Tabachnick & Fidell, 1989) was used to analyse the Stages of Change data. The purpose of this analysis was to determine if participation in the mental skills training programme had a beneficial effect on motivation/readiness to use mental skills training within the overall baseball training programme. Due to low frequency counts or empty cells, the stages of Preparation, Action and Maintenance were combined into a single category labelled Performing the Behaviour. It was hypothesised that the analysis would show an increase from pretest to posttest in the number of treatment group participants classified as Performing the Behaviour but no change over time for the control group.

Results indicated a significant Group by Time by Stage interaction effect, ($\chi^2 = 16.79$, $p < .001$; Table 1). Specifically, 67.9% of the participants in the treatment group were classified as being in the Contemplation stage during the pretesting. The remaining 32.1% were classified as Performing the Behaviour. During the posttesting, 92.9% of the participants in the treatment group were categorised as Performing the Behaviour, and only 7.1% were categorised into the Contemplation stage. Those few treatment group participants who were not categorised as Performing the

Behaviour following the intervention, were among the lowest compliers to the mental skills training programme, falling at or below the 20th percentile in terms of compliance levels.

By comparison, 53.8% of the control group participants were classified as Performing the Behaviour at the time of the pretest. A further 30.8% were in the Contemplation stage and 15.4% were in the Pre-Contemplation stage during the pretesting. On the posttest, the percentage of control group participants Performing the Behaviour had decreased to 39.1%. The remainder of the control group participants were categorised into either the Contemplation stage (43.5%) or the Pre-Contemplation stage (17.4%).

TABLE 1: Percent Of Participants At Each Stage Across Time



	PRETEST			POSTTEST		
	Pre Con	Con	Performing the Behaviour	Pre Con	Con	Performing the Behaviour
Treatment	0.0	67.9	32.1	0.0	7.1	92.9
Control	15.4	30.8	53.8	17.4	43.5	39.1

NOTE: Pre Con = Precontemplation Stage
Con = Contemplation Stage

Further analysis of the data in Table 1 was undertaken using the Friedman 2-Way ANOVA to compare changes in the control group to changes in the treatment group (cf. Cardinal & Sachs, 1995). The Friedman 2-Way ANOVA indicated no change from pretest to posttest for the control group participants ($\chi^2 = 1.00$, ns), but a significant behaviour shift was confirmed for the treatment group participants ($\chi^2 = 13.24$, $p < .001$). This shift consisted of a decrease in the number of players in the Contemplation category and an increase in the number of players in the Performing the Behaviour category.

Change in Self-Assessed Mental Strengths by Group. Responses to the Self-Assessed Mental Strengths Questionnaire were classified as reflecting either a strength or a weakness. A strength was defined as a ranking of 1 or 2 for a particular mental skill, while a weakness was defined as a ranking of 5 or 6. Separate three-way frequency analyses (group x time x strength/weakness) were employed to determine if participation in the mental skills training programme had a beneficial effect on self-reported ability in any of the six mental skill areas. It was expected that the analyses would show a significant increase from pretest to posttest in the percentage of treatment group participants considering each skill a strength and/or a significant decrease in the percentage of treatment group participants considering each skill a weakness. No change was expected in strength/weakness ranks for the control group.

None of the analyses conducted on these mental skill categories revealed a statistically significant

group by time by strength/weakness interaction. The percent of participants reporting each skill as a strength or as a weakness is shown in Table 2.

TABLE 2: Change In Self-Assessed Mental Strengths And Weaknesses By Group

	Pretest Strength	Posttest Strength	Pretest Weakness	Posttest Weakness
Control of Nerves and Tension (χ^2 = 2.79, p = .095)				
Treatment	48%	37%	16%	33%
Control	30%	47%	30%	21%
Concentration (χ^2 = 0.26, p = .613)				
Treatment	52%	33%	16%	22%
Control	57%	58%	13%	16%
Emotional Control (χ^2 = 0.03, p = .874)				
Treatment	20%	30%	40%	44%
Control	22%	26%	39%	42%
Use of Imagery (χ^2 = 0.59, p = .442)				
Treatment	32%	48%	32%	22%
Control	22%	16%	61%	47%
Self-Confidence (χ^2 = 0.01, p = .912)				
Treatment	20%	15%	44%	37%
Control	39%	32%	26%	21%
Planning and Analysis (χ^2 = 2.16, p = .141)				

Treatment	28%	30%	52%	30%
Control	30%	21%	30%	53%

Perceived Competence and ACSI-28. Initial inspection of the Perceived Competence data and the ACSI-28 data suggested large differences between the treatment group and the control group for the data gathered on the pretest. Multivariate Analysis of Variance confirmed the observed differences, $F(19,22) = 2.23$, $p = .036$. Comparison of univariate means indicated that the control group participants rated themselves significantly higher than the treatment group participants on these measures during the pretesting. To compensate for these initial differences, a percent-of-baseline approach was utilised in analysing the data from the ACSI-28 and the Perceived Competence Questionnaire (cf. Abueg, Colletti & Kopel, 1985; Grove, Wilkinson & Dawson, 1993). Percent-of-baseline scores were calculated by dividing the posttest scores by the pretest scores and then multiplying by 100. This approach allowed for a comparison of change over time in the two groups, independent of the pretest differences.

The hypothesis that participation in the mental skills training programme would have a beneficial effect on self-perceived competence in dealing with specific psychological challenges in baseball was tested using a series of one-way ANOVAs. The ANOVAs compared the percent-of-baseline scores for each item across the treatment and the control groups.

Results from the ANOVAs revealed few significant differences between the two groups (Table 3). The item, "Set clear performance goals for this year" approached

statistical significance, $F(1,50) = 2.89$, $p = .09$. This non-significant effect indicated a trend toward greater improvement by the treatment group as compared to the control group (Treatment Mean = 127.03%; Control Mean = 108.61%). The item "Maintain intense concentration for an entire game" showed a significant difference between the groups, $F(1,50) = 6.04$, $p = .02$, but examination of the means for this item revealed a relationship in the direction opposite to the hypothesis.

TABLE 3: Percent-of-Baseline Comparison Of Control And Treatment Groups On The 12 Perceived Competence Items

Perceived Competence Results	**Control Mean (SD)**	**Treatment Mean (SD)**	**F** (1,52)	**p**
Maintain intense concentration for an entire game	103.34 (16.11)	94.26 (14.86)	6.0	.02
Quickly re-focus attention after distractions	110.54 (28.87)	109.82 (25.91)	< 1	.76
Ignore negative comments from opponents & spectators	102.87 (20.38)	95.30 (21.63)	2.1	.16
Effectively deal with bad calls by the umpire	114.57 (40.37)	111.60 (29.32)	< 1	.70
Vividly relive past performances in my mind	116.33 (40.16)	115.08 (35.17)	< 1	.82
Clearly picture special plays in my mind	112.93 (23.92)	117.20 (38.71)	< 1	.68
Maintain confidence during a slump	108.10 (22.37)	115.10 (42.04)	< 1	.58
Block negative thoughts when they occur	111.00 (21.30)	114.72 (44.84)	< 1	.94

Set clear performance goals for this year	108.61 (33.21)	127.03 (42.16)	2.9	.09
Analyse my performances and develop plans for improving	106.8 (32.69)	114.91 (35.36)	1.2	.27
Recognise signs of tension and nervousness in myself	105.65 (21.43)	105.14 (28.27)	< 1	.97
Lower my tension when too nervous	122.30 (59.65)	152.19 (101.3)	1.4	.25

The percent-of-baseline approach also was used to test the hypothesis that participation in the mental skills training programme would have a beneficial effect on psychological skills as measured by the seven subscales of the ACSI-28. One-way Analyses of Variance were employed to compare percent-of-baseline scores between the treatment and the control group on each of the seven ACSI-28 subscales.

No significant differences were found between the groups on any of the seven subscales. Group means and ANOVA results are presented in Table 4.

TABLE 4: Percent-of-Baseline Comparison Of Control And Treatment Groups On The 7 Subscales Of The ACSI-28

ACSI-28 Subscale Results	**Control Mean (SD)**	**Treatment Mean (SD)**	**F** (1,42)	**p**
Coping With Adversity	101.30 (31.25)	93.86 (29.27)	1.07	.31
Coachability	103.95 (25.83)	106.84 (18.37)	< 1	.76
Concentration	100.03 (16.36)	100.90 (21.71)	< 1	.99

Confidence and Achievement Motivation	97.74 (15.34)	96.35 (17.88)	< 1	.70
Goal Setting and Mental Preparation	87.08 (36.45)	91.32 (39.00)	< 1	.72
Peaking under Pressure	120.41 (31.69)	106.69 (25.85)	3.05	.09
Freedom from Worry	113.36 (46.04)	115.33 (37.18)	< 1	.98

Within-Group Analyses

Personality Correlates of Compliance. Pearson correlations and effect size analyses were used to test the hypothesis that the personality constructs of Conscientiousness, High Personal Standards, and Concern over Mistakes would predict the extent of compliance with the mental skills training programme. Cohen's *d* was used as the index of effect size (Cohen, 1988, 1992). The results of these analyses, presented in Table 5, indicated a strong relationship between Conscientiousness and compliance to the mental skills training programme (*r* = .48, *d* = 1.09). Furthermore, a moderate relationship between existed between High Personal Standards and compliance (*r* = .29, *d* = .60). Concern over Mistakes and compliance were only minimally related (*r* = .10, *d* = .20).

TABLE 5: Personality And MSTP Compliance: Bivariate Correlations and Effect Sizes

	MSTP Compliance	COM	HPS
Concern Over Mistakes (COM)	.098 P= .68 d= .20		
High Personal Standards (HPS)	.289 P= .22 d= .60	.225 P= .34 d= .46	
Conscientiousness (NEO)	.478 P= .03 d= 1.09	-.012 P= .96 d= -.02	.378 P= .10 d= .82

Note: Cohen (1988, 1992) suggests that d's of .20, .50, and .80 represent small, moderate and large effect sizes respectively

Following the correlation analysis, the three personality factors (Conscientiousness, Concern Over Mistakes, and High Personal Standards) were used as potential predictors in a stepwise regression with compliance as the criterion. The results of this analysis (Table 6) indicated that Conscientiousness was the single best predictor of compliance to the mental skills training programme (R = .48, adjusted R^2 = .19, p = .03). Neither High Personal Standards nor Concern Over Mistakes made a significant contribution to the prediction of compliance when evaluated concurrently with Conscientiousness.

TABLE 6: Personality And MSTP Compliance: Stepwise Regression Results

Variable	Regression Coefficient	Beta Weight	Multiple R	Adjusted R^2
NEOCON	.649	.281	.478	.186

Constant -10.339

Relationship of Compliance to Changes in Perceived Competence. Correlational techniques were used to test the hypothesis that compliance would be related to changes in perceived competence to deal with specific psychological challenges in baseball. Change scores were calculated by subtracting pretest scores from posttest scores. Pearson correlations were then used to examine the relationship between compliance and the change scores from the Perceived Competence Questionnaire.

Levels of compliance to the mental skills training programme did not significantly predict changes in perceived competence in coping with any of the specific psychological challenges in baseball. Moderate effect sizes ($d > .50$) were evident for several items (Table 6), but the direction of those influences was inconsistent. For example, those participants who complied most showed a tendency to report greater improvement in "ability to maintain intense concentration", "vividly relive past performance in my mind", and "ability to analyse performances and develop plans for improving them". On the other hand, the more compliant players also had a tendency to report decreases in their ability to "quickly refocus attention after a distraction".

TABLE 6: Relationships Between Compliance And Change In Perceived Competence: Correlations And Effect Sizes

Correlations between Compliance and Perceived Competence	**r**	**p**	**d**

Maintain intense concentration for an entire game	.27	.17	.56
Quickly re-focus my attention after a distraction	-.25	.20	-.56
Ignore negative comments from opponents or spectators	-.21	.27	-.43
Effectively deal with bad calls by the umpire	-.01	.97	-.02
Vividly relive performances in my mind	.27	.16	.56
Clearly picture special plays in my mind	-.08	.68	-.16
Maintain confidence during a slump	-.18	.36	-.37
Block negative thoughts when they occur	.10	.61	.20
Set clear performance goals for this year	-.15	.43	-.30
Analyse performances and develop plans for improving them	.25	.20	.52
Recognise signs of nervousness and tension in myself	-.11	.58	-.22
Lower my tension when too nervous	-.13	.51	-.26

Compliance and Changes in ACSI-28 Ratings. The hypothesis that compliance to the mental skills training programme would relate to improvements on the seven ACSI-28 subscales was also tested using correlation analyses. Change scores were created for the ACSI-28 subscale scores in the same manner as Perceived Competence scores, and Pearson correlations were calculated between compliance scores and ACSI-28 change

scores. Levels of compliance did not significantly predict psychological skill changes as measured by any of the seven subscales of the 28-Item Athletic Coping Skills Inventory. Examination of effect sizes did, however, indicate a substantial positive relationship between compliance and the Goal Setting and Mental Preparation subscale (*r* = .38, *d* = .82; Table 7).

TABLE 7: Relationships Between Compliance And Change On Seven ACSI-28 Subscales: Correlations And Effect Sizes

Correlations between Compliance and ACSI-28 Subscales	*r*	*p*	*d*
Coping With Adversity	.15	.54	.30
Coachability	.07	.79	.14
Concentration	-.14	.56	-.28
Confidence and Achievement Motivation	.01	.96	.02
Goal Setting and Mental Preparation	.38	.10	.82
Peaking under Pressure	-.20	.41	-.41
Freedom from Worry	-.08	.73	-.16

Change in Coach Ratings of Player's Mental Skills. Repeated measures ANOVAs were used to test the hypothesis that the coaches would perceive improvements in their players' abilities in the six general mental skill areas as a result of participation in the mental skills training programme. Dependant measures in these analyses were the summed ratings in each mental skills category as provided by the three WABA coaches. Results indicated that the coaches perceived changes following

the intervention for the mental skill areas of concentration, $F(1,28) = 14.67$, $p = .01$, use of imagery, $F(1,28) = 18.92$, $p = .01$, self-confidence, $F(1,28) = 17.31$, $p = .01$, and planning and analysis, $F(1,28) = 13.40$, $p = .01$. Control of nerves and tension, $F(1,28) = 0.28$, ns, and emotional control, $F(1,28) = 2.02$, ns, were not perceived by the coaching staff to have changed significantly from pretest to posttest. Examination of pretest and posttest means, provided in Table 8, indicated that all of the significant differences were a result of perceived improvements following the mental skills training programme.

TABLE 8: Comparison Of Coach Ratings Over Time

Mental Skills Area	**Mean Pre (SD)**	**Mean Post (SD)**	**F** (1,28)	**p**
Control of Nerves/Tension	17.34 (2.45)	17.59 (3.20)	.28	.60
Concentration	17.07 (3.64)	18.59 (3.76)	14.76	.01
Emotional Control	18.21 (2.74)	18.90 (3.47)	2.02	.17
Use of Imagery	16.45 (2.59)	18.07 (3.03)	18.92	.01
Self-Confidence	16.14 (2.71)	18.83 (3.72)	17.31	.01
Planning & Analysis	16.00 (2.78)	17.48 (3.08)	13.40	.01

Social Validity Issues

Examination of the social validity questionnaire completed by the WABA coaching staff indicated overall support for the mental skills training programme. The

coaches felt very confident that the mental skills training programme would help improve the team's performance, and they expressed strong interest in learning more about mental skills training and sport psychology. While the coaching staff was very confident that they would continue to use mental skills training for their future teams, they all felt that their players only moderately enjoyed participating in the mental skills training programme. The individual results from each WABA coach are provided in Table 10, with an overall average score for each social validity question.

TABLE 10: Ratings For Social Validity Items By The WABA Coaching Staff

Social Validity Results	**Coach A**	**Coach B**	**Coach C**	**Mean**
How logical has this MSTP seemed to you?	8	10	8	**8.67**
How confident do you feel that this MSTP will help your team's performance?	9	9	9	**9.00**
How confident would you be in recommending this MSTP to other coaches?	8	9	9	**8.67**
How worthwhile do you feel the time spent on mental skills training was for your team?	6	8	9	**7.67**
How interested would you be in learning more about mental skills and sport psychology?	10	10	10	**10.0**

How much do you think your players have enjoyed participating in this MSTP?	6	7	7	**6.67**
How confident are you that you will continue to use mental skills training for your teams in the future?	9	10	10	**9.67**
Note: Ratings were made on a numerical scale ranging from 0 (Not at all) to 10 (Very much so)				

Inspection of open-ended responses revealed three common themes reported by the Western Australia Baseball Academy coaching staff:

1) The imagery skills and relaxation techniques were considered the most useful and important aspects of the mental skills training programme.

2) The coaches reported concern that the younger players in the group did not fully comprehend some aspects of the programme. One coach suggested conducting separate mental skills training programmes for the younger and the older players.

3) The coaches generally felt that the mental skills consultants could have had more on-field contact with the players, with less time spent teaching the skills in an on-field setting.

Other suggestions made in the open-ended questions included decreasing the amount of mental skill homework required by the players, minor changes in the order of

skill presentation during the weekly group sessions, and that a long-term follow-up examination should be conducted after the skills have been practiced and further developed.

CHAPTER 4: DISCUSSION

Summary of the Findings

The results of this study provide support for the effectiveness of the mental skills training programme delivered to members of the Western Australia Baseball Academy in terms of promoting the use of mental skills training within their overall baseball training programme. Less support was evident for the effectiveness of the mental skills training programme in improving self-perceived ability in specific mental skill areas. Personality correlates of compliance to mental skills training were also noted.

Adoption of Mental Skills Training. As hypothesised, the results of the evaluation indicated positive movement across behaviour change stages for the participants in the treatment group but no significant movement for the control group participants. Following the intervention, virtually all (93%) of the treatment group participants were using mental skills training as part of their overall baseball training programme. The remainder of the treatment participants were contemplating using mental skills training as part of their overall baseball training programme, but they were not regularly engaging in mental skills training. The individuals who were not actually engaging in mental skills training were also found to be among the least committed to the mental skills training programme in

terms of programme compliance.

This result indicates a very high success rate in promoting the use of mental skills training for baseball. However, Greenspan and Feltz (1988), Vealey (1994), and Weinberg and Comar (1994) all recommend conducting long-term follow-up analyses to determine if behaviour changes have been maintained beyond the conclusion of the mental skills training programme. As well, the WABA coaching staff indicated a desire for long-term testing on the Social Validity Questionnaire. Future studies should examine if the desired behaviours (using mental skills training as part of an overall training programme) are maintained beyond the conclusion of an intervention.

The movement of the treatment group from predominantly contemplation to regular use of mental skills training is interesting in light of the views expressed by Prochaska and colleagues (Prochaska & DiClemente, 1986; Prochaska & Marcus, 1994). They propose that interventions should be matched to the stage of change for individuals receiving the intervention. Interventions which are matched to the stage of the participants are typically more successful, have lower dropout rates, and encounter less resistance than do interventions which are not stage-matched (Cardinal, 1995a; Cardinal, 1995c; Prochaska & Marcus, 1994). It would seem that the six-week mental skills training programme delivered to the Western Australia Baseball Academy was well-suited for facilitating behavioural action from young players who were considering the use mental skills training as part of their overall training programme.

The results from the Stages of Change Questionnaire also suggest that the stages of change model is an

effective tool for evaluating mental skills training programmes. Several recent intervention evaluations (Gould, Petlichkoff, Hodge & Simons 1990; Brewer & Shillinglaw, 1992; Neumann, 1995) have measured mental skills training programme effectiveness by assessing knowledge, importance and/or planned use of psychological strategies among programme participants. While assessing planned/expected use of mental skills training is valuable in evaluating mental skills training programmes, it measures behavioural intention, not actual behaviour. Thus, unlike the stages of change model, there is no differentiation between participants who are intending to use mental skills training (Contemplation), those who are actively taking steps towards adopting mental skills training (Preparation), and those who are actually engaging in mental skills training (Action/Maintenance).

The flexibility of the stages of change model in differentiating between intention and behaviour allows mental skills consultants to match training programmes more directly with the needs and motivation of the athletes. Individuals who are in the preparation stage may require guidance in the form of prompting the use of mental skills and reinforcement of those behaviours, while contemplators may benefit more from learning skills and techniques, and being educated about the benefits of mental skills training. Furthermore, individuals in the action stage might be best served by receiving occasional prompting to use mental skills, and the incorporation of advanced skills and techniques into their mental training routines. Thus, the identification of an athlete's stage of behaviour change may be useful to mental skills consultants not only in terms of targeting interventions, but also in terms of

assessing their impact.

Changes In Mental Skill Ability. The evidence for improvements in specific psychological skills was less convincing than the evidence for adoption of mental skills training within the overall training programme. No significant differences in improvement between the treatment group and the control group were noted for any of the ACSI-28 subscales. Furthermore, the only item on the Perceived Competence Questionnaire for which scores differed significantly between the groups was "Ability to Maintain Intense Concentration", but this difference resulted from improvements by the control group and decrements by the treatment group. It is unknown why the treatment group showed the decrease, although it is possible that the wording of the question may have been vague. The concentration component of the mental skills training programme discussed the concept of "energy conservation", which involved temporarily reducing one's level of concentration between plays or innings, then refocussing attention in sequential steps. Future administrations of the Perceived Competence Questionnaire should perhaps consider altering the phrasing of that concentration item to emphasise intensity of focus during live play.

Results of the Self-Assessed Mental Strengths Questionnaire, from which the Perceived Competence items were developed, did not show significant effects either. No significant shifts of perceived strength were noted for any of the six mental skill areas examined. This result implies that following the intervention, treatment group subjects generally did not feel that mental skills which were initially perceived as a weakness had been significantly improved.

These results may be truly reflective of the impact of the mental skills training programme. More specifically, it is possible that the mental skills training programme simply was not powerful enough to produce improvements in ability, and the limited impact could have been due, in part, to a mismatch between group needs and programme structure. Although a needs assessment was incorporated into the mental skills training programme as recommended by various investigators (Boutcher & Rotella, 1987; Gordon, 1990; Prapavessis, et al., 1990; Seabourne et al., 1985), the programme may have adhered too closely to a predetermined structure. This structure was based on a sound knowledge of psychological demands in baseball and the needs of baseball players in previous WABA programmes, but it may not have focussed enough attention on the unique needs of these players and impact significantly on the their psychological abilities.

The lack of significant changes could also be due, in part, to the relatively brief time period between the intervention and the posttesting. It is believed that mental skills, much like physical skills, must be practiced regularly over an extended period of time before changes become noticeable (Weinberg & Williams, 1993), and 6 weeks may not have been a sufficient amount of time. A long-term follow-up examination of the treatment group participants could be conducted to examine this possibility.

Other factors may have had an impact on the results of this study as well. The group differences during the pretesting, although statistically controlled using the percent of baseline approach, may offer alternative possibilities as to why there were so few significant

effects on these measures. For example, it is possible that these initial differences existed because the treatment and control groups differed in terms of how critically they examined their own abilities. As part of their involvement in a talent development programme, WABA players were subjected to regular assessment of their abilities and specialised training designed to improve their weaknesses. This analytical environment could make shortcomings more salient than positive attributes. Competitive experiences could have had a similar effect. The majority of the treatment group participants had competed in national or international competition, while only 20% of the control group had experienced competition at that level. Higher levels of competition might have placed greater psychological demands on the WABA players, which could have been reflected in lower self-ratings on the Perceived Competence Questionnaire and the ACSI-28.

A phenomenon known as the Big-Fish-Little-Pond effect also deserves consideration. This phenomenon occurs because one's self-concept is influenced by comparisons to the ability of significant others (Marsh, 1987, 1993). Individuals who are comparing their own ability to people of high ability tend to underestimate their personal abilities. Conversely, individuals whose comparison group is less able will tend to overestimate their abilities. This effect has been noted in both academic settings (Marsh, 1987) and in sport/physical-activity (Marsh, 1993).

Because the treatment group participants had moved from local baseball clubs to an elite development programme, their self-perceptions could have been influenced by the big-fish-little-pond effect. More specifically, the players might have had a relatively

high level of self-perceived psychological skill at the beginning of the WABA programme because they were using their club teammates as a basis for estimating their own abilities. After working within the WABA programme, however, the players might have adopted different comparison standards for themselves and their abilities. If the other WABA players were used as a basis for comparison, the increased ability of the comparison group could have led to a decrease in perceived ability in a number of areas.

Social desirability effects could also have contributed to the inability to detect movement on the ACSI-28 from pretest to posttest. Smith and colleagues (1995) noted significant correlations between the Marlowe-Crowne Social Desirability Scale and each of the seven ASCI-28 subscales, which indicates that participants may tend to report themselves favourably on this questionnaire. For example, it seems unlikely that participants would report that they "almost never feel confident that I will play well". Inspection of the data in this study suggested that such biases may have occurred. The average pretest and posttest scores from five of the seven ACSI-28 subscales were in the upper third of the scale range ($\underline{M} > 8$). As each subscale had a maximum possible score of 12, the high pretest scores caused a ceiling effect, minimising the room for improvements following the mental skills training programme. Using the "Coachability" subscale as an example, the average pretest score of 10.22 limited the participants to 1.78 scale units of improvement. Researchers should consider revisions to the ACSI-28 to limit its social desirability and minimise these sorts of ceiling effects in future studies.

Coaches Perceptions of Improvements. Although the self-report data from the players revealed few positive significant changes in mental skill abilities, the coaching staff did perceive improvements as a function of the mental skills training programme. Specifically, the coaches rated the players' concentration skills, use of imagery, self-confidence, and planning/analysis abilities as significantly improved following the intervention.

Several explanations can be offered for the discrepancies between player self-reports and the coaching staff's perception of player abilities. First, the coaching staff may have selectively attended to instances of improvement in order to justify their inclusion of mental skills training in the WABA programme. A considerable amount of WABA training time was allocated to mental skills training, and the coaches therefore may have been inclined to exaggerate its strengths and/or minimise its weaknesses. This sort of cognitive bias is a central component of attitude formation according to dissonance theory (Festinger, 1964; West & Wicklund, 1980).

A second possibility is that the WABA coaching staff were not affected by the shift in self-comparison groups. While the group to which the WABA players compared their abilities may have changed from pretest (club teammates) to posttest (WABA teammates), the WABA coaches might have consistently compared the abilities of the players to the abilities of other elite players. The use of a consistent comparison group could have resulted in a more sensitive assessment of improvements in ability.

Mental Skills Training Programme Compliance.

Conscientiousness was shown to be a good predictor of compliance with the mental skills training programme. This result is consistent with the earlier findings of Bull (1991), who observed that self-motivation predicted both adherence frequency and adherence duration. Although self-motivation (Dishman & Ickes, 1981) has not been empirically correlated with NEO-PI Conscientiousness, there appears to be a distinct overlap between the two measures. This overlap may be particularly strong for the 'self-discipline' facet of Conscientiousness. Future research could examine the possible links between these two constructs as well as additional situational and dispositional correlates of compliance (cf. Bull, 1991; Hardy & Jones, 1994).

Relationship of Compliance to Changes in Mental Skill Abilities. Compliance to the mental skills training programme was a strong predictor of improvement in the Goal-Setting and Mental Preparation subscale of the ACSI-28. In addition, compliance was a moderate predictor of ability to Maintain Intense Concentration, ability to Vividly Relive Past Performances, and Ability to Analyse Performances and Develop Plans for Improvement. No other Perceived Competence items or ACSI-28 subscales improved as a function of compliance to the mental skills training programme. Oddly, the Perceived Competence Questionnaire item "Ability to Quickly Refocus After Distractions" was negatively correlated with compliance, indicating that those who complied to a lesser extent showed greater improvement in this area. Although the lack of more significant improvements was unexpected, it is possible that the hypothesised changes in perceived competence and coping skills would require more time and practice to manifest

themselves. Follow-up testing could provide additional information about the effects of long-term adherence on psychological skills development.

Correlational analysis of compliance and the coaching staffs perceptions of changes in the players' mental skill ability revealed unexpected results. The coaches perceptions of the players for the items "Concentration", "Control of Nerves and Tension", "Emotional Control" and "Planning and Analysis" showed a moderate decline as compliance to the mental skills training programme increased. It is unknown why compliance seemed to have a negative impact in these areas. Future studies should explore the impact of compliance on mental skill ability, to determine if this phenomenon is apparent in other mental skills training programmes.

Implications for Baseball Players and Coaches

Mental skills training has the potential to be very beneficial for baseball players (Dorfman & Kuehl, 1989; Ravizza & Hanson, 1995). Results from this study indicate that participation in a comprehensive mental skills training programme is an effective tool for prompting baseball players to use mental skills training as part of an overall baseball training programme. In addition, the lack of spontaneous change in the use of mental skills training by the control group suggests that baseball players of this age are not likely to independently begin using mental skills training as part of their overall baseball training.

Baseball players undertaking mental skills training as part of their overall baseball training programme should not expect to immediately notice great improvements in their mental skill capabilities or

ability to cope with specific psychological challenges. Such improvements might be noticeable by trained and experienced baseball coaches, however. As with any new skills, physical or otherwise, the skills must be practiced regularly for a period of time before improvements will be noticeable.

This study also found that baseball players who scored high on NEO-Conscientiousness tend to comply with the demands of a mental skills training programme to a greater degree than do baseball players who do not score as high on this measure. For this reason, coaches and mental skills consultants should make special efforts to reinforce the practice of mental skills by those baseball players who tend to display less conscientiousness.

Recommendations for Future Research

The benefits of a mental skills training programme do not come as a result of mere participation in the programme, but rather they come as a result of ongoing mental skills training by the athlete. For this reason, it is important that evaluations of mental skills training programmes assess whether or not the participants in the intervention actually engage in mental skills training both during and after a structured mental skills training programme. If participants do not regularly engage in mental skills training following the intervention, then the value and effectiveness of the mental skills training programme is certainly questionable. To further determine the validity of using the transtheoretical model to gauge participants' motivation to use mental skills training, future evaluations should employ measures of behaviour change similar to that used in this evaluation.

As well, future studies should examine the reliability and validity of the ACSI-28 with young samples. The results from the ASCI-28 in this study are quite inconsistent with results of other baseball studies (e.g., Smith & Christensen, 1995; Smith, Schutz, Smoll & Ptacek, 1995) which used the same measure. As well, researchers should attempt to restructure the ACSI-28 in an effort to minimise the social desirability aspect.

A shortcoming of this evaluation was that it did not examine changes in game performance as a result of the mental skills training programme. While the assessment of performance was considered and would have strengthened the evaluation, practical constraints prohibited the researchers from doing so. More specifically, the WABA Elite Development Programme is conducted during the baseball off-season and consists primarily of skill development work in specialised training groups. Very few competitive games are played, except for loosely structure scrimmages. It was therefore not possible to collect game performance data. Future evaluations of mental skills training programmes with this group should consider these sorts of practical difficulties and attempt to incorporate performance-based measures into the evaluations.

Conclusions and Summary

Overall, the mental skills training programme delivered to the participants of the Western Australia Baseball Academy appears to have been effective in promoting the use of mental skills training as part of an overall baseball training programme. The baseball players receiving the mental skills training programme were rated by the coaching staff as significantly

improved in four mental skill areas, although the players' own self-ratings did not reveal similar perceptions of improvement.

Responses to social validity questions by the Western Australia Baseball Academy coaching staff indicated that the mental skills training programme was very well received and perceived as being beneficial to the performance of the baseball players. Suggestions and comments from the WABA coaching staff should be considered in order to improve this particular mental skills training programme. Perhaps most noteworthy among these is the suggestion that on-field contact between the players and the mental skills consultants should be emphasised to a greater degree, as opposed to classroom style sessions and homework exercises.

Finally, the evaluation of the mental skills training programme allowed the researchers to explore issues related to compliance with mental skills training programmes. It was found that the personality characteristic of compliance, as measured by the NEO Personality Inventory, was strongly related to self-monitored compliance with the demands of the mental skills training programme. The determinants and consequences of compliance within sport-related mental skills training programmes would be an interesting direction for future research.

References

Abueg, F.R., Colletti, G. & Kopel, S.A. (1985). A study of reactivity. The effects of increased relevance and saliency of self-monitored smoking through enhanced carbon monoxide feedback. Cognitive Therapy and Research, 9, 321-333.

Adair, R.K. (1990). The physics of baseball. New York, NY: Harper & Row.

Alston, W. & Weiskopf, D. (1972). The baseball handbook: Strategies and techniques for winning. Boston, MA: Allyn and Bacon.

Andre, J.C. & Means, J.R. (1986). Rate of imagery in mental practice: An experimental investigation. Journal of Sport Psychology, 8, 124-128.

Anshel, M.H., Gregory, W.L. & Kaczmarek, M. (1990). The effectiveness of a stress training programme in coping with criticism in sport: A test of the COPE model. Journal of Sport Behavior, 13, 194-217.

Australian Institute of Sport (n.d.). Centering. Unpublished manuscript: Sport Psychology Unit, Australian Institute of Sport, Canberra.

Bakker, F.C. & Kayser, C.S. (1994). Effect of a self-help mental training programme. International Journal of Sport Psychology, 25, 158-175.

Baseball Canada (1986). Coaching advanced baseball. Champaign, IL: Human Kinetics.

Blair, A., Hall, H. & Leyshon, G. (1993). Imagery effects on the performance of skilled and novice soccer player. Journal of Sports Sciences, 11, 95-101.

Boggs, W. & Brisson, W. (1990). The techniques of modern hitting. New York, NY: Pedigree.

Bond, J. (n.d.). Arousal control training. Unpublished manuscript: Sport Psychology Unit, Australian Institute of Sport, Canberra.

Boutcher, S.H. & Crews, D.J. (1987). The effect of a pre-shot attentional routine on a well-learned skill. International Journal of Sport Psychology, 18, 30-39.

Boutcher, S.H. & Rotella, R.J. (1987). A psychological skills educational program for closed-skill performance enhancement. The Sport Psychologist, 1, 127-135.

Brewer, B.W. & Shillinglaw, R. (1992). Evaluation of a psychological skills training workshop for male intercollegiate lacrosse players. The Sport Psychologist, 6, 139-147.

Bryan, A.J. (1987). Single-subject designs for evaluation of sport psychology interventions. The Sport Psychologist, 1, 283-292.

Bull, S.J. (1991). Personal and situational influences on adherence to mental skills training. Journal of Sport and Exercise Psychology, 13, 121-132.

Bunker, L., Williams, J.M. & Zinsser, N. (1993). Cognitive techniques for improving performance and building confidence. In J.M. Williams (Ed.), Applied Sport Psychology: Personal Growth to Peak Performance (2nd Ed.; pp. 225-242). Mountain View, CA: Mayfield.

Burton, D. (1989). Winning isn't everything: Examining the impact of performance goals on collegiate swimmers' cognition and performance. The Sport Psychologist, 3, 105-132.

Cardinal, B.J. (1995a). Behavioral and biometric comparisons of the preparation, action, and maintenance stages of exercise. Wellness Perspectives: Research, Theory, and Practice, 11, 36-43.

Cardinal, B.J. (1995b). The stages of exercise scale and stages of exercise behavior in female adults. Journal of Sports Medicine and Physical Fitness, 35, 87-92.

Cardinal, B.J. (1995c). The transtheoretical model of behavior change as applied to physical activity and exercise: A review. Journal of Physical Education and Sport Sciences, 8, 32-45.

Cardinal, B.J. & Sachs, M.L. (1995). Prospective analysis of stage-of-exercise movement following mail-delivered, self-instructional exercise packets. American Journal of Health Promotion, 9, 430-432.

Cardinal, B.J. & Sachs, M.L. (1996). Effects of mail-mediated, stage-matched exercise behavior change strategies on female adults' leisure-time exercise behavior. Journal of Sports Medicine and Physical Fitness, 36, 100-107.

Chouinard, N. (1982). Goal-setting: A motivational strategy. In T. Orlick, J.T. Partington & J.H. Salmela (Eds.), Mental Training for Coaches and Athletes (2nd ed.). Ottawa, ON: Coaching Association of Canada.

Cohen, J. (1988). Set correlation and contingency tables. Applied Psychological Measurement, 12, 425-434.

Cohen, J. (1992). A power primer. Psychological Bulletin, 112, 155-159.

Cox, R.H. (1990). Sport psychology: Concepts and applications (2nd ed.). Dubuque, IA: Wm. C. Brown.

Daw, J. & Burton, D. (1994). Evaluation of a comprehensive psychological skills training program for collegiate tennis players. The Sport Psychologist, 8, 37-57.

Dishman, R.K. (1983). Identity crisis in North American sport psychology: Academics in professional issues. Journal of Sport Psychology, 5, 123-134.

Dishman, R.K. & Ickes, W.T. (1981). Self-motivation and adherence to therapeutic exercise. Journal of Behavioral Medicine, 4, 421-438.

Dorfman, H.A. & Kuehl, K. (1989). The mental game of baseball: A guide to peak performance. South Bend, IN: Diamond Communications.

Duncanson, S. (1986). Unity of knowledge and action: The thoughts of Wang Yang-ming. In S. Kleinman (Ed.), Mind and body: East meets west. Champaign, IL: Human Kinetics Publishers.

Fava, J.L., Velicer, W.F. & Prochaska, J.O. (1995). Applying the transtheoretical model to a representative sample of smokers. Addictive Behaviors, 20, 189-203.

Feltz, D.L. & Landers, D.M. (1983). The effects of mental practice on motor skill learning and performance: A meta-analysis. Journal of Sport Psychology, 5, 25-57.

Festinger, L. (1964). Conflict, decision, and dissonance. Stanford, CA: Stanford University.

Frost, R.O., Heimberg, R.G., Holt, C.S., Mattia, J.I., & Neubauer, A.L. (1993). A comparison of two measures of perfectionism. Personality & Individual Differences, 14, 119-126.

Frost, R.O. & Henderson, K.J. (1991). Perfectionism and reactions to athletic competition. Journal of Sport & Exercise Psychology, 13, 323-335.

Frost, R.O., Marten, P., Lahart, C. & Rosenblate, R. (1990). The dimensions of perfectionism. Cognitive Therapy & Research, 14, 449-468.

Gauron, E.F. (1984). Mental training for peak performance. Lansing, NY: Sport Science Associates.

Gayton, W.F. & Nickless, C.J. (1987). An investigation of the validity of the Trait and State Sport-Confidence Inventories in predicting marathon performance. Perceptual and Motor Skills, 65, 481-482.

Gordon, S. (1990). A mental skills training program for the Western Australia state cricket team. The Sport Psychologist, 4, 386-399.

Gorely, T. & Gordon, S. (1995). An examination of the transtheoretical model and exercise behavior in older adults. Journal of Sport & Exercise Psychology, 17, 312-324.

Gould, D. (1993). Goal setting for peak performance. In J.M. Williams (Ed.), Applied Sport Psychology: Personal Growth to Peak Performance (2nd Ed.; pp. 158-169). Mountain View, CA: Mayfield.

Gould, D., Petlichkoff, L., Hodge, K. & Simons, J. (1990). Evaluating the effectiveness of a psychological skills educational workshop. The Sport Psychologist, 4, 249-260.

Gould, D. & Udry, E. (1994). Psychological skills for enhancing performance: Arousal regulation strategies. Medicine and Science in Sports and Exercise, 26, 478-485.

Greenspan, M.J. & Feltz, D.L. (1989). Psychological interventions with athletes in competitive situations: A review. The Sport Psychologist, 3, 219-236.

Greer, H.S. & Engs, R. (1986). Use of progressive relaxation and hypnosis to increase tennis skill learning. Perceptual and Motor Skills, 63, 161-162.

Grove, J.R. (1985). Make training and competition a learning experience. Sports Coach, 8(4), 3-4.

Grove, J.R. (1988a). Mental training for baseball. Part 3: Developing concentration and emotional control. Baseball Australia, 4(2), 6-7.

Grove, J.R. (1988b). Mental training for baseball. Part 2: Controlling nervousness and tension. Baseball Australia, 4(1), 22-23.

Grove, J.R. (1988c). Mental training for baseball. Part 1: Planning the programme and identifying weaknesses. Baseball Australia, 3(4), 1-3.

Grove, J.R. (1989). Mental training for baseball. Part 4: Using imagery in training and games. Baseball Australia, 4(4), 12-23; 23.

Grove, J.R. (1991). Concentration training for infielders in baseball and softball. Sports Coach, 14(1), 27-30.

Grove, J.R. (1996). WA Baseball Academy mental skills training program. Perth, WA: Department of Human Movement, The University of Western Australia.

Grove, J.R. & Hanrahan, S.J. (1988). Perceptions of mental training needs by elite field hockey players and their coaches. The Sport Psychologist, 2, 222-230.

Grove, J.R., Wilkinson, A. & Dawson, B.T. (1993). Effects of exercise on selected correlates of smoking withdrawal. International Journal of Sport Psychology, 24, 217-236.

Hamilton, S.A. & Fremouw, W.J. (1985). Cognitive-behavioural training for college basketball free-throw performance. Cognitive Therapy and Research, 9, 479-483.

Hanin, Y. & Syrja, P. (1995). Performance affect in junior ice hockey players: An application of the individual zones of optimal functioning model. The Sport Psychologist, 9, 169-187.

Hanson, T. (1992). The mental aspects of hitting in baseball: A case study of Hank Aaron. Contemporary Thought on Performance Enhancement, 1, 49-70.

Hardy, L. & Jones, G. (1994). Current issues and future directions for performance-related research in sport psychology. Journal of Sport Sciences, 12, 61-92.

Harris, D.V. & Williams, J.M. (1993). Relaxation and energizing techniques for regulation of arousal. In J.M. Williams (Ed.), Applied Sport Psychology: Personal Growth to Peak Performance (2nd Ed.; pp. 185-199). Mountain View, CA: Mayfield.

Hewitt, P.L. & Flett, G.L. (1989). The Multidimensional Perfectionism Scale: Development and validation. Canadian Psychology, 30, 339.

Hewitt, P.L. & Flett, G.L. (1991). Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. Journal of Personality and Social Psychology, 60, 456-470.

Hewitt, P.L., Flett, G.L., Turnbull-Donovan, W. & Mikail, S.F. (1991). The Multidimensional Perfectionism Scale: Reliability, validity, and psychometric properties in psychiatric samples. Psychological Assessment: A Journal of Consulting and Clinical Psychology, 3, 464-468.

Heyman, S.R. (1987). Research and interventions in sport psychology: Issues encountered in working with an amateur boxer. The Sport Psychologist, 1, 208-223.

Hughes, S. (1990). Implementing psychological skills training program in high school athletics. Journal of Sport Behavior, 13, 15-22.

Jordan, P. (1988). Pitching: The keys to excellence. New York, NY: Sports Illustrated.

Kendall, G., Hrycaiko, D., Martin, L. & Kendall, T. (1990). The effects of an imagery rehearsal, relaxation, and self-talk package on basketball game performance. Journal of Sport & Exercise Psychology, 12, 157-166.

Kenney, K.C. (1986). Handbook of Mental Health Consultation. Rockville, MD: U.S. Department of Health and Human Services.

Kindall, J. (1988). Baseball: Play the winning way. New York, NY: Sports Illustrated.

Locke, E.A. & Latham, G.P. (1985). The application of goal setting to sports. Journal of Sport Psychology, 7, 205-222.

Marcus, B., & Simkin, L. (1993). The stages of exercise behavior. Journal of Sports Medicine and Physical Fitness, 33, 83-88

Marsh, H.W. (1987). The big-fish-little-pond effect on academic self-concept. Journal of Educational Psychology, 79, 280-295.

Marsh, H.W. (1993). Physical fitness self-concept: Relations of physical fitness to field and technical indicators for boys and girls aged 9-15. Journal of Sport & Exercise Psychology, 15, 184-206.

Martens, R. (1987). Coaches guide to sport psychology. Champaign, IL: Human Kinetics Publishers.

Martin, J.J. & Gill, D.L. (1991). The relationship among competitive orientation, sport-confidence, self-efficacy, anxiety, and performance. Journal of Sport & Exercise Psychology, 13, 149-159.

McCrae, R.R. & Costa, P.T., Jr. (1989). Rotation to maximize the construct validity of factors in the NEO Personality Inventory. Multivariate Behavioral Research, 24, 107-124.

Meyers, A.W. & Schleser, R. (1980). A cognitive behavioural intervention for improving basketball performance. Journal of Sport Psychology, 2, 69-73.

Millar, K. (1982). Confidence training programme. In T. Orlick, J.T. Partington & J.H. Salmela (Eds.),

Mental Training for Coaches and Athletes (2nd ed.). Ottawa, ON: Coaching Association of Canada.

Murphy, S.M. (1994). Imagery interventions in sport. Medicine and Science in Sports and Exercise, 26, 486-494.

Muten, E. (1991). Self-reports, spouse ratings, and psychophysiological assessment in a behavioral medicine program: An application of the five-factor model. Journal of Personality Assessment, 57, 449-464.

Nash, H., Solin, E. & Solin, L-G (1989). A guide for relaxation and inner mental training. Noarlunga, SA: Health Development Foundation.

National Coaching Certification Program. (1990). Coaching theory level 3. Gloucester, ON: Coaching Association of Canada.

Neumann, C.A. (1995). Design, implementation and evaluation of a mental skills training programme for equestrian athletes. Unpublished Master's Dissertation: The University of Western Australia.

Nideffer, R.M. (1985). Athlete's guide to mental training. Champaign, IL: Human Kinetics.

Nideffer, R.M. (1993). Concentration and attention control training. In J.M. Williams (Ed.), Applied Sport Psychology: Personal Growth to Peak Performance (2nd Ed.; pp. 243-261). Mountain View, CA: Mayfield.

Nideffer, R.M. & Sharpe, R.C. (1978). A.C.T.: Attention control training. New York, NY: Wideview.

Orlick, T. (1980). In pursuit of excellence. Ottawa, ON: Coaching Association of Canada.

Orlick, T. (1986). Psyching for sport: Mental training for athletes. Champaign, IL: Human Kinetics.

Orlick, T., Partington, J.T. & Salmela, J.H. (1983). Mental training for coaches and athletes (2nd ed.). Ottawa, ON: Coaching Association of Canada.

Oxendine, J.B. (1988). American Indian sports heritage. Champaign, IL: Human Kinetics Books.

Parker, J.D.A., Bagby, R.M. & Summerfeldt, L.J. (1993). Confirmatory factor analysis of the Revised NEO Personality Inventory. Personality and Individual Differences, 15, 463-466.

Perry, C. (1990). Psychological skills training program: Australian Baseball Team. Canberra, ACT: Australian Institute of Sport.

Prapavessis, H., Gordon, S. & Grove, J.R. (1990). Design and implementation of mental skills training programmes. Sports Coach, 13(4), 7-10.

Prapavessis, H., Grove, J.R., McNair, P.J. & Cable, N.T. (1992). Self-regulation training, state anxiety, and sport performance: A psychophysiological case study. The Sport Psychologist, 6, 213-229.

Prochaska, J.O. & DiClemente, C.C. (1986). Toward a comprehensive model of change. In W.R. Miller & N. Heather (Eds.), Treating addictive behaviors: Processes of change. New York, NY: Plenum.

Prochaska, J.O. & Marcus, B.H. (1994). The transtheoretical model: Applications to exercise. In R. Dishman (Ed.), Advances in Exercise Adherence. Champaign, IL: Human Kinetics.

Ravizza, K. & Hanson, T. (1995). Heads up baseball: playing the game one pitch at a time. Indianapolis, IN: Masters Press.

Richard, J. & Wheeler, C. (1991). Not too high, not too low: Stress management strategies for professional baseball players and their fans. Dubuque, IO: Kendall/Hunt.

Rodgers, W., Hall, C. & Buckolz, E. (1991). The effect of an imagery training program on imagery

ability, imagery use, and figure skating performance. Journal of Applied Sport Psychology, 3, 109-125.

Rushall, B.S. (1992). Mental skills training for sports. Spring Valley, CA: Sport Science Associates.

Russo, J., Landolphi, D. & Gershberg, H. (1985). Championship baseball techniques, fundamentals and drills. West Nyack, NY: Parker.

Savoy, C. (1993). A yearly mental training program for a college basketball player. The Sport Psychologist, 7, 173-190.

Schmid, A. & Peper, E. (1993). Training strategies for concentration. In J.M. Williams (Ed.), Applied Sport Psychology: Personal Growth to Peak Performance (2nd Ed.; pp. 262-273). Mountain View, CA: Mayfield.

Schouwenburg, H.C. & Lay, C.H. (1995). Trait procrastination and the big-five factors of personality. Personality and Individual Differences, 18, 481-490.

Seabourne, T.G., Weinberg, R.S., Jackson, A. & Suinn, R.M. (1985). Effect of individualized, nonindividualized, and package intervention strategies on karate performance. Journal of Sport Psychology, 7, 40-50.

Shambrook, C.S. & Bull, S.J. (1996). The use of a single-case research design to investigate the efficacy of imagery training. Journal of Applied Sport Psychology, 8, 27-43.

Shaw, B. (1972). Pitching: The basic fundamental and mechanics of successful pitching. New York, NY: Viking.

Smith, R.E. (1989). Applied sport psychology in an age of accountability. Journal of Applied Sport Psychology, 1, 166-180.

Smith, R.E. & Christensen, D.S. (1995). Psychological skills as predictors of performance and

survival in professional baseball. Journal of Sport & Exercise Psychology, 17, 399-415.

Smith, R.E., Schutz, R.W., Smoll, F.L. & Ptacek, J.T. (1995). Development and validation of a multidimensional measure of sport-specific psychological skills: The Athletic Coping Skills Inventory-28. Journal of Sport & Exercise Psychology, 17, 379-398.

Straub, W.F. (1989). The effect of three different methods of mental training on dart throwing performance. The Sport Psychologist, 3, 133-141.

Strean, W.B. & Roberts, G.C. (1992). Future directions in applied sport psychology research. The Sport Psychologist, 5, 55-65.

Tabachnick, B.G. & Fidell, L.S. (1989). Using multivariate statistics (2nd Ed.). New York, NY: Harper Collins.

Terry, P., Coakley, L. & Karageorghis, C. (1995). Effects of intervention upon precompetition state anxiety in elite junior tennis players: The relevance of the matching hypothesis. Perceptual and Motor Skills, 81, 287-296.

Unestahl, L-E. (1982). Better sport by IMT - Inner mental training. Orebro, Sweden: Veje.

Unestahl, L-E. (1983). Inner mental training: A systematical self-instructional program for self-hypnosis. Orebro, Sweden: Veje.

Vealey, R.S. (1986). Conceptualization of sport-confidence and competitive orientation: Preliminary investigation and instrument development. Journal of Sport Psychology, 8, 221-246.

Vealey, R.S. (1988). Future directions in psychological skills training. The Sport Psychologist, 2, 318-336.

Vealey, R.S. (1994). Current status and prominent issues in sport psychology interventions. Medicine and Science in Sports and Exercise, 26, 495-502.

Vealey R.S. & Walter, S.M. (1993). Imagery training for performance enhancement and personal development. In J.M. Williams (Ed.), Applied Sport Psychology: Personal Growth to Peak Performance (2nd Ed.; pp. 200-224). Mountain View, CA: Mayfield.

Weinberg, R.S. (1994). Goal setting and performance in sport and exercise settings: A synthesis and critique. Medicine and Science in Sports and Exercise, 26, 469-477.

Weinberg, R.S. & Comar, W. (1994). The effectiveness of psychological interventions in competitive sport. Sports Medicine, 18, 406-418.

Weinberg, R.S., Seabourne, T.G. & Jackson, A. (1981). Effects of visuo-motor behavior rehearsal, relaxation and imagery on karate performance. Journal of Sport Psychology, 3, 228-238.

Weinberg, R.S., Stitcher, T., & Richardson, P. (1994). Effects of a seasonal goal-setting program on lacrosse performance. The Sport Psychologist, 8, 166-175.

Weinberg, R.S. & Williams, J.M. (1993). Integrating and implementing a psychological skills training program. In J.M. Williams (Ed.), Applied Sport Psychology: Personal Growth to Peak Performance (2nd Ed.; pp. 274-298). Mountain View, CA: Mayfield.

West, S.G. & Wicklund, R.A. (1980). A primer of social psychological theories. Monterey, CA: Brooks/Cole.

Williams, J.M. & Straub, W.F. (1993). Sport psychology: Past, present, future. In J.M. Williams (Ed.), Applied sport psychology: Personal growth to peak

performance (2nd Ed.; pp. 1-10). Mountain View, CA: Mayfield.

Williams, T. & Underwood, J. (1986). The science of hitting. New York, NY: Simon & Schuster.

Wollman, N. (1986). Research on imagery and motor performance: Three methodological suggestions. Journal of Sport Psychology, 8, 135-138.

Appendix 1: Self Assessed Mental Skills Questionnaire

Listed below are some categories of mental skills which are important for baseball performance. Please read over each category and the examples, and then rank the skills from what you do best to what you do worst. Write the number 1 in the box beside the thing you do best, 2 in the box next to the thing you do second best, and continue in that manner until all of the categories have been assigned a different number between 1 (BEST) and 6 (WORST).

☐ **CATEGORY 1 - CONTROL OF NERVES AND TENSION**

For example:
I am able to sleep well the night before an important game
I am able to recognise signs of nervousness & tension in myself
I can voluntarily lower my tension when nervous

☐ **CATEGORY 2 - CONCENTRATION**

For example:
I am can get so absorbed in the game that everything else disappears
I am able to maintain intense concentration for an entire game
I am able to re-focus attention quickly after a distraction

☐ **CATEGORY 3 - EMOTIONAL CONTROL**

For example:
I am able to ignore comments by opponents or spectators
I am able to accept criticism from coaches or team mates
I am able to accept bad calls

☐ **CATEGORY 4 - USE OF IMAGERY**

For example:
I am able to vividly relive past performances in my mind
I am able to vividly imagine future performances in my mind
I am able to clearly rehearse special plays in my mind

☐ **CATEGORY 5 - SELF-CONFIDENCE**

For example:
I am able to handle slumps without losing confidence in myself
I am able to block out negative thoughts when they occur
I am able to encourage team mates who are competing for my position

☐ **CATEGORY 6 - PLANNING AND ANALYSIS**

For example:
I can clearly specify my performance goals for this year
I can clearly specify my performance goals for the next two weeks
I can analyse upcoming opponents and formulate a plan of action

Appendix 2: Perceived Competency Questionnaire

(Sample Questions)

Listed below are some situations that can occur in baseball. Read over the situations and decide whether or not you could do it. Then, rate how well you think you would be able to do it. Rate each situation from 0 to 10, with 0 being "Unable to do it at all", and 10 being "Perfectly able to do it".

1. Maintain intense concentration for an entire game.

Unable to do it — Perfectly able to do it
0 1 2 3 4 5 6 7 8 9 10

2. Ignore negative comments from opponents or spectators?

Unable to do it — Perfectly able to do it
0 1 2 3 4 5 6 7 8 9 10

3. Vividly relive past performance in my mind?

Unable to do it — Perfectly able to do it
0 1 2 3 4 5 6 7 8 9 10

4. Maintain confidence during a slump?

Unable to do it — Perfectly able to do it
0 1 2 3 4 5 6 7 8 9 10

5. Set clear performance goals for this year?

Unable to do it — Perfectly able to do it
0 1 2 3 4 5 6 7 8 9 10

6. Recognise signs of nervousness and tension in myself?

Unable to do it — Perfectly able to do it
0 1 2 3 4 5 6 7 8 9 10

7. Quickly refocus my attention after a distraction?

Unable to do it — Perfectly able to do it
0 1 2 3 4 5 6 7 8 9 10

8. Effectively deal with bad calls by the umpire?

Unable to do it — Perfectly able to do it
0 1 2 3 4 5 6 7 8 9 10

9. Clearly picture special plays in my head?

Unable to do it — Perfectly able to do it
0 1 2 3 4 5 6 7 8 9 10

10. Block negative thoughts when they occur?

Unable to do it Perfectly able to do it
0 1 2 3 4 5 6 7 8 9 10

11. Analyse my performances and develop plans for improving weaknesses?

Unable to do it Perfectly able to do it
0 1 2 3 4 5 6 7 8 9 10

12. Recognise signs of nervousness and tension in myself?

Unable to do it Perfectly able to do it
0 1 2 3 4 5 6 7 8 9 10

Appendix 3: Stages of Change Questionnaire

Mental Skills Training involves the development, regular practice, and use of psychological techniques to improve sport performance. It includes doing work each week in areas like **goal setting, relaxation, mental rehearsal,** and **self-confidence.**

Please answer TRUE or FALSE to each of the following questions about your use of Mental Skills Training as part of your overall baseball training program.

1) I currently do not use mental skills training as part of my overall baseball training program

TRUE / FALSE

2) I intend to begin using mental skills training as part of my overall baseball training program within the next 6 months

TRUE / FALSE

3) I currently use mental skills training as part of my overall baseball training program

TRUE / FALSE

4) I have used mental skills training as part of my overall baseball training program for the past six months

TRUE / FALSE

BE SURE YOU HAVE ANSWERED YES OR NO TO EACH OF THE QUESTIONS

Scoring Algorithm

If Question 1 = true and Question 2 = false, then = Precontemplation

If Question 1 = true and Question 2 = true, then = Contemplation

If Question 1 = false and Question 2 = false, then = Preparation

If Question 3 = true and Question 4 = false, then = Action

If Question 3 = true and Question 4 = true, then = Maintenance

Appendix 4: Sample Mental Skills Training Diary

1. There are three programs on side two of your tape. Listen to program #3 (mental rehearsal) five times, the program #4 (confidence - long version) five times, and then program #5 (confidence - short version) five times. One program per day is the usual method, but you can do more sessions than that if you wish.

2. Listen to the tape in an out-of-the-way location where you won't be disturbed. After each session, use the chart below to write down the date/time and any comments or problems.

Program 3 (Wk 3) Mental Rehearsal	Date Done	Time Done	Comments/Problems
Session #11			
Session #12			
Session #13			
Session #14			
Session #15			

Appendix 5: Social Validity Questionnaire

1. How logical has the MSTP seemed to you?

0---1---2---3---4---5---6---7---8---9---10
(Not at all) (Very much so)

2. How confident do you feel that this mental skills training programme will help your team's performance?

0---1---2---3---4---5---6---7---8---9---10
(Not at all) (Very much so)

3. How confident would you be in recommending this mental skills training programme to other coaches?

0---1---2---3---4---5---6---7---8---9---10
(Not at all) (Very much so)

4. How worthwhile do you feel that the time spent on mental skills training was for you team?

0---1---2---3---4---5---6---7---8---9---10
(Not at all) (Very much so)

5. How interested would you be in learning more about mental skills training and sport psychology?

0---1---2---3---4---5---6---7---8---9---10
(Not at all) (Very much so)

6. How much do you think your players have enjoyed participating in this mental skills training programme?

0---1---2---3---4---5---6---7---8---9---10
(Not at all) (Very much so)

7. How confident are you that you will continue to use mental skills training for your teams in the future?

0---1---2---3---4---5---6---7---8---9---10
(Not at all) (Very much so)

A) In your opinion, what were the most useful and important parts of this mental skills training programme?

B) Do you have and suggestions for improving this mental skills training programme, in terms of its content, and its delivery?

Appendix 6: Athletic Coping Skills Inventory (ASCI-28)

A number of statements that athletes have used to describe their performances are given below. Please read each statement carefully and then recall as accurately as possible how often you experience the same thing. There are no right or wrong answers.

Almost Never	Some-times	Often	Almost always	
0	1	2	3	I maintain emotional control no matter how bad things are going for me
0	1	2	3	Pressure situations are challenges I welcome
0	1	2	3	On a daily basis, I set very specific goals for myself that guide what I do
0	1	2	3	I handle unexpected situations in sport very well
0	1	2	3	While competing, I worry about making mistakes or failing to come through
0	1	2	3	I feel confident when I play well
0	1	2	3	If a manager criticises or yells at me, I correct the mistake without getting upset about it
0	1	2	3	When things are going badly, I tell myself to keep calm, and this works for me
0	1	2	3	The more pressure there is during a game, the more I enjoy it
0	1	2	3	I do lots of planning about how to reach my goals
0	1	2	3	When I am playing sports, I can focus my attention and block out distractions
0	1	2	3	I put a lot of pressure on myself by worrying how I will perform
0	1	2	3	I get the most out of my talents and skills
0	1	2	3	When a manager criticises me, I become upset rather than helped
0	1	2	3	When I feel myself getting too tense, I can quickly relax my body and calm myself
0	1	2	3	I tend to play better under pressure because I think more clearly
0	1	2	3	I set my own performance goals for each practice
0	1	2	3	It is easy for me to keep distracting thoughts from interfering with something I am watching or listening to
0	1	2	3	I think about what will happen if I mess up
0	1	2	3	When I fail to reach my goals, it makes me try even harder
0	1	2	3	I improve my skills by listening carefully to advice and instruction from managers
0	1	2	3	I remain positive and enthusiastic during competition, no matter how badly things are going
0	1	2	3	I make fewer mistakes when the pressure's on because I concentrate better
0	1	2	3	I have my own game plan worked out in my head long before the game begins
0	1	2	3	It is easy for me to direct my attention and focus on a single object or person
0	1	2	3	I worry quite a bit about what others think about my performance
0	1	2	3	I don't have to be pushed to practice or play hard; I give 100%
0	1	2	3	When manager tells me how to correct a mistake

				I've made, I take it personally and feel upset

Appendix 7: NEO-C Questionnaire

Please indicate the extent to which you agree or disagree with the following statements. Respond by circling the number that best represents how you feel. Give your honest opinion; there are no "right" or "wrong" answers.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	I keep my belongings neat and clean	1	2	3	4	5
2	I'm pretty good about pacing myself so as to get things done on time	1	2	3	4	5
3	I try to perform all the tasks assigned to me conscientiously	1	2	3	4	5
4	I have a clear set of goals and work toward them in an orderly fashion	1	2	3	4	5
5	I work hard to accomplish my goals	1	2	3	4	5
6	I am not a very methodical person	1	2	3	4	5
7	I pay my debts promptly and in full	1	2	3	4	5
8	I waste a lot of time before settling down to work	1	2	3	4	5
9	I try to do jobs carefully, so they won't have to be done again	1	2	3	4	5
10	Sometimes I'm not as dependable or reliable as I should be	1	2	3	4	5
11	I strive to achieve all that I can	1	2	3	4	5
12	When I make a commitment, I can always be counted on to follow through	1	2	3	4	5
13	I like to keep everything in its place so I know just where it is	1	2	3	4	5
14	I never seem to be able to get organised	1	2	3	4	5
15	I am a productive person who always gets the job done	1	2	3	4	5
16	I tend to be somewhat exacting and take great care in what I do	1	2	3	4	5
17	I strive for excellence in everything I do	1	2	3	4	5
18	I am easy-going and laid-back	1	2	3	4	5

Appendix 8: Modified MPS Questionnaire

		Strongly Disagree				Strongly Agree
1	If I fail at work or school, I am a failure as a person	1	2	3	4	5
2	If I do not set the highest standards for myself, I am likely to end up a second-rate person	1	2	3	4	5
3	I should be upset if I make a mistake	1	2	3	4	5
4	It is important to me that I be thoroughly competent in everything I do	1	2	3	4	5
5	If someone does a task at work or school better than me, then I feel like I failed the whole task	1	2	3	4	5
6	I set higher goals than most people	1	2	3	4	5
7	If I fail partly, it is as bad as being a complete failure	1	2	3	4	5
8	I hate being less than the best at things	1	2	3	4	5
9	I am good at focusing my efforts on attaining a goal	1	2	3	4	5
10	People will probably think less of me if I make a mistake	1	2	3	4	5
11	I have extremely high goals	1	2	3	4	5
12	If I do not do as well as other people, it means I am an inferior human being	1	2	3	4	5
13	Other people seem to accept lower standards from themselves than I do	1	2	3	4	5
14	If I do not do well all the time, people will not respect me	1	2	3	4	5
15	I expect higher performance in my daily tasks than most people	1	2	3	4	5
16	The fewer mistakes I make, the more people will like me	1	2	3	4	5

Appendix 9: Control Group Strength/Conditioning Program

Session	Focus of Session
1	Introduction to Weight Training principles
2	Muscular Endurance - Finding Weights
3	Muscular Endurance Session
4	Muscular Strength - Finding Weights
5	Muscular Strength Session
6	Muscular Power - Finding Weights
7	Muscular Power Session

Appendix 10: Player Goals Sheet

1. Long-Term Dream Goal:
   What is your long term dream goal with regard to baseball? What is possible in the future if you stretch all your limits?

2. This Year's Outcome Goal:
   Given your present level of physical skill, your potential for improvement, and your current motivation, what do you believe are challenging but achievable outcome goals for you **this year**? (examples: regular starter for A-grade team; make Perth Heat training squad; sign a professional contract; etc.)

3. Personal Performance Goals:
   a) Given your present level of physical skill, your potential for improvement, and your current motivation, what do you believe are challenging but achievable outcome goals for your **offensive game** this year (Be specific, using numbers whenever possible. What do you need to do in terms of offensive performance to achieve the outcome goal in #2 above?)

   b) Given your present level of physical skill,, your potential for improvement, and your current motivation, what do you believe are challenging but achievable outcome goals for your **defensive game** this year (Be specific, and use numbers whenever possible. What do you need to do in terms of defensive performance to achieve the outcome goals in #2 above?)

4. Mental Toughness Goals:
   Given your present level of physical skill,, your potential for improvement, and your current motivation, what do you believe are challenging but achievable outcome goals for your **mental game** this year (Be specific, and use numbers whenever possible. What do you need to do in terms of mental game to achieve the outcome goals in #2 and 3 above? Examples: Learn to control nerves/tension; improve concentration; etc.)

5. Daily Training Goals:
   a) Are you willing to establish a daily goal (either physical or mental) before each of your practice sessions this year?

   b) My personal goal for my next practice session is:

   c) In order to accomplish this goal, I will do the following:

   d) If I need help to work towards this goal, I will ask: