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Effect of self-monitoring strategies on motor skill performance

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EFFECT OF SELF-MONITORING STRATEGIES ON MOTOR SKILL PERFORMANCE

A thesis submitted in partial fulfilment of the requirements for the award of the degree

DOCTOR OF PHILOSOPHY

from

THE UNIVERSITY OF WOLLONGONG

by

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BA, DipEd, BAppSc (Human Movement), MA (PhysEd) San Diego State

HUMAN MOVEMENT SCIENCE DEPARTMENT

1991
To Mum and Dad

I love you
annus mirabilis
hoc erat in votis
laus Deo!
PREFACE

Heartiest thanks to Dr. Mark H. Anshel for his expert assistance on this project. I also extend my thanks to Anne Porter and Dr. Ken Russell for sharing their statistical proficiency.

Kim Draisma at the Centre for Adult Literacy, University of Wollongong, Julie Leigh, Janette Smart and Davis & Davis Publications have all contributed to the production of this manuscript.

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I certify that the following manuscript is entirely my work. It has not previously been submitted for a degree at any other university or institution.
ABSTRACT

If individuals wish to change or self-regulate their behaviour then it is necessary to self-monitor existing behaviours. Current self-monitoring theory embodies two principles which suggest that: 1. for difficult tasks, positive self-monitoring improves performance, while negative self-monitoring impairs performance, and 2. for easy tasks, positive self-monitoring impairs performance, while negative self-monitoring improves performance. However, the effect of implementing the various self-monitoring strategies as task complexity changes is unknown. The project consisted of a series of three studies that enlisted 42 university student subjects, 17 males and 25 females (M = 24.8 yrs.). The first study ascertained subjects' performance scores and perceptions of difficulty for five levels of a computer game task. This evaluation was undertaken to establish subject-validated 'difficult' and 'easy' tasks. Subjects perceived the easy task to be significantly easier than their performance scores indicated (p<.05). In Experiment 2, subjects performed 100 trials on either the difficult or easy computer game task using one of three allocated self-monitoring styles. These were: 1. positive self-monitoring (i.e., recording skill success); 2. negative self-monitoring (i.e., recording lack of skill success), and 3. a group in which did not monitor their performance. Before and after the 100 trials, subjects completed inventories to determine their perceptions of task difficulty, cognitive arousal, and expectancies for success. Subjects' attributions were measured after completing the 100 trials. Results indicated that performance scores for the positive self-monitoring group were not superior to negative self-monitors for the difficult task (p>.05). In the easy task condition negative self-monitors were superior to positive self-monitors. Corresponding to the superior performance negative affect decreased (p < .05), expectancies were increased (p < .001) and attributions became less external (p < .05), more internal (p < .01), stable (p < .01) and controllable (p < .01). Experiment 3 determined the effectiveness of implementing different self-monitoring strategies as the complexity of the task changed. Results indicated that it was possible to change: 1. from positively self-monitoring for the difficult task to negatively self-monitoring for the easy task (p< .001), and 2. from negatively self-
monitoring for the easy task to positively self-monitoring for the difficult task \((p < .05)\). If individuals' perceptions of task difficulty or their performance scores indicate that the criterion task is difficult, then they should employ a positive self-monitoring cognitive strategy. However, if individuals determine that the criterion task is easy, then a negative self-monitoring cognitive strategy should be employed. The sequencing of self-monitoring strategies under differing degrees of task difficulty should now lead to more precise models of self-monitoring in the self-regulation of behaviour, and to more effective proposals for promoting effective self-regulation, especially when performing sport skills of varying complexity.
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1.1 Literature Overview

Self-monitoring refers to a process whereby individuals systematically gather information about their behaviour (McFall & Hammen, 1971). The process of self-monitoring allows the individual to determine whether desired goals are being achieved. The individual does this by initially monitoring existing performance levels and then comparing those performances with desired performance goals (Kirschenbaum, 1987a, 1987b; Kirschenbaum & Wittrock, 1990). As a result of the feedback that the individual receives concerning goal achievement, through the self-monitoring process, behavioural patterns can be self-regulated in order to achieve the desired behavioural results. Self-monitoring provides essential information that will enable the self-regulation of behaviour to occur.

Self-monitoring is effectual as a behavioural change agent due to its reactive effect (Hayes & Cavior, 1977). That is, self-monitored behaviour will often change as a function of the initiation of a self-monitoring program. In previous research many behavioural treatments have included self-monitoring as an assessment device (e.g., Stuart & Davis, 1972). More recently self-monitoring has been used as an agent of behavioural change (Abrams & Wilson, 1979).

Behavioural changes resulting from self-monitoring are well documented across a variety of behaviours such as the prevention of addiction relapse (Marlatt & Gordon, 1985), increasing self-efficacy

Initial research findings concerning the way in which self-monitoring altered behaviour were equivocal (see reviews by Kazdin, 1974 and Nelson, 1977). For example, self-monitoring was shown to be reactive with a wide range of behaviours, yet the direction of the behavioural change produced by self-monitoring varied across studies (Abrams & Wilson, 1979). In some studies, the use of a self-monitoring strategy appeared to increase target behaviour (e.g., Horan, Baker, Hoffman and Shute, 1975), while in other studies self-monitoring facilitated a decrease in target behaviour (e.g., Wade, 1974).

Self-monitoring research appeared to exhibit some inconsistencies. However Sieck and McFall (1976), in their synopsis of the status of self-monitoring research concluded that:

> The question “Is self-monitoring reactive?” is too simplistic. The more meaningful question to ask is, “What effects occur, under what conditions, in what behaviours, with what subjects, as a function of what specific self-monitoring procedure?” (p.958)

Various researchers have followed Sieck and McFall's (1976) directive to define further the specific components of the self-monitoring process. Subsequently, certain principles of self-monitoring have been hypothesised, defined and validated. It is the primary aim of this study to contribute further to this body of knowledge.

Two types of self-monitoring strategies are well established in the self-regulatory literature: 1. positive self-monitoring, and 2. negative self-monitoring. An individual's ability to recognise and/or record positively valued behaviours or attributes, either overtly or covertly, is termed
positive self-monitoring. Conversely negative self-monitoring refers to the tracking of negative behaviours or characteristics that an individual desires to decrease or extinguish (Kirschenbaum & Wittrock, 1990; McFall & Hammen, 1971; Tomarken & Kirschenbaum, 1982).

Reactive behaviour change produced by the use of a self-monitoring strategy depends not only on the self-monitoring strategy used (i.e., either positive or negative self-monitoring), but also on the individual's mastery of the task which is being monitoring (Kirschenbaum & Karoly, 1977; Kirschenbaum, Ordman, Tomarken and Holtzbauer, 1982). Consequently, negative self-monitoring does not simply decrease undesirable behaviours, while positive self-monitoring increase desirable behaviours, as was first believed to be the case with self-monitoring programs (Maletzky, 1974). However, behaviour change has emerged as dependent on, not only the implemented self-monitoring strategy, but also the individual's perception of the degree of difficulty of the monitored task.

For example, negative self-monitoring of an easy task can increase the occurrence of the monitored behaviour. However if the task is difficult then negative self-monitoring can decrease task performance (e.g., Wade, 1974). Correspondingly, positive self-monitoring of an easy task can decrease behaviour, whereas positive self-monitoring of a difficult task can create performance improvements (e.g., Tomarken & Kirschenbaum, 1982). The effectiveness of a self-monitoring strategy is specific to the performance task situation.

The interaction between self-monitoring strategy and the degree of task difficulty is well-replicated in the self-monitoring literature (e.g., Kirschenbaum, Ordman, Tomarken and Holtzbauer, 1982; Johnston-O'Conner & Kirschenbaum, 1986). Current theory suggests two basic self-monitoring principles which relate to the degree of task mastery: 1. for difficult tasks, positive self-monitoring improves performance while negative self-monitoring can prove especially detrimental, and 2. for easy tasks, positive self-monitoring can cause behavioural dysfunctioning while negative self-monitoring will improve performance (Kirschenbaum, 1987a; Kirschenbaum & Wittrock, 1990).
While both principles of self-monitoring are firmly established, sport can provide occasions when the individual’s perception of the degree of task difficulty may be in flux. For example, athletes running up a rocky hill may perceive that they are engaged in a difficult task. However upon reaching the hill crest athletes are faced with running a long smooth downhill incline. At some stage of the descent athletes’ perceptions of the demands of this running task may change from difficult to relatively easy, and consequently, the self-monitoring literature suggests that the strategy being used would need to change in order to effectively meet the demands of the new task situation.

Research indicates that the use of a positive self-monitoring strategy when performing a difficult motor skill has proven effective for performance improvement. Therefore the self-monitoring runner may employ a positive self-monitoring strategy on the way up the hill in order to maintain performance. However, the continued use of positive self-monitoring on a well-mastered or easy motor skill (i.e., going downhill) may prove detrimental to performance (e.g., Tomarken & Kirschenbaum, 1982). At this time the self-monitoring literature would suggest that the athlete needs to change from using a positive self-monitoring strategy in a difficult situation (i.e., going uphill) to using a negative self-monitoring strategy for the easier situation (i.e., going downhill). The change in self-monitoring strategies would take place in order that the athlete could maintain optimal skill performance levels.

The literature clearly indicates that both positive and negative self-monitoring strategies have separately proven effective for enhancing performance when conjugated with the appropriate levels of task difficulty. Therefore the question remains, is it possible that an athlete could effectively change from using a positive self-monitoring strategy in a difficult task situation to using a negative self-monitoring in an easy situation? This is the nature of the challenge which this research attempts to investigate.

This study will attempt to validate subjects’ perceptions of task difficulty, as well as manipulate subjects’ self-monitoring strategies in
order to investigate task performance and emotional, attributional and expectancy responses. By studying subjects' responses to various self-monitoring strategies under differing degrees of task difficulty, it may be possible to further identify the elements that are most vital to successful self-monitoring and the nature of the interaction between these elements. More importantly, the study will investigate the sequencing of self-monitoring strategies under differing degrees of task difficulty. In turn, this should lead to more precise models of self-monitoring in the self-regulation of behaviour, and to more effective proposals for promoting effective self-regulation, especially in performing sport skills.

1.2 Review of Literature

1.2.1 What is Self-Regulation of Behaviour?

Self-regulation refers to the process by which individuals manage their goal-directed behaviour in the relative absence of immediate external constraints (Bandura, 1988; Carver & Scheier, 1981; Kanfer & Karoly, 1972; Kirschenbaum, 1987a, 1987b; Kirschenbaum & Wittrock, 1990; Mischel, 1973). For example, in order to achieve consistent success in sport, an athlete must spend considerable time and energy refining various sport performance parameters such as skill, power, and physical and mental capacities. Extensive effort is devoted to skill training, emotional and cognitive preparation, planning, establishing goals, and monitoring and evaluating overall performance (Kirschenbaum, 1985, 1987b). Because self-monitoring plays such a vital role in the self-regulation of behaviour, it is necessary to establish how self-monitoring impacts on the self-regulation process.

Many precompetition training behaviours are undertaken by the athlete as solitary pursuits, and a large percentage of the athlete's effort is expended without immediate feedback or gratification from others (Kirschenbaum, 1987b). The athlete's training for competition could be construed as an act of postponing certain short-term rewards, pleasure and also postponing reinforcement, in order to achieve long term goals. For example, athletes who pursue a strict
sport training program in order to achieve optimal performance levels must forego a degree of relaxation time and social activities (Kirschenbaum, 1987b; Highlen & Bennett, 1983). Events that are viewed by the athlete as pleasurable, rewarding, or reinforcing are postponed for substantially more reinforcing events in the future.

During self-regulation individuals will respond in a manner not normally displayed. Kuhl (1984) refers to these 'unusual' behaviours as non-dominant responses. The newly developed behaviour will assist the individual in delaying immediate gratification or, similarly, aid in tolerating unpleasant events in order to achieve a desired long-term goal (Kanfer & Phillips, 1970; Karoly & Kanfer, 1982). An athletic competition often tests the effectiveness of the athlete's skill in managing thoughts and behaviours in order to delay immediate gratification. In this context, athletic training is an example of how individuals can, by altering existing behavioural patterns, self-regulate their behaviour (Kirschenbaum, 1985, 1987b).

1.2.2 The Five-Stage Model of Self-Regulation

The process of self-regulation involves complex interactions between personal cognitions, physiology, behaviours, and the environment (Kirschenbaum, 1985, 1987b; Kirschenbaum & Wittrock, 1990). For example, consider the complexity of athletic participation, that involves: skill training; reading and thinking about the sport; watching and listening to the sport; preparing emotionally and cognitively for competition; establishing, working toward, and re-evaluating performance goals; attending to task components during competition, and so on. In order to 'map-out' this complex interaction between the self-regulating individual and the environment, in a simple and organised manner, a five-stage model of the self-regulation process has been proposed (Carver and Scheier, 1981; Kanfer, 1971; Kanfer and Karoly, 1972; Kirschenbaum 1985, 1987a, 1987b; Kirschenbaum and Karoly, 1977).
The process of self-regulation assumes that there will be:

1. an identification of the problem behaviour;
2. a commitment to change that problem behaviour;
3. an active process of behaviour change;
4. management of the problem environment, and finally
5. generalisation of behaviour.

The five-stage model of self-regulation, illustrated below in Figure 1.1, provides a useful over-view for understanding the process of self-regulating motor skill performance.

**Figure 1.1:** The five-stage model of self-regulation
More specifically, the five stages of the self-regulation model in Figure 1.1 embody:

1. **The Identification of a Problem Behaviour**

The first of the five stages in the self-regulation model deals with problem recognition (Karoly, 1977; Kirschenbaum 1985, 1987a, 1987b). During this stage people become aware that their normal patterns of behaving have become disrupted, and that they no longer produce their usual behavioural pattern. Many athletes, for example, train and perform in a relatively automatic and task-focused fashion (Kimble & Perlmuter, 1970; Kuhl, 1984; Langer, 1978; Rushall & Pyke, 1991). Typically, athletes will pursue their sport by following a training program, listening to a coach, competing when it is appropriate, and so on. This degree of training 'automaticity' does not lend itself to perceiving one's performance as potentially problematic. Therefore, the central issue for the self-regulating athlete is the identification of the extent to which everything possible is being done to ensure peak performance. When deficient areas are identified then can athletes begin to take more responsibility for improving the quality of their training performance. This first stage of self-regulation reinforces the fundamental importance of recognising that behaviour change is possible and that working towards change may be desirable (Kirschenbaum, 1987b; Karoly & Kanfer, 1982).

2. **A Commitment to Change the Problem Behaviour**

Sometime after acknowledging the existence of a problem, often after more closely observing certain target behaviours, the individual's next step is to decide to change the problem behaviour. A commitment or decision phase ensues in which the individual decides to initiate behaviour change. The individual's commitment to this process is subject to manipulation by a variety of consequences such as the athlete's commitment to change, and/or the criteria which the individual has established for behaviour change. The commitment phase indicates that individuals 'want' to change their behaviour to improve the probability of reaching personal goals (Bentler & Speckart,
For example, researchers found that the amount of expressed commitment by an athlete to a fitness training program will usually predict the level of perseverance of that individual to the training program (Dishman & Ickes, 1981).

3. The Active Process of Behaviour Change

With the self-regulatory problem identified and the commitment made to modify the unsatisfactory behaviour, the individual must then begin an active process of behaviour change. The process of behaviour change is the point where self-monitoring and self-regulation interact.

The first phase in the change process is self-monitoring, that is, the systematic observation of when target behaviours occur. Target behaviours are behaviours which the individual previously identified and committed to in the first two stages of the self-regulation model. The systematic observation of target behaviours is usually followed by covert and/or an overt recording of the frequency of these behaviours.

The next phase is to compare the monitored behaviour with the standards of the targeted behaviour change that were established in the commitment stage. This process is referred to as 'self-evaluation'. Finally, self-rewards are allocated if the self-evaluation is favourable. Inversely, an unfavourable self-evaluation results in self-punishment (Karoly, 1977; Kirschenbaum 1985, 1987a, 1987b). This chain of events from self-monitoring through self-evaluation to self-consequation is what self-regulation theorists have termed an action/interaction (cybernetic) model.

In the cybernetic model, a negative feedback loop serves as the basic unit of self-regulatory functioning. This feedback loop, illustrated below in Figure 1.2, is one of constant action and interaction between the self-monitoring, self-evaluation and self-consequation processes.
When Figure 1.2 is considered serially, the self-monitoring of existing behaviour levels provides a basis on which individuals can self-evaluate their behaviour. The self-evaluation of existing behaviour levels, and the subsequent comparison of existing behaviour with desired levels of behaviour, leads to behaviour changes through self-consequation. It is called a negative feedback loop of self-regulation because self-reward maintains the target behaviour, whereas self-punishment (negative feedback) requires individuals to change their responding (Kirschenbaum 1987a, 1987b). When applied to a sport performance context, this negative feedback loop emphasises systematically attending to performance feedback, evaluating performance against a specified criterion, and reducing or negating any perceived behavioural deviations from the goal or comparison standard (Kirschenbaum, 1987b). If, for example, athletes wish to reduce the perceived difference between their current and desired levels of aerobic fitness, then they may need to increase the intensity of their aerobic training.

In another example of an active negative feedback loop, Kirschenbaum and Bale (1980) taught university golfers to self-monitor their effective golf shots during competition. The golfers identified the problem with their performance as lack of 'good' shots, and as such, their goal was to produce better quality swings. After completing each hole, they engaged in self-monitoring and self-evaluation by noting which of their shots (e.g., drive, 5-iron, long putt) met their goal standards. They were told to mentally rehearse these good shots (i.e., favourable self-consequation) immediately after completing each hole. In accord
with predictions from the negative feedback loop of self-regulation, this self-monitoring process accelerated the overall quality of their performance toward their desired goals.

Negative feedback loop theory is also used by Cole and Gardner (1984) in a self-management program designed to assist the developmentally disabled to change their behaviour in a deliberate manner. Specific skills taught to the subjects included self-monitoring, self-evaluation and self-consequation. Research results demonstrated that developmentally disabled individuals, ranging from mildly to profoundly impaired and from children to adults, could self-regulate behaviour through this process.

Under most environmental conditions, self-regulation theorists believe that the process of establishing goals and engaging in self-monitoring, self-evaluation and self-consequation will result in reduced discrepancies between ongoing behaviours and predetermined goals or standards (Bandura, 1990; Carver & Scheier, 1981; Kanfer & Karoly, 1972; Kirschenbaum, 1987a; 1987b; Kirschenbaum & Wittrock, 1990; Mischel, 1973). For example, the self-monitoring of golf swings may prompt an unfavourable self-evaluation of current swing performance levels. This in turn may produce negative feedback which will prompt the individual to behave in a manner that will reduce the difference between current and desired levels of swing performance. Therefore, the role of the negative feedback loop is to change behaviours.

4. Managing the Problem Environment

Self-regulated behaviour does not occur in a vacuum. Social and physical environments can debilitate or facilitate efforts to achieve personal goals. For the athlete, facilities must support ample opportunities to train long and hard. Similarly, relationships among team members and between players and coaches need to be positive and cohesive if athletes are to achieve high-level performance (Kirschenbaum & Smith, 1983; Smith, Smoll & Curtis, 1978; Yukleson, Weinberg & Jackson, 1984). Self-regulation of sport performance requires planning to manage the many aspects of the sport environment.
5. Generalising the Behaviour

Individuals often fail to maintain or generalise behaviour change over time and across settings because of a variety of competing demands from internal and external sources. The successful self-regulator has to generalise behaviour despite internal stressors such as emotional states and physiological pressures. While external sources of distraction include social pressures and conflicts. Certain self-regulated skills or behaviours may disappear from the distracted athletes' repertoire unless a sustained effort to maintain skills over a prolonged period of time is made. In order to circumvent this failure of generalisation, vigilant self-monitoring of target behaviours, often to the point of developing an obsessive-compulsive self-monitoring strategy, has been suggested (Highlen & Bennett, 1983; Kirschenbaum, 1985, 1987a, 1987b; Kirschenbaum & Tomarken, 1982; Kirschenbaum & Bale, 1980).

At the heart of the five-stage self-regulatory behaviour change process is the negative feedback loop. Without the systematic self-monitoring of behaviour it is impossible for the individual to evaluate effectively goal-directed behaviour. Self-consequation cannot occur without self-evaluation, and unless there is systematic behavioural self-monitoring, it will be impossible for the self-regulation of behaviour to take place (Kirschenbaum, 1985; 1987a).

1.2.3 Self-Monitoring and Self-Regulatory Failure

In the previous section, the significance of the self-monitoring process in the self-regulation of behaviour was established. Following is a review of literature which attempted to determine the cause of self-regulatory failure. It should become clear that inept self-monitoring is a central issue in the failure to self-regulate behaviour effectively. This should re-emphasise the vitality of the self-monitoring process for behavioural self-regulation.

Effective self-regulation requires the performer to respond appropriately and consciously to failure. If the individual fails to achieve a desired
goal it is then usually necessary to confront that inability to regulate behaviour. People may try to emotionally distance themselves from their failure to change the necessary behaviour. This may be done by attributing the cause of their failure to circumstances beyond their control (Weiner, 1985). Similarly people may devalue the source of an evaluation that is unfavourable (Jacobs, 1977). Some people may even entirely avoid any situations that could be associated with confronting failure or failure-related situations (Duval & Wicklund, 1972). Ultimately, a person may simply continue to deny that they are unable to achieve a desired goal and persist with ill-fated attempts at reaching that goal (Kirschenbaum, 1987a).

However, if the desire to reach a goal is sufficiently intense, individuals may seek advice on how to reach the desired goal, as an alternative to avoidance and denial. Self-regulatory training programs have been used to teach the skills needed to reach desired personal goals in areas as diverse as eating disorders (e.g., Stalonas & Kirschenbaum, 1985), study behaviours (e.g., Richards, 1981), drug addiction (e.g., Leventhal & Cleary, 1980), and sport (e.g., Kirschenbaum, 1985; 1987b; Kirschenbaum & Wittrock, 1990). Yet Kirschenbaum (1987a) indicates that the administrators of these programs have had limited success in changing the participant’s behaviour. Individuals have failed to maintain or generalise the self-regulated behaviour changes, learned from the training programs, to the criterion of ‘real world’ behaviour. Empirical evaluations of these training programs have shown that many self-regulatory interventions have not maximised generalised behaviour change over time or across settings, resulting in self-regulatory failure (Kirschenbaum & Tomarken, 1982).

One reason that could partially explain the lack of success in the self-regulation training programs is the diverse manner in which theorists have construed the role of thought processes in self-regulation. For example, Carver and Scheier (1981) suggest that strong, negative expectancies could cause the collapse of self-regulated behaviour change by negatively impacting on performance levels. Kanfer and Hagerman (1981), on the other hand, argue that internal attributions for failure experiences may cause difficulties in generalising behaviour
change. Marlatt and Gordon (1985) suggest that cognitive-behavioural steps such as avoiding relapse episodes and avoiding negative emotional states are needed to evade self-regulatory failure (Kirschenbaum, 1987a).

While these investigators have generated empirically based self-regulation models supported by research (see volumes by Carver & Scheier, 1981; Kanfer & Karoly, 1972), their specific suggestions about changing self-regulatory behaviour and the underlying thought processes have not been empirically tested (Kirschenbaum, 1987a). To overcome the limitations of the lack of empirical information in previous documentation about self-regulatory training programs, Kirschenbaum (1987a) analysed three diverse, yet related self-regulatory literatures in the areas of: 1. successful and unsuccessful self-regulation; 2. the relapse process, and 3. attentional process in self-regulation.

1. Successful and Unsuccessful Self-Regulation

Kirschenbaum (1987a) prefaced his review of the success-failure self-regulation literature by noting that much of the past research in this area is methodologically flawed. Therefore, he focused only on those findings which had been replicated and that had the required methodological sophistication, in order to examine differences between successful and unsuccessful self-regulation.

The review of successful and unsuccessful self-regulators suggested three potentially active elements that could lead to self-regulatory failure: 1. depressogenic cognitions, such as weak self-efficacy, and poor self-evaluation and self-consequation responses; 2. difficulties coping with emotional stressors, and 3. disengagement from existing self-monitoring procedures.

2. The Relapse Process

This review focused on the relapse process whereby an individual breaks rules concerning the rate of consumption behaviours (e.g.,
having more than two alcoholic drinks per day, or smoking a cigarette) (Marlatt & Gordon, 1985). Since many relapses occur within the behavioural self-regulation context, then the study of the relapse process provided a focus on actual instances of failing to generalise an acquired behaviour.

The relapse process review lead Kirschenbaum (1987a) to again reinforce that depressogenic cognitions, difficulty coping with emotional stressors and disengaging from self-monitoring were contributing factors to self-regulatory failure. He also suggested three new elements that could influence self-regulatory failure: 1. the influence of social pressure; 2. the experience of an initial relapse episode, and 3. the physiological effect of cravings.

3. **Attentional Process in Self-Regulation**

In his third review, Kirschenbaum (1987a) suggested that implicit in both the success-failure and relapse literature was an attentional mechanism that affected self-regulation. Specifically, he suggested that factors such as depressogenic cognitions, that decreased attention to important self-aspects of behaviour, were responsible for reductions in sustained self-monitoring. Depressogenic or other cognitions which decreased attention to self-aspects of behaviour became active components of self-regulatory failure.

Kirschenbaum's (1987a) analysis of these three self-regulatory literatures led him to suggest seven essential elements that could promote self-regulatory failure (i.e., depressogenic cognitions; emotional stressors; disengagement of habit changes; social pressures; initial relapse; physiological pressures; attentional focusing problems). He proposed a relationship between these seven elements, self-monitoring and self-regulatory failure which is illustrated below in Figure 1.3.
One strong overriding theme that emerged from the relationship depicted in Figure 1.3 was the primacy of 'disengagement from self-monitoring' (p. 94) as the functional element in self-regulatory failure. It was apparent from the literature review that the influence of other factors could lead to an individual's failure to continue to self-monitor target behaviour, which in turn could lead to self-regulatory failure.

For example, Condiotte and Lichtenstein (1981) found that 12 out of the 24 subjects who had attended a smoking cessation program experienced relapse episodes. Eleven of these 12 smokers chose to stop self-monitoring their cigarette smoking behaviour 'either just prior to or at the same time as they experienced their relapse episode' (p. 652). During subsequent interviews the subjects indicated that the self-data collection had become so aversive, 'they couldn’t handle it any more' (p. 652). Similarly Fisher, Green, Friedling, Levenkron and Porter (1976) found that weight reducers who ceased self-monitoring during the three week Christmas holiday season gained 50 times as much weight as those who maintained their self-monitoring behaviour.
The discontinuations of self-monitoring during these relapse episodes strongly supported earlier assertions about the important role that continued self-monitoring has in successful self-regulation.

1.2.4 Self-Monitoring and Self-Regulatory Success

Based on his review of related studies, Kirschenbaum (1987a) concluded that '...some form of systematic attention to self-regulated target behaviour must be sustained to avoid self-regulatory failure.' (p. 94). He further indicated that the need to systematically monitor behaviour strongly suggests that sustained self-monitoring is necessary for successful self-regulation (Kirschenbaum, 1987a, p. 94). The assertion that active self-monitoring appears to be a necessary condition for generalised self-regulated behaviour change is also supported by the experimental research.

For example, in a study of successful long-term weight reduction in children, Flanery and Kirschenbaum (1986) found that self-monitoring of caloric intake significantly correlated with maintenance of weight loss 18 months after the initial weight-loss intervention had ceased. Prickett (1987) examined the effect of self-monitoring on the number of positive comments given by 28 music therapy students to peers, when serving as skill coaches. Subjects listened to audio tapes of their previous week's coaching session and monitored the number of positive, negative and neutral comments which they gave. There was a significant increase in the number of positive comments given during self-monitoring when compared to baseline. Schloss, Schloss and Smith (1988) trained three speech- and language-impaired adolescents in employment interview techniques. The authors taught the subjects how to self-monitor their use of positive comments, questions and self-disclosures in mock interview situations. Subsequently, in actual interview situations, self-monitoring training effectively increased the pragmatic speech and language use of the subjects over baseline. Gurney (1987) found that school pupils who self-monitored academic achievement enhanced their self-esteem, and in some cases improved their academic performance. Another example supporting the use of self-monitoring for behaviour change
was an experiment by Mahoney, Moore, Wade and Moura (1973) who investigated American college students preparing for the university admission examinations. In this study, students received performance feedback on the accuracy of their responses to general aptitude test questions. The four groups either self-recorded each correct response continuously, self-recorded their performance results intermittently, received immediate feedback on their responses, but were not given the opportunity to self-monitor or received neither self-monitoring instructions nor performance feedback (control). Results revealed that the self-monitoring subjects from the first two groups displayed significantly better performance scores than either the performance feedback/no self-monitoring group or the control subjects. Self-monitoring of the academic performance produced the best test scores.

Studies by Storey and Gaylord-Ross (1987), Wing, Epstein, Nowalk and Scott (1988), and Baum and Creer (1986) all support the assertion that self-monitoring is central to successful self-regulation. In an investigation of oral participation Storey and Gaylord-Ross. (1987) used a multi-component self-regulation package to increase the rate of verbal interaction of four severely developmentally disabled high school students. The treatment package consisted of educating the subjects in role playing, interpreting graphic feedback, receiving contingent reinforcement and, positive self-monitoring. An analysis of the intervention results indicated that while a combination of the self-regulation treatment components could impact on oral participation, positive self-monitoring alone could adequately maintain verbal interactions for three of the four subjects. Similarly, Wing, Epstein, Nowalk and Scott (1988) had 20 overweight adult patients with Type II diabetes participate in weight control programs, that included either self-monitoring of blood glucose only, or extensive training in self-regulation of blood glucose. Subjects in the latter condition were taught to monitor blood glucose, to recognise discrepancies between actual and ideal blood glucose, to change eating habits and exercise behaviours to reduce these discrepancies, and to reinforce themselves for completing the steps in self-regulation. There was no evidence that the extensive training in self-regulation
improved short- or long-term health outcomes more so than simply self-monitoring blood glucose levels. Baum and Creer (1986) investigated whether medication compliance by 16 asthmatic children would change after 12 sessions of either instruction in self-monitoring or a combination of self-monitoring, education and positive reinforcement. Subjects in the combination treatment group did not show greater gains in medication compliance, health locus of control and self-concept than did the self-monitoring-only group. In all three studies simple self-monitoring proved to be as effective for behaviour change as a more extensive self-regulation programs.

Although Fender (1989) indicates that 'there is no research on burnout in athletes...published in relevant journals' (p.70), there is a strong sport science literature base which advocates the use of self-monitoring as a necessary procedure for successful athletic self-regulation and the prevention burnout. In addition to the case studies already presented the following theoretical postulations are presented in order to again highlight the importance of self-monitoring as a means of behavioural self-regulation.

Physical training allows sport competitors the opportunity to alter existing performance patterns by self-regulating sport-related behaviours. Athletes can self-regulate their training volume, duration and intensity in order to meet with the demands of their sport. However, not all athletes are able to cope consistently with the pressures of training and/or competition. Some athletes quit their sport altogether, while others experience severe performance deterioration. Athletes who fail to self-regulate effectively often manifest physiological and behavioural stress symptoms such as fatigue, insomnia, anxiety and depression (Smith, 1986). These athletes are said to be in a 'slump' or burned out.

Several definitions of slumping exist, for example Harris and Harris (1984) define slumps as:

...periods when the athlete fails to maintain the usual consistency in performance without any detectable mechanical failure (p. 170).
Smith (1986) says slumping is a syndrome having:

...physical, mental, and behavioural components...(whose)...development represents complex interactions between environment and personal characteristics (p. 37).

While Fender (1989) says that slumping is:

...a reaction to the stresses of athletic competition...characterized by feelings of emotional exhaustion, an impersonal attitude toward those the athlete associates with, and decreased athletic performance (p. 64).

Simplistically put, a slump is:

a state when individuals become fed up with whatever they are doing and throw in the towel (Harris & Harris, 1984, p. 170).

The term slump has become popular in the sports vocabulary and is used to describe performance-related problems such as inconsistency (Taylor, 1988). However, the concept of slumping first appeared in literature concerning job stress under the label of 'burnout' (Freudenberger, 1974). Freudenberger first defined burnout as:

...a state of fatigue or frustration brought about by devotion to a cause, or way of life, or relationship that failed to produce the expected reward (1980, p. 13).

Burnout afflicts dedicated, idealistic individuals:

who are motivated toward high achievement and who work in unrewarding situations (Henschen, 1986, p. 329).

Both Freudenberger and Henschen indicate that burnout will occur without rewarding and reinforcing experiences.

Slumping is directly related to poor or inappropriate self-regulation. Self-regulation focuses on the reward process, and how people reinforce their goal-directed behaviour (Kirschenbaum, 1985). In a sporting context, self-regulation is concerned with how athletes postpone short-term rewards in order to achieve long-term rewards. Practicing the components of a sport, engaging in basic physical conditioning or training, learning and executing performance strategies, and most other aspects of successfully participating in sport requires postponement of immediate reinforcement (Kirschenbaum, 1985).
Those athletes who perceive that training or competition does not produce expected rewards may start to behaviourally and cognitively withdraw from their sport. These athletes lack the skills and use of strategies to effectively self-regulate sport-related thoughts and behaviours, and this may lead to a performance slump. The production of quality training and competitive behaviours is essentially based on the athlete consistently and appropriately self-rewarding sport behaviours (Taylor, 1988). According to the negative feedback loop, self-reward promotes and maintains self-regulated behavioural change. However, self-rewarding will not take place unless there is self-monitoring of existing behaviours (Kirschenbaum, 1987a; Taylor, 1988). Therefore athletes need to self-monitor performance information in order to avoid slumping.

Deciding which sport behaviours should be self-monitored is necessary for slump prevention. However, deciding on appropriate skills to monitor will ultimately rely on: how a slump is defined by the athlete within the context of the sport situation; a consideration of the criteria for successful performance and, the athlete’s previous performance level. By operationally determining slump behaviours, it is possible to determine the skills that need to be monitored in order to prevent a subsequent decrement in performance (Fender, 1989).

The variety of slump definitions make it clear that there is no single, accepted operational definition for the term, and slumps are best defined by the individual in terms of how performance is effected (Capel, 1986; Fender, 1989). Taylor (1988) suggests that the term slump has the most meaning when the current level of performance is compared with the baseline level of performance. If the current level of performance is noticeably lower than a prior level of performance, then this may be considered as a slump. Because the slump ‘reaction’ varies with individuals, then the ultimate slump definition will be the individual’s recognition of a behaviour change which indicates a lower performance level. The recognition of slump symptoms can be achieved through self-monitoring. By self-monitoring a variety of training and competitive behaviours athletes are better equipped to understand the frustrating experiences that lead to performance
This is not to say that athletes will not be challenged, particularly in the early stages of a performance problem. However, self-monitoring allows for a causal analysis of deficient performance.

Identifying and assessing slumped performance is an important aspect of slump prevention. This process consists, primarily, of monitoring and recording specific observable and measurable sporting behaviours. Objective data are useful in identifying actual, as opposed to perceived, performance decrements and improvements. This information can be collected by players or coaching staff. There is no universal criterion for delineating a slump, therefore objective data can provide essential guidelines for isolating deficient aspects of performance.

Consistently monitoring physical, environmental and psychological factors can provide early warning signs concerning excessive symptoms of stress that facilitate burnout. This assessment is best done by having athletes use an inventory that considers psychological factors. Information gained from the self-monitoring of the athlete's thoughts, attitudes and emotions can indicate the initial onset of excessive stress or burnout, that precedes the more debilitating effects of physiological overtraining (Rushall, 1988b).

The stressors that cause an individual to stop self-monitoring target behaviours originate from outside, as well as within, the sporting environment. Athletes respond to a matrix of life stressors according to their coping capacity. Accepting the assertion that the athlete has a limited tolerance for stress, it is possible that accumulated stressors, associated with the athletic environment, could exceed the athlete's finite stress capacity and lead to a performance slump (Rushall, 1988a).

Based on stress models outlined by Martens (1977) and Passer (1983), it is proposed that slumping athletes will pass through four stages of psychological response to burnout. These stages strongly reflect the five-stage model of self-regulation (see Figure 1.1). Firstly, athletes will question why usual patterns of behaviour are not producing the
usual result. In the second stage, athletes investigate their thoughts concerning what is happening to them. This stage involves a cognitive appraisal of the slump, in which athletes evaluate their current behaviours and assess their ability to deal with it. The third stage deals with how athletes evaluate their slump, that is, their cognitive appraisal of the slump. This reaction may manifest as physiological arousal, anxiety or worry. These emotional reactions do not follow a logical sequence and influence the athlete's emotional responses to the slump. These emotional responses are especially influential in the fourth stage, when athletes consider response alternatives to the situation. The fourth step involves adherence to the physical, technical and psychological rehabilitation programs. At any stage of this model the use of a self-monitoring intervention may have a powerful effect on influencing accurate cognitions regarding the slump. Identifying the causes of a slump is a crucial step towards alleviating it. Understanding that the cause of a slump could be associated with training and competition provides the athlete and coach opportunities to plan intervention programs that will prevent slumping.

Taylor (1988) adopts a multi-disciplinary psychobiological model in providing interventions to prevent and eliminate slumps. Athletes and coaches monitor and evaluate the physiological, technical, technological and psychological aspects of the athlete's sport performance. He emphasises that each of these sport science disciplines contain a variety of specific sub-components that can interact and cause performance deterioration. For example, fatigue due to overtraining and/or overcompeting could cause illness, injury and nutritional deficiencies. Likewise, changes in the characteristics of an athlete's equipment or technique could detrimentally affect the physical processes associated with timing and kinaesthesis. In addition to physical factors there is a variety of psychosocial factors that can cause performance decrement and may often prolong a slump (Taylor, 1988).

Some psychosocial factors that may predispose athletes to slump include: anxiety, life stresses and personality traits. Anxiety as a trait
or stable personality characteristic, may manifest itself to the point that the athlete is quite anxious in most life situations. It is possible that high levels of anxiety in sport may be characteristic of the athlete who is prone to slump. Insecure athletes who are highly anxious or worried, may induce a performance slump (Wiese & Weiss, 1987). The relationship between slumping and life stress needs empirical validation, but anecdotal observation would suggest events such as change of school or home, death of a friend or family member, or trouble in academic performance may be perceived as psychologically stressful by the athlete (Wiese and Weiss, 1987). Feigley (1984) states there are three personality characteristics which increase an individual's susceptibility to athletic burnout. Initially he cites perfectionists, who have unrealistic standards of performance and a tendency to overtrain. Other-oriented people who love to be praised and hate to be criticised, and non-assertive athletes are also cited as members of the high-risk category. Taylor (1988) suggests that an analysis based on information gained from multi-disciplinary monitoring will provide accurate direction for the cure and prevention of slumping.

An essential element of preventing and curing slumps includes monitoring the amount of time spent on-task in training and competition (Taylor, 1988). The athlete needs brief periods of time in a different social environment, away from the continuous training/competing cycle. Training according to the principles of overload calls for sufficient recovery time during training micro-cycles (Rushall & Pyke, 1991). Being outside of the sport for a brief period time allows athletes to gain an objective perspective on their performances. If the athlete has strong negative emotions about performance, then a 'time-out' can help break this negative emotional chain, turning negative views of past performances into positive attitudes about future preparation and competition. Through self-monitoring the athlete can become increasingly aware of vast amount of time spent in training, and organise a 'time-out' plan (Taylor, 1988).

Morgan (1984) suggests that research on slumping and burnout indicates that a prime contributor to these conditions are athletes'
feelings of no personal control over current events. Morgan suggests that when athletes perceive that they are committed to a situation over which they have no control, slumping is inevitable. However allowing athletes to set and monitor training and competition goals will solidify athletic commitment, and provide a sense of autonomy that can eliminate slumping. Striving for and attaining short- and long-range goals provides a sense of accomplishment that is motivating. Consequently, training and competition goals should be specific, measurable and realistic. The use of short-term goals, and rewards for accomplished goals is strongly recommended for slump prevention (Taylor, 1988).

Taylor (1988) suggests that it is necessary to specify and monitor a variety of goals that will alleviate the slump. Initially, monitoring a return-to-form goal is desirable, where athletes stipulate the levels of competitive performance to which they wish to return. It may be the average performance level prior to the slump or it may be a higher or lower performance level depending on the causal information acquired through self-monitoring. Next, athletes must set a causal goal that addresses the level of undesirable performance associated with a particular slump cause. Once the slump's cause is identified the athlete must make a commitment to make the time and effort to alleviate the problem. The athlete then needs to set and monitor daily training goals in order to reach the causal goals and return-to-form goals. This collective goal-setting process is best accomplished by the athlete in consultation with the coach and, perhaps, a sport psychology consultant, who must jointly decide on daily training goals that are realistic, rewarding, reinforcing and produce a positive orientation toward the sport performance. These goals serve to motivate the slumped athlete to persist and produce the effort necessary for recovery.

Other psychological strategies can be employed to facilitate recovery for slumped athletes. For example, motivational strategies are critical in helping athletes continue their rehabilitation programs. Imagery, visualisation and relaxation may be used to rehearse and prepare appropriate emotions that may be experienced by the athlete upon
return to training and competition after a slump. In addition, the slumping athlete can use cognitive restructuring techniques, redirecting negative or irrational thoughts into positive, task oriented thoughts and affirmations that can help provide direction and motivation to the rehabilitation process (Wiese & Weiss, 1987).

The increased likelihood of behaviours being repeated if followed by pleasurable feelings or rewards is a behaviouristic principle that has important implications in the prevention of slumping. Athletes will continue to train if they enjoy it, so it is essential that their behaviour is positively reinforced. Lack of proper reinforcement schedules in response to intense effort can lead to and prolong slumping. Self-rewards for the attainment of training and competitive goals must be meaningful, realistic, and usually short-term (Henschen, 1986). Self-monitoring performance is the basis for proper self-rewarding which can regulate behaviour and prevent slumping.

Earlier, it was indicated that self-monitoring is a necessary condition for behaviour change. It now appears that the successful self-regulator must maintain self-monitoring strategies despite distractions and stressors such as social pressures, conflicts, difficulties in coping with stress, and antagonistic physiological processes. Self-monitoring can promote and maintain self-regulated behavioural change, and is a precondition to avoiding self-regulatory failure (Kirschenbaum, 1987a).

1.2.5 Self-Monitoring Strategies

Previously, self-monitoring was defined as the systematic gathering of information about target behaviours (McFall & Hamm, 1971). Self-monitoring implies that a person can discriminate the occurrence of target behaviours, and explicitly or cognitively record them (Kirschenbaum, 1987a; Kirschenbaum & Wittrock, 1990). There are two ways to self-monitor, either positively or negatively.

An individual's ability to recognise and/or record positively valued behaviours or attributes is termed positive self-monitoring. Conversely,
negative self-monitoring refers to the tracking of negative behaviours or characteristics that an individual desires to decrease or eliminate (Tomarken & Kirschenbaum, 1982; McFall & Hammen, 1971).

Examples of both positive and negative self-monitoring are used in a study by Kirschenbaum, Ordman, Tomarken, and Holtzbauer (1982). Kirschenbaum et al., provided unskilled bowlers with a standard instructional lesson on the seven components of effective bowling. Positive and negative self-monitoring groups both received self-monitoring recording sheets, one for each of 10 games bowled. The sheets included a 7 by 10 grid (i.e., the number of components of effective bowling: foot position, stance, etc., times the number of frames bowled: 1 to 10) onto which they monitored their performance. Instructions given on how to positively and negatively self-monitor follows:

**Positive self-monitoring** After bowling each frame, review the seven components of Brain Power Bowling. For those components that you did well put a number from 1 to 3 in the box corresponding to that component. 1 = good; 2 = very good; 3 = excellent. If you did not do a good job on a particular component, leave that box blank.

**Negative self-monitoring** After bowling each frame, review the possible errors you could have made by not following the seven components of Brain Power Bowling. If you made any of these possible errors, put a number from 1 to 3 in the box corresponding to that error, denoting how poorly you did. 1 = terrible; 2 = very poor; 3 = poor. If you did not make an error on a particular component, leave that box blank (pp. 337-338).

1.2.6 The Effect of Self-Monitoring Strategies

Initial research on positive and negative self-monitoring suggested that as behaviour change agents, these two different self-monitoring strategies (i.e., positive and negative self-monitoring) could not only change behaviours, but alter behaviours in a specific direction (Cavior & Marabotto, 1976; Hayes & Cavior, 1977; Mahoney, Moore, Wade and Moura, 1973; Maletzky, 1974). For example, negative self-monitoring of unwanted behaviours, such as smoking and overeating had been found to decelerate the occurrence of these behaviours (e.g., Maletzky, 1974). On the other hand, positive self-monitoring of desired behaviours such as smoking cessation and appropriate study
behaviours accelerated the incidence of the desired behaviours (e.g., Mahoney, Moore, Wade and Moura, 1973).

As self-monitoring research continued to expand it became increasingly clear that self-monitoring alone could no longer be considered as the only factor to impact on target behaviour (e.g., Kirschenbaum & Karoly, 1977). Precise experimental protocols (e.g., Kirschenbaum & Karoly, 1977; Kirschenbaum, Ordman, Tomarken and Holtzbauer, 1982) have indicated that the direction and magnitude of behaviour change produced by the use of a self-monitoring strategy is dependent on two factors: 1. the self-monitoring strategy used (i.e., positive or negative self-monitoring), and 2. the individual’s mastery of the monitored task. Change in behaviour produced by self-monitoring appears to be dependent not only on the self-monitoring strategy used by the individual, but also on the individual’s degree of mastery of the monitored task. The interaction between self-monitoring strategy and the degree of task difficulty has been expanded and replicated in research results which have appeared in subsequent self-monitoring literature (e.g., Kirschenbaum, Ordman, Tomarken and Holtzbauer, 1982; Johnston-O’Conner & Kirschenbaum, 1986).

Current self-monitoring theory suggests two basic principles for the interaction between self-monitoring strategy and the degree of task difficulty: 1. Positive self-monitoring improves performance of poorly-mastered or difficult tasks, while negative self-monitoring can be detrimental to the performance of difficult tasks, and 2. positive self-monitoring can prove especially detrimental to performance when tasks are well-mastered or easy, while negative self-monitoring improves performance when tasks are easy (Kirschenbaum, 1987a; Kirschenbaum & Wittrock, 1990).

1.2.7 Principle 1: Difficult Tasks and Self-Monitoring

When individuals attempt to regulate behaviours that are difficult, self-recorded instances of successful behaviour (positive self-monitoring) will facilitate performance as opposed to focusing on instances of failure (negative self-monitoring). An example of this
principle is shown in a study by Kirschenbaum, Ordman, Tomarken and Holtzbauer (1982) that compared the performances of skilled and unskilled women ten-pin bowlers who had received a 20-minute group lesson from a professional bowler on the seven components of effective bowling.

Women from both groups were matched for skill, then randomly allocated to either a positive self-monitoring, negative self-monitoring, a non-monitoring/lesson only group or a no-treatment (control) group. The first two groups followed the bowling lesson with several weeks of either positive self-monitoring (recording the effective execution of the component skills) or negative self-monitoring (recording ineffective execution of the component skills) as they bowled. The exact self-monitoring procedures for this experiment were previously described in Chapter 1.2.5. The other two groups also continued to bowl competitively, but did not employ a self-monitoring strategy.

An analysis of the test scores showed that the unskilled women bowlers (i.e., those individuals who had to regulate behaviours that were difficult) who positively self-monitored improved significantly more ($p$'s < .01) than the other groups. When bowlers attempted behaviours that were difficult, while simultaneously self-recording instances of successful key bowling component performance (positively self-monitoring), they achieved greater bowling performance outcomes than those who focused on instances of failure (negative self-monitoring).

Johnston-O'Connor and Kirschenbaum (1986) also conducted a study of the effects of self-monitoring on sport performance that highlighted the effectiveness of positively self-monitoring when performing a difficult task. In this experiment, 109 unskilled golfers were provided with an instructional pamphlet which included a description of the five key components of the golf swing:

**Stance:** Position the ball in a line with the inside of the heel of the left foot. Move the right foot closer to the ball for each successively lower club (i.e., 9-iron closer than 8-iron, etc.). Extend arms to full natural length.
**Posture:** Strive for a relaxed, stable, balanced posture. The knees should be somewhat flexed, shoulders slumped slightly forward, and back fairly straight.

**Head Position:** The head should be kept still from address to impact, almost as if the head and neck were parts of a central axis around which the rest of the body turns.

**Downswing Initiation:** Lead with the feet by shifting weight toward the target in succession following the feet, the ankles, knees, and then hips should move sideways toward the target.

**Follow-through:** Hit through the ball, not to it by shifting weight to the left foot and letting the arms swing out and all the way up with continued acceleration (p. 127).

After instruction on the five key components of the golf swing, then golfers were randomly selected to either positively self-monitor (record successfully executed components of the swing), neutrally self-monitor (record components of the swing without regard to the successfulness of execution), or not to self-monitor (control). Subjects were also randomly assigned to either observe or not to observe videotapes of their swing performance, in order to induce two levels of self-focused attention.

Subjects were videotaped, on three separate occasions, as they attempted to hit six wiffle balls. After three of the six balls had been struck then subjects would have the opportunity to view a videotape of their preceding swings. Self-monitoring groups would then use this time to review their swing performances and rate them accordingly. The three self-monitoring groups differed in the self-monitoring procedures which they employed following their first three swings:

**Positive Self-Monitoring** Following each experimental session, subjects in the feedback condition reviewed the videotapes of their three swings and completed an instructional sheet containing a 3 x 5 grid (i.e., Swing numbers 1-3 x 5 Elements of the Swing). Subjects completed the grids as they watched the tapes by entering a plus in the row corresponding to the appropriate swing and the column corresponding to the elements that they had executed well. Subjects in the no-feedback condition were asked to “mentally review each of the three swings” in order to complete the self-monitoring grids following each session. In addition, positive self-monitors were instructed to make positive self-statements, such as “You can do it!” prior to each of the next 3 swings.
Neutral Self-Monitoring: Neutral self-monitors followed a parallel procedure to complete their grids, except they followed this instruction: "Each time you can specifically identify how you executed one or more swing elements, put a slash (/) in the table below, beside the swing number and under the element."

No Self-Monitoring: These subjects were instructed to observe their videotapes if they were in the feedback condition. The no feedback/no self-monitors (i.e., controls) were told they would take a short break between sessions (p. 127).

After self-monitoring had taken place, subjects performed the final three swings of the six swing set. Two undergraduate women then reviewed the post-monitoring swings, scoring them for quality, consistency and errors using a behavioural observation system. Analysis of variance applied to this data revealed that, in accordance with the predictions of Principle 1, unskilled golfers who positively self-monitored generally showed the expected improvements in performance compared to controls and to similarly unskilled golfers who self-monitored in a neutral fashion. Positive self-monitoring by unskilled golfers resulted in performance improvements.

Other studies such as McFall (1970) and Gottman and McFall (1972) have also confirmed the significance that positive self-monitoring plays in improving the performance of difficult tasks. McFall (1970) had college smokers who wished to quit smoking self-monitor their smoking frequency. Smoking cessation is an activity that requires great 'expenditure of sustained effort and concentration' (Kirschenbaum and Karoly, 1977, p. 1117) thus, for these college smokers, cessation was a difficult task. Smoking students self-monitored either the number of cigarettes smoked (negative self-monitoring), or the number of occasions on which they considered smoking, but resisted the temptation (positive self-monitoring). Again, in accordance with the predictions of Principle 1, students who monitored instances of deciding not to smoke (positive self-monitoring) decreased their consumption over a 13 day period, while students who monitored instances of smoking (negative self-monitoring) significantly increased their cigarette consumption in the same period.

In a similar study, Gottman and McFall (1972) rated oral participation in a classroom situation. For the 17 potential high school drop-outs who were subjects for this study oral participation (i.e., answering
questions, contributing to class discussions) was also described by Kirschenbaum and Karoly (1977, p.1117) as a poorly-mastered or difficult task. Subjects who were given instruction to positively self-monitor instances of appropriate talking increased their oral participation. However, subjects receiving instructions to self-monitor the occasions during which they wanted to talk, but instead remained silent (negative self-monitoring), decreased their oral participation. The investigation showed a directional effect pattern consistent with the results reported supporting Principle 1. Positive self-monitoring of oral participation lead to self-regulated increases in appropriate oral responses relative to negative self-monitors.

Kirschenbaum and Karoly (1977) used an experimental paradigm that demonstrated the superiority of positive self-monitoring relative to negative self-monitoring with difficult tasks. Ninety-six student volunteers worked on mathematics problems in preparation for university admissions tests. The students were assigned to one of four groups: 1. self-monitoring their inaccurate problem solving (negative self-monitoring); 2. self-monitoring accurate problem solving (positive self-monitoring); 3. no self-monitoring, but instead receiving the same kind of immediate performance feedback as the self-monitoring group, or 4. a control group who did not self-monitor nor receive immediate feedback.

Subjects were asked to work on either difficult (35% response accuracy) mathematics tasks or relatively simple (65% response accuracy) mathematics tasks during three 15-minute problem solving periods. Participants assigned to performance feedback and self-monitoring groups received feedback in the form of a flashing light that corresponded to the correct answer being given immediately after each press of the response button. All participants heard a bell sound every three minutes during each 15-minute problem solving period. At the toll of the bell positive self-monitors pressed a mechanical counter if the flashing light indicated that they had answered the last problem correctly. Negative self-monitors pressed the counter if the last problem was answered incorrectly.
In line with predictions from Principle 1, negative self-monitoring of the solutions to the difficult (35% response accuracy) mathematics tasks caused the expected self-regulatory failure. Negative self-monitoring generated the largest number of inaccurately solved problems.

In another study supportive of Principle 1, Wong (1988) had 60 adolescent subjects self-monitor their performance on a 1-hour problem-solving test. The subjects had to record the feedback which they received from the experimenter. The experimenter would give either positive reinforcement, negative reinforcement or no reinforcement (control) to the subjects. Consequently, subjects recording experimenter feedback were virtually positively, negatively or not self-monitoring. Problem-solving ability was significantly superior for subjects who monitored the experimenter's positive reinforcement compared with those who monitored the negative reinforcement. Self-monitoring of positive feedback caused superior performance relative to self-monitoring of negative feedback on the difficult test task.

The principle asserting that individuals performing a difficult task should positively self-monitor instances of successful behaviour, in order to facilitate performance outcomes, rather than focus on instances of failure (negative self-monitoring) has been strongly supported in the literature.

1.2.8 Principle 2: Easy Tasks and Self-Monitoring

Principle 2 predicts that when people perform behaviours that are easy or well-mastered, then self-monitoring instances of successful behaviour (positive self-monitoring) will inhibit performance compared with focusing on instances of failure (negative self-monitoring). That is, positive self-monitoring of an easy task leads to poorer performance, while negative self-monitoring of easy tasks leads to performance improvement (Kirschenbaum, 1985; 1987a; Kirschenbaum & Wittrock 1990).
Wade (1974) asked 32 college students to self-monitor their performance on 10 sets of match-to-sample items. Subjects in the study were divided into four self-monitoring recording groups:

**Condition SC** Subjects were instructed to record their choices; then if the choice was correct (i.e., the choice matched the correct answer displayed by the machine) they were to depress the counter plunger (i.e., positive self-monitoring).

**Condition SI** Instructions for SI subjects differed from Condition SC only in that they were to depress the counter plunger whenever their choices differed from the answer displayed by the machine (i.e., negative self-monitoring).

**Condition PF** Subjects had no counter available and were instructed only to record a W or an R whenever their choices were wrong or right, respectively.

**Control** Subjects had no counter available and were provided no feedback. They were instructed only to scribe rectangles around the answer space each time they recorded their choices.

Both the recording of W and R and the scribing of rectangles were employed to equalise time spent in the respective conditions and to direct attention to feedback where applicable. When subjects had read their respective instructions, they were given one guided demonstration of the procedure for their condition with a sample item (p. 246).

The results revealed that subjects were 85 to 94% accurate throughout the study. Therefore the matching-to-sample task in this experiment was considered a low difficulty or easy task. Further, results revealed that subjects who monitored the number of correct answers (positive self-monitored) on this (easy) task attained better initial performance levels than negative self-monitors, but their total performance scores deteriorated over time. Subjects monitoring the number of incorrect answers (i.e., negative self-monitoring) maintained high performance levels throughout the entire study. This cumulated in a higher number of correct responses for negative self-monitors by the conclusion of the self-monitoring procedure. The responses of both the self-monitoring groups were predicted by Principle 2. Positive self-monitoring of the easy task led to poorer performance, while negative self-monitoring led to enhanced performance.

In another study assessing the influence of self-monitoring on easy tasks, Tomarken and Kirschenbaum (1982) asked 66 volunteers to
participate in mathematics tutoring sessions in order to prepare for university admission examinations. The experimental stimuli consisted of 270 mathematics questions that had been answered correctly by at least 70% (M = 85%) of sample students. As such, the questions selected for use in this experiment were of a low difficulty (easy) level.

Six experimental groups were established consisting of three levels of self-monitoring (positive, negative and no self-monitoring) and two levels of self-monitoring frequency (high and low). Three lots of 3 by 15-minute experimental sessions were held during three consecutive weeks. Within the experimental sessions a bell would sound to indicate that monitoring should take place.

At the sound of the bell, positive self-monitors indicated on a ring of numbered 5.5" X 4" flip cards (mounted on a stand before them) the number of problems answered correctly since the bell last rang. This number was added to the number already shown on the ring. Negative self-monitors noted the number of problems answered incorrectly in the elapsed interval. Performance-feedback subjects did not self-monitor (p. 587).

In accord with the predictions of Principle 2, positive self-monitoring of these easy mathematics questions compared to negative self-monitoring led to: 1. less accurate problem solving; 2. less persistent self-monitoring, and 3. lower rates of attendance at program sessions. Positive self-monitoring, relative to negative self-monitoring, led to performance impairments under easy task conditions (Kirschenbaum & Karoly, 1977; Masters & Santrock, 1976, Tomarken & Kirschenbaum, 1982).

In an experiment designed to investigate the role of evaluative and affective responses as behavioural reinforcers, Masters and Santrock (1976) found that when children labelled a problem-solving task as 'easy', they could persist longer at the task when they used negative affective statements about their performance (i.e., negative self-monitoring). These findings are commensurate with Principle 2 and support the concept of negative self-monitoring while performing easy tasks. In the same study, when performing poorly mastered tasks which the children had labelled as 'difficult', the results indicated greater persistence at the problem-solving task when positive affective
statements about their performance were used (i.e., positive self-monitoring) as opposed to negative affective statements (i.e., negative self-monitoring). This result is consistent with the previously listed Principle 1 (i.e., that positive self-monitoring improves performance of difficult tasks, while negative self-monitoring can be detrimental to the performance of difficult tasks). As such, Masters and Santrock (1976) demonstrated both principles of self-monitoring in the one study. Positive affective statements improved performance of the difficult task, and negative affective statements were detrimental to the performance of the difficult task (Principle 1), while negative affective statements improved performance of the easy task, and positive affective statements were detrimental to the performance of the easy task (Principle 2). Other researchers, such as Kirschenbaum et al., (1982) and Kirschenbaum and Karoly (1977), have also examined both of the principles of self-monitoring within the one study. These studies also provide information in addition to a confirmation of the principles of self-monitoring. They highlight the issue of task difficulty in self-monitoring.

1.2.9 Task Difficulty Levels and Self-Monitoring

Positive self-monitoring is effective for improving performance in difficult task situations, and negative self-monitoring effective for improving performance in easy task situations. However the question of what is a 'difficult' or an 'easy' task is yet to be addressed. The following studies begin to direct the search for task difficulty definition.

In a study discussed earlier (see Chapter 1.2.7) Kirschenbaum et al., (1982) had skilled and unskilled women ten-pin bowlers receive a lesson on the components of effective bowling. They followed the lesson with several weeks of either positive self-monitoring (recording the effective execution of the component bowling skills), negative self-monitoring (recording ineffective execution of the component bowling skills), no self-monitoring, or no-treatment (control). As previously reported, unskilled bowlers who positively self-monitored improved their performance significantly and substantially more than unskilled bowlers who negatively self-monitored or did not self-monitor. These
findings support Principle 1. However, for the skilled bowlers, who either positively or negatively self-monitored their performance, results indicated that they performed no better than the no-treatment (control) group (all \( p \)'s > .05). For the positive self-monitoring group, this result supports Principle 2, affirming that positive self-monitoring in an easy situation was detrimental to performance or, at least, no better than no-treatment (control). However Principle 2 also predicts that skilful negative self-monitors should perform better than all other groups, yet they performed no better than no-treatment (control) group.

While Kirschenbaum et al., (1982) did not attempt to explain these results, it may be suggested that skilled bowlers (\( M = 147.3, \, SD = 8.5 \)) did not sufficiently differ from unskilled bowlers (\( M = 123.7, \, SD = 9.1 \)). The apparent lack of difference in skill levels of these bowlers made it difficult to achieve performance related effects while using different self-monitoring strategies. When reviewing the experimental results without considering Kirschenbaum et al.,'s (1982) imposed task classification delineation, it is possible to conceive that all subjects responded in support of Principle 1. Consequently, it could be suggested that while there were nominally two groups of bowlers, they both considered the bowling task to be difficult.

This problem of task difficulty classification is more fully exposed in another study also discussed earlier (see Chapter 1.2.7). Kirschenbaum and Karoly (1977) tested 96 student volunteers who worked on mathematics problems in preparation for university admissions tests. The students were assigned to one of four monitoring groups: 1. negative self-monitoring; 2. positive self-monitoring; 3. no self-monitoring, or 4. a control group.

In this experiment subjects were asked to work on either difficult (35% response accuracy) mathematics tasks or relatively simple (65% response accuracy) mathematics tasks. Performance results indicated that negative self-monitoring of the difficult (35% response accuracy) mathematics tasks caused the expected self-regulatory failure, in line with predictions for Principle 1. However, when subjects were asked to work on the relatively simple (65% response accuracy) mathematics
tasks, results were obtained that were not predicted by Principle 2. Instead of negative self-monitoring improving performance on the easy task, negative self-monitoring actually lowered performance compared to the performance feedback and control groups. This type of response is usually associated with Principle 1 and difficult tasks.

Similarly, positive self-monitoring was expected to occasion self-regulatory failure when the task was relatively simple, in accordance with Principle 2. Yet results indicated that under this relatively simple task difficulty condition positive self-monitoring facilitated accurate responding when compared to negative self-monitoring and control groups. Again this was a response in line with Principle 1 rather than Principle 2. Performance results from the use of self-monitoring strategies appear to indicate that the subjects consider both the 35% and the 65% response accuracy tasks as difficult, not easy tasks. Hence performance results from both levels of mathematics tasks support Principle 1.

Results from Kirschenbaum and Karoly's (1977) study were as predicted by Principle 1, however they hypothesised that results would concur with Principle 2. The mathematics task used in their study had a maximum response accuracy of 65%. Tomarken and Kirschenbaum's (1982) subsequent study suggests this response accuracy level represents a difficult, not an easy, well-mastered task. The monitored task needs to be of a sufficiently low difficulty in order to induce behaviours that will cause responses in line with predictions from Principle 2. Tomarken and Kirschenbaum (1982) suggest that positive self-monitoring should facilitate self-regulatory failure only in a task situation that has a response accuracy of 65% or greater. Alternatively, it could be suggested that negative self-monitoring will only facilitate performance increases when used in task situations which have a response accuracy of 65% or more.

Figure 1.4 below represents the conclusions drawn from the Kirschenbaum and Karoly (1977) and Tomarken and Kirschenbaum (1982) investigations in regard to task difficulty level and performance. These conclusions are supported in studies by Mahoney, Moore, Wade, and Moura (1973) and Wade (1974), that will be investigated next.
Principle 1
Difficult Tasks
0% to 65/70%
response accuracy
Positive Self-Monitoring
Improves Performance
Negative Self-Monitoring
Impairs Performance

Principle 2
Easy Tasks
65/70% to 100%
response accuracy
Positive Self-Monitoring
Improves Performance
Negative Self-Monitoring
Impairs Performance

Figure 1.4: Response accuracy levels and the effects of self-monitoring

Mahoney, Moore, Wade, and Moura's (1973) study confirms the suggestion in Figure 1.4 that a response accuracy of less than 65% is needed to achieve results in-line with predictions from Principle 1. One group of subjects in the Mahoney et al., (1973) study recorded each correct response to a general aptitude test on a feedback-teaching machine (i.e., they positively self-monitored), while the other two groups got either feedback or no feedback, with no monitoring opportunities. The task was assessed post-hoc to have a 51% response accuracy. Those subjects who positively self-monitored maintained their review of efforts significantly longer and performed more accurately on the task. Positive self-monitoring of a moderate task (i.e., 51% response accuracy) facilitated performance, in-line with predictions from Principle 1.

Wade (1974) had subjects perform a task with an 85% to 94% response accuracy rate. He reported that positive self-monitoring of this task facilitated poor performance. This suggests that an 85% to 94% response accuracy level will achieve results in line with predictions from Principle 2. Other research from Tomarken and Kirschenbaum (1982), which used tasks with a response accuracy levels of 70% or greater, also revealed that positive self-monitoring facilitated self-regulatory failure, in line with predictions from Principle 2. Both these studies suggest that a response accuracy of 70% or greater is needed to achieve results in line with predictions from Principle 2.
In summary of the previous research (Kirschenbaum & Karoly, 1977; Mahoney et. al., 1973; Tomarken and Kirschenbaum, 1982; Wade, 1974) the following conclusions appear warranted (see also Figure 1.4 above):

1. Tasks with a response accuracy of 65% to 70% or less (i.e., from 0% to 70% response accuracy) will facilitate a decreased performance if negative self-monitoring is implemented.

2. Tasks with a response accuracy of 65% to 70% or less (i.e., from 0% to 70% response accuracy) will facilitate an increased performance if positive self-monitoring is implemented.

3. Tasks with a response accuracy of 65% to 70% or more (i.e., from 70% to 100% response accuracy) will facilitate an increased performance if negative self-monitoring is implemented.

4. Tasks with a response accuracy of 65% to 70% or more (i.e., from 70% to 100% response accuracy) will facilitate a decreased performance if positive self-monitoring is implemented.

Having examined the research into the effects of positive and negative self-monitoring on performance, it would appear that the use of a particular self-monitoring strategy can be either detrimental or assist in performing a motor task. The magnitude of the effect of the positive or negative self-monitoring on task performance is at least dependent upon the monitor's degree of mastery of the task. It appears that the effects of using a self-monitoring strategy change when subjects response accuracy levels are above or below 65% to 70%.

1.2.10 Establishing Valid Levels of Task Difficulty

Clearly the subject’s response accuracy level is a crucial component in determining how the performance outcome will be influenced by the use of a self-monitoring strategy. However, one limitation in the
previous self-monitoring literature is the apparent lack of concern for the use of subject-based definitions of the criterion task. Thus, this section will examine information concerning how criterion task definitions are attained.

Certain levels of response accuracy are necessary to effect behavioural change if using a self-monitoring strategy (e.g., Mahoney, Moore, Wade, & Moura, 1973; Tomarken & Kirschenbaum, 1982; Wade, 1974). In previous literature many researchers have assumed that their subjective categorisation of an experimental criterion task, as an easy, moderate or difficult task, is commensurate with their subjects’ perceptions of the task (e.g., Burton, 1989; McGowan & Schultz, 1989). If the results of the previous self-monitoring research are to be used as the basis for implementing self-monitoring strategies, then it is necessary to confirm that subjects’ perceptions of the criterion task match the experimenter’s implied task perception. If the correlation between the subjects’ classification of the task and the researcher-defined classification of the task is low, then the validity of a study may be questionable. The subjects’ perceptions concerning their level of skill mastery on the criterion task must match the experimenter’s perceptions.

An example of this problem in the extant literature is evident in a study by McGowan and Shultz (1989). The authors explored differences in affect of American collegiate football athletes who performed simple and complex sport skills. McGowan and Shultz (1989) designated offensive positions on the football team as complex tasks and defensive positions as simple tasks. These designations were not based on any established criteria, neither researched nor anecdotal, other than the authors’ subjective opinions. The authors failed to utilise any of the existing task classification schemata (e.g., Farrell, 1975; Fleishman, 1975; Gentile, Higgins, Miller and Rosen 1975; Harrow, 1972) to analyse the gross motor components of the offensive and defensive skills. Nor did the researchers consider individual differences among subjects, such as previous experience.

An additional limitation in this research is the apparent failure of experimenters to ask the subjects to confirm the validity of the task
designation as simple or complex. In the McGowan and Shultz (1989) study, there may have been inexperienced defensive linemen who perceived the criterion task, designated in the study as 'simple' to be quite difficult. Similarly, there may have been experienced offensive players who, contrary to the 'complex' skill designation, may have perceived the skill as relatively simple. The individual perceptions of the task may have influenced the players' responses to the affect and attention questionnaires which in turn, may have confounded results. It is evident that asking subjects about their perceptions of task difficulty will validate the researcher-defined task difficulty classification.

In another example of ignoring the individuals' perceptions of task difficulty, Burton (1989) studied the effects of goal setting on simple and complex basketball tasks. He categorised the task complexity of seven basketball skills by using Landers and Boutchers' (1986) skill categorisation model. This model rates the complexity of motor skills based on the perceptual, decisional and motoric response characteristics of the task. Burton defined the basketball skills as highly complex, based on the performer's use of numerous muscles and fine motor coordination. However the rating of high task complexity was not verified with the performers. Burton neglected to ask his subjects whether they agreed with the skill grading classification indicated by the categorisation model. Consequently, there was no correlation reported between the model's skill categorisation and the subject's perceptions of the basketball skill. An important issue, not addressed in this study, was whether some subjects perceived the basketball task to be easier than did other subjects, and consequently, did these different task perceptions alter the effectiveness of the goal setting strategies used.

Giannini, Weinberg and Jackson (1988) also objectively quantified the basketball tasks used in their experiment as simple or complex. They identified a timed shooting task as low in co-ordinative and dynamic complexity and, as such, it was designated by them as a simple task. The one-on-one offensive basketball task was high in co-ordinative and dynamic complexity, and thus was considered a complex task.
The researchers also used pretesting procedures to match their subjects and to ensure that they had the prerequisite skills to participate in the basketball tasks. Although test-retest reliability for the simple and complex tasks was .84 and .91, respectively, they did not ask their subjects to confirm the differences in simple and complex task difficulty. Thus, despite consistent performance, validity of their task classification is tenuous.

In non-sporting contexts, similar assumptions about the classification of task difficulty have also previously been made. Investigating the effects of a difficult versus an easier task on state-trait anxiety, Finch, Kendall, Dannenburg and Morgan (1978) gave children two lists of nonsense syllables. These lists were operationally defined by the experimenters as easy or difficult by the 'meaningfulness of the nonsense syllables' (p. 254). According to pilot tests, the nonsense syllables - two lists of ten consonant-vowel-consonant type words - were reported to vary in meaningfulness from easy (100% meaningful) to difficult (0% meaningful). Again the experimenters, rather than the subjects, determined task difficulty. Subjects were not asked to confirm the researchers' 'meaningfulness' classifications. While it may have been valid to pilot test whether the tasks were meaningful to subjects, a reaffirmation of the task difficulty classifications in such research is warranted.

Another study that highlights the need for experimenters to implement task difficulty confirmation by subjects is Garland's (1982) replication of an earlier study by Locke, Shaw, Saari, and Latham (1981). Garland (1982) investigated how different levels of goal difficulty related to task performance. It is unclear in the Garland study exactly who designated the goal difficulty levels as easy, medium and hard, however there is no indication from the literature that it was the subjects. These goal difficulty levels were most probably imposed by the experimenters. Regardless of the manner in which the goal difficulty levels were set in the Garland study, it would appear that the task classifications were not determined or validated by the subjects.

More in line with a subject-validated task difficulty system, Wright and Brehm (1984) used subjects' behaviour as the basis of a
classification system. After some warm-up trials, subjects used a hand dynometer and were assigned to one of three difficulty conditions: 1. easy ('You should just move the indicator needle'); 2. difficult ('You should squeeze your initial maximum level plus 5 on the dial'), or 3. impossible ('You should squeeze twice your initial maximum effort'). However, again, these task classifications were not confirmed by the subjects in the study.

Throughout the extant literature, researchers have assumed that their categorisation of an experimental task is commensurate with the subjects' task categorisation. Researchers need to validate their assumptions of task difficulty with their subjects. If they do not, then any further research may be invalid.

1.2.11 Confirming Task Validity: A Basis for Scientific Reliability

The following section will examine information concerning how criterion task definitions should be attained. In attempting to ensure validity in skill difficulty classification three strategies are needed. First, skill levels that are being used in the investigation must be pilot tested (Cozby, 1985). Second, average performance scores (i.e., response accuracy rates) must be determined for each level of task difficulty tested (Nicohols, 1978, 1980; Nicohols, Miller & Arden, 1983), and finally, as indicated, subjects must confirm task difficulty categorisations.

The averaging of performance scores in order to designate task difficulty levels, and to ensure that subjects and experimenters have a similar conceptualisation of a task's degree of difficulty, is known as the normative testing approach (Nicohols, 1978, 1980; Nicohols, Miller & Arden, 1983). Kirshenbaum and Karoly (1977) employed the normative approach to validate task difficulty classification in their investigation into self-regulatory failure. The authors used mathematics tasks of varying levels of difficulty to determine the performance effects of different self-monitoring strategies.

Through a comprehensive pilot testing program, Kirshenbaum and Karoly (1977) compiled means for low- and high-difficulty sets of
mathematic problems. As indicated previously, the nominally 'low-difficultly' set contained problems that were answered correctly by at least 65% of the pilot sample, while the 'high-difficulty' problems were answered correctly by no more than 35% of the pilot sample. The researchers then pretested subjects on 20 mathematic problems of moderate difficulty to ensure that they had appropriate entry-level skills for their experiment. The researchers knew that the mathematic problems were of moderate difficulty because they had pilot tested numerous problems on other students prior to their pretesting.

The use of a normative approach by Kirshenbaum and Karoly (1977) provided useful approximations of task difficulty levels, however, the researchers neglected to confirm their task difficulty nomenclature with subjects' perceptions. It would appear that researchers should have made this confirmation with the subjects, as experimental results indicated that the nominally 'low-difficultly' group, in fact, performed in accordance with predictions for the 'high-difficulty' group. A confirmation of the subjects' perceptions of task difficulty may have indicated that a stronger level of criterion task was required for the independent variable. The normative approach is excellent for determining task performance levels, yet the labelling of those performance levels should be guided by the perceptions of the performers.

Earlier investigations have used a normative approach to determine average performance levels. For example, Mowen, Middlemist and Luther (1981) examined the effect of goal difficulty levels on task performance. Based on the results of a pilot test to determine how many addition problems could be solved in 40 minutes, Mowen et al., (1981) found that all subjects could solve 30 problems, half the subjects could solve 55 problems, and none of the subjects could complete 95 problems. Consequently goal difficulty levels were assigned as hard, medium and easy, respectively. Yet again no subject confirmation of these objective scores was made.

Huber (1985) also utilised a normative approach to determine goal difficulty levels on a computer maze game. In order to establish
appropriate goal levels, a pilot study was conducted. Forty students solved either three easy or three difficult mazes. The distribution of average scores was examined to select easy, moderate, and difficult goals for each maze task. Because half (median) of the subjects in the easy task condition took more than 70 moves to solve the maze, this performance level was chosen as the moderate goal. For the difficult mazes, 10 subjects (50%) averaged more than 300 moves, this served as the criterion for the moderate goal. Because only five persons (25%) took fewer than 50 moves and five (25%) more than 90 moves, these performance levels were chosen as the difficult and easy goals, respectively, for the easy task. For the difficult task, the easy goal was 375 moves and the hard goal was 225 moves. A total of 75% and 25% of pilot subjects, respectively, achieved these levels. But again no subject confirmation of these objective task difficulty score levels were made.

Kieffer (1976) also applied a normative approach to validate task difficulty classifications for a pursuit rotor task. In a pilot study, he recorded subjects’ times and from these times he determined easy and hard task difficulty levels for the study. Meyer, Schacht-Cole and Gellatly (1988) also used a pilot test to determine mean scores for easy, moderate and hard creativity goals, to be used for investigating cognitive mechanisms by which assigned goals affected creative performance. Neither of these researchers, however, reported the exact means by which the percentage scores for each level of task difficulty was determined. Yet, it is clear that the authors implemented a normative approach, averaging pilot test results for each task in order to determine the degree of task difficulty.

The normative approach to task difficulty validation may still partially neglect to allow for the individual’s unique interpretation of the task’s degree of difficulty. However, this technique has been viewed as a far more valid method of categorising task difficulty than subjective experimenter-designation (Nicohols, 1978, 1980; Nicohols, Miller & Arden, 1983). While a normative approach to discovering subjects’ perceptions of task difficulty appears valid, it is also essential that subjects confirm the obtained norms, because a test’s validity:
...must be established with reference to the particular use for which the test is being considered' (Anastasi, 1982, p. 131).

Ultimately the only way in which researchers can be 100% sure that subjects are interpreting the degree of task difficulty in the same way as they are is to ask the subjects to confirm the task difficulty levels during and/or after task performance.

Aponik and Dembo (1983) validated three levels of mathematics task difficulty in their investigation of causal attributions, by questioning the subjects about their perceptions of task difficulty. As part of their testing procedure, they asked the subjects to respond to the question:

The above items have in the past been found to be easy (moderate, difficult) items to answer correctly. Do you believe the items were: (a) easy; (b) of moderate difficulty, or (c) difficult? (p. 33).

Although the authors did not report the correlation between the tasks' classifications and the subject's interpretations of the task, this experimental technique validated their imposed levels of task difficulty.

Many researchers have neglected to ask their subjects to confirm the task difficulty designations. Part of the problem that influences researchers' assumptions about the subject's interpretation of task difficulty is the lack of recognition of the role of cognitive processes in skilled performance.

1.2.12 Cognitive Processes in Skilled Motor Performance

Motor tasks differ in the degree of physical, situational and cognitive demands placed on the performer. Therefore, learning and performing motor skills with efficiency requires the performer to determine the cognitive, as well as the physical and situational task demands (Singer & Gerson, 1981). One approach to organising these various demands is through the development of classification systems and taxonomies for the psychomotor domain.

Farrell (1975), Fleishman (1975), Gentile, Higgins, Miller and Rosen (1975) and Harrow (1972) have all provided comprehensive classification systems and taxonomies designed to help describe the
physical processes of task performance. For example, Gentile et al.,'s (1975) model uses kinematic and visual inspection with attention to limb co-ordination as a basis for task analysis. Their model also gives consideration to whether the task is self-paced, mixed-paced or externally paced. The performer is the focal point of each of these skill classification models, but only the physical actions of the person are recognised. Not accounted for are the mental processes through which an individual progresses in performing a motor skill.

Simpson (1966, 1972) characterised skilled behaviour as reflective of not only a physical component, but also reflective of the mental and emotional states of the performer. The relationship between the physical and psychological domains of behaviour cannot be overlooked, especially if performance is to be described appropriately and effectively. While previous skill researchers have considered many of the physical aspects of the motor task, few have given consideration to the performer's cognitive involvement in the various skill activities (Singer & Gerson, 1981). Consequently, some researchers (e.g., Huber, 1985; Meyer, Schacht-Cole and Gellatly, 1988) have assumed that if they accurately classify the physical actions of the experimental task, it will follow that the subjects performing these tasks will perceive them in the same way as described in the classification system.

While some researchers have apparently neglected to consider the cognitive side of performance, there are several authors who have emphasised the importance of cognitive skills and knowledge as a foundation for performing complex motor behaviours. The role of cognitive skills in executing skilled movements has been examined in the sports of basketball (Allard, Graham, & Paarsalu, 1980; Bard & Fleury, 1976; French & Thomas, 1987), hockey (Starkes & Deakin, 1984; Bard & Fleury, 1981), and tennis (Jones & Miles, 1978). For example, in French and Thomas' (1987) examination of the relationship between sport-specific knowledge and childrens' basketball skills two salient conclusions were made. First, basic motor skills and cognitive decision-making skills are related to the knowledge of basketball. That is, sport-specific knowledge is necessary for skilled basketball performance. Second, knowledge is, in part, responsible for the

Russell's (1990) research with athletes also underscores the importance that cognitive skills and level of knowledge have on motor performance. Russell used structured interviewing techniques and inductive content analysis to examine how 20 expert athletes from four different sports defined and classified sport task situations. The research highlighted the way that these highly skilled, competitive athletes, perceived and categorised situations. These performers appeared to organise knowledge of their sport on the basis of underlying performance principles, rather than reacting to surface features of a sport problem, as low-skilled performers often do. Research suggests that there are important differences in respect to cognitions for high- and low-skilled performers.

While it appears that some researchers have chosen to ignore the cognitive variable in their experimental methodology. The role of cognition in motor performance is undeniable. Therefore unless the performers' cognitions are considered in a task analysis and classification, experimental results may be confounded. It is apparent that both normative testing of the criterion task and obtaining the subjects' task perceptions are limitations that need to be overcome in order to correctly define and validate the level of task difficulty.

1.2.13 Some Limitations of Previous Self-Monitoring Research

As indicated in Chapter 1.2.3, there are studies in which self-monitoring has yielded no significant effect on behaviour (see a review by McFall, 1977). Many of these earlier studies have had limitations due to confounding variables and research design. For example, at a stop-smoking clinic, volunteers were encouraged to self-monitor their smoking behaviour for a three-week period as a part of the treatment program (McFall & Hammern, 1971). The positively self-monitoring subjects gave themselves a 'positive point' on a wrist counter each time they successfully resisted the temptation to smoke. Subjects in the
negatively self-monitoring group recorded 'negative points' each time they were unable to resist the smoking of a cigarette. A control group received no self-monitoring instructions other than to record daily consumption. A second positive self-monitoring group were required to earn at least 20 positive points per day on their wrist counter. Results revealed no statistically significant differences in the success rates of the different self-monitoring conditions. Significant decreases in the smoking rate were achieved for all self-monitoring groups, however all groups in the study relapsed to near baseline consumption levels at the time of a six month follow-up. Poor methodological considerations and other confounding factors in this study make the implications of these results in regard to self-monitoring somewhat tenuous (Kirschenbaum, 1982). In this study, demand characteristics (Orne, 1962) including therapist contact, direct instruction to quit and contracts to quit entirely can cue subjects to behave in ways that tend to confirm the hypothesis. Care must be taken to ensure a consistent and unbiased verbal protocol is used if a double blind technique is not available. The use of carefully prepared written instructions can considerably decrease the subject's perceptions of the experimental manipulation and consequently decrease the chance of confounded results (Cozby, 1985).

Kantorowitz, Walters and Pezdek (1978) also investigated stop-smoking treatment programs comparing negative self-monitoring (recording number of cigarettes smoked) versus positive self-monitoring (recording number of urges resisted). In accordance with previously described self-monitoring principles, the positive self-monitoring group was predicted to show a greater reduction in smoking behaviour than the negative self-monitoring group. However, over the course of the treatment, subjects in both groups demonstrated significant reductions in smoking frequency as compared to a no-treatment (control) group. In a review of eight previous smoking studies, McFall and Hammen (1971) concluded that significant reductions in the rate of smoking could be achieved during any smoking cessation treatment program irrespective of the specific behavioural treatment techniques employed. This may be one reason for the lack of differentiation in performance of the positive and negative self-monitoring groups in the Kantorowitz et al., (1978) study.
Principles of self-monitoring, discussed earlier, predict that both McFall and Hammen (1971) and Kantorowitz et al., (1978) should have found significantly reduced smoking behaviour for positive self-monitors and increased cigarette consumption for negative self-monitors. Yet, both studies revealed no significant differences between groups. According to these studies the effect of using a self-monitoring strategy on a difficult behavioural task would appear inconclusive. However, again, certain avoidable methodological constraints, experimenter demand characteristics (Orne, 1962) and subjects' volatile reactions to smoking behaviour treatment make it difficult to interpret the results of these smoking cessation studies in regard to self-monitoring. Close attention to all methodological considerations is necessary for successful self-monitoring research.

As well as considering factors that affect the performance of individuals who positively and negatively self-monitor, this present study is also concerned with gathering information on cognitive matters related to performance. Questions about the influence of positive and negative self-monitoring on psychological factors, such as attribution, expectancy, and emotion may partially determine whether changing self-monitoring strategies as a function of task difficulty is possible. There is a plethora of literature concerning how varying degrees of affect, attribution and self-efficacy impact the process of self-regulating motor behaviours (see reviews of affect by Vallerand, 1986; attributions by Brawley 1986; and self-efficacy by Feltz, 1986; Horn, 1986). However, a paucity of research has been published on how self-monitoring, a process behavioural self-regulation, influences these three cognitive factors. The following chapters will investigate the influence that the use of self-monitoring strategies has on affect, attributions and expectancies.

1.2.14 Self-Monitoring, Affect, and Behaviour

In order to understand how positive and negative self-monitoring might influence affect, it is necessary to understand how positive and negative self-monitoring functions. As previously indicated, an individual's ability to recognise and/or record positively valued
behaviours or attributes is termed positive self-monitoring. Conversely, negative self-monitoring refers to the tracking of negative behaviours or characteristics that an individual desires to decrease. Positive self-monitoring draws attention to 'good' behaviours, while negative self-monitoring draws attention to 'bad' behaviours (Tomarken & Kirschenbaum, 1982; McFall & Hammen, 1971).

Kirschenbaum, Tomarken and Humphery (1985) have suggested that the use of a self-monitoring strategy will induce changes in affect commensurate with the performer's current self-monitoring strategy. They suggest, in fact, that the use of a positive or negative self-monitoring strategy is tantamount to using a mood induction procedure. Mood induction is a process where individuals significantly change their mood by reading a series of self-statements that may be positive (e.g., 'I know I've got what it takes to succeed') or negative in nature (e.g., 'I am discouraged and unhappy about myself'). The validity of this procedure as a means of inducing affect has been well documented in several controlled studies (e.g., Alloy, Abramson & Viscusi, 1981; Coleman, 1975; Polivy & Doyle, 1980; Sirota & Schwartz, 1982; Velten, 1968).

Kirschenbaum et al., (1985) contend that 'positive self-monitoring clearly resembles positive affect' (p. 511). The authors submit that positive self-monitoring increases attention to self-generated positive outcomes which in turn increases positive affect. Accordingly, as positive self-monitoring continues, the self-monitors' positive affect should increase. Reaven and Peterson (1985-86) support this hypothesis in their examination of 10 nursing home residents. The authors found that self-monitoring positive physical and mental functioning had a positive influence on the elderly subjects' mood.

The Kirschenbaum et al., (1985) study addressed the influence of positive self-monitoring on positive affect. Yet their suggestions also indicate that negative self-monitoring acts in a similar, but opposite, manner to the process described for positive self-monitoring. Thus, ostensibly, negative self-monitoring would draw attention to negative self-aspects, resulting in negative affect. As the use of negative self-monitoring continues negative affect increases.
Other than Reaven and Peterson (1985-86), Tomarken and Kirschenbaum (1982) appear to have been the only researchers to examine the process of self-monitoring on the self-monitors' affect. Tomarken and Kirschenbaum (1982) investigated the impact of self-monitoring on affect with 66 American college students who participated in three 15-minute mathematic problem-solving periods. Throughout each problem-solving period students either positively self-monitored, negatively self-monitored, or received performance feedback without using self-monitoring. The two self-monitoring groups were further divided into a low-frequency self-monitoring group (i.e., self-monitored twice within the 15-minute problem solving period) and a high-frequency group (i.e., self-monitored six times within the 15-minute problem solving period). At the end of each problem-solving period participants completed an arousal questionnaire - the Inventory of Personal Reactions - State Test II (1977). Of the five factors on the Zuckerman Inventory one dealt with positive affect, while another dealt with negative affect.

Based on the Inverted-U or activation/arousal hypothesis (Yerkes & Dodson, 1908) Tomarken and Kirschenbaum (1982) suggested that using positive self-monitoring would lead to decreased arousal and increased positive affect, whereas negative self-monitoring would be an antecedent for high arousal and decreased positive affect. However, with the 66 subjects monitoring their mathematics performance they found no significant differences in positive affect due to self-monitoring condition. That is, no significant differences for positive affect scores were found between the positive self-monitors, negative self-monitors or the performance feedback group. This result was noted as 'surprising' by the authors especially considering that positive self-monitoring induced self-regulatory failure of performance in accord with Principle 1. Consequently, changes in positive affect were expected to follow.

Negative self-monitors tended to report greater negative affect than positive self-monitors, in accord with predictions from self-monitoring principles. This indicated that negative self-monitoring did, in fact, facilitate negative affect. Smith, Ingram, and Roth (1985) provided
indirect support for this finding in their study which shows that negative self-evaluations, on a self-consciousness scale, lead to depression. Tomarken and Kirschenbaum's (1982) findings are also supported by several cognitive theories of depression (e.g., Beck, Rush, Shaw & Emery, 1979; Rehm, 1977) which stress that people become depressed by selectively attending to unpleasant or negative information about themselves. Individuals tend to seek out and remember information that is congruent with their induced affective states (Kirschenbaum, Tomarken & Humphery, 1985; Wright & Mischel, 1982). If negative self-monitoring becomes particularly aversive then people may tend to withdraw from self-monitoring and thus self-regulation of behaviour may cease (Carver, 1979). Individuals may behaviourally withdraw from the aversive situation if feasible, or attentionally if behavioural withdrawal is impossible (Kirschenbaum, Tomarken & Humphery, 1985; Carver & Scheier, 1981).

Kirschenbaum et al., (1985) have also suggested that, similar to the self-monitoring/performance relationship explored earlier, there is a task mastery component involved in the self-monitoring/affect relationship. This suggests that self-monitoring will impact on affect differently under different levels of task mastery. The authors suggested that self-monitoring in difficult task conditions (e.g., a 30% response accuracy) will exaggerate affect. For example, positive affect will be increased when positively self-monitoring in a difficult task condition. Similarly negative affect will be amplified by negative self-monitoring in a difficult task condition. Explaining the mechanism that underlies the influence of self-monitoring on affect in difficult conditions Kirschenbaum et. al., (1985) suggest that performing difficult tasks increases arousal (e.g., Kirschenbaum & Karoly, 1977), which, in turn, increases self-focused attention (Wegner & Giuliano, 1980, 1983). Because heightened self-focused attention typically magnifies affective states (e.g., Kirschenbaum & Tomarken, 1982), it is plausible to suggest that positive self-monitoring should intensify positive affect and negative self-monitoring should similarly deepen negative affect in difficult conditions.

Under easy task conditions (i.e., a 70% response accuracy) positive self-monitoring can lead to poor performance (Principle 1).
Kirschenbaum et al., (1985) postulate that positive self-monitoring of an easy task may intensify positive affect. However, they also cite studies (e.g., Raps, Reinhard & Seligman, 1980; Wright & Mischel, 1982) that suggest that both positive and negative affect is minimally influenced by performance and performance-based cognitions (e.g., the use of a self-monitoring strategy) under easy task conditions. They submit that the positive affect generated as a consequence of task success and positive self-monitoring may minimise any negative affect and, consequently restrict the range of affective response by the subject. They further suggest that because the performance of easy tasks typically proceeds in an 'automatic' fashion, then performance pertains more directly to how the performer's attention is focused rather than affective states. In the study by Kirschenbaum et al., (1985) positive self-monitoring had relatively little impact on affect in the easy task condition.

In the easy task situation, heightened attentiveness to errors occasioned by negative self-monitoring may not produce changes in affect. Instead, it may actually produce enhanced task-focused attention or 'action orientation' (Kuhl, 1984). Action orientation is a cognitive activity characterised by heightened task focus and an active search for problem-solving techniques (Carver & Scheier, 1981). Negative self-monitoring in the easy task situation may, in fact, induce the utilisation of more sophisticated problem-solving strategies, focusing on performance enhancement rather than influencing affect. Therefore, both positive and negative self-monitoring of easy tasks is expected to have relatively little impact on affect.

In summary, in a difficult task condition research suggests that positive self-monitoring will increase positive affect. Similarly, negative affect will be amplified by negative self-monitoring in a difficult task condition. Both positive and negative self-monitoring of easy tasks is expected to have relatively little impact on affect.

1.2.15 Self-Monitoring, Attributions, and Behaviour

Attribution theory focuses on how individuals explain the causes of their behaviour and the behaviour of others (McAuley & Duncan,
1990). When people explain the reasons for their performance outcomes, causes can be investigated and, if necessary, changes in emotions and/or expectancies can be implemented for future performances (Kirschenbaum, Tomarken and Humphrey, 1985).

Some cognitive psychologists suggest that emotional reactions to events are in fact preceded by a cognitive appraisal of an event outcome (Arnold, 1960, 1970; Weiner, 1985). Consequently, if, as illustrated in the previous section, using a self-monitoring strategy can impact on affective reactions then, it may also be possible that the use of a particular self-monitoring strategy will influence attributions. Thus the attribution/affect/behaviour linkage could be in effect (McAuley & Duncan, 1990).

In an example of linking a performer's actions with attributions and emotions, researchers (e.g., Weiner, 1985) suggest that prior to making causal attributions, individuals initially engage in a causal search to explain performance outcomes. The attributions are subsequently linked to the subjects' emotions. For example, the batter who is almost hit with the thrown baseball on two consecutive pitches may attribute this to purposeful and antagonistic actions of the opposing pitcher (attribution). Accordingly, the batter may react with anger and hostility (affect), rushing the mound, and instigating a bench-clearing brawl between the two teams (behaviour) (McAuley & Duncan, 1990). The attribution/affect/behaviour link is in effect.

The attribution/affect/behaviour relationship consists of three stages, with each stage involving progressively more complex cognitions (Weiner, 1985). In the first stage it is assumed that upon experiencing an achievement related outcome, individuals will appraise performance, and subsequently rate it on a continuum ranging from subjective success to subjective failure. A key postulate of Weiner's (1985) model is that this subjective performance appraisal generates a broad set of outcome-dependent general affects (e.g., success = happy; failure = sad). These outcome-dependent emotions are very general positive or negative reactions experienced immediately following success or failure outcomes, regardless of the performance outcome to which the
cause is ascribed. Thus, individuals immediately ‘feel good’ when they succeed and ‘feel bad’ when they fail, irrespective of the causal attribution made for the outcome (McAuley & Duncan, 1990).

In the second stage, the individual is assumed to undertake an attributional search in order to identify the causes of the performance outcome. In the third and final stage, affect is displayed in some form of behaviour. The resulting affective reaction is the product of the individual’s reflective appraisal of the event, and the formation of specific emotions is influenced by the person’s specific causal attributions. However it is not the causal attribution itself that is directly related to formation of the emotion. Rather, it is the common underlying properties of these attributions, the causal dimensions, that are theorised to precipitate the distinct affective reactions to achievement outcomes (Robinson & Howe, 1989; Weiner, 1979, 1985, 1986). These casual dimensions offer a clearer conceptual framework for understanding how diverse causes influence behaviour in similar ways. Each causal dimension is postulated to be responsible for the generation of specific enduring affective reactions. The postulated relationships between causal dimensions and affect have been described by McAuley and Duncan (1990) and are as follows.

Internal locus of control attribution dimensions (e.g., personality, ability) for success and failure outcomes are related to self-confidence, and will, respectively, raise or lower an individual’s sense of self-esteem. External locus of control attribution dimensions for success and failure outcomes are linked, respectively, to positive or negative affect toward the external source that influences the performance (Robinson & Howe, 1989; Weiner, 1985). Controllability attribution dimensions are hypothesised to generate emotions that have a moral or ethical component to them. For example, a negative personal outcome ascribed to factors controllable by others is associated with anger (Weiner, Graham, & Chandler, 1982), while a similar outcome ascribed to uncontrollable personal factors (e.g., ability) is hypothesised to be associated with shame (Weiner, 1985) and lowered self-esteem (Covington, 1984; Seligman, 1975). The primary influence of the stability attributional dimension is considered to be on the expectancy
of future outcomes, a secondary influence of this dimension is hypothesised to be on the magnitude of emotional reactions, particularly those of a self-related nature. For example, failure attributed to a stable cause (e.g., ability) is proposed to contribute to feelings of depression and apathy. Emotions generated by an unstable attribution (e.g., effort) are proposed as unlikely to be extended to future events (Weiner, 1985).

Drawing upon the previously described model by Weiner (1985) and models developed by Lazarus (1966, 1984), and Arnold (1960), Vallerand (1986, 1987) proposed a model for the formulation of emotions, which also suggests that two types of cognitive appraisal, known as intuitive and reflective appraisal, may influence affect. For Vallerand (1987), intuitive appraisal represents an immediate response to, or perception of, how well the task was performed. Vallerand (1987) suggests that, in sport, intuitive appraisal may best be reflected by a person's perceptions of how well or poorly a task was performed (McAuley & Duncan, 1990). This is similar to Weiner's (1985) outcome-dependent emotions (i.e., Stage 1 of Weiner's model).

The second component of Vallerand's (1987) model, reflective appraisal, unlike intuitive appraisal, involves concentrated cognitive processing invoking a number of reflective processes including causal attributions that result in emotional responses. Such appraisal is a close parallel of Weiner's et. al.'s (Weiner, 1985; Weiner, Russell & Lerman, 1979) postulations concerning attribution-dependent emotions (i.e., Stage 3 of Weiner's model) (McAuley & Duncan, 1990; Robinson & Howe, 1989).

Vallerand (1986, 1987) suggests that how individuals perceive themselves to have performed (i.e., subjective success or failure) will give rise to affect. This affect will invoke causal attributions that result in emotional responses. Weiner (1985) and his colleagues (Weiner et al., 1979) have also identified certain emotions that are a function of the achievement outcome. However, Weiner et al., suggest that these feelings are very general and do not strongly impact on causal ascriptions or affect. Vallerand (1986, 1987), and more recently
McAuley and Duncan (1990), and Robinson and Howe (1989) present evidence to support the hypothesis that suggests that intuitive appraisal plays a large role in directly influencing affect from which causal ascriptions are made.

Within the scope of the present paper, the debate between Weiner’s (1985) model and Vallerand’s (1987) model is largely theoretical rather than applied. Weiner (1985) suggests that attributions made by the performer directly influence affect; this is a relationship that suggests attributions precede affect. On the other hand, Vallerand (1986, 1987) suggests that emotions influence attributions which, in turn, influence affect, an affect/attributions/affect relationship. The influence of attributions on affect is recognised in the previously described models. Both Vallerand’s (1987) and Weiner’s (1985) models confirm that certain attributions generate particular emotions. For example, in both models, attributions to uncontrollable personal factors such as a lack of ability are associated with the generation of a shameful affect. Therefore, while the question of 'when' the affect is generated differs between Weiner’s (1985) and Vallerand’s (1987) model, the fact that affect is generated from the person's attributes is consistent.

Kirschenbaum, Tomarken and Humphrey (1985) are, perhaps, the only researchers who have studied the effect of positive and negative self-monitoring on attributions. The authors measured changes in attributions for performance in low and high mastery conditions before and after affect induction. Results indicated that attributions under high-mastery (easy) conditions were not significantly influenced by mood induction. This result was expected, considering that there were no differences in affect under the easy task condition. What attributions were given by subjects for their performance in the easy condition are not reported. However, in the low-mastery (hard) condition, subjects experiencing positive affect induction attributed their performance more to the difficulty of the task than to their ability as compared with subjects with induced negative affect. When the task was difficult, 'positive mood' subjects attributed performance to external unstable factors, more so than did subjects with negative
affect, who attributed the outcome to internal stable factors. Greater shame and dissatisfaction is experienced by the individual who attributes poor outcome to internal factors, as opposed to when the individual believes that the performance was attributable to external factors (Leith & Prapavessis, 1989).

In a related study, Rusdill (1988) investigated how perceived competence would influence the causal dimension orientation of subjects. Ninety male and female subjects responded to the Causal Dimension Scale (CDS) after receiving fictitious negative feedback while performing a stabilometer balancing task. The negative feedback suggested that the subjects performed below average compared to other college age students. Those subjects who perceived their performance due to internal, controllable and unstable factors significantly increased their expectations across trials, however, internal, uncontrollable and stable perceptions decreased performance expectations across trials.

This present study is concerned with the attribution and affect relationship and how it will be influenced by the use of a positive or negative self-monitoring strategy. Research suggests that when subjects are performing in the difficult condition then positive self-monitoring may produce attributions to external unstable factors, while negative self-monitoring may generate internal stable factors. The little research available at present, suggests that attributions in easy task conditions will be minimally influenced by the use of either self-monitoring strategy.

1.2.16 Recording Attributions

Early researchers in the study of attribution neglected to recognise that subjects should be active participants in dimensional scale ratings of their causal attributions (McCauley & Duncan, 1990). Subjects were forced to select attributions from tests that may not have contained statements that matched their perception of what caused the event. The use of fixed items (ability, effort, luck, task) and experimenter-assigned dimensions (internal/external, stable/unstable) have been criticised by several researchers (Brawley, 1986;
McAuley & Gross, 1983; Rejeski & Brawley, 1983; Russell, 1982). It is generally accepted that a more open-ended response format for attributions and attribution dimensions allows the researcher to tap the cognitive phenomenology of the subject, while minimising the chances for experimenter bias. Open-ended responses also allow for consideration of the existence of more than one cause for performance outcomes. With the introduction of a more flexible attribution rating system, it was necessary for researchers to assign attributions to appropriate causal dimensions. Ambiguous open-ended attributions often meant that the researcher and subject could not agree on the meaning of the causal attribution (McAuley & Duncan, 1990).

To deal with attribution distortion, Russell (1982) developed the Causal Dimension Scale (CDS), which assisted researchers in correctly categorising attributions. Russell avoided problems with external and controllable interactions by modifying the definition of controllability. He redefined a controllable cause as one that could be controlled, changed or affected by either the athlete or another person. Despite redefining the controllability attribution, the early version of the CDS (Russell, 1982) failed to distinguish between causes that were controllable by the individual versus controllable by other people. Thus, causes were simply controllable or uncontrollable with no indication of who was controlling the cause. However the CDS II (McAuley, Duncan, & Russell, 1989; 1991) addresses this problem using a revised version of Russell's (1982) original CDS. The CDS II scale differs from the original in that it comprises four rather than three causal dimensions including, locus of causality, stability, personal control, and external control. Through the use of the CDS II the cause of the control can now be more effectively identified.

1.2.17 Self-Efficacy and Sport-Confidence

In the motor performance literature Bandura's (1977) self-efficacy theory has, to date, proven the most enduring approach to studying self-confidence (Weinberg & Jackson, 1990). Bandura (1977, 1988, 1990) views behavioural change as being mediated by only one cognitive mechanism that he refers to as self-efficacy. He defines self-
efficacy as an individual's strength of conviction in her or his ability to execute successfully a behaviour required to produce a certain outcome. If the individual possesses the appropriate skills and incentives to perform, then self-efficacy theory asserts that actual performance will be predicted by the individual's belief in personal competence (Weinberg & Jackson, 1990). Studies have indicated a moderate to strong positive relationship between efficacy expectations and subsequent performance in both laboratory (Feltz, 1982; Gould, & Weiss, 1981; Weinberg, Gould, & Jackson, 1979; Weinberg, Yukelson & Jackson, 1980) and field settings (Gould, Weiss, & Weinberg, 1981; Highlen, & Bennett, 1983; Mahoney, Gabriel, & Perkins, 1987; Meyers, Cooke, Cullen, & Liles, 1979).

An example of how efficacy expectations can influence subsequent performance is demonstrated in a study by Blittner, Goldberg, and Merbaum (1978). The authors attempted to increase smoking cessation, the strength of their subjects' efficacy, and outcome expectancies, by providing bogus feedback to a group of smokers following extensive personality testing. Therapists repeatedly told the subjects they were selected for the smoking cessation treatment because psychological tests showed that:

...they had strong willpower and great potential to control and conquer their desires and behaviour. Thus, it was quite clear that during the course of treatment (a self-monitoring procedure) they would completely stop smoking (p.555).

Results showed that the efficacy enhancement group effectively reduced their smoking behaviour over time compared to a control group that did not receive the persuasive communications about expectancies.

More recently, a study that links high self-efficacy levels with favourable performance outcomes was demonstrated in a study by Poag and McAuley (1991). Sixty male undergraduates were randomly assigned to a repeated success situation or a repeated failure situation involving a basketball task. The undergraduates performed three sets of ten free-throws in competition against a highly skilled confederate. The confederate would either, allow the subject to be successful by
performing poorly or he would convincingly beat the subjects. Self-efficacy scores were taken after each set of throws. Initial self-efficacy scores doubled for the subjects who experienced repeated success. The group who experienced the repeated failure did not change their efficacy scores over time. Their self-efficacy scores indicated that after the first unsuccessful set low efficacy cognitions were prevalent and subsequently did not change over time. The authors suggest that the initial failure in the first set lowered efficacy to a point where success was not expected. This low expectation remained constant and did not further change with continued failure. Therefore, it would appear that results of past research indicate that successful performers tended to exhibit higher levels of self-efficacy than less successful performers.

As indicated, the majority of studies investigating self-confidence for performing motor skills have used Bandura's (1977, 1990) self-efficacy theory to predict behaviour by measuring individuals' efficacy expectations (Vealey, 1986). However, Harter's (1978) conceptual model of perceived confidence has also been adapted to sport in an attempt to predict achievement behaviour (Feltz & Brown, 1984; Roberts, Kleiber, & Duda, 1981; Spink & Roberts, 1980). Likewise, other researchers have used performance expectancies to operationalise self-confidence and attempt to predict performance (Corbin, 1981; Corbin, Landers, Feltz, & Senior, 1983; Scanlan & Passer, 1979, 1981). Yet, Vealey (1986) suggests that self-confidence has been operationalised differently in all the different research situations studied. She also suggests that the construct of self-confidence that has been conceptualised in these approaches is a general self-confidence, not sport specific self-confidence (Vealey, 1986).

To aid in the development of a sport specific self-confidence scale Vealey (1986) studied the self-efficacy literature. From the existing constructs she defined a sport specific self-confidence referred to as sport-confidence. According to Vealey's definition sport-confidence is:

...the belief or degree of certainty individuals possess about their ability to be successful in sport (p. 222).
Vealey (1986) suggested that sport confidence could be separated into two constructs: a dispositional construct termed 'trait sport-confidence' and a state construct termed 'state sport-confidence'. Trait sport-confidence may be defined:

...as the belief or degree of certainty individuals usually possess about their ability to be successful in sport (p.223).

State sport-confidence represents feelings or acute manifestations of an underlying disposition and a particular eliciting situation. State sport-confidence is therefore defined:

...as the belief or degree of certainty individuals possess at one particular moment about their ability to be successful in sport (p.223).

The results of Vealey's (1986) research also indicated that successful performers tended to exhibit higher levels of both state and trait sport-confidence than less successful performers.

1.2.18 Self-Monitoring, Sport-Confidence and Behaviour

It appears that there are no studies that have investigated the impact of self-monitoring on self-efficacy or sport-confidence. Consequently, this present study will attempt to investigate the influence that positive and negative self-monitoring of a motor task has on sport-confidence.

It was indicated earlier that positive self-monitors attend to aspects of successful performance and subsequently increase their positive affect. In much the same way, it is hypothesised that positive self-monitoring may strengthen perceptions about performance ability. Positive self-monitoring can reinforce perceptions of success, and feelings of competence, pride and satisfaction, which may, in turn, influence sport-confidence. Similarly, negative self-monitoring may reinforce facets of unsuccessful performance. Self-perceptions of failure, feelings of inadequacy and dissatisfaction may surface that could undermine state sport-confidence. A study by Bouffard-Bouchard (1990) collateral supports these hypotheses. Bouffard-Bouchard examined the influence of performance feedback on self-efficacy for 64 Canadian students attempting problem-solving tasks.
She found that subjects who received positive feedback on their problem-solving performance judged themselves to be more efficacious than subjects who made self-appraisals following negative feedback. Positive feedback was correlated to higher self-efficacy scores than was negative feedback.

If immediately after using a positive or negative self-monitoring strategy state sport-confidence was in some way influenced, then this may impact on the implementation of different self-monitoring strategies as the task complexity changes. For example, while performing a difficult task the use of a positive self-monitoring strategy should increase sport-confidence and benefit performance. At the same time, positive expectancies for dealing with the change in task complexity and self-monitoring strategy may also be generated (Poag and McCauley, 1991). However, if the individual has been negatively self-monitoring then this may decrease sport-confidence, leaving performers doubting their ability to succeed on the following level of task complexity. Further investigation is also needed of an apparent dichotomy that exists in the literature. The use of negative self-monitoring in an easy situation is a performance enhancing strategy (Principle 2), however, negative self-monitoring can also decrease sport-confidence leading to decreased performance (Poag and McCauley, 1991). Does that indicate that self-monitoring has a greater influence over performance than does sport-confidence? This present study will attempt to investigate the influence that positive and negative self-monitoring of a motor task has on sport-confidence.

1.2.19 Literature Summary

The literature clearly indicates that both positive and negative self-monitoring strategies have proven effective for enhancing performance when combined with the appropriate levels of task difficulty. However, the influence of self-monitoring strategies on affect, attribution and expectancy is somewhat unclear. Much of the existing research on self-monitoring and these cognitive factors is in the area of behavioural psychology, with only limited work coming from the area of sport and motor behaviour. Figure 1.5, below, is a synthesis of trends which appear in both sport and behavioural psychology.
Figure 1.5: The influence of self-monitoring and task difficulty on performance and cognitive factors.

Figure 1.5 clearly indicates that self-monitoring strategies can influence performance in both easy and difficult task situations. Yet it would appear that the cognitive variables are only influenced by the use of self-monitoring strategies under difficult task conditions.

1.3 Statement of the Problem

The main purpose of this study was to examine the effects of positive and negative self-monitoring strategies on motor performance under difficult and easy task situations. A secondary aim was to examine the effects that positive and negative self-monitoring strategies have on subject's affect, expectancies and attribution under difficult and easy task situations. A subject-validated degree of task difficulty was used...
to ensure that the designated self-monitoring strategy would be used with the appropriate degree of task difficulty. Of primary interest in this study was: 1. the examination of the effect of positive and negative self-monitoring strategies on motor performance as the complexity of the task changed; 2. the impact of positive and negative self-monitoring strategies on performer's affect, expectancies and attribution as task complexity changed, and 3. the validation of task complexity as determined by the performers, a factor often absent in previous related research.

1.4 Research Hypotheses

The following directional hypotheses were tested:

1. **The results of the subjects' performances on the criterion task (i.e., the computer game) will be significantly related to the subjects' assessments of the degree of task difficulty.**

This hypothesis is predicted based on a dearth of previous research concerning the use of subject-defined task difficulty levels. An important issue under examination is that previous researchers have not controlled for levels task difficulty when examining performance-based issues. They have wrongly assumed that the subjective categorisation of the criterion skill as easy, moderate or difficult was commensurate with their subjects' response accuracy (e.g., Burton, 1989; McGowan & Schultz, 1989).

2. **Positive self-monitoring of a difficult task will lead to enhanced performance as compared with negative self-monitoring in the same task situation.**

3. **Negative self-monitoring of a difficult task will lead to impaired performance as compared with positive self-monitoring in the same task situation.**

4. **Positive self-monitoring of an easy task will lead to**
impaired performance as compared with negative self-monitoring in the same task situation.

5. **Negative self-monitoring of an easy task will lead to enhanced performance as compared with positive self-monitoring in the same task situation.**

The principles of positive and negative self-monitoring have been developed using non-subject-validated tasks. Therefore, it is necessary to 're-validate' principles of self-monitoring using subject-validated levels of task difficulty. Then further research or assumptions based on these principles may confidently proceed

6. **It is hypothesised that after positively self-monitoring on a difficult motor task that, negative self-monitoring on an easy motor task will lead to enhanced performance compared to positive self-monitoring in the same task situation.**

7. **It is hypothesised that after negatively self-monitoring on an easy motor task that, positive self-monitoring on a difficult motor task will lead to enhanced performance compared to negative self-monitoring in the same task situation.**

Assuming that the principles of positive and negative self-monitoring in difficult and easy task situations are re-established using subject-validated tasks then the following question is of interest. Could a subject who was using a positive (negative) self-monitoring strategy on a difficult (easy) task change to a negative (positive) self-monitoring strategy as the skill became perceptively easier (difficult)? This is the nature of the question that this research will investigate. The sequencing of self-monitoring strategies under differing degrees of task difficulty should lead to more precise models of self-monitoring in the self-regulation of behaviour, and to more effective proposals for promoting self-regulation, especially when performing sport skills of varying complexity.
1.5 Definition of Terms

**Negative Self-Monitoring** The tracking of negative behaviours or characteristics that an individual desires to decrease or extinguish (Kirschenbaum & Wittrock, 1990; McFall & Hammen, 1971; Tomarken & Kirschenbaum, 1982).

**Positive Self-Monitoring** An individual’s ability to recognise and/or record positively valued behaviours or attributes, either overtly or covertly (Kirschenbaum & Wittrock, 1990; McFall & Hammen, 1971; Tomarken & Kirschenbaum, 1982).

**Task Difficulty** The subjects’ perception of the degree of difficulty of the computer task. The task has two levels. Subjects respond to a questionnaire to indicate their subjective feelings for the degree of difficulty on both levels of the computer task.

1.6 Assumptions

It was assumed that:

1. An improvement in skill on the criterion task would be reflected by superior performance scores;

2. The skill of playing Shufflepuck was a novel skill for all subjects;

3. When the experimenter explained game skills and skill strategies to the subjects they would implement these skills and strategies;

4. The mental capacities of all subjects were within the normal population. Thus, the logic of appropriate skill strategy implementation could be comprehended;

5. All subjects possessed, and were capable of normal vision. Therefore, they could effectively track the puck and paddle movements on the screen.
1.7 Limitations of the Study

1. Researchers who have previously examined the effects of self-monitoring on task difficulty have usually attempted to teach correct usage of the self-monitoring strategies to the subjects. It has been assumed in these self-monitoring studies that subjects were, in fact, using these strategies and doing so in the proper manner. In the present study, the a manipulation check (see Appendix B4) was used to ensure the correct use of the self-monitoring strategies. However, there was no guarantee that the manipulation check accurately represented subjects' behaviours. Yet if subjects said they were using a self-monitoring strategy, then the experimenter assumed this was true.

2. There is no experimental evidence as to the 'best' method to teach Shufflepuck. Incorporated in the present study were the methods, strategies, and techniques of a professional table-tennis player (Leach, 1971), in combination with strategies and additional advise from computer game players. Thus, it was possible that the advice offered concerning skill performance and skill strategy was not accurate.

3. The type and nature of the motor task used in the present study contained a strong hand-eye component, a discrete motor skill task. Application of these results can be considered only in regard to discrete sports and tasks, and not considered representative of other tasks involving strength and endurance.

4. It should be considered that the student subjects in this experiment may differ in their performance motivation to athletic populations. Primarily because laboratory tasks differ in nature from sport skill field tasks. Computer playing subjects may well be less motivated to adhere to the self-monitoring protocols than athletes who are self-monitoring their athletic skill techniques. Therefore, in view
of the limited representativeness and size of the sample which participated in the experiment, inferences must be confined to male and female student populations, aged 21 to 34 years.

1.8 Significance of the Study

Successful sport performance depends on effective self-regulation of behaviour, and effective behavioural self-regulation depends on the use of appropriate self-monitoring techniques. Positive self-monitoring and negative self-monitoring strategies, when used under certain task conditions, have been shown to affect motor skill performance positively. Despite the fact that self-monitoring strategies have been studied in a limited way in the motor skill domain, there are implications for using self-monitoring in sport.

Perhaps the most significant undertaking of this research is the investigation of the effect of implementing positive and negative self-monitoring strategies under difficult and easy motor performance situations. Self-monitoring research has shown that using a positive self-monitoring strategy, when performing a difficult task will improve performance. Similarly, negative self-monitoring will improve behaviour outcome when performing an easy task. Unknown, however, is the effect of implementing appropriate self-monitoring strategies as task complexity changes.

The nature of motor skill performance is often dynamic. As such, the player's perception of the degree of difficulty of a motor task may change as situational variables change. Therefore, an athlete who is using a self-monitoring strategy to maintain or improve performance will need to respond to changed task demands. Consequently, an understanding of the effects on motor performance of the sequencing of self-monitoring strategies, as task complexity changes will lead to more precise models of self-monitoring and more effective proposals for promoting self-regulation in sport.
2.1 Subjects

2.1.1 Subject Pool

The same subjects were used in each of the three experiments in this study to equate previous experience in: 1. performing the same number of trials of the criterion skill, and 2. in using the same cognitive strategies. The subjects for these experiments were students from within the Department of Human Movement Science at the University of Wollongong. The experiment was open to all 55 students from the Department's Drugs and Nutrition course. In total there 42 subjects who participated in the study, including 25 females and 17 males ($M$ age = 24.8 yrs., $SD$ = .61), all of whom were randomly and evenly assigned to experimental and control groups.

In Experiment 1 there were 42 subjects who performed at each of the five levels of task difficulty. Thirty-six of these 42 subjects were randomly selected to participate in Experiment 2. All participants in the second experiment were randomly allocated into one of three groups, with each group containing 12 subjects. Experiment 2 consisted of: 1. a group in which subjects learned to positively monitor their performance; 2. a group in which subjects learned to negatively monitor their performance, and 3. a group that engaged in a mathematical task instead of monitoring their performance. For the third experiment, 32 subjects were randomly selected from the 36 subjects in Experiment 2. These 32 subjects completed the subject
pool for Experiment 3. The number of subjects chosen for each experimental condition allowed for balancing of subjects in treatment conditions, and hence, appropriate statistical analysis.

2.1.2 Informed Consent

Human subject and informed consent procedures were evaluated by the University of Wollongong Human Ethics Committee and found to be congruent with set guidelines. Subjects were asked to sign a consent form prior to testing (see Appendix F), and the 'Ethical Principles of Psychologists' (American Psychological Association, 1981) were used as a guideline for the treatment of subjects in the study.

2.2 Equipment

2.2.1 Hardware and Software

An Apple® Macintosh Plus™ computer with the standard Apple® graphical interface mouse was used by each subject for the computer game tasks. The Apple® Macintosh Plus™ computer was configured with an 8-MHz. 68000 processor, 2.5 MB RAM and one double density (800K) 3.5-inch floppy-disk drive. The standard compact 9-inch screen (512 x 342 pixel bit-mapped display) was used to display the computer game application.

To test the hypotheses, a game with variable skill levels and discernible tactical and skill strategies was needed, Shufflepuck (Version 1) met these requirements. Shufflepuck is a public domain software written and copyrighted by Gross (1987). Shufflepuck is a computerised tennis game in which the subject plays against a computer opponent. The objective of this game is for the subject to hit the puck past the opponent's paddle and win the point. The game may be programmed so that task complexity can be varied. For example, higher task difficulty is acheived by decreasing the size of the subject's paddle and puck, shortening the length of the court, and at the same time increasing the opponent's paddle size. The settings for paddle size,
court length, puck size etc. for the difficult and the easy tasks are listed in Appendix G and Appendix H respectively.

In order to determine the subjects' perceptions of task difficulty, subjects were asked to rate tasks after performing at varied levels of difficulty. The Shufflepuck software was programmed to provide five levels of progressive task difficulty. According to subjects' perceptions and experimental needs, two of these five tasks were selected. The difficult and the easy game screen configurations, which were the criterion tasks in Experiment 2 and 3, are illustrated below in Figures 2.1 and 2.2.

Figure 2.1: The subject's view of the difficult game screen
After viewing Figures 2.1 and 2.2 it is apparent that while the nature of the game changes across the levels of task difficulty, the same cognitive and motor skills are required for effective performance.

2.2.2 Monitoring Forms and Rating Sheets

The computer tasks which subjects' determined as difficult and easy were used in both the second and third experiments. Subjects used either positive, negative, or no self-monitoring while performing each of these tasks. The positive and negative monitoring groups self-monitored their performance on the criterion task using a performance rating form (see Appendices B2 & B3). The control group completed mathematics tasks (see Appendix C) rather than engage in self-monitoring.

Each of the three groups in the second experiment completed five questionnaires. The questionnaires were designed to assess the subjects' mood, their expectancies of future performance, causal attributions, and perceptions of task difficulty about the computer game task. The following psychological inventories were used:
1. Pre- and posttask mood states were assessed using the Children’s Arousal Scale - Adult Version (CAS-A) (Anshel, 1985) (see Appendix A.1);

2. Pre- and posttask expectancies were assessed using the State Sport-Confidence Inventory (SS-CI) (Vealey, 1986) (see Appendix A.2) and the,

3. Causal Dimension Scale II (CDS II) (McAuley, Duncan, & Russell, 1991) (see Appendix A.3) to assess subjects’ causal attributions to explain their performance upon completion of the computer game task.

4. Pre and post task rating scale to assess subjects’ perceptions of task difficulty (see Appendix B.1).

5. Mid task and manipulation check was used to assess if subjects’ were utilising the independent variable (see Appendix B.4).

2.3 Procedure

The protocol development, pretesting and testing procedures are described in the following sections.

2.3.1 Protocol Pretesting

Prior to Experiment 1, different levels of the criterion task were evaluated by a representative sample of subjects not included in the study. These procedures validated the structure, content, and sequencing of the experimental procedure. The same process was undertaken to determine the effectiveness of the self-monitoring procedures.

The evaluation of protocol occurred in two stages. First, two subjects, one male and one female, completed the three proposed experiments. Members of both sexes were asked to assist in test evaluation as both
females and males were participating as experimental subjects. Initially, the two subjects attempted and rated each of the five levels of computer game difficulty in the first experiment. Next they engaged in positive and negative self-monitoring of criterion tasks for the second and third experiments. They were asked to offer suggestions related to vocabulary, omissions of content, degree of game difficulty and other possible deficiencies in the experimental procedure or materials which might deter optimal performance and proper self-monitoring.

The second pretest of the experimental protocol was undertaken by four subjects, two females and two males who, again, critically reviewed the materials which were revised in the initial one-to-one evaluation. Again, in order to improve experimental reliability, subjects used the five levels of task difficulty in the first experiment, and engaged in either positive, negative or no (control) self-monitoring of the criterion tasks for subsequent experiments. One subject positively self-monitored, another negatively self-monitored and two subjects used no self-monitoring (control) during the second experiment. For the third experiment, all subjects were taught to use both self-monitoring strategies. Based on feedback concerning the comprehensibility of the experimental protocol final procedures were established.

2.3.2 Subject Pretesting

All subjects used in Experiment 1 experienced two pretests prior to performing. The first pretest consisted of playing the computer game at the most simple of the five set levels. The purpose of the pretest was to ensure that each subject possessed the basic hand-eye co-ordination skills that were necessary for the computer task. Subjects were oriented with their role in the pretest in the following manner. After being thanked for their agreement to participate in the study, subjects were told that the aim of the experiment was to determine how many games they could win at each level of task difficulty. Next, they were shown a short demonstration game of Shufflepuck using the easiest level of task difficulty. The demonstration of the 'playing mechanics'
of Shufflepuck was completed within approximately two minutes. The demonstration covered instruction on: 1. starting the game; 2. scoring the game, and 3. techniques for working the mouse. As no previous studies had used the Shufflepuck application, it was not possible to give predetermined game scores indicative of unskilled behaviour. However, based on initial pilot testing with skilled and unskilled computer game players, it was determined that subjects who, after minimal direction, could not make three consecutive returns on any one of five trials at the easiest level of difficulty should be eliminated from the study. These primary skills are referred to as entry behaviours (Dick & Carey, 1978).

Entry behaviours are specific skills that a subject, in a designated population for whom instruction is intended, must be able to demonstrate prior to beginning an instructional activity. For example, in order to learn the present criterion motor skill it was necessary to demonstrate minimal but specific ability on moving the mouse in order to hit the puck. Thus entry behaviours are skills already attained by subjects prior to instruction (Anshel, 1979; Dick & Carey, 1978).

The purpose of the second pretest, offered only to subjects who met the criterion for the first pretest, was to eliminate participants who were already able to perform the to-be-learned computer game skill. In the second pretest, subjects who completed six or more consecutive returns, on any one of three trials on the most difficult task were assessed as too skilled and, therefore were eliminated.

Subjects were asked to demonstrate proficiency on two entry behaviours: 1. their skill in performing the criterion task as determined by completing a minimum of three returns on one trial of the easiest skill level, and 2. their inability to demonstrate sufficient skill on the computer game by completing six or more returns on one trial of the most complex skill level. Thus, subjects needed to demonstrate that they were neither 'underskilled' nor 'overskilled' on the criterion task in order to be included in the testing. No subjects were eliminated from the experiment due to their lack of motor skills or their computer game playing ability.
2.3.3 Experiment 1

After appropriate pretesting, 42 subjects (17 males and 25 females) participated in the first experiment. The aim of this experiment was to ascertain the subjects' perceptions of the degree of difficulty at each of the five presented levels of the criterion task. Consequently all subjects attempted, then rated, each of the five game levels.

There were five levels of the computer game task at which subjects performed. At each level of task difficulty two dependent variables were measured: 1. the number of games won, and 2. the performer's subjective interpretation of the degree of task difficulty. Because there were five progressively more difficult levels of the task, it was necessary to randomise the presentation order of tasks to the subjects, and control for any order effects which may have influenced the results (Cozby, 1985).

With five levels of task difficulty, 125 possible permutations of the one-through-five order of task presentation were available. Therefore, in order allocate a sequence of task performance to subjects, a random computer-generated list of 42 one-through-five permutations was used.

Subjects were again told that the aim of the experiment was to determine how many games they could win at each level of task difficulty. Next, subjects participated in a skills and strategy instructional session. In this session, subjects learned the skills of playing Shufflepuck. The six Shufflepuck skills which were taught are listed in Appendix D. Subjects were then given an opportunity to practice these skills over six consecutive 15-point games. Two games were played at Level 1 (easy), two games at Level 3 (moderate), and two games at Level 5 (difficult). Finally, subjects were given the opportunity to ask any questions concerning their role in the experimental procedure before continuing.
2.3.4 Collection of Data: Experiment 1

During the testing procedure subjects attempted 20 trials on each level of the five difficulty levels (Levels 1-5), according to the random permutation order. The performance results of these attempts were recorded. After each 20-trial block, subjects were asked to indicate on a Likert scale their subjective interpretation of the degree of task difficulty of that level.

Experiments 2 and 3 required the use of tasks which were perceived by the subjects as 'difficult' and 'easy'. Having performer's give their subjective interpretation of the degree of task difficulty made it possible to determine which tasks subjects considered as 'difficult' and 'easy'. Using skill complexity levels which are validated by performers' perceptions, in addition to performance outcomes, ensures that subjects are, in fact, perceiving the tasks as difficult or easy.

2.3.5 Experiment 2

Thirty-six of the 42 subjects in Experiment 1, 16 males and 20 females, were randomly selected to participate in Experiment 2. The aim of this experiment was to replicate and 're-validate' the principles of positive and negative self-monitoring using the subject-validated levels of task difficulty ascertained in Experiment 1. Subjects were randomly allocated, according to subject identification number, to one of three groups. The groups, each containing 12 subjects, included: 1. a group in which subjects positively monitored computer game performance; 2. a group in which subjects negatively monitored computer game performance, and 3. a control group in which no self-monitoring was undertaken and subjects performed mathematical tasks (see Appendix C).

According to their group allocation, subjects were instructed on the use of the designated self-monitoring strategy (see Appendix E). Positive and negative self-monitoring subjects learned to check their Shufflepuck skill against a list of technical game-playing skills and note behaviours which were used successfully (i.e., for positive self-
monitoring) (see Appendix B.2) or were not used successfully (i.e., for negative self-monitoring) (see Appendix B.3). The no self-monitoring (control) subjects were given a list of technical skills (see Appendix D), but were not explicitly told to self-monitor. Instead, subjects in the no self-monitoring group engaged in mathematical tasks during the 30-second intervals in which other subjects' self-monitored. The verbal protocol for teaching the subjects how to self-monitor is contained in Appendix E.

2.3.6 Collection of Data: Experiment 2

Subjects in each of the three groups performed one of two tasks, either: 1. 100 trials on the difficult task followed by 100 trials on the easy task, or 2. 100 trials on the easy task followed by 100 trials on the difficult task. The order of presentation of difficult and easy tasks was balanced within each self-monitoring group to counter any possible order effect. The frequency with which subjects 'won' against the computer constituted one dependent variable.

Subjects completed self-monitoring questionnaires after every 15 trials (Ts. 15, 30, 45, 60, 75, 90). Completing the self-monitoring questionnaire consisted of checking game-playing behaviours against the list of six technical skills and recording the presence or absence of appropriate skills. The self-monitoring questionnaire was used as a mechanical means of ensuring that the self-monitoring process was actually undertaken by the subjects. After 70 trials subjects also completed a manipulation check form in order to indicate the effectiveness of their use of the designated self-monitoring strategy (see Appendix B4).

For both the difficult and easy tasks, subjects completed measures for perception of task difficulty, affect (CAS-A) and expectancies (SS-CI) just prior to, and immediately after, performing the 100 trials. Subjects' attributions (CDS II) were only measured after trials were completed.

The pretask measures (i.e., CAS-A, SS-CI, task difficulty perceptions)
were taken after a 20-point warm-up trial on the level of task difficulty (i.e., either difficult or easy) on which the individual was about to perform. Preperformance levels of task difficulty were taken in Experiment 2 to ensure that the subjects still interpreted the criterion tasks from Experiment 1 as difficult and easy. Affect and expectancy scores were taken as baseline measures. Therefore, after the 20 warm-up points had been played the subject: 1. rated the degree of task difficulty on a 1 to 10 scale (very, very easy to very, very difficult, respectively) (see Appendix B.1); 2. rated their degree of affect in relation to the upcoming performance, by responding to 10 questions, each with a 1 to 7 semantic differential scale (see Appendix A.1), and 3. rated self-expectations in relation to the upcoming performance, by responding to 13 questions, each with a 1 to 9 semantic differential scale (see Appendix A.2).

The post-performance measures were recorded immediately after the completion of the 100 trials. The same measures of task difficulty, affect and expectations were used. In addition, however, subjects rated their attributions by responding to 12 questions, each with a 1-9 semantic differential scale (see Appendix A.3). The same procedure was followed for testing on the level of task difficulty that was not used in the initial testing procedure.

Two independent variables were manipulated: 1. the level of task difficulty, and 2. the self-monitoring strategy used for each level of task difficulty. Then dependent variables were measured: 1. the number of times the subject beat the computer (i.e., successful performances); 2. the subject's preperformance perceptions of task difficulty; 3. the subject's post performance perceptions of task difficulty; 4. the subject's preperformance affect scores; 5. the subject's post performance affect scores; 6. the subject's preperformance expectancy scores; 7. the subject's post performance expectancy scores; 8. the subject's post performance attributions; 9. the subject's self-efficacy in their ability to perform the self-monitoring task, and 10. subjects' perceptions of their ability to use the designated self-monitoring strategy.
This experiment aimed to examine the effects of various self-monitoring strategies on motor performance as a function of task difficulty. Specifically, the experiment was designed to determine a subject's performance when using a specified self-monitoring strategy on a certain level of game difficulty. Further, the experiment was also designed to determine a subject's affective, expectancy and attributional reactions to performing a difficult or easy task when positively, negatively or not self-monitoring.

2.3.7 Experiment 3

The research design for Experiment 3 required 32 subjects to use a previously experienced self-monitoring strategy. However, after the completion of Experiment 2, there were only 24 experienced self-monitors, comprised of subjects who had previously positively or negatively self-monitored. The other 12 subjects from Experiment 2 were non-monitoring (control) subjects. Because Experiment 3 required 32 subjects who were experienced self-monitors, eight additional subjects were needed who had previously engaged in self-monitoring while performing the criterion task.

These eight subjects, four males and four females, were randomly selected, by subject identification numbers and equated for sex, from the 12 non-monitoring (control) subjects in Experiment 2. These subjects had completed the same number of game trials as the 24 self-monitoring subjects in Experiment 2, but did not have the same self-monitoring experience. Therefore, in order to match subjects on self-monitoring experience and game skill experience, the following assignment of treatments was required. It was necessary for: 1. the 24 experienced self-monitoring subjects to perform an equal amount of non-monitoring (control) trials as they had performed self-monitoring trials; 2. the eight non-monitoring (control) subjects had to self-monitor their game skill for the same number of trials as they had performed non-monitoring (control) trials, with four randomly selected subjects, two males and two females, positively self-monitoring, while the other two males and two females negatively self-monitoring.
When all 32 subjects, 14 males and 18 females, had an equal amount of self-monitoring and game skill experience, the subject pool was then randomly divided into two groups equated for sex, each containing seven males and nine females. Thus, there were 16 subjects who were experienced positive self-monitors and 16 experienced negative self-monitors. These subjects then commenced the final experiment using a self-monitoring strategy commensurate with their previous self-monitoring experience.

Before the warm-up, skill trials and self-monitoring commenced in Experiment 3, it was necessary to inform and educate the subjects of their need to use a different self-monitoring strategy from the one that they had previously experienced. If, for example, subjects had previously used a positive self-monitoring strategy, then it was necessary for those subjects to also use, at the appropriate time in Experiment 3, a negative self-monitoring strategy. Subjects were already experienced with the procedure for self-monitoring, therefore introducing a new self-monitoring strategy only necessitated educating subjects on how to monitor differently. This education procedure was established in Experiment 2 (see Appendix E). The necessary subject self-monitoring education took place prior to the commencement of the Experiment 3. This was done to ensure that subjects could change self-monitoring strategy immediately upon instruction.

The aim of Experiment 3 was to determine the feasibility of changing self-monitoring strategies as the demands of the criterion task changed. For example, the study examined whether a subject who was using a positive (n.b., counterbalanced condition indicated in brackets) negative self-monitoring strategy on a difficult (easy) task, could change to a negative (positive) self-monitoring strategy as skill trials became perceptively easier (more difficult), in order to maintain efficient performance relative to the level of task difficulty.

In order to indicate that a change in self-monitoring strategy and level of task difficulty could actually occur, it was necessary to compare the subject's performance in the changed self-monitoring/task difficulty condition with performance in the original self-monitoring/task
condition. In Figure 2.3 below the design of the experiment to indicate the change in self-monitoring strategy and task difficulty is illustrated. Subjects in the ‘original condition’ maintained a positive (negative) self-monitoring strategy while switching task difficulty levels from difficult (easy) to easy (difficult). However, in the ‘changed condition’, subjects switched both, self-monitoring strategies from positive (negative) to negative (positive), and task difficulty levels from difficult (easy) to easy (difficult). By comparing performance in the ‘original condition’ with performance in the ‘changed condition’, it is possible to determine if there is any difference between performance scores in the two conditions. Dissimilar performance scores indicate that it is possible to implement different self-monitoring strategies as the level of task difficulty changes.

The comparison between the two change conditions in the lower half of Figure 2.3 simply represents the counterbalanced version of the comparison conditions in the top half of the diagram, and as such should not be interpreted as part of the overall experimental design.

OR

Figure 2.3: Experiment 3 design (continued next page)
From the experimental design illustrated in Figure 2.3, it was possible to compare and evaluate a subject's performance when implementing different self-monitoring strategies as the complexity of the task changed.

As in Experiment 2, subjects were allowed a 20-point warm-up trial on each task they attempted. Performance scores were not recorded during the warm-up period. In the 'original condition', eight subjects in the first group (and eight subjects from the counterbalanced group) performed 100 trials on the difficult (easy) task while using the positive (negative) self-monitoring strategy. The subjects were then directed to maintain the positive (negative) self-monitoring strategy while changing to the easy (difficult) task for 100 more trials. In the 'changed condition', the subjects reverted to the difficult (easy) task and the positive (negative) self-monitoring strategy again for 100 trials, before changing both self-monitoring strategy and level of task difficulty to the easy (difficult) task and the negative (positive) self-monitoring strategy.
2.3.8 Collection of Data: Experiment 3

After the 20 warm-up points, subjects rated the degree of task difficulty on a scale of 1 to 10 (very, very easy to very, very difficult, respectively) (see Appendix B.1). Each subject then performed 100 trials on the difficult (easy) task using a positive (negative) self-monitoring strategy. Again, each subject completed the self-monitoring check list questionnaire after every 15 trials (Ts., 15, 30, 45, 60, 75, and 90) and a manipulation check after 70 trials. For the next 100 skill trials, now on the easy (difficult) task, the subjects continued to positively (negatively) self-monitor, completing the self-monitoring check list questionnaire after every 15 trials (Ts., 15, 30, 45, 60, 75, and 90) and the manipulation check after 70 trials. Subjects then returned to the original positive (negative) self-monitoring strategy and difficult (easy) task, continuing the use of the self-monitoring and manipulation checks as described. Finally, subjects switched to negative (positive) self-monitoring and the easy (difficult) task, with the completion of the self-monitoring and manipulation checks continuing.
3.1 Experiment 1

After pretesting 42 subjects (17 males and 25 females) participated in the first experiment. The aim of this experiment was to ascertain the subjects' perceptions of difficulty for each of the five criterion tasks. Two dependent variables were obtained for each subject in response to the five levels of task difficulty (i.e., the independent variable). One dependent variable consisted of the subjects' perceptions of the degree of task difficulty. The other dependent variable was motor performance. Subjects had to attempt and then rate each level of task difficulty. Alpha level for all statistical comparisons was .05.

With the relatively small number of subjects (n=42) it was necessary to rank subjects' perceptions using an ordinal scale, based on limited distributional assumptions. Consequently, it was necessary to determine any differences in subjects' perceptions of task difficulty across the five game levels. Perceptions were ranked and compared to performance scores using a Friedman two-way analysis of variance (ANOVA). Results indicated that there was a significant difference in subjects' responses indicating that subjects were not consistent in their responding across the five games ($\chi^2 (4) = 118.15, p < .001$). Thus, differences in the degree of perceived task difficulty among the five game levels were found.

The Friedman was then used to ascertain if differences existed in subjects' performance scores on the five game levels. Test results
indicated that performance scores were also significantly different across the five task conditions ($\chi^2 (4) = 103.11, p < .001$). Preliminary test results indicated that: 1. subjects perceived the criterion task to be significantly different across the five levels of task difficulty, and 2. subjects significantly differed on their performance scores on the criterion tasks for the five levels. Therefore, further investigation to determine actual task perception and performance scores was justified. The means and standard deviations of performance scores and perceptions in Experiment 1 were investigated. These are listed in Table 3.1.

<table>
<thead>
<tr>
<th>Perceptions of Task Difficulty</th>
<th>Performance Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>M = 86.5 SD=13.3</td>
</tr>
<tr>
<td>Level 2</td>
<td>M = 70.5 SD=11.4</td>
</tr>
<tr>
<td>Level 3</td>
<td>M = 59.4 SD=13.0</td>
</tr>
<tr>
<td>Level 4</td>
<td>M = 53.8 SD=16.4</td>
</tr>
<tr>
<td>Level 5</td>
<td>M = 24.5 SD=11.6</td>
</tr>
<tr>
<td></td>
<td>M = 81.1 SD=10.3</td>
</tr>
<tr>
<td></td>
<td>M = 80.6 SD=12.9</td>
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<tr>
<td></td>
<td>M = 69.4 SD=19.8</td>
</tr>
<tr>
<td></td>
<td>M = 59.2 SD=20.0</td>
</tr>
<tr>
<td></td>
<td>M = 27.3 SD=8.5</td>
</tr>
</tbody>
</table>

Table 3.1
Means and Standard Deviations for Task Difficulty Perceptions and Task Performance for Experiment 1
According to results listed in Table 3.1, the Level 1 and Level 5 tasks met subject-defined and literature-based definitions for the 'easy' (Level 1) and 'difficult' (Level 5) criterion tasks.

A Wilcoxon Matched-Pairs Signed-Ranks Test was used to confirm that the difficult and easy tasks were significantly different based on subjects' perceptions ($Z(42) = -5.65, p < .001$) and motor performance ($Z(42) = -5.60, p = < .001$). There was a significant difference in subjects perceptions and performance between the difficult and easy tasks. The Wilcoxon test was then used to determine differences in perceptions and performance on each level of task difficulty individually. Results for the difficult task (Level 5) indicated that subjects' perceptions of task difficulty were statistically similar to their performance scores ($Z(42) = -.98, p > .05$). Performance scores matched subjects' perceptions of task complexity on the difficult task. However, on the easy task, subjects' perceptions were significantly different from their performance scores ($Z(42) = -2.39, p < .001$). Subjects perceived the easy task to be significantly less difficult than their performance indicated. The differences in perceptions and performance scores for the two levels of task difficulty are illustrated below in Figure 3.1.

Figure 3.1: Mean scores for task perception and performance on the easy (Level 1) and difficult (Level 5) tasks.
Figure 3.1 clearly indicates that subjects' perceptions matched their performance scores for the difficult task, however, on the easy task perceptions and performance scores were not similar.

3.2 Experiment 2

Thirty-six of the 42 subjects in Experiment 1, 16 males and 20 females, were randomly selected to participate in Experiment 2. The aim of this experiment was to replicate and 're-validate' the principles of positive and negative self-monitoring using subject-validated criterion tasks ascertained in Experiment 1. A secondary purpose of Experiment 2 was to examine the effects of different self-monitoring strategies on emotion, expectancy and causal attribution under difficult and easy task conditions.

3.2.1 Performance Scores

Performance scores were obtained for each subject during the motor task. A 3 x 2 ANOVA (Strategies x Task Difficulty) was conducted to determine if the effect on performance of the three self-monitoring strategies was similar for both levels of task difficulty. A significant interaction indicated differences in performance scores between the difficult and easy task conditions for the three self-monitoring strategies \( F (2,33) = 6.38, p < .05 \). Performance scores were not consistent across combinations of self-monitoring strategies and levels of task difficulty. This justified further investigation of these differences.

When comparing performance scores within self-monitoring strategies and between task difficulty conditions least significant difference scores (LSD) were used. LSD post-hoc analysis was chosen because if offered a conservative means of identifying significant differences. LSD scores indicated that performance on the easy task was always significantly superior to scores obtained on the difficult task, regardless of the self-monitoring strategy employed \( (p < .001) \). Subjects consistently performed significantly better on the easy task than on the difficult task independent of the self-monitoring strategy used.
LSD analysis of self-monitoring performance scores for the **difficult** task condition revealed that: 1. subjects using a positive self-monitoring strategy in the difficult task condition were not significantly superior to subjects using a negative self-monitoring strategy in the same condition ($p > .05$). Yet further analysis revealed that a significant result at the 10% level; 2. positive self-monitors were significantly superior to the control group ($p < .05$), however 3. negative self-monitors were not significantly different to the control group ($p > .05$). Positive self-monitors did not significantly outperform the negative self-monitoring group in the difficult task condition.

In the **easy** task condition LSD analysis revealed that: 1. negative self-monitors were significantly superior to positive self-monitors ($p < .001$); 2. negative self-monitors were significantly superior to the control group ($p < .05$), and 3. the control group were significantly superior to the positive self-monitoring group ($p < .05$). Negative self-monitoring was significantly superior to positive and no self-monitoring in the easy task condition. The effects of self-monitoring on performance at the two levels of task difficulty are clearly illustrated below in Figure 3.2.

![Figure 3.2: Subjects' mean performance scores for difficult and easy tasks when either positively, negatively or not self-monitoring](image)
In Figure 3.2 it is apparent that negative self-monitoring is significantly superior to positive self-monitoring in the easy task condition.

3.2.2 Change in Performance Scores Throughout the Trial

Of interest was the change in performance over trials due to the use of different self-monitoring strategies. For each level of task difficulty subjects completed a self-monitoring intervention after each 15 trials of the 100-trial block. Performance totals for each of the six sets of 15 trials were analysed to determine changes in performance.

ANOVA indicated that the pattern of scoring per trial block was different between difficult and easy task when a positive self-monitoring strategy was used (Wilks' $\lambda$ = .07, $F(2,33) = 16.94$, $p < .001$). However, similar response patterns were found between the difficult and easy tasks when negatively self-monitoring (Wilks' $\lambda$ = .28, $F(2,33) = 3.64$, $p > .05$), and when not self-monitoring (Wilks' $\lambda$ = .85, $F(2,33) = .25$, $p > .05$). When subjects were positively self-monitoring they responded differently across task conditions. Yet negative and no self-monitoring strategy groups were similar in their response patterns for both difficult and easy tasks.

A 3 x 6 MANOVA (Self-Monitoring Strategies x Trial Blocks) with repeated measures on the last factor was then used to indicate if the pattern of responding for each self-monitoring strategy group within the difficult task condition was similar. Results indicated that performance over the trials for the three self-monitoring strategies was not the same ($F(10, 58) = 4.66$, $p < .001$). Subjects' pattern of responding for the three self-monitoring strategies was not consistent in the difficult task condition. Consequently individual block-to-block analyses for each monitoring style and each level of task difficulty were justified. Figure 3.3 illustrates changes in performance scores for each of the trial blocks when positive, negative and no self-monitoring strategies were used with the difficult task.
DIFFICULT TASK CONDITION

Figure 3.3: Subjects’ mean performance scores for each of the 15-trial blocks when positive, negative and no self-monitoring strategies are used in the difficult task condition.

To closer investigate the events depicted in Figure 3.3 the use of a series of paired t-tests to determine the between trial block performance differences for each self-monitoring strategy was necessary. A comparison of performances between trial blocks was carried out to determine if performance significantly changed due to repeated exposure to the self-monitoring intervention. The results of those comparisons are indicated below in Table 3.2.
Table 3.2
Significant Differences Between Trial Blocks Within Self-Monitoring Strategies
for the Difficult Task

<table>
<thead>
<tr>
<th>Trial Blocks</th>
<th>1 to 2</th>
<th>2 to 3</th>
<th>3 to 4</th>
<th>4 to 5</th>
<th>5 to 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Self-Monitoring</td>
<td></td>
<td>*</td>
<td>**</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>Negative Self-Monitoring</td>
<td></td>
<td></td>
<td>**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Self-Monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. * indicates significance at \( p < .05 \). ** indicates significance at \( p < .01 \).

According to results in Table 3.2, in the difficult condition the positive self-monitoring intervention was effective for significantly improving the number of successful responses between the second and third trial blocks (\( t (11) = -2.28, p < .05 \)), and also between the fourth and fifth (\( t (11) = -4.00, p < .01 \)), and fifth and sixth trial blocks (\( t (11) = -2.35, p < .05 \)). Negative self-monitoring improved performance between the second and third trial blocks (\( t (11) = -3.36, p < .01 \)). Those subjects in the control group who did not use a self-monitoring strategy maintained a consistent rate of responding across all trial blocks. Positive self-monitoring significantly increased performance in the difficult task condition on three occasions, while negative self-monitoring increased performance scores once.

To determine differences in performance between self-monitoring groups within each trial block three one-way ANOVA contrasts were completed. Specifically, positive self-monitors were compared with negative self-monitors, positive self-monitors with no self-monitors and negative self-monitors with no self-monitors. Because three contrasts were being undertaken within the one trial block then the
.05 level of significance was divided by three to realise a more stringent .0167 level of significance for these contrasts. The results of these contrasts for the difficult condition are summarised below in Table 3.3, which reflects data illustrated in Figure 3.3.

Table 3.3
Significant Differences Between Self-Monitoring Strategies Within Trial Blocks for the Difficult Task

<table>
<thead>
<tr>
<th>Trial Blocks</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive vs. Negative Self-Monitoring</td>
<td></td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive vs. No Self-Monitoring</td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Negative vs. No Self-Monitoring</td>
<td></td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. * indicates significance at \( p < .0167 \)

The results in Table 3.3 indicate that there was no significant differences in the number of successful responses per trial block for the three self-monitoring strategies in trial blocks one and two. In the third trial block positive and negative self-monitors had a similar number of successful responses \((t (11) = -0.88, p > .0167)\), however those in the control group were significantly poorer scorers than the negative self-monitors \((t (11) = -2.65, p < .0167)\). Positive and negative self-monitors continued to have a similar number of successful responses in the fourth trial block \((t (11) = 0.62, p > .0167)\), while the no self-monitoring group maintained their significantly poorer performance than the positive self-monitors \((t (11)= 3.1, p < .0167)\) and the negative self-monitors \((t (11) = -2.88, p < .0167)\). In the fifth and sixth trial blocks positive self-monitoring became significantly superior to the negative \((t (11) = 2.72, p < .0167; t (11) = 2.93, p < .0167)\) and no self-monitoring groups \((t (11) = 2.99, p < .0167; t (11) = 5.21, p < .0167)\).
These two groups then performed at a similarly low success rate ($t(11) = -0.79, p > .0167$; $t(11) = -2.21, p > .0167$).

The preceding results indicated that in the difficult task condition the use of a positive self-monitoring strategy increased scoring between trial blocks two and three and four and six, with positive self-monitoring becoming significantly superior to all other self-monitoring strategies by trial blocks five and six. Negative self-monitors improved their performance between trial blocks two and three. However, as the performance progressed scores per trial block decreased until they performed similarly to the control group in trial blocks five and six. Subjects in the no-monitoring (control) group maintained consistently low scores across trials.

Another 3 x 6 Multivariate ANOVA with repeated measures was then used for the easy task condition. Results indicated that the performance on the three monitoring styles were significantly different across the trial blocks ($F(10, 58) = 8.71, p < .001$). Subjects’ pattern of responding for the three self-monitoring strategies was not consistent in the easy task condition. Subjects’ mean performance scores in the easy task condition for trial blocks when positively, negatively or not self-monitoring are illustrated below in Figure 3.4.
Figure 3.4: Subjects' mean performance scores for each of the 15-trial blocks when positive, negative and no self-monitoring strategies are used in the easy task condition.

Further investigation of the results in Figure 3.4 included a series of paired t-tests to determine the between trial block differences for each of the monitoring strategies. A comparison of performances between trial blocks was carried out to determine if performance significantly changed due to repeated exposure to the self-monitoring intervention. The results of those comparisons are indicated below in Table 3.4.
### Table 3.4
Significant Differences Between Trial Blocks Within Self-Monitoring Strategies for the Easy Task

<table>
<thead>
<tr>
<th></th>
<th>Trial Blocks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 to 2</td>
</tr>
<tr>
<td>Positive Self-Monitoring</td>
<td>**</td>
</tr>
<tr>
<td>Negative Self-Monitoring</td>
<td></td>
</tr>
<tr>
<td>No Self-Monitoring</td>
<td></td>
</tr>
</tbody>
</table>

**Note.** * indicates significance at $p < .05$. ** indicates significance at $p < .01$.

According to Table 3.4, in the easy condition the positive self-monitoring intervention was effective for significantly decreasing the number of successful responses between the first and second trial block ($t(11) = 3.08, p < .01$), and between the fourth and fifth ($t(11) = 3.25, p < .01$), and fifth and sixth trial blocks ($t(11) = 3.32, p < .01$). Negative self-monitoring improved performance between the fourth and fifth trial blocks ($t(11) = -3.74, p < .01$). Subjects who did not use a self-monitoring strategy maintained a consistent response rate across all the trial blocks. Positive self-monitors significantly decreased performance in the easy task condition on three occasions, while negative self-monitoring increased performance scores once.

To determine the differences in performance between self-monitoring groups within each trial block three one-way ANOVA contrasts were completed. Again the .0167 alpha level was used for reasons which have previously been explained. The contrasts for the easy condition are summarised below in Table 3.5, which reflects the data illustrated in Figure 3.4.
Table 3.5
Significant Differences Between Self-monitoring Strategies Within Trial Blocks for the Easy Task

<table>
<thead>
<tr>
<th>Trial Blocks</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive vs. Negative Self-Monitoring</td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>Positive vs. No Self-Monitoring</td>
<td>*</td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Negative vs. No Self-Monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

Note. * indicates significance at $p < .016$

The results in Table 3.5 indicate that positive self-monitors had a significantly higher scoring rate in the first trial block than the negative ($t (11) = 2.96, p < .016$) and no self-monitoring groups ($t (11) = 2.83, p < .016$). There was no significant difference in the number of successful responses per trial block for the three self-monitoring strategies in trial blocks two and three. From the fourth trial block onwards negative self-monitors' performance remained significantly superior to that of the positive self-monitors ($t (11) = -2.68, p < .016$; $t (11) = -7.25, p < .016$; $t (11) = -11.1, p < .016$). In the fifth trial block the positive self-monitors scored significantly less than the control group ($t (11) = -3.97, p < .016$). In the final trial block all self-monitoring groups were significantly different, with negative self-monitoring superior to control ($t (11) = -3.19, p < .016$) and positive self-monitoring groups ($t (11) = -11.1, p < .016$).

The preceding results indicate that in the easy task condition the use of positive self-monitoring resulted in significantly poorer performance between trial blocks one and two, and four and six, with positive self-monitoring becoming significantly inferior to all other self-monitoring strategies by trial block five. Negative self-monitors significantly
improved in the final trial. The scores of those subjects in the non-monitoring (control) group varied as the performance progressed, but remained virtually unchanged. Negative self-monitors gradually increased the number of correct responses per trial block as the performance progressed, while positive self-monitors decreased.

### 3.2.3 Affect Scores

Pre- and post-performance positive and negative affect scores were obtained by subjects responding to the CAS-A (Anshel, 1985). For positive affect scores, ANOVA indicated no significant self-monitoring strategy by pre-post score by task difficulty interaction ($F(2,33) = 1.39, p > .05$). Pre-post positive affect scores were consistent across combinations of self-monitoring strategies and levels of task difficulty. ANOVA also indicated that: 1. there was no significant interaction between the difficult and easy task conditions and the three self-monitoring strategies ($F(2,33) = 1.64, p > .05$), and 2. there was no significant interaction between pre-post affect scores and the three monitoring strategies ($F(2,33) = 2.64, p > .05$). In summary, positive affect was not influenced by the use of a positive, negative or no self-monitoring strategy in either the difficult or easy task conditions.

For negative affect scores, ANOVA indicated that there was a significant interaction for self-monitoring strategy by pre-post score by task difficulty ($F(2,33) = 6.51, p < .01$). Pre-post scores were not consistent across combinations of self-monitoring strategies and task difficulty levels. Additional t-testing for paired samples indicated that there was no significant pre and post score difference for negative affect in the difficult condition when: 1. negatively self-monitoring ($t(11) = .84, p > .05$), and when 2. not self-monitoring ($t(11) = -.61, p > .05$). Likewise, in the easy task condition there is no significant difference in pre and post scores when: 1. positively self-monitoring ($t(11) = 2.09, p > .05$), and when 2. not self-monitoring ($t(11) = .92, p > .05$). However, tests indicated that negative affect was significantly decreased when positively self-monitoring in the difficult situation ($t(11) = -4.78, p < .001$), and when negatively self-monitoring in the easy situation ($t(11) = -2.60, p < .05$). Negative affect was significantly decreased by
positively self-monitoring in the difficult situation, and by negatively self-monitoring in the easy condition.

The degree to which positive and negative affect were influenced by different self-monitoring strategies under difficult and easy task conditions is listed below in Table 3.6.

<table>
<thead>
<tr>
<th>Positive Affect</th>
<th>Negative Affect</th>
<th>No Self-Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positive</strong></td>
<td><strong>Negative</strong></td>
<td><em>No Self-Monitoring</em></td>
</tr>
<tr>
<td>Self-Monitoring</td>
<td>Self-Monitoring</td>
<td></td>
</tr>
<tr>
<td>Difficult Task</td>
<td>Difficult Task</td>
<td>Difficult Task</td>
</tr>
<tr>
<td>Positive</td>
<td>8.40%</td>
<td>9.33%</td>
</tr>
<tr>
<td>Negative</td>
<td>11.79%</td>
<td>18.62%</td>
</tr>
<tr>
<td>Self-Monitoring</td>
<td>Difficult Task</td>
<td>Difficult Task</td>
</tr>
<tr>
<td>Positive</td>
<td>8.15%</td>
<td>3.62%</td>
</tr>
<tr>
<td>Negative</td>
<td>17.40%</td>
<td>7.92%</td>
</tr>
<tr>
<td>Self-Monitoring</td>
<td>Easy Task</td>
<td>Easy Task</td>
</tr>
<tr>
<td>Positive</td>
<td>4.16%</td>
<td>3.87%</td>
</tr>
<tr>
<td>Negative</td>
<td>22.94%</td>
<td></td>
</tr>
</tbody>
</table>

Note. * indicates significance at p < .05.

Table 3.6 indicates that negative affect decreased between pre and post performance scores while positively self-monitoring in the difficult condition and while negatively self-monitoring in the easy condition.

### 3.2.4 Expectancy Scores

Pre- and post- performance expectancy scores were obtained by subjects responding to the SS-CI (Vealey, 1986). ANOVA indicated that there was not a significant interaction for self-monitoring strategy by pre-post scores by task difficulty (F(2,33)= 2.90, p > .05). Pre-post expectancy scores were consistent across combinations of self-monitoring strategies and levels of task difficulty. However, an alpha of p = .069 prompted additional investigation into pre-post scores.
After using a *t*-test for paired samples results indicated that there were no pre and post expectancy score differences in the difficult condition when: 1. positively self-monitoring (*t* (11)= 1.20, *p* > .05); 2. negatively self-monitoring (*t* (11)= .75, *p* > .05), and when 3. not self-monitoring (*t* (11)= .75, *p* > .05). Similarly, in the easy task condition there was no significant pre and post differences in expectancy scores when: 1. positively self-monitoring (*t* (11)= 1.43, *p* > .05), and when 2. not self-monitoring (*t* (11)= -.48, *p* > .05). However, when subjects used a negative self-monitoring strategy on the easy task, expectancies were significantly different (*t* (11)= -4.55, *p* < .001). When subjects negatively self-monitored in the easy task condition then their expectancies for future success significantly increased between the pre and post performance conditions.

The degree to which expectancy scores were influenced by different self-monitoring strategies under difficult and easy task conditions is listed below in Table 3.7.

### Table 3.7

Percent Change between Pre- and Post-performance Expectancy Scores due to the Use of Various Self-monitoring Strategies in Difficult and Easy Task Conditions

<table>
<thead>
<tr>
<th>S. S-CI Scores (i.e. expectancy)</th>
<th>Positive Self-Monitoring</th>
<th>Negative Self-Monitoring</th>
<th>No Self-Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficult Task</td>
<td>Easy Task</td>
<td>Difficult Task</td>
<td>Easy Task</td>
</tr>
<tr>
<td>✆1.05%</td>
<td>✅5.87%</td>
<td>✅6.35%</td>
<td>✆8.34%</td>
</tr>
</tbody>
</table>

**Note.** * indicates significance at *p* < .001

According to Table 3.7 negative self-monitoring on the easy task increased expectancy by 8.34%.
3.2.5 Attributional Scores

Attributions were obtained using the CDS II (McAuley, Duncan & Russell, 1989) after subjects had performed. ANOVA indicated for the locus of causality attributions that there was a significant interaction between self-monitoring strategies and task difficulty ($F (2,33) = 12.48$, $p < .01$). Locus of causality attributions were not consistent across combinations of self-monitoring strategies and levels of task difficulty. Further investigation using the LSD indicated that: 1. when a positive self-monitoring strategy was used locus of causality attributions were significantly superior for the difficult task than for the easy task ($p < .05$); 2. when a negative self-monitoring strategy was used locus of causality attributions were significantly superior for the easy task than for the difficult task ($p < .01$), and 3. when no self-monitoring strategy was used locus of causality attributions were not significantly different for the difficult and easy tasks ($p > .05$). Locus of causality attributions were significantly internal when positively self-monitoring on the difficult task and when negatively self-monitoring on the easy task, in comparison to negative and positive self-monitors in the same respective conditions.

ANOVA results for external control attributions indicated significant interaction between self-monitoring strategies and task difficulty ($F (2,33) = 8.41$, $p < .01$). External control attributions were not consistent across combinations of self-monitoring strategies and levels of task difficulty. LSD indicated that: 1. when a positive self-monitoring strategy was used external control attributions were significantly superior for the easy task than for the difficult task ($p < .05$); 2. when a negative self-monitoring strategy was used external control attributions were significantly superior for the difficult task than for the easy task ($p < .05$), and 3. when no self-monitoring strategy was used external control attributions were not significantly different for the difficult and easy tasks ($p > .05$). External control attributions were significantly higher when positively self-monitoring on the easy task and when negatively self-monitoring on the difficult task, in comparison to negative and positive self-monitors in the same respective conditions.
There was a significant interaction for the stability attribution scores indicating an inconsistency of responding between self-monitoring strategies and task difficulty ($F(2,33) = 3.91, p < .05$). Stability attributions were not consistent across combinations of self-monitoring strategies and levels of task difficulty. Further investigation using LSD indicated that: 1. when a positive self-monitoring strategy was used stability attributions were not significantly different for the difficult task and easy tasks ($p > .05$); 2. when no self-monitoring strategy was used stability attributions were not significantly different for the difficult task and easy tasks ($p > .05$), however 3. when a negative self-monitoring strategy was used stability attributions were significantly superior for the easy task than for the difficult task ($p < .01$). Stability attributions were significantly greater when negatively self-monitoring on the easy task in comparison to, positive self-monitoring on the difficult or easy tasks and negative self-monitoring on the difficult task.

ANOVA indicated for personal control attributions that there was a significant interaction between self-monitoring strategies and task difficulty ($F(2,33) = 10.65, p < .05$). Personal control attributions were not consistent across combinations of self-monitoring strategies and levels of task difficulty. LSD indicated that: 1. when a positive self-monitoring strategy was used personal control attributions were not significantly different for the difficult and easy tasks ($F(2,33) = 0.42, p > .05$); 2. when a negative self-monitoring strategy was used personal control attributions were significantly superior for the easy task than for the difficult task ($F(2,33) = 9.25, p < .01$), and 3. when no self-monitoring strategy was used personal control attributions were significantly superior for the easy task than for the difficult task ($F(2,33) = 4.08, p < .05$). Personal control attributions were significantly higher when using a negative self-monitoring strategy in the easy condition or no self-monitoring strategy in the easy task condition, in comparison to positive self-monitors in the same respective condition.

In Table 3.8 subjects' mean attributional dimension scores after using either a positive, negative or no self-monitoring strategy in difficult and easy task conditions are listed.
Table 3.8
Mean Attribution Scores due to the Use of Various Self-monitoring Strategies in Difficult and Easy Task Conditions

<table>
<thead>
<tr>
<th></th>
<th>Positive Self-Monitoring</th>
<th>Negative Self-Monitoring</th>
<th>No Self Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Difficult Task</td>
<td>Easy Task</td>
<td>Percent Difference</td>
</tr>
<tr>
<td>Locus of Causality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>18.50</td>
<td>14.50</td>
<td>21.62%</td>
</tr>
<tr>
<td>External Control</td>
<td>7.80</td>
<td>12.10</td>
<td>55.13%</td>
</tr>
<tr>
<td>Stability</td>
<td>12.75</td>
<td>15.80</td>
<td>23.92%</td>
</tr>
<tr>
<td>Personal Control</td>
<td>17.75</td>
<td>17.00</td>
<td>4.23%</td>
</tr>
</tbody>
</table>

Note. * attribution scores ranged from three to 22.5. The lower scores indicate greater external attributions while the higher scores indicate more internal attributions. ** indicates significance at p < .05. *** indicates significance at p < .01

According to Table 3.8 positively self-monitoring subjects perceived a significantly higher degree of internal causality for performance on the difficult task than the easy task. When a negative self-monitoring strategy was used, significantly greater attributions to internal causality were made by subjects performing the easy task than by those performing the difficult task. Subjects’ perceptions of external control were significantly lower when positively self-monitoring in the difficult condition, and when negatively self-monitoring in the easy condition. Strongest perceptions of external control occurred when subjects positively self-monitored in the easy condition and negatively self-monitored in the difficult condition.
3.2.6 Task Difficulty Scores

To confirm that subjects were continuing to interpret tasks as difficult and easy throughout the trials pre and post performance indicators were used. ANOVA indicated no significant interaction for self-monitoring strategy by pre-post score by task difficulty ($F(2,33) = .34, p > .05$). Pre-post task difficulty scores were consistent across combinations of self-monitoring strategies and levels of task difficulty indicating that subjects' perceptions of task difficulty did not change during trials. ANOVA also indicated that the average difference in pre-post task difficulty scores between the difficult and easy tasks was not significantly different across the three monitoring strategies ($F(2,33) = .89, p > .05$), and that the difference in pre-post scores for task difficulty was not significantly different across the three monitoring strategies ($F(2,33) = .63, p > .05$). Subjects' perceptions of task difficulty did not change during the course of criterion task performance.

3.2.7 Manipulation Check Scores

Manipulation checks were administered after 70 trials to assess subjects use of the independent variable. Mean scores revealed that subjects rated both their positive and negative self-monitoring ability as very good with ratings of 2.4 ($SD = .86$) and 2.5 ($SD = 1.16$) respectively, where a rating of 1 correlated with a very, very good self-monitoring ability.

3.3 Experiment 3

Thirty-two subjects, 14 males and 18 females performed the motor task to determine the probability of implementing different self-monitoring strategies as task complexity changed. It was therefore necessary to compare the subjects' performance scores in the 'changed' condition (where self-monitoring strategy and task difficulty changed) with their scores in the 'unchanged' condition (where only task difficulty changed). Score differences would indicate that different self-monitoring strategies could be used when task complexity changes.
Below in Figure 3.5 are subjects' mean performance scores when using a positive self-monitoring strategy, followed by a negative self-monitoring strategy, under difficult and easy task conditions.

![Figure 3.5](image)

**Figure 3.5**: Subjects' mean performance scores when using a positive self-monitoring strategy, followed by a negative self-monitoring strategy, under difficult and easy task conditions.

According to Figure 3.5 and t-tests for paired samples, when subjects were in the easy task condition and used a negative self-monitoring strategy then their performance scores were significantly superior to when they used the positive self-monitoring strategy in the same condition \( t = -5.07, \ df=15, \ p <.001 \). That is, those subjects who changed, from positively self-monitoring in the difficult condition to positively self-monitoring in the easy condition had significantly poorer performance scores than those subjects who changed from positively self-monitoring in the difficult condition to negatively self-monitoring in the easy condition.

Manipulation checks to ensure appropriate use of the independent
variable revealed that subjects rated both their positive and negative self-monitoring performances as very good with mean scores of 2.3 (SD = .75) and 2.5 (SD = .79) respectively.

In Figure 3.6 are illustrated subjects' mean performance scores when using a negative self-monitoring strategy, followed by a positive self-monitoring strategy, under difficult and easy task conditions.

According to Figure 3.6 and t-testing, subjects in a difficult task situation who positively self-monitored had performances which were significantly superior to those subjects who used the negative self-monitoring strategy ($t = -2.33$, df=15, $p < .05$). Those subjects who changed, from negatively self-monitoring in the easy condition, to negatively self-monitoring in the difficult condition had significantly poorer performance scores than those who changed from negatively self-monitoring in the easy condition to a positively self-monitoring in the difficult condition.
Manipulation checks again revealed that subjects rated both their positive self-monitoring and negative self-monitoring performances as very good with mean scores of 2.4 ($SD = 1.03$) and 2.3 ($SD = .98$).

If performance scores were similar between the two 'change' conditions in each of the preceding experiments, then that would indicate that changing the self-monitoring strategy as task difficulty changed was the same as maintaining the self-monitoring strategy when task difficulty changed. However, significantly different performance scores indicated that changing task difficulty and self-monitoring strategy was possible.

3.4 Summary

Positive, negative and no self-monitoring strategies were used on subject-validated difficult and easy criterion tasks to determine the effects of self-monitoring on performance. Significant results indicated that:

1. when a positive self-monitoring strategy was used for the difficult task then performance improved overtime, negative affect decreased, and attributions became more internal and controllable;

2. when a positive self-monitoring strategy was used for the easy task then performance was impaired overtime, and attributions became less internal and more uncontrollable;

3. when a negative self-monitoring strategy was used for the difficult task then performance was impaired, and attributions became less internal, unstable and uncontrollable and,

4. when a negative self-monitoring strategy was used for the easy task then performance improved, negative affect decreased, expectancies increased and attributions became internal, stable and controllable.
After re-establishing the principles of self-monitoring with subject-validated criterion tasks, it was demonstrated that performance-enhancing self-monitoring strategies could be implemented as the complexity of the criterion task changed.
4.1 Introduction

In the present study, an attempt was made to examine the implementation of various self-monitoring strategies as a function of task complexity. Specifically, positive, negative and no self-monitoring strategies were used with subject-validated difficult and easy tasks, to determine the effect on motor performance, emotion, pre-task expectancy and post-task attribution. To this end, several hypotheses were generated in which performance outcomes, as a function of the experimental conditions, were predicted. Discussion of these hypotheses follows.

4.2 Task Perception Versus Task Performance

The purpose of Experiment 1 was to ascertain subjects' perceptions of task difficulty at each level of the game. In this way subject-validated 'difficult' and 'easy' tasks could be determined. It was hypothesised that subjects' perceptions of task difficulty would match their performance scores on the criterion tasks (see Hypothesis #1). Results indicated partial support for this hypothesis. Perceptions of task difficulty and performance scores were similar on the more complex skill ($p < .05$). However, for the easy task there were significant differences between the subjects' perceptions and performance, with subjects perceiving the task to be significantly easier than performance scores indicated ($p < .001$). The differences between perception and performance scores on the easy task were relatively less important in
this study because, both dependent variables (i.e., perception and performance scores) were within the appropriate criterion range (i.e., above 70% response accuracy) to induce behavioural changes when using a self-monitoring strategy.

However, these results raise further questions, beyond the scope of the present investigation, concerning the use of either task perceptions and/or performance scores, as indicators of a tasks' difficulty. For example, should researchers define and investigate questions of task difficulty based on subjects' performance scores, or should task complexity be defined according to subjects' perceptions? Results from this study suggested that, while subjects' perceptions of performance were accurate for the difficult task (i.e., around 25-30% response accuracy), when performing the easy task (i.e., around 80-85% response accuracy) subjects perceived that their performance was significantly better than scores indicated. It appears that subjects' perceptions and performance scores should be jointly examined. Researchers in future studies also need to use subject-defined criterion tasks and not rely on their own intuitive beliefs to validate task complexity. Lack of task complexity validation is a limitation of past motor performance research (e.g., McGowan & Schultz, 1989).

4.3 Task Performance

It was hypothesised that in the difficult task condition, using a positive self-monitoring strategy would lead to superior performance compared to the use of a negative self-monitoring strategy (see Hypothesis #2) and, that negative self-monitors would perform poorly in comparison to positive self-monitors (see Hypothesis #3). Results indicated that both these hypothesis were confirmed, however not at the .05 level of significance. Specifically, for Hypotheses 2 and 3 subjects who positively self-monitored in the difficult task condition performed better than the negative self-monitoring group at the $p < .10$ level of significance. While this level of statistical significance is less stringent than the 5% level, certain factors must be considered that support the proposed hypotheses. A definite trend emerged in the subjects'
scoring patterns. This trend indicated an increase in score-per-trial-block for positive self-monitors, while negative self-monitors maintained a consistent scoring rate (see Figure 3.1, Table 3.2 and Table 3.3). Results strongly imply that under similar future conditions positive self-monitors will become even more significantly different from negative self-monitors. It would appear that further trials and repeated exposure to the self-monitoring interventions may lead to a situation where positive self-monitoring is significantly superior to negative self-monitoring, at the .05 level. Another consideration when assessing the acceptability of the results is the 'difficult' task used in these experiments. The most difficult task that previous self-monitoring researchers have used is a task with a 51% response accuracy (Mahoney, Moore, Wade, and Moura, 1973). According to subjects performance in Experiment 1, the 'difficult' task used for this experiment had at least a 27% response accuracy. While it may be suggested that a high degree of task difficulty is the best scenario in which to assess the effect of the self-monitoring variable, it also must be considered that a complex task, and the corresponding low level of response accuracy, allows little scope for differentiation of performance between self-monitoring styles. Results from Experiment 2 suggest a practical, if not statistical, superiority for positive self-monitors in the difficult task condition. If the developing performance trends, the practical significance of the results and the magnitude of the less stringent alpha level (i.e., \( p < .10 \)) are considered, and the hypotheses are found acceptable on these bases, then experimental results concur with findings obtained by McFall (1970), Gottman and McFall (1972), Kirschenbaum and Karoly (1977), Kirschenbaum, Ordman, Tomarken and Holtzbauer (1982), Johnston-O'Conner and Kirschenbaum (1986). These findings suggest that positive self-monitoring is superior to negative self-monitoring in the difficult task condition.

For the easy task condition, it was hypothesised that the use of a positive self-monitoring strategy would lead to impaired performance compared to negative self-monitoring (see Hypothesis #4) and, that negative self-monitors would perform better than positive self-monitors (see Hypothesis #5). Results indicated that both these hypothesis were confirmed at the .05 level of significance. In the easy task
condition, negative self-monitors performed significantly better than the positive self-monitoring group. This result concurs with outcomes obtained by Wade (1974), Masters and Santrock (1976), Kirschenbaum and Karoly (1977), Kirschenbaum, Ordman, Tomarken and Holtzbauer (1982), and Tomarken and Kirschenbaum (1982) who also found that negative self-monitors performed significantly better than positive self-monitors in the easy task condition. An analyses of performance across trials was then undertaken to better understand how and when Kirschenbaum's (1987a) principles of self-monitoring impact on motor performance.

4.4 Task Performance Across Trials

Previous investigations concerning the use of self-monitoring strategies have specifically concentrated on identifying whether changes in criterion performance exists after using a self-monitoring strategy. Johnston-O'Conner and Kirschenbaum (1986) investigated pre-post treatment changes in golf swing quality and consistency when using a positive self-monitoring strategy. Similarly, Kirschenbaum, Ordman, Tomarken and Holtzbauer (1982) reported significant score improvement for ten-pin bowlers who positively, as opposed to negatively, self-monitored performance. However, no self-monitoring studies have reported performance changes over the course of the self-monitoring intervention. Further research in this area can assist in determining how and when self-monitoring influences motor performance.

4.4.1 The Influence of Positive Self-Monitoring Across Trials

For Experiment 2, subjects in the difficult task condition who positively self-monitored significantly increased the number of correct responses per trial block after blocks 2, 4 and 5. Responding appeared to 'gain momentum' as positive self-monitoring continued in the difficult condition. Improved performance scores coincided with a decrease in negative affect (p < .05) and greater internal (p < .05) and less external attributions (p < .05) in comparison to positive self-monitors in the easy condition. Similar attribution patterns have been reported by
other successful motor skill performers (Duncan & McAuley, 1987; McAuley, 1985; McAuley & Gross, 1983; Robinson & Howe, 1989; Tenenbaum & Furst, 1985). Likewise, several studies also confirm that decreased negative affect is favourably related to performance (Carrol, 1978; Hale and Strickland, 1976; Master, Barden & Ford, 1979; Natale & Hontos, 1982; Teasdale & Fogerty, 1979; Wright & Mischel, 1982). Vallerand (1986) also suggests that decreased negative affect and increased positive affect can facilitate and sustain productive and creative activity.

Kirschenbaum et. al., (1985) suggest that performing difficult tasks increases arousal (e.g., Kirschenbaum & Karoly, 1977), which, in turn, increases self-focused attention (Wegner & Guillian, 1980, 1983). When positively self-monitoring in the difficult condition, it would appear that the decreased negative affect and internal attributions combined with the proposed increased focus of attention, to suggest a causal mechanism for the gradual improvement in performance scores. The increased performance results, generated with the assistance of decreased negative affect, internal attributions and increased focus of attention support Hypothesis #2 which suggests that positive self-monitoring improves performance in a difficult situation (Principle 1 - Kirschenbaum. 1987a).

In the easy task condition, positive self-monitoring usually decreased the number of correct responses given per trial block. After trial block 1 there was a significant decrease in performance. Between trial blocks 2 and 3 performance remained consistent, however after trial blocks 4 and 5 performance again continued to significantly decrease. Kirschenbaum, Tomarken and Humphery (1985), Mischel, Ebbstein and Zeiss (1973), and Scheier and Carver (1982) all suggest that positive self-monitoring in an easy situation decreases the salience of the positive performance feedback. This devalued feedback may then become aversive and lead to behavioural and attentional disengagement from self-regulated tasks that are well-mastered. This may explain the decrease in performance scores across trial blocks for positive self-monitors performing the easy task in Experiment 2. This data supports Hypothesis #4 which suggests that positive self-monitoring inhibits performance in an easy situation (Principle 2 - Kirschenbaum. 1987a).
4.4.2 The Influence of Negative Self-Monitoring Across Trials

In Experiment 2, when subjects were negatively self-monitoring, in the difficult task condition, performance improved during trial block 2 \( (p < .05) \). However, after this initial improvement, performance-per-trial-block remained consistent for the following blocks. Suggestions that some type of learning phenomenon (Magill, 1985) or warm-up effect (Anshel, 1985) may be responsible for the improvement in initial performance could be considered, as performance scores for the positive and negative self-monitoring groups are similar for the first four trial blocks \( (p < .05) \). However, the no self-monitoring group does not exhibit any warm-up or learning effects. Their performance remains consistent across all trial blocks \( (p < .05) \). This suggests that the initial increase in performance may be a function of the use of a self-monitoring strategy. Therefore, explanations as to why negative self-monitors maintain a consistent trial-block-performance after block 2 must be related to the performance feedback and cognitions generated by the use of a negative self-monitoring strategy, in the difficult task condition. While negatively self-monitored performance increased, then remained unchanged, reported attributions were becoming external \( (p < .001) \), unstable \( (p < .001) \) and uncontrollable \( (p < .001) \) in comparison to negative self-monitors, in the easy condition. Similar ‘externalised’ attributions have been reported by other unsuccessful performers (Duncan & McAuley, 1987; McAuley, 1985; McAuley & Gross, 1983; Robinson & Howe, 1988; Tenenbaum & Furst, 1985). It would appear that externalised attributions, possibly generated by the use of a negative self-monitoring strategy, may have contributed to the performance pattern. Research would suggest that if negative self-monitoring had continued, then causal attributions for performance may have lead to a situation where subjects behaviourally or attentionally withdrew from the task (Kirschenbaum, Tomarken & Humphery, 1985; Scheier & Carver, 1982). Based on the Inverted-U or Yerkes and Dodsons’ activation/arousal hypothesis (cited in Cox, 1985) Tomarken and Kirschenbaum (1982) suggest that negative self-monitoring is an antecedent for high arousal and increased negative affect. These authors indicate that if negative self-monitoring becomes particularly aversive then people
may behaviourally withdraw from the aversive situation if feasible, or they may attentionally withdraw, if behavioural withdrawal is impossible (Kirschenbaum, Tomarken & Humphery, 1985; Scheier & Carver, 1982). This explanation is also supported by Wade (1974) who found an initial problem solving increase, followed by a steady performance decrease for negatively self-monitoring college students in his study.

Subjects who negatively self-monitored, in the easy task condition significantly increased the accuracy of their performance in trial block 4 (p < .001). Subjects in this experimental condition decreased negative affect (p < .05), and increased expectancies (p < .05). These subjects also made more internal (p < .001), stable (p < .001) and controllable (p < .001) attributions than negative self-monitors, in the difficult condition. Kirschenbaum et al., (1985) suggest that heightened attentiveness to errors occasioned by negative self-monitoring, in the easy condition may actually produce enhanced task-focused attention or 'action orientation' (Kuhl, 1984). Action orientation is a cognitive activity characterised by heightened task focus and an active search for problem-solving techniques (Carver & Scheier, 1981). Subjects negatively self-monitoring, in the easy task condition, produced increased performance scores, which may have been a product of enhanced task-focused attention and internal attributions. This may partially explain an increase in performance scores across trial blocks. This increase is in line with Principle 2 which suggests that negative self-monitoring improves performance in an easy task condition (Kirschenbaum, 1987a).

4.5 Self-monitoring and Attributions

Results indicated that when subjects positively self-monitored in the difficult condition then attributions were significantly more internal (p < .05) and less external (p < .05) compared with positive self-monitors in the easy task condition. Similarly, when subjects negatively self-monitored in the easy condition then outcomes were significantly more internal (p < .01), personal (p < .01), stable (p < .01) and less external (p < .05) compared with negative self-monitors, in the difficult task.
condition. When self-monitoring and task difficulty combined to produce performance improvements then attributions were internal. However when performance decreased or remained unchanged attributions were external. These results are supported by previous studies examining the attributions of winners and losers, in which winners demonstrated a more internal locus of control, more stability and greater controllability than losers did (Duncan & McAuley, 1987; McAuley, 1985; McAuley & Gross, 1983; Robinson & Howe, 1988; Tenenbaum & Furst, 1985).

Subjects in this study were 'self-serving' in their attributions regarding the causes of performance (Carron, 1980). Carron's (1980) description of self-serving causal attributions adequately describes subjects' attributions for this experiment:

There is a tendency to ascribe successful outcomes to personal/internal factors while unsuccessful outcomes are attributed to environmental/external factors. In short, I am responsible and accept credit for the success whereas, on the other hand, the loss was out of my control (p. 76).


This study also allowed an opportunity to assess attributions and affect together. Weiner (1985) and Vallerand (1987) indicated that the causal dimensions of stability, controllability and causality all contribute to the formulation of emotion. McAuley and Duncan (1989) further suggested that the stability and locus of causality dimensions contributed specifically to depressogenic cognitions. Results from the present study also indicated that those subjects who performed poorly and attributed the outcome to external and unstable causes likewise had higher negative affect than successful performers, even though those who performed poorly had deflected the 'blame' by attributing outside themselves. The claims of McAuley and Duncan (1989) and Robinson and Howe (1989) that suggest an attribution/affect link, which indicates that causal attributions can influence affect appear correct.
4.6 Self-monitoring and Affect

Results of Experiment 2 indicated that when performance scores increased while positively self-monitoring in the difficult condition or negatively self-monitoring in the easy condition, then negative affect decreased \((p < .05)\). None of the scores for positive affect reached statistical significance however, the direction of the non-significant positive affect increases and decreases were correlated to performance score increases and decreases (see percentage changes for positive affect in Table 3.6). That is, if subjects were using a performance enhancing strategy/task combination then positive affect showed a tendency towards increasing while negative affect decreased.

In the psychomotor literature, several studies confirm that increased positive affect and decreased negative affect are favourably related to performance. Carrol (1978) found that positive affect enhanced finger tapping performance, digit symbol substitution and pursuit rotor tracking. Hale and Strickland (1976) also found that subjects performed cognitive integration tasks more quickly in situations in which positive affect had been induced, than in situations in which negative affect had been induced. Additionally, positive affect has been related to faster reaction times (Teasdale & Fogerty, 1979), reductions in the length of time it takes to learn new skills (Master, Barden & Ford, 1979), increases in writing speed (Natale & Hontos, 1982), and higher estimation or expectations for future performance and favourable global self-evaluations (Wright & Mischel, 1982). While changes in negative affect reached a significant level, the direction of the positive affect changes also appeared correlated with performance scores and literature-based predictions.

Likewise, the increases in negative affect, when subjects performed poorly did not reach statistical significance. However there was a tendency for negative affect to increase when performance decreased (see percentage changes for negative affect in Table 3.6). Increased negative affect for poor performance is supported by several cognitive theories of depression (e.g., Beck, Rush, Shaw & Emery, 1979; Rehm, 1977) which stress that people become depressed by selectively
attending to unpleasant or negative information about themselves. Likewise a study by Smith, Ingram, and Roth (1985) also showed that negative self-evaluations (i.e. negative self-monitoring) led to depressogenic cognitions. The non-significant increases in negative affect for poor performance are supported in the affect literature.

Kirschenbaum et al., (1985) suggested that there is a task mastery component involved in the self-monitoring/affect relationship. Explaining the mechanism that underlies the influence of self-monitoring on affect in difficult task conditions, Kirschenbaum et. al., (1985) suggest, based on the work of Wegner and Guillian (1980; 1983) that performing difficult tasks increases arousal which in turn increases self-focused attention. Because heightened self-focused attention typically magnifies affective states (e.g., Kirschenbaum & Tomarken, 1982), then Kirschenbaum et. al., (1985) suggest that attempting a difficult task when positively self-monitoring will intensify positive affect, and negative self-monitoring will similarly deepen negative affect. Results from the present study do not statistically confirm Kirschenbaum et al.'s (1985) suggestions concerning intensified affect in the difficult task condition, however results do extend these suggestions. While positive affect did not significantly increase when a positive self-monitoring strategy was used for the difficult task, negative affect did significantly decrease. According to Kirschenbaum et. al., (1985) positive self-monitoring on the difficult task will intensify positive affect however, in the present study it decreased negative affect. Future researchers may wish to investigate positive affect increases and negative affect decreases while using a positive self-monitoring strategy in a difficult task condition.

Kirschenbaum et al., (1985) also postulate that positive and negative self-monitoring of easy tasks will have relatively little impact on affect. They submit that the positive affect generated as a consequence of high task success may minimise negative affect and, consequently, restrict the range of subjects affective responses. Results from the present study indicate that positive affect appears to increase and negative affect is decreased while negatively self-monitoring in the easy task condition. This supports Kirschenbaum et. al.,'s (1985)
suggestion. However when positively self-monitoring on the easy task then negative affect has a tendency to increase while positive affect appears to decrease. In this easy task condition, positive self-monitoring tends to decrease performance scores and affect becomes depressogenic. It would appear that affect is not minimised in all easy task conditions as Kirschenbaum et. al. (1985) suggest. Future researchers may attempt to determine the degree to which task difficulty or task performance influences affect while self-monitoring.

4.7 Self-monitoring and Expectancy

Subjects completed an expectancy inventory before and after their performance in order to determine the influence of self-monitoring on expectancy. Results indicated that when subjects negatively self-monitored in the easy task condition, they significantly increased expectancies for future success ($p < .001$). The significant result for successful negative self-monitors in the easy condition is supported by laboratory (Feltz, 1982; Gould, & Weiss, 1981; Weinberg, Gould, & Jackson, 1979; Weinberg, Yukelson & Jackson, 1980) and field studies (Gould, Weiss, & Weinberg, 1981; Highlen, & Bennett, 1979; Mahoney, Gabriel, & Perkins, 1987; Meyers, Cooke, Cullen, & Liles, 1979). These investigations have generally shown that positive relationships exist between an individual’s expectations and motor performance. That is, more successful athletes exhibit higher efficacy expectations than their less successful counterparts (Weinberg & Jackson, 1990). Bandura (1990) suggests that performance accomplishments provide the most powerful and dependable source of efficacy expectations. Highest performance scores were correlated with the most confident performers. Bandura (1990) suggests that consistent highly skilled performance creates a strong sense of self-confidence and that the individual can perform the behaviours required to produce the desired outcomes. For example, in the verbal learning literature Bouffard-Bouchard (1990) showed that greater efficacy scores were related to more completed problems, more efficient problem-solving strategies, and accurate self-evaluation responses. Performance accomplishments can lay the foundation for building confidence (Weinberg & Jackson, 1990).
Present findings that suggest that superior performance scores and higher efficacy scores are related are supported by studies (e.g., Bouffard-Bouchard, 1990; Diener & Dweck, 1980) that indicate that highly self-efficacious individuals are not handicapped by self-debilitating thoughts or fears of failure. Consequently they can more clearly evaluate and execute their role in reference to the task criteria. Successful performers tend to exhibit higher levels of self-efficacy and present study results confirm this (Bandura, 1990).

The combining of efficacy and affect measures within the one study provided an opportunity to investigate their relationship. Feltz (1982) has reported little support for the relationship between self-efficacy and emotional arousal. However, the present results indicated that self-efficacy and emotion were correlated. When negatively self-monitoring in the easy task condition then expectancies increased and negative affect decreased. These results are supported by Bandura’s (1977) claim that efficacy and emotion co-affect behaviour. That is, emotion influences behaviour through the expectations that a person’s actions generate.

An examination of expectancy scores in relation to attributions was also undertaken. Negative self-monitoring subjects in the easy task condition perceived positive performance outcomes to be a result of stable factors (e.g., poor opponent, high personal ability) rather than unstable factors (e.g., great effort, good luck). Literature suggests that this type of attributional pattern ensures greater expectancy for future success, and subjects in this study confirm this (Duncan & McAuley, 1987; Nicholls, 1980; Robinson & Howe, 1988). Again another causal mechanism for successful performance is suggested.

4.8 Self-Monitoring and a Causal Mechanism

The negative feedback loop serves as the basic unit of self-regulatory functioning, and the process of engaging in self-monitoring, self-evaluation and self-consequation results in behaviour change (Bandura, 1977; Carver & Scheier, 1981; Kanfer & Karoly, 1972; Kirschenbaum, 1987a; 1987b; Kirschenbaum & Wittrock, 1990;
Mischel, 1973). Self-regulation theorists believe that the mechanisms that underlie behaviour change in the negative feedback loop are self-reward, which maintains or improves target behaviour, and self-punishment, which requires individuals to change their responding (Kirschenbaum, 1987a, 1987b). Study results provide an opportunity to understand, on a 'micro' level, how self-reward maintains target behaviour and how self-punishment generates behaviour change.

Positive and negative self-monitoring when performing difficult and easy tasks, respectively, improved subjects' performance over the trials in the present investigation. Self-regulation theory suggests that when the appropriate self-monitoring strategies and task difficulty conditions are combined, self-rewarding occurs and performance is improved. Current results suggest that while motor performance improved, negative affect decreased, expectancies increased and attributions became more internal, stable and controllable. Leith (1989) proposes that affect, expectancies and especially attributions can determine the quantity and quality of subsequent motivation. This suggests that affect, expectancies and attributions may act as motivational mechanisms that will influence self-reward, and subsequently performance when using a self-monitoring strategy. This study suggests that if the self-monitoring individual improved performance, experienced less negative affect, had higher expectancies, and more egocentric attributions, then that individual will be motivated to self-reward and, thus, maintain or improve existing behaviours.

When subjects were positively self-monitoring in the easy task condition, or negatively self-monitoring, in the difficult task condition performance scores did not improve. At the same time negative affect and external attributions increased, while expectancies for success decreased. It could be predicted that these individuals were less motivated to maintain existing behaviours, and that they behaviourally and/or attentionally withdrew from the aversive situation and thus their performance scores decreased (Kirschenbaum, Tomarken & Humphery, 1985; Carver & Scheier, 1982). These processes may explain why poorly performing individuals need to be challenged and confronted by self-punishment in order to change their inappropriate behaviours.
and cognitions. The suggestions as to how self-reward and self-punishment can maintain or change behaviour, provide a basis for understanding the change of self-monitoring strategy as task complexity changes.

4.9 Changing Self-Monitoring Strategies and Task Complexity

It was hypothesised in this study that, subsequent to the use of a negative self-monitoring strategy in the easy task condition, the use of positive self-monitoring would result in superior performance compared with negative self-monitoring in a difficult task condition (see Hypothesis #7). Results of the study confirmed this prediction at the 5% level. It was also hypothesised that following the use of a positive self-monitoring strategy, in a difficult situation, that the use of negative self-monitoring on the easy task, would enhance performance compared to positive self-monitoring in the same situation (see Hypothesis #6). Results of the study also confirmed this hypothesis at the 1% level.

If performance scores had been similar between the condition when, subjects changed task difficulty conditions but not self-monitoring strategies, and the condition when, subjects changed task difficulty conditions and self-monitoring strategies, then, this would have indicated that it was not possible to implement different self-monitoring strategies as task complexity changed. However, significant differences between the scores for these two conditions, indicated that changing self-monitoring strategies was possible as task complexity changed.

Apparently no previous investigations have studied the effect of self-monitoring strategies under varying degrees of task difficulty. If individuals' perceptions of task difficulty or their performance scores indicate that the criterion task is difficult, then they should employ a positive self-monitoring cognitive strategy. However, if individuals determine that the criterion task has become easy, then a negative self-monitoring cognitive strategy should be employed.
4.10 Summary and Implications

1. Subjects' performance scores matched their perception of task difficulty in the difficult condition but not in the easy condition. Researchers need to ensure that task difficulty is validated based on the performers' perceptions in future investigations.

2. The principles of self-monitoring were reinstated using subject-validated levels of task difficulty. Performance improved through the use of a positive self-monitoring strategy, with the difficult task, and a negative self-monitoring strategy with the easy task. In addition, negative affect decreased, expectancies were higher and causal attributions became more internal, stable and controllable. When negatively self-monitoring, on the difficult task or positively self-monitoring on the easy task, performance was poorer, negative affect increased, expectancies were lower, and performance became externally attributed.

3. It was indicated that previous studies were limited by the assumption that subjects used self-monitoring strategies correctly. Performance results and manipulation checks for this study indicate that changing self-monitoring strategies under differing degrees of task difficulty is possible. This may lead to a situation where individuals who are performing similar skills to those undertaken in this experiment may change their self-monitoring strategy to match task complexity changes. Because athletes were not tested performing sport skills which they have mastered then the realistic limitations of this study suggest that it would be improper to imply that athletes may benefit from changing self-monitoring strategies to suit task complexity. However, these experiments provide a basis on which further sport skill field studies and experimentation can confidently proceed. Future researchers may attempt sport-based self-monitoring interventions in order to design even more effective means for promoting effective self-regulation, especially when performing sport skills of varying complexity.
REFERENCES
REFERENCES


APPENDICES
Appendix A.1

CAS - A
Childrens Arousal Scale - Adult Version (Anshel, 1985)
Please circle the number that best describes your feelings at the present time (right now). Here is an example: If asked the question 'How do you feel right now?', you would respond by circling the appropriate number.

<table>
<thead>
<tr>
<th>Weak</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Not Weak</th>
</tr>
</thead>
</table>

You would circle '1' if you feel very weak, '7' if you think you do not feel very weak, or a number in between, say '4' if you think you feel about average. You must complete this questionnaire within a 30-second period.

<table>
<thead>
<tr>
<th>Happy</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Not Happy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relaxed</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Not Relaxed</td>
</tr>
<tr>
<td>Worried</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Not Worried</td>
</tr>
<tr>
<td>Excited</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Not Excited</td>
</tr>
<tr>
<td>Eager</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Not Eager</td>
</tr>
<tr>
<td>Scared</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Not Scared</td>
</tr>
<tr>
<td>Sad</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Not Sad</td>
</tr>
<tr>
<td>Upset</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Not Upset</td>
</tr>
<tr>
<td>Nervous</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Not Nervous</td>
</tr>
<tr>
<td>Frightened</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Not Frightened</td>
</tr>
</tbody>
</table>
Appendix A.2

SS-CI
State Sport-Confidence Inventory (Vealey, 1986)
Please answer these questions based on how confident you feel right now. Circle the number that best describes how confident you feel right now about performing in upcoming trials. You must complete the questionnaire within a one-minute period.

**How confident are you right now in your ability to:**

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>execute the skills necessary to be successful</td>
<td>1</td>
<td>2 3 4</td>
<td>5 6 7 8 9</td>
</tr>
<tr>
<td>make critical decisions during competition</td>
<td>1</td>
<td>2 3 4</td>
<td>5 6 7 8 9</td>
</tr>
<tr>
<td>perform under pressure</td>
<td>1</td>
<td>2 3 4</td>
<td>5 6 7 8 9</td>
</tr>
<tr>
<td>execute successful strategy</td>
<td>1</td>
<td>2 3 4</td>
<td>5 6 7 8 9</td>
</tr>
<tr>
<td>concentrate well enough to be successful</td>
<td>1</td>
<td>2 3 4</td>
<td>5 6 7 8 9</td>
</tr>
<tr>
<td>adapt to different competition situations and still be successful</td>
<td>1</td>
<td>2 3 4</td>
<td>5 6 7 8 9</td>
</tr>
</tbody>
</table>
How **confident** are you right now in your ability to:

### achieve your competitive goals

<table>
<thead>
<tr>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

### be successful

<table>
<thead>
<tr>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

### think and respond successfully during competition

<table>
<thead>
<tr>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

### meet the challenge of the competition

<table>
<thead>
<tr>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

### be successful based on your preparation for these trials

<table>
<thead>
<tr>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

### perform consistently enough to be successful

<table>
<thead>
<tr>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

### bounce back from performing poorly and be successful

<table>
<thead>
<tr>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>
Appendix A.3

CDS II

Causal Dimension Scale II (McAuley, Duncan & Russell, 1991)
Think about the reason or **reasons that cause your outcome** in the task you just did. The items below concern your **impressions** or **opinions** of this cause or **causes of your performance**. Circle one number for each of the following questions.

<table>
<thead>
<tr>
<th>Question</th>
<th>Numbers</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>That reflects an aspect of yourself</td>
<td>9 8 7 6 5 4 3 2 1</td>
<td>Reflects an aspect of the situation</td>
</tr>
<tr>
<td>Managable by you</td>
<td>9 8 7 6 5 4 3 2 1</td>
<td>Not manageable by you</td>
</tr>
<tr>
<td>Permanant</td>
<td>9 8 7 6 5 4 3 2 1</td>
<td>Temporary</td>
</tr>
<tr>
<td>You can regulate</td>
<td>9 8 7 6 5 4 3 2 1</td>
<td>You cannot regulate</td>
</tr>
<tr>
<td>Over which others have control</td>
<td>9 8 7 6 5 4 3 2 1</td>
<td>Over which others have no control</td>
</tr>
<tr>
<td>Inside you</td>
<td>9 8 7 6 5 4 3 2 1</td>
<td>Outside you</td>
</tr>
<tr>
<td>Stable over time</td>
<td>9 8 7 6 5 4 3 2 1</td>
<td>Variable over time</td>
</tr>
<tr>
<td>Under the power of other people</td>
<td>9 8 7 6 5 4 3 2 1</td>
<td>Not under the power of other people</td>
</tr>
<tr>
<td>Something about you</td>
<td>9 8 7 6 5 4 3 2 1</td>
<td>Something about others</td>
</tr>
<tr>
<td>Over which you have power</td>
<td>9 8 7 6 5 4 3 2 1</td>
<td>Over which you have no power</td>
</tr>
<tr>
<td>Unchangeable</td>
<td>9 8 7 6 5 4 3 2 1</td>
<td>Changeable</td>
</tr>
<tr>
<td>Other people can regulate</td>
<td>9 8 7 6 5 4 3 2 1</td>
<td>Other people cannot regulate</td>
</tr>
</tbody>
</table>
Appendix B.1

Task Rating Questionnaire
DATE: ............................................. ID NO.: ........................... 

TASK RATING SHEET

Please circle the number that you think best describes the level of difficulty of this task. Here is an example: You would circle '1' if you thought the task was very very easy. You might circle '10' if you thought that the task was very very hard.

---

**TASK 1**

How would you describe the level of difficulty of this task?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>very very easy</td>
<td>moderate</td>
<td>very very hard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**TASK 2**

How would you describe the level of difficulty of this task?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>very very easy</td>
<td>moderate</td>
<td>very very hard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**TASK 3**

How would you describe the level of difficulty of this task?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>very very easy</td>
<td>moderate</td>
<td>very very hard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**TASK 4**

How would you describe the level of difficulty of this task?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>very very easy</td>
<td>moderate</td>
<td>very very hard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**TASK 5**

How would you describe the level of difficulty of this task?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>very very easy</td>
<td>moderate</td>
<td>very very hard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B.2

Positive Self-Monitoring Questionnaire
SELF-MONITORING SCORE SHEET

Here is a technique to monitor your performance. After every 15 trials, you will be asked to review the six components of Skilled Shufflepucking. For those components that you felt were well performed during the last 15 trials, put a number in the box corresponding to your feeling.

1 = good; 2 = very good, or 3 = excellent.

If you did not feel that you performed well on a particular component, place the letter ‘A’ in that box. You must complete the self-monitoring within a 30-second period.

1 = good; 2 = very good; 3 = excellent

Controlled the paddle
Swung the paddle
Played ahead
Service ready
Slammed the puck
Sliced the puck
Appendix B.3

Negative Self-Monitoring Questionnaire
Self-Monitoring Score Sheet

Here is a technique to monitor your performance. After every 15 trials, you will be asked to review the possible errors you could have made by not following the six component principals of Skilled Shufflepucking. If you made any errors during the last 15 trials, put a number in the box corresponding to the neglected skill, denoting how poorly you did.

1 = poor; 2 = very poor, or 3 = terrible.

If you did not make an error on a particular component, place a zero (0) in that box. You must complete the self-monitoring within a 30-second period.

1 = poor; 2 = very poor; 3 = terrible

| Controlled the paddle | Swing the paddle | Played ahead | Service ready | Slammed the puck | Sliced the puck |
Appendix B.4

Manipulation Check
Please try and answer the following question honestly and accurately. You must complete it within a 15-second period. **To what extent have been able to use the technique of self-monitoring?**

1  2  3  4  5  6  7  8  9  10
very very well  moderately  very very poorly
Appendix  C

Mathematics Problems and Answer Key
MATHEMATICS TASKS

1. Which of the following is less than one-third?
   (A) 22/63
   (B) 4/11
   (C) 15/64
   (D) 33/98
   (E) 102/303

2. A carpenter needs four boards, each 2 feet, 9 inches long. If wood is sold only by the foot, how many feet must he buy?
   (A) 9
   (B) 10
   (C) 11
   (D) 12
   (E) 13

3. If 9x + 5 = 23, the numerical value of 18x + 5 is
   (A) 46
   (B) 41
   (C) 32
   (D) 36
   (E) 13
4. At a holiday camp, 30% of the children are from New South Wales and 20% of these are from Sydney. What percent of the children in the camp are from Sydney?
   (A) 50%
   (B) 33.3%
   (C) 10%
   (D) 6%
   (E) 60%

5. A set of papers is arranged and numbered from 1 to 40. If the paper numbered 4 is drawn first and every seventh paper thereafter is drawn, what will be the number of the last paper drawn?
   (A) 36
   (B) 37
   (C) 38
   (D) 39
   (E) 40
MATHEMATICS ANSWER SHEET

1.

2.

3.

4.

5.
ANSWER KEY

1. C

2. C

3. B

4. D

5. D
Appendix  D

Skills and Strategies for Skilled Shufflepucking
Skilled Shufflepucking

1. **Controlling the paddle**
The paddle is controlled by movement of the mouse. Broad, sweeping movements of the mouse or erratic changes in direction may place the player out of position for the next return. Therefore it is suggested that small smooth movements be used when guiding the mouse. Moving the paddle left or right is done by move the mouse left or right.

2. **Swinging the paddle**
When pushing the mouse forward or backward the paddle will travel within the limits of the court grids. If the paddle is "swung" from the back to the front of the court to meet the incoming puck, the return will be more powerful than if the paddle was simply positioned at the front of the court to rebound the incoming puck.

3. **Playing ahead**
If the eyes are kept focused between the opponent's paddle and the half-way line, then it should be possible to anticipate the line of the incoming puck and, consequently, be able to predict where the paddle should be placed.

4. **Service ready**
The best strategy is to be mobile when waiting for an opponent serve. This is done by moving the paddle from left to right in the back third of the court ready to come forward to return the incoming puck.

5. **Slamming the puck**
Pushing the button down on the mouse can double the speed of the return by clicking. But, remember, if the puck hits the opponent paddle it will also return twice as fast.

6. **Slicing the puck**
Hitting the puck while cutting the paddle from left to right, or right to left, will send the puck ricocheting into the opponent's court. This may beat the opponents paddle, but if it contacts the opponents paddle the puck may continue to ricochet back into the court.
Appendix E

Self-Monitoring Instructions
Thank you for agreeing to participate in these computer game trials. As you play Shufflepuck this time, you will be asked to complete a task after every 15 points played. I will also ask you to complete some questionnaires before and after testing. Please try to answer these questions as honestly and accurately as you can.

In this study there will only be two different levels of the game tested - difficult and easy. You will have the opportunity to practice your skills and strategies before the testing is started. Please feel free to refresh your memory on skill strategies by again reading about the six component principals of Skilled Shufflepucking. (Subject receives a copy of Skilled Shufflepucking)
For subjects in the:

1. **Instruction Only Group.** After a 20-point practice trial you may commence testing. Every 15 trials I will ask you to attempt a mathematics task (Appendix C). Please write your answers on the answer sheet provided (Appendix C).

2. **Positive Self-monitoring Group.** Here is a performance monitoring device to use during testing (Appendix B2). After each 15 trials, you will be prompted to review the six components of Skilled Shufflepuckering. For those components that you remember that you did well, put a number from 1 to 3 in the box corresponding to that component. 1 = good; 2 = very good; 3 = excellent. If you did not do a good job on a particular component, place the letter ‘A’ in that box. You may begin 20-point practice trial using the self-monitoring strategy, after that trial scoring will commence.

3. **Negative Self-monitoring Group.** Here is a performance monitoring device to use during testing (Appendix B.3). After each 15 trials, you will be prompted to review the possible errors you could have made by not following the five component principals of Skilled Shufflepuckering. If you made any of these possible errors, put a number from 1 to 3 in the box corresponding to that error, denoting how poorly you did. 1 = poor; 2 = very poor; 3 = terrible. If you did not make an error on a particular component, place a zero (0) in that box. You may begin 20-point practice trial using the self-monitoring strategy, after that trial scoring will commence.
Appendix F

Consent Form
CONSENT FORM

You are invited to participate in a study of the cognitive effects of various self-monitoring styles. The research is being conducted by Dr. Mark H. Anshel, Senior Lecturer in Sport Psychology, and Michael B. Martin, Doctoral candidate in the Human Movement Science Department at The University of Wollongong. We believe the study will yield new insights regarding the use of cognitive strategies by athletes and may support changed methodology for psychological training to enhance athletic performance. You are free to decline any testing session, or terminate your involvement in the study at any time without penalty.

If you decide to participate, you will be asked twice within a one month period to play a computer game and then to answer some questionnaires. This should take about one hour each visit. The testing will take place in Building 20 (Sport Psychology Laboratory), University of Wollongong. All testing results will be kept confidential; no information will be shared with other participants. Questionnaires and data recording forms will be identified by code number and the data will be available only to the investigator and faculty adviser. A summary of results and study findings will be sent to you.

If you have any questions, please feel free to ask. Additional questions can be directed to Michael B. Martin at (02) 5249568 or Dr. Mark H. Anshel at (042) 213881. You will be given a copy of this form to keep.

YOU ARE MAKING A DECISION WHETHER OR NOT TO PARTICIPATE. YOUR SIGNATURE INDICATES THAT YOU HAVE DECIDED TO PARTICIPATE, HAVING READ THE INFORMATION ABOVE.

.......................................................... ..........................................................
SIGNATURE OF SUBJECT                        DATE

..........................................................
SIGNATURE OF SUBJECT

..........................................................
SIGNATURE OF INVESTIGATOR
Appendix  G

Game Settings for the Difficult Task
Perception

Steps Ahead

Depth

Error

player rating 1755  Set It  Cancel

Power

Left-Right Minimum

Left-Right Maximum

Front-Back Minimum

Front-Back Maximum

player rating 1755  Set It  Cancel
Appendix H

Game Settings for the Easy Task
Back Paddle Size
player rating 1671
Set It  Cancel

Blocking Paddle
Left-Right Bounce 850
Front-Back Bounce 050
Left-Right Power 100
Front-Back Power 100
player rating 1671
Set It  Cancel

Hitting Paddle
Left-Right Bounce 050
Front-Back Bounce 050
Left-Right Power 100
Front-Back Power 100
player rating 1671
Set It  Cancel
Service

Left-Right Minimum

[slider with value 100]

Left-Right Maximum

[slider with value 120]

Front-Back Minimum

[slider with value 100]

Front-Back Maximum

[slider with value 200]

Player rating: 1671

Set It  Cancel

- 192 -