EFFECT OF REPETITION ON STATE ANXIETY DURING A HIGH PLATFORM LUNGE TASK AND ASSOCIATED ABILITY TO PROCESS VISUAL AND AUDITORY CUES

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Statement of Original Authorship

The work contained in this thesis has not been submitted previously for a degree or diploma at any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

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Dedication

To my love,

Alysia

And to my family

Rosalie (Mum), Eduard (Dad, 1980),

Ineka (Sister) and Shayne (Brother, 2002),

and also Carl, Luke and Heidi

Acknowledgements

I would like to acknowledge the support of the New South Wales Institute for Educational Research from which a student research prize was awarded for this Project.

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To the participants who at times throughout the testing procedure would have been glad to give up, but continued on for the purpose of this study, I express sincere appreciation. Without them, none of this would have been possible.

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Last, but by no means not the least, I acknowledge God who has allowed and guided all knowledge and learning and provided me an opportunity to grasp a small piece of it.

Abstract

Objective: The purpose of this study was to examine the effect of repetition on state anxiety during an anxiety-evoking task and the associated ability to process visual and auditory cues.

Methods: Twenty-six females (21.8 ± 2.8 yrs.) were required to perform six lunges, separated by five minutes, from a six-meter platform. Measures of state anxiety were recorded during each attempt including time to jump (Tjump), heart rate (HRjump) and self-reported evaluations of somatic (SA) and cognitive anxiety (CA). During the countdown to jump the subjects were exposed to five visual and five auditory pieces of information that they were asked to recall 60 seconds after the lunge.

Results: Only 13 of the 26 subjects were able to complete the required six lunges. Those who completed all attempts (Complete Group) had previously reported lower levels of trait anxiety (TA) than the Withdraw Group and recorded significantly lower Tjump in the first attempt. The Complete Group demonstrated significant reductions in arousal after only one attempt ($p < 0.05$) and no further decreases in any of the anxiety measures were observed after the fourth lunge. Recall of the visual and auditory cues presented in the countdown was significantly compromised in the first attempt but then improved to a peak in the fourth attempt. Recall ability diminished in the fifth and sixth lunges and appeared to be associated with the low levels of arousal observed in these attempts. Visual cues were more readily recalled under all arousal conditions than the auditory cues.

Conclusions: The results indicate that the individual response to repetition of an anxiety-evoking task is highly variable. When learning skills that induce anxiety, optimal information

processing appears to occur in the third or fourth attempt as high levels of anxiety are associated with earlier attempts and complacency can occur with further attempts. Visual cues are processed more readily than auditory cues at all levels of arousal, highlighting the importance of visual instruction strategies. The findings are informative from the perspective of understanding best practice in the learning of anxiety-evoking skills and are therefore relevant in many sporting, educational and vocational settings.

Table of Contents

Statement of Original Authorship 2

Statement of Copyright 2

Dedication 3

Acknowledgements 4

Abstract 5

Table of Contents 7

List of Figures 10

List of Tables 11

List of Appendices 12

Chapter 1 - Introduction to the Study - 13

Introduction 13

Research questions 13

Importance of the Study 14

Structure of the Thesis 15

Chapter 2 - Review of the Literature - 16

Introduction 16

Anxiety and Arousal 16

Trait and State Anxiety 17

Cognitive and Somatic Anxiety 18

Factors Influencing the Anxiety Response 19

Anxiety and Information Processing 20

Inverted U Theory 20

Cue-Utilization Hypothesis 23
Attentional Control Theory 24
Processing Efficiency Theory 25
Working Memory Capacity Theory 25
Short-Term Memory and Information Processing 26
Catastrophe Theory 28
Reversal Theory 28
Summary 29
Chapter 3 - Methods - 31
Study Participants 31
Procedures 32
Statistical Analyses 37
Chapter 4 - Results - 39
Task Arousal 39
Attrition 40
Repetition and Arousal 41
Arousal and Recall 45
Chapter 5 - Discussion - 48
Introduction 48
Attrition 48
Influence of Repetition on Arousal 49
Influence of Repetition on Recall 50
Information Processing Under Varying Levels of Arousal 53
Chapter 6 - Conclusions - 56

Summary and Conclusions 56

Practical Implications 57

Future Directions 58

References 60

Appendix I 70

Study Trait Anxiety Questionnaire and Control Test. 70

Appendix II 72

Study Data Sheets. 72

List of Figures

Figure 1: Inverted U Hypothesis showing the region of optimal arousal. 21

Figure 2: Arousal level for complex tasks. 22

Figure 3: Platform setup illustrating projector screen and safety mechanisms. 33

Figure 4: Participant attempting the lunge 34

Figure 5: Participant viewing PowerPoint 35

Figure 6: Attrition rate across the six attempts. 40

Figure 7: Time required for the participant to jump after countdown. 42

Figure 8: Changes in CA the self-reported cognitive anxiety scores over the course of the six attempts. 43

Figure 9: Changes in SA over the course of the six attempts. 43

Figure 10: Changes in HRjump over the course of the six attempts. 44

Figure 11: Mean auditory recall results (out of a possible score of five) for the six attempts. 46

Figure 12: Mean visual recall results (out of a possible score of five) for the six attempts. ... 47

List of Tables

Table 1: Selected data for the Complete and Withdraw groups. * denotes significant difference at the 0.05 level. 41

Table 2: Decrease in measures of anxiety as a percentage (%) of the first attempt scores. ..44

Table 3: Correlations between the measures of anxiety and recall. * and ** denotes significance at the 0.05 and 0.01 level, respectively. 45

List of Appendices

Appendix I: Study Trait Anxiety Questionnaire and Control Test. 70

Appendix II: Study Data Sheets. 72

Chapter 1

- Introduction to the Study -

Introduction

The learning of new skills can excite high levels of arousal and even anxiety. Over one century ago, Yerkes and Dodson (1908) first documented the impact of arousal and anxiety on skill performance. Since that time, several theories have been developed to explain the arousal performance relationship and its implications in the execution of both physical and mental tasks (Easterbrook, 1959; Eysenck, 1979; Hanin, 2000). However, the relationship has proven to be complex and several questions remain unanswered. One unresolved issue relates to the effect of repetition on the level of arousal an individual experiences when performing an anxiety-inducing task. A second issue requiring further investigation relates to how arousal level influences an individual's ability to process visual and auditory information. These two issues form the basis for this study.

Research questions

The study addresses the following research questions:

1. How does repetition of an activity of perceived high risk influence an individual's level of state anxiety?

2. How, and to what degree, is the ability to process visual and auditory cues affected by high levels of state anxiety?
3. Are visual or auditory cues more effectively received during periods of high arousal?

Importance of the Study

Activities such as the high platform lunge—involving an individual leaping from a height to grasp a suspended bar—have become commonplace in outdoor education settings and other personal development programs. While the high rope manoeuvre is designed to excite high levels of arousal (for the purpose of intrapersonal learning), the nature of the task, performed with the aid of ropes, lends itself to being performed in a safe and well-controlled manner. However, there are many other tasks that evoke high levels of arousal but take place in open environments where aspects of the skill are uncontrollable. Such activities include driver education, adventure sports (scuba-diving, hang gliding, white-water paddling, surfing), aviation training, elements within the armed forces, police and fire fighting work, and many of the activities inherent in the increasingly-popular "experiential learning" in schools. To optimise safety, a thorough understanding of the processes involved in performing tasks in states of high arousal or even anxiety is needed.

An understanding of the influence of task repetition on arousal will inform how many times an individual should be required to repeat a task before moving on to more complex and challenging skills. From a safety perspective, a greater knowledge of the influence of repetition on arousal will provide principles for best practice.

Further knowledge of the effect of high arousal and anxiety on an individual's ability to process visual and auditory information will be informative for determining the best modes of instruction during the learning of anxiety-evoking skills. Once again, this could improve safety as well as provide a basis for developing the most effective educational strategies.

Structure of the Thesis

The thesis is divided into six chapters. The current chapter has introduced and provided a brief background to the study, highlighting its significance. Chapter 2 examines the literature relating to arousal, anxiety and performance, and culminates by identifying the specific research questions to be addressed. A description of the research methods employed in the study is provided in Chapter 3, including the processes undertaken in identifying the study participants, the procedures for collecting the data and how the data was analysed. The results of the study are stated in Chapter 4 and the implications of these findings are discussed in Chapter 5. The discussion in Chapter 5 centres on the research questions stated in the present chapter. Chapter 6 concludes the thesis by identifying the practical implications of the findings, commenting on the limitations of the study and making recommendations for further research.

Chapter 2

- Review of the Literature -

Introduction

Learning new skills can excite high levels of arousal and the arousal response can be uniquely individual. Numerous factors contribute to this individual response that in turn can have a substantial effect on the individual's ability to perform a task. Over the last century, and especially within the past 40 years, considerable research has focused on the impact of high arousal, or anxiety on skill performance (Miu, Heilman, Opre & Miclea, 2005). In this review these theories and their underpinning explanations shall be examined. Emphasis will be given to normal populations rather than clinically anxious groups.

Anxiety and Arousal

Arousal describes the extent to which an individual is stimulated or excited and is related to the level of activation of their central nervous system (Schmidt & Wrisberg, 2004). An individual's arousal level can vary from extremely low, as during sleep, to extremely high, such as that experienced during intense activities and distressing situations. It should be recognised that arousal is neither good nor bad, but constitutes various emotional states, which can be regarded positive or negative depending upon the context (Farnbach &

Farnbach, 2001). As detailed below, an individual's arousal level can have a tremendous influence upon their performance, both physically and mentally.

Anxiety is an emotional response to a situation perceived to threaten personal well-being. Essentially, anxiety can be regarded as a state of heightened arousal associated with a belief that there is a present risk (Eysenck, Derakshan, Santos & Calvo, 2007; Farnbach & Farnbach, 2001). Anxiety characteristically possesses motivational properties (Spielberger, Sarason & Defares, 1988), but a common anxiety-motivated behaviour is avoidance (Kincheski & Carobrez, 2009; Rubin, Amlôt, Page & Wessely, 2009). While anxiety is intended to warn an individual of potential danger so that appropriate actions can be taken, Spielberger (1966) has described the state as mostly unpleasant and undesirable. As discussed below, when arousal levels are elevated to anxiety, individuals often have a diminished ability to process information, make appropriate decisions and carry out skills (Mühlberger, Wieser & Pauli, 2008).

Trait and State Anxiety

Anxiety possesses two dimensions: trait anxiety and state anxiety. Schmidt & Wrisberg (2004) define trait anxiety as a person's general disposition to perceive situations as threatening. Weinberg & Gould (2003) assert that trait anxiety is an enduring disposition and is related to an individual's personality type (Shaw, Gorely & Corban, 2005). Individuals with a high level of trait anxiety may even perceive non-dangerous circumstances as threatening.

State anxiety relates to the level of arousal or activation an individual experiences at a particular time or in response to a particular event (Hackfort & Spielberger, 1989). Accordingly, state anxiety is susceptible to fluctuations, unlike trait anxiety that is more stable and enduring (Morris & Summers, 2004). Weinberg & Gould (2003) use the example of a basketball player to contrast the difference between trait and state anxiety. The players' trait anxiety will determine their general tendency to be anxious about the game, while the varying challenges of the game determine their instantaneous (state) experience of anxiety.

Cognitive and Somatic Anxiety

Anxiety can be further divided into cognitive and somatic elements. Cognitive anxiety relates to the thought component of anxiety. Characteristic of cognitive anxiety are negative expectations and worrying thoughts about performance, as well as poor self-evaluation and a perception that the evaluation of others is critical (Shaw et al., 2005). Somatic anxiety deals with the physical symptoms of anxiety and an awareness of them (Weinberg & Gould, 2003). Symptoms of somatic anxiety may include an awareness of a pounding heart, nausea, clammy hands, trembling legs or a dry mouth (Bull, Albinson & Shambrook, 1996).

Many situations elicit both cognitive and somatic elements of anxiety (Martens & Landers, 1970), yet the levels of cognitive and somatic anxiety are not necessarily well related (Morton, 2009). In a study of experienced competitive cross-country hang gliding pilots, Morton (2009) found markers of somatic anxiety were high when launching and landing the craft while concurrent levels of self-reported cognitive anxiety were low. Whether cognitive

or somatic state anxiety influenced skill performance is equivocal. Bull et al. (1996) reported somatic anxiety to be not as long-lasting as cognitive anxiety and that it alleviates soon after performance is underway. Conversely, Gould, Petlichkoff, Simons & Vevera (1987) found somatic anxiety to be more influential upon performance than cognitive anxiety in pistol shooting. More recently, McMaster University (Anonymous, 2008) reported that improvements in an individual's perception of cognitive anxiety facilitated their performance compared to that of somatic anxiety. It is likely that the relative effect of somatic and cognitive anxiety is dependent upon several factors that may include the nature of the activity and attributes of the individual. Given their discrete nature, it is clear that when studying anxiety it is important to consider both somatic and cognitive elements, not simply its intensity.

Generally, most people will experience anxiety and arousal on a regular basis as a part of everyday life. Tasks resulting in anxiety and arousal may include a job interview or engaging in a competitive activity (Schmidt & Wrisberg, 2004). The degree to which anxiety and arousal act on a person is a significant determinant of performance, particularly in situations where fast and accurate decisions need to be made. Murphy (2005) points out that when preparing for competition, an athlete's nervousness causes a number of physical changes that impact directly on sport performance.

Factors Influencing the Anxiety Response

In addition to trait anxiety there are several other factors that can influence an individual's level of somatic anxiety in a particular situation. One factor is the individual's self-efficacy,

which describes their belief in their capability of performing in a certain manner to attain certain goals (Ormrod, 2006). Mitchell, Hopper, Daniels, George-Falvy & James (1994), found an individual's self-efficacy to be the best predictor of their success in the initial attempts of a complex task. Self-efficacy is developed through positive and successful experiences that can lead to a sense of mastery (Miller, 2005). Miller (2005) suggests that mastery improves psychological states, which may reduce the level of cognitive anxiety experienced by an individual. Conversely, negative experiences can result in low self-efficacy and subsequent high levels of anxiety.

Anxiety and Information Processing

Substantial research has considered the relationship between anxiety and performance, and numerous theories have been developed to explain the relationship. Several of these theories are relevant to this study, including the Inverted U Hypothesis, Cue-Utilization Theory, Attentional Control Theory, Working Memory Capacity Theory, Processing Efficiency Theory, Catastrophe Theory and Reversal Theory.

Inverted U Theory

The Inverted U Hypothesis is well known in the discussion of the arousal-performance relationship. The theory, proposed by Yerkes & Dodson in 1908, asserts that as arousal increases, so does performance to an optimal point, after which performance decreases in

response to any further increases in arousal. The Inverted U principle is best represented graphically as shown below (Figure 1).

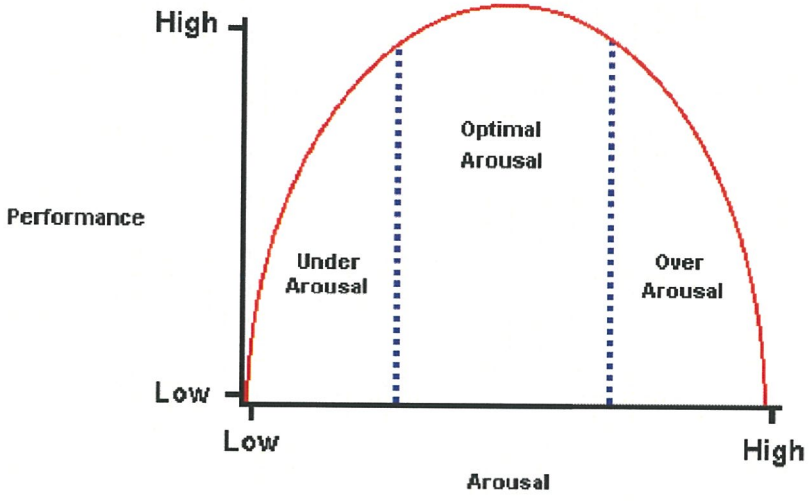


Figure 1: Inverted U Hypothesis showing the region of optimal arousal.

The Inverted U Hypothesis implies a zone of optimal functioning that relates to an arousal zone in which an individual will achieve peak performance (Morris & Summers, 2004). Weinberg & Gould (2003) suggest that the zone is not a single point but a bandwidth.

Harmison (2006) claims that successful athletic performance does not always occur at a moderate level of arousal, but instead may occur at low levels of arousal for some athletes and high levels for others. Further, the nature of the task being performed can have a tremendous impact upon the ideal level of arousal for optimal performance. Simple, gross motor skills may require higher levels of arousal to achieve optimal performance than

complex, fine motor skills (Schmidt & Wrisberg, 2004). Essentially, the shape of the curve is skewed to the right for simple skills (Figure 2) and to the left for complex ones.

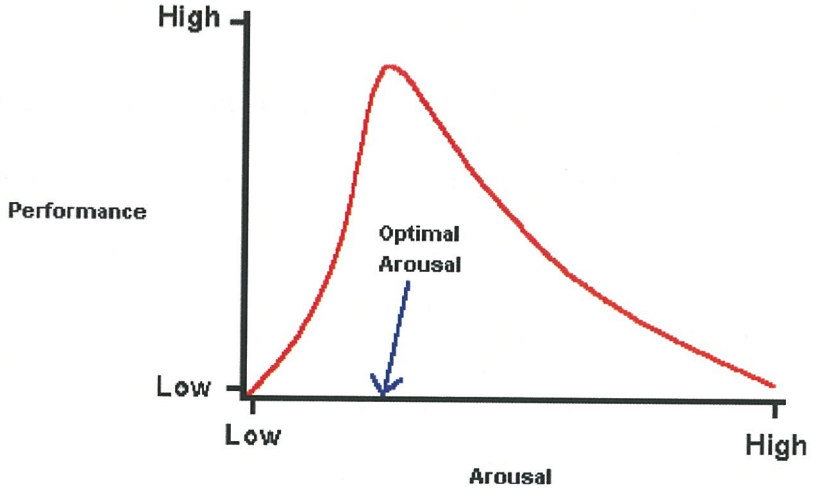


Figure 2: Arousal level for complex tasks.

The Inverted U Theory has limitations however, one of which only explains outcomes after the fact (Murphy, 2005). Another identified problem is that the theory does not explain how arousal affects performance, nor does it take into consideration the fact that different cognitive interpretations of arousal affect the performance. There is also an inconsistency with the symmetrical shape of the U, which indicates a gradual deterioration of performance as arousal increases. This contrasts with most performers' experiences who have found that extra levels of arousal usually result in rapid and dramatic decreases in performance (Murphy, 2005). The most noted limitation of this hypothesis is the definition of optimal. What is optimal for one individual may not be optimal for another.

While it serves as a useful observation, the Inverted U has its limitations in that it does not explain why the relationship between arousal and performance exists. Research has been carried out in effort to address this relationship from which several conclusions have been drawn and theories developed.

Cue-Utilization Hypothesis

Easterbrook (1959) asserted that emotional arousal acts to decrease the range of cues an organism perceives and processes. He suggested that under conditions of low arousal individuals tend to process many task-irrelevant cues in addition to task-relevant ones. For example, a basketball player in a game situation may receive information not only from the play but also from the crowd, which may be irrelevant to the task. Conversely, high levels of arousal result in an individual excluding task-relevant cues. Easterbrook (1959) explains the zone of optimal functioning as that relating to a level of arousal in which an individual excludes all task-irrelevant cues and includes all task-relevant cues. Essentially, the Cue-Utilization hypothesis is based on a premise of perceptual narrowing (Schmidt & Wrisberg, 2004). During conditions of low arousal the perceptual field is relatively wide and the person takes in many cues, most of which are irrelevant to the task. High arousal causes a narrowing of the perceptual field resulting in many important cues being missed. Schmidt & Lee (2005) concur with Easterbrook (1959) that in order to take in the most relevant cues while discarding irrelevant cues, an optimal level of arousal is needed.

Attentional Control Theory

Eysenck et al. (2007) suggest that anxiety impairs attentional control, which in turn diminishes performance in high arousal situations. This Attentional Control Theory therefore explains poor performance associated with anxiety—as illustrated by the Inverted U Hypothesis—not as a problem with processing task-relevant cues but rather a deficiency in the effective direction of attention. They suggest that trait-anxious individuals prefer to allocate attentional resources to threat-related stimuli, whether focusing internally on stimuli such as worrisome thoughts, or externally alarming and distractive stimuli. Bull et al. (1996) suggest that fatigue and anxiety can both seriously affect attentional control. They make reference to "attentional narrowing," which is a condition similar to "perceptual narrowing," where performers fail to pick up on important, critical cues.

Leon & Revelle (1985) cite Mandler & Sarason (1952) as explaining that anxious situations induce a drive that functions to reduce the level of anxiety in order to complete the task, or interferes with the task as a result of feelings of inadequacy, helplessness, heightened somatic reactions, anticipations of negative social consequences or diminished esteem. In a study carried out by Terry & Burns (2001) to measure the effect of anxiety on several information-processing tasks, it was found that anxiety level did affect both attention and retention. In their study, Mandler & Sarason (1952) found that highly-anxious people performed better when no further reference was made to their performance, while whereas people low in anxiety performed better as a result of references to their performance. Clearly, attentional focus can influence performance although it has been argued that anxiety might not always lead to decreases in performance due to its motivational properties increasing mental effort (Eysenck & Calvo, 1992).

Processing Efficiency Theory

Processing Efficiency Theory is quite different from performance effectiveness, which deals with the quality of the performance. It refers to the relationship between the effectiveness of a performance and the processing resources invested in that performance. Processing Efficiency Theory was devised by Eysenck & Calvo (1992) to explain why anxiety did not always lead to attentional distraction and decreased performance in cognitive tasks. Their key argument was that in addition to attentional disruption, worry acts as a motivational instrument that increases mental effort. The theory is explained as being focused on cognitive processes and cognitive tasks.

Studies have shown that the central executive of working memory, when faced with poor performance, initiates different processing activities to try to free up more working-memory capacity. The findings of a variety of cognitive tasks supporting the idea of Processing Efficiency Theory have concluded that anxiety impairs processing efficiency more than performance effectiveness, and that the negative effects of anxiety on task performance increase as the task demands more working memory capacity (Shaw et al., 2005). It is also asserted by Eysenck, Payne & Derakshan (2005) that the effects of trait anxiety on processing efficiency and performance effectiveness are mediated by state anxiety.

Working Memory Capacity Theory

A better understanding of working memory has been aided by several studies that have found that when two tasks or operations are simultaneously engaged, performance suffers as a consequence of resource depletion (Shackman, Sarinopoulos, Maxwell., Pizzagalli,

Lavric & Davidson, 2005). Eysenck (1979) has described the phenomenon as a consequence of limited working memory in which anxiety-induced concerns compete with task-relevant information for space in the processing system. It is important to note that the study, however, did not specify whether this was true for both genders. It was also observed that threat-induced anxiety selectively disrupts spatial performance.

The "visuospatial sketchpad", as outlined by Baddeley & Hitch (1994), is one component of a three-component working memory system and is involved in visual and spatial processing and storage. The remaining two components are the central executive, which is an attention-like, modality-free system, and the phonological loop, which is involved in verbal rehearsal. Baddeley & Hitch (1994) argue that each of these components of the working memory involve the use of separate resources. A fourth component of the working memory system has now been identified by Baddeley (2002) and is known as the episodic buffer which forms an interface between the subsystems (phonological loop and visuospatial sketchpad) and long-term memory. Eysenck et al. (2005) in describing the theory, explain that anxious individuals have an impaired ability to process information efficiently. They continue by commenting on the difficulty in establishing which components of the working memory system are most affected by anxiety.

Short-Term Memory and Information Processing

Information processing is the process of acquiring, retaining and using information. It is defined by Strickland (2001) as the procedure by which people select, process, and internalise information and how they use it to make decisions and guide their behaviour.

The information is received from external or internal stimuli and is gathered through the senses and transformed by a variety of mental operations (including the encoding to symbols). It receives attention through the perceptual processes and is stored in either short-term or long-term memory, where it interacts with previously stored information to generate a response, or output.

In a study carried out by Hogg & Eckloff (2008), it was pointed out that it is very difficult to take in all the information presented. Accordingly, an individual will selectively perceive information of importance to them, and from these perceptions will abstract, label and structure it for storage in the cognitive systems. The study describes short-term memory as the primary memory, the capacity for a small amount of information, received from sensory input or recalled from long term memory. This information is readily available for a brief period of time, is used immediately or moved to working memory for processing.

Hogg & Eckloff (2008) arrived at a number of recommendations to assist the design of instructional material when using visual and auditory information. Several important methods include the need to increase working memory capacity by using auditory as well as visual information under conditions where both sources of information are not-unneeded and essential to understanding. If the visual channel becomes overloaded, move a portion of the essential processing from a visual to an auditory channel, and vice-versa. It is also advantageous to place the necessary printed words with the corresponding parts of graphics to reduce visual scanning, and also to avoid presenting identical streams of printed and spoken words.

Catastrophe Theory

Catastrophe Theory, as discussed by Hardy, Beattie & Woodman (2007), was originally developed by the French mathematician, René Thom in 1975 to geometrically model all the naturally-occurring discontinuities in the world. It was in 1990 that British sport psychologist, Lew Hardy provided a three-dimensional, descriptive model of the relationship between cognitive anxiety, physiological arousal and performance (Hardy & Parfitt, 1991). The Catastrophe Model as explained by Weinberg & Gould (2003) predicts that physiological arousal is related to performance in an Inverted-U fashion, but only when an athlete is not worried or has low cognitive state anxiety. The "catastrophe", as it is called, occurs just past the point of optimal arousal and is associated with a rapid decline in performance. This deterioration in performance is dramatically different from the previously discussed, gradual decline of the Inverted U Hypothesis.

The model is further outlined by Murphy (2005), as predicting that when cognitive anxiety is low it follows the curve of the Inverted U Hypotheses. When cognitive anxiety is high, performance improves as physiological arousal increases, also much like the Inverted U, after which however, there is a catastrophic drop. The two main predictions as summarised by Shaw et al. (2005) are that when cognitive anxiety is high, there will be catastrophic effects on performance as physiological arousal reaches higher levels, and that under conditions of high cognitive anxiety, hysteresis will occur.

Reversal Theory

Reversal Theory was developed by Michael Apter in 1982 and is a wide-ranging theory that relates motivation to emotion (Morris & Summers, 2004). This view is quite different from other theories and is used by Kerr (1985) to explain how sport performance is based on how

one interprets the hedonic tone of his or her own arousal level. Kerr, Fujiyama & Campano (2002) discuss hedonic tone in the context of performers being either in a telic or paratelic state. By telic, they are referring to people who are serious and goal-orientated, with a preference for low levels of arousal, whereas someone who is paratelic exhibits behaviour that is spontaneous, impulsive and sensation-orientated, with a preference for high levels of arousal. Schmidt & Lee (2005) describe paratelic people as finding pleasure in the immediate situation where high levels of arousal can be interpreted in a positive way. Telic people on the other hand prefer to plan ahead and find satisfaction in goal achievement where high levels of arousal are interpreted in a negative way. The prediction that Reversal Theory makes is that changes in arousal can result in a shift in the performer's state from either anxiety into excitement, or boredom into relaxation, or vice-versa (Shaw et al., 2005). These "reversals" can shift from minute to minute as Murphy (2005) describes.

Summary

The literature indicates a clear relationship between arousal and performance and suggests that high levels of arousal, characteristic of anxiety, can have disastrous effects on performance. It is well accepted that the arousal-performance relationship can be roughly illustrated by an Inverted U, as presented over one century ago by Yerkes and Dodson (1908). Various explanations for the Inverted U Hypothesis have been forwarded, the most prominent being that high levels of arousal cause a narrowing of the perceptual field such that individuals miss important task-relevant cues. The adverse effect of anxiety on performance has also been explained as a function of limited attention in which the

symptoms of anxiety leave little attentional capacity or working memory for the task at hand. While these theoretical explanations are enlightening, their practical implications have not been adequately addressed. For example, the effect of task repetition on an individual's arousal level and subsequent ability to process visual and auditory information has not been considered.

Chapter 3

- Methods -

Study Participants

Twenty-six female participants between the ages of 18 and 30 (21.8 ± 2.8 yrs.) were recruited for the study. Subjects were invited to participate without coercion and were recruited by means of advertising in Avondale College newsletters, lectures and residence halls. The 26 participants were derived from approximately 100 individuals who initially expressed an interest in the study. A number of individuals attended the testing area for the purpose of inspecting the procedure, but declined from further participation. Individuals who agreed to participate were provided with a participant information statement which outlined the procedures involved with the activity. They were then asked to sign a consent form. The study protocol was conducted in compliance with the Avondale College Human Research and Ethics Committee from which ethical clearance was obtained.

Procedures

Data collection occurred in two testing sessions.

Session 1

Session 1 occurred in a classroom removed from the scene of the high platform lunge used in session 2. The intent of session 1 was to collect base-line data in a non-confronting environment for comparison with the results obtained in the anxious state induced during session 2.

On arriving at the classroom the participant completed a modified version of the Sport Competition Anxiety Test (SCAT) (Martens, 1977) to assess their level of trait anxiety. The questionnaire consisted of nine questions: two relating to personal details of the respondent, three relating to cognitive trait anxiety, and four relating to somatic trait anxiety (see Appendix 1). Session one also included a simple memory-recall test that was to be used again repeatedly in session 2, as described below. Following this control testing, the participant moved to an auditorium in which the high platform lunge was constructed.

Session 2

Session 2 involved the subject performing six repeats of a high platform lunge. The activity was designed to appear dangerous and threatening while being safe and controlled. The high platform lunge used in this study was modelled on that employed in school-based initiative learning programs.

The apparatus was constructed using industrial grade steel scaffolding to a platform height of six metres. In the interests of safety a guardrail projected an additional meter beyond the platform (see Figure 3). Suspended in front of the platform was a trapeze handle (see Figure 4), fixed to an engineered beam. Adjacent to the handle a screen was suspended onto which images could be projected using a data projector (Figure 5).



Figure 3: Platform setup illustrating projector screen and safety mechanisms.



Figure 4: Participant attempting the lunge

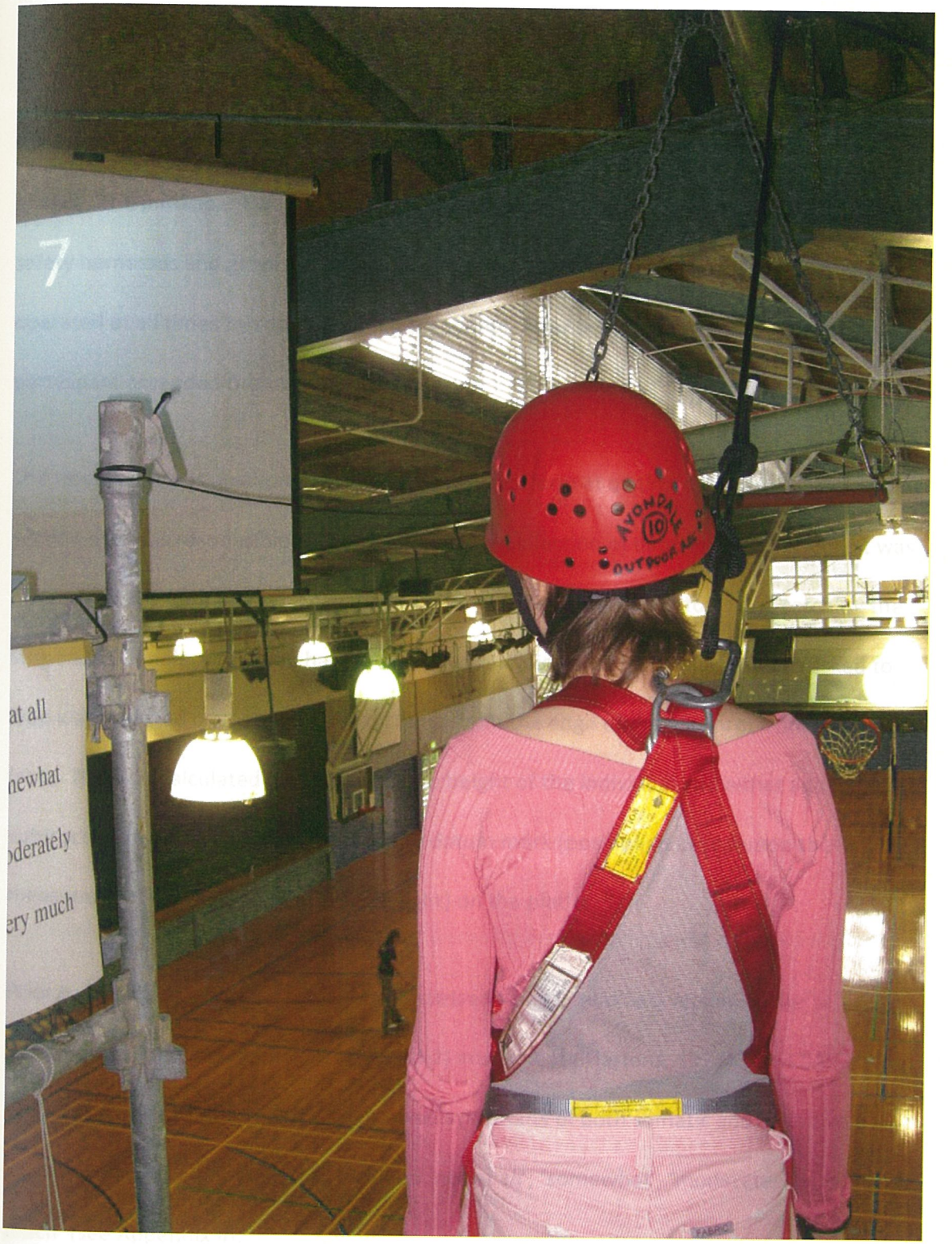


Figure 5: Participant viewing PowerPoint.

Before commencing the first lunge, the participant was fitted with a Suunto T6 heart rate (HR) monitor (Suunto Oy, Finland) that recorded the participant's HR at 2-second intervals throughout the testing session. Heart rate was used as one measure of the subject's somatic anxiety. The participant was also fitted with necessary safety equipment including a helmet, safety harnesses and gloves. At this point they were connected to a belay rope that was operated at all times by ropes qualified personnel. After being securely fastened, the participant ascended the six meter platform.

The researcher was positioned at the top of the platform at all times throughout the testing session and was responsible for commanding the collection of data. Firstly, the subject was briefed again on the task which involved them leaping from the platform and catching the suspended handle. While the handle was fixed, the distance the participant was asked to leap was adjusted by modifying the distance from the edge of the platform from which they leapt. This was calculated by measuring the height of the individual and either adding or subtracting the difference in height to the datum mark (positioned based upon the measurement of a person of average height) on the platform.

Prior to the first jump state anxiety was assessed using a modified version of the Competitive State Anxiety Inventory (CSAI-2) instrument (Martens, 1977). The CSAI-2 asked the participant's to rate their self-perceived symptoms of both somatic and cognitive anxiety on a four point scale that included 'not at all', 'somewhat', 'moderately' and 'very much' (see Appendix II).

The participant was then given a 10-second countdown during which five visual and five auditory pieces of information were presented in an alternate fashion. The images were

projected onto the suspended screen adjacent the handle and included miscellaneous but recognisable shapes and objects such as a bike, ball or cow. The sounds were emitted from speakers placed proximal to the subject and were also recognisable everyday noises such as a dog bark, ringing telephone or the chime of a doorbell (a complete list of the images and sounds is included in Appendix II). The subject was clearly instructed prior to the first jump to remember as many as possible of the sights and sounds they were presented with during the countdown. At the conclusion of the 10-second countdown the participant was asked to jump and catch the trapeze bar. In the case that they did not leap on command, the time before which they did leap was recorded. After successfully grasping the handle, the subject was asked to release the bar, upon which they were lowered to the ground by the certified ropes instructor.

Sixty seconds after the completion of the jump the participant was asked to recall as many of the auditory and visual cues presented to them during the countdown as possible. Following a five minute rest period, the entire procedure was repeated a further five times.

The heart rate data was later downloaded from the heart rate monitor for analysis using Suunto Training Manager Version 1.3.3 (Suunto Oy, Finland) and the peak heart rate achieved during the countdown for each lunge was identified.

Statistical Analyses

Data analysis was performed using SPSS version17 (SPSS, Inc.). Descriptive statistical analysis involved mean±standard deviation and the 0.05 level of significance was adopted.

Relationships between the somatic and cognitive anxiety measures, heart rate, time to jump (Tjump) and recall scores were assessed using Pearson's correlation coefficient. To optimise the power of the analyses the data for all lunges for all subjects (total = 123 lunges) were pooled.

As indicated in the results section to follow, only 13 of the subjects were able to complete the required six lunges. Accordingly, the subjects were assigned into two groups for the analyses: "Complete Group" and "Withdraw Group". Differences between the groups were assessed using independent sample t-tests. Backward stepwise linear regression was used to identify factors that predicted which subjects withdrew from the testing protocol before the six attempts had been completed.

Changes in the various measures taken over the six jumps were assessed using General Linear Modelling repeated measures. Mauchley's test of sphericity was applied and if the test was significant the within-subject effect was determined using the Huynh-Feldt correction (if epsilon > 0.75) and the Greenhouse-Geisser correction (if epsilon < 0.75). Pairwise comparisons of main effects were applied with no confidence interval adjustment.

Chapter 4

- Results -

Task Arousal

The high platform lunge task used in the present study clearly evoked high levels of anxiety in the participants. On average, the subjects hesitated 488 ± 815 seconds (s) after being given the command to perform the first lunge and actually following through with the task. Further, only 13 (Complete Group) of the 26 subjects were able to complete the six lunges required by the study. The peak heart rate (HRjump) immediately prior to performing the first lunge was 154 ± 8 bpm, which approximated 75% of predicted maximum heart rate, and the mean heart rate for the entire testing session of those who completed all six trials was 121 ± 24 bpm.

Somewhat expectedly, the participant's trait anxiety score (TA) reported in session 1 was significantly related to their somatic state anxiety score (SA; $r = 0.72$, $p < 0.01$) and cognitive state anxiety score (CA; $r = 0.73$, $p < 0.01$) reported immediately prior to the first jump.

When the data for all lunges and all subjects was pooled, several significant relationships were noted. The time to jump (Tjump) was positively correlated to the subjects' SA ($r = 0.36$, $p < 0.01$) and CA ($r = 0.46$, $p < 0.01$) but was unrelated to their HRjump ($r = - 0.05$). The subjects' SA and CA were highly related ($r = 0.82$, $p < 0.01$) and to a lesser extent SA was

correlated to HRjump ($r = 0.24$, $p < 0.05$) which is noteworthy given that heart rate has been identified as a marker of somatic anxiety. HRjump was not related to CA ($r = 0.17$).

Attrition

The attrition rate across the six lunges is illustrated in Figure 6. It was unanticipated that over half the subjects who completed the first lunge would not be capable of following through to complete all attempts.

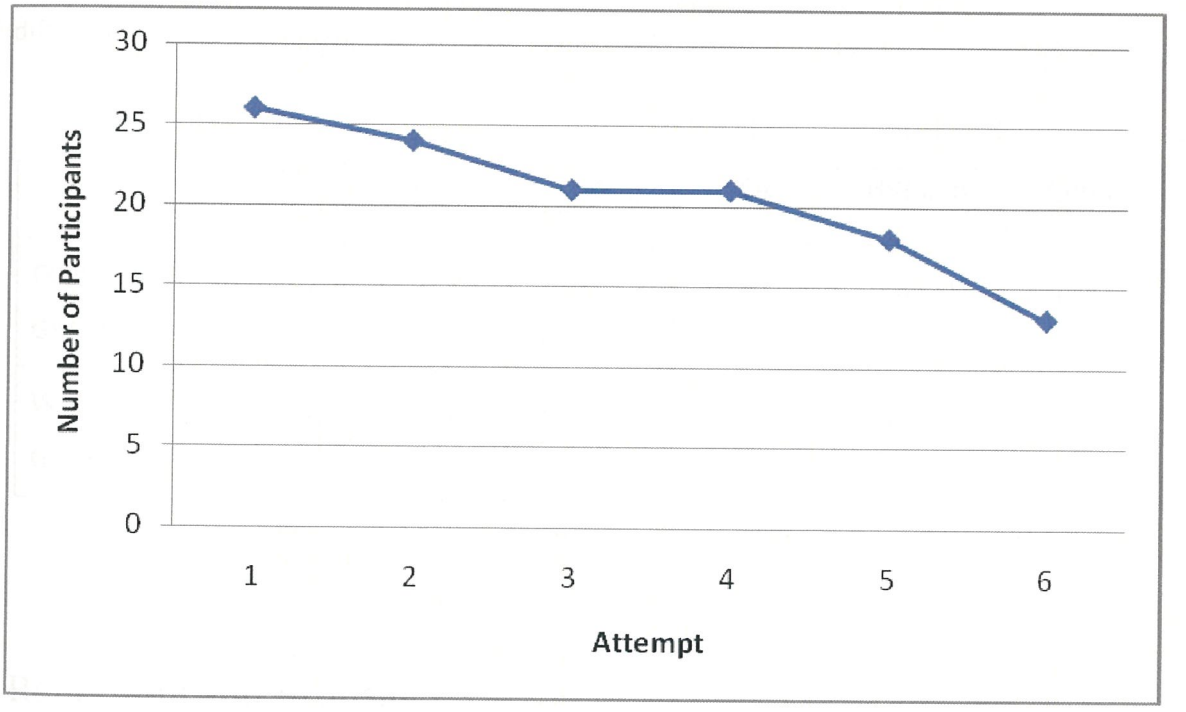


Figure 6: Attrition rate across the six attempts.

For further analyses the subjects were grouped according to whether they completed the six attempts (Complete Group) or withdrew from the study (Withdraw Group). As shown in

Table 1, the only significant difference between the groups was the time required to perform the first lunge ($p = 0.03$). Similarly, regression analysis indicated that the only variable predicative of those who withdrew before completing the six attempts was Tjump on the first attempt ($\beta = 0.43$, $p = 0.04$). While there was a trend for TA and CA to be higher in the Withdraw Group the differences were not significant at the 0.05 level ($p = 0.11$ and 0.21, respectively).

Table 1: Selected data for the Complete and Withdraw groups. * denotes significant difference at the 0.05 level.

	Age	TA	SA	CA	HRjump	Tjump
Complete Group	20.9±2.7	13.3±3.1	10.1±3.7	10.8±3.2	154±21	141±476
Withdraw Group	22.7±2.8	15.6±3.9	10.7±3.8	12.5±3.7	153±14	835±945*

Repetition and Arousal

As only 13 subjects were able to perform the required six lunges, analyses of the effect of repetition on anxiety was limited to this group.

The time required for the subjects in the Complete Group to jump after receiving the countdown is shown in Figure 7. Despite the indicated trend, the decrease in Tjump was not

significantly different from the first to subsequent trials as a result of one subject who hesitated for 1725 s on the first trial but then jumped on command in the further trials.

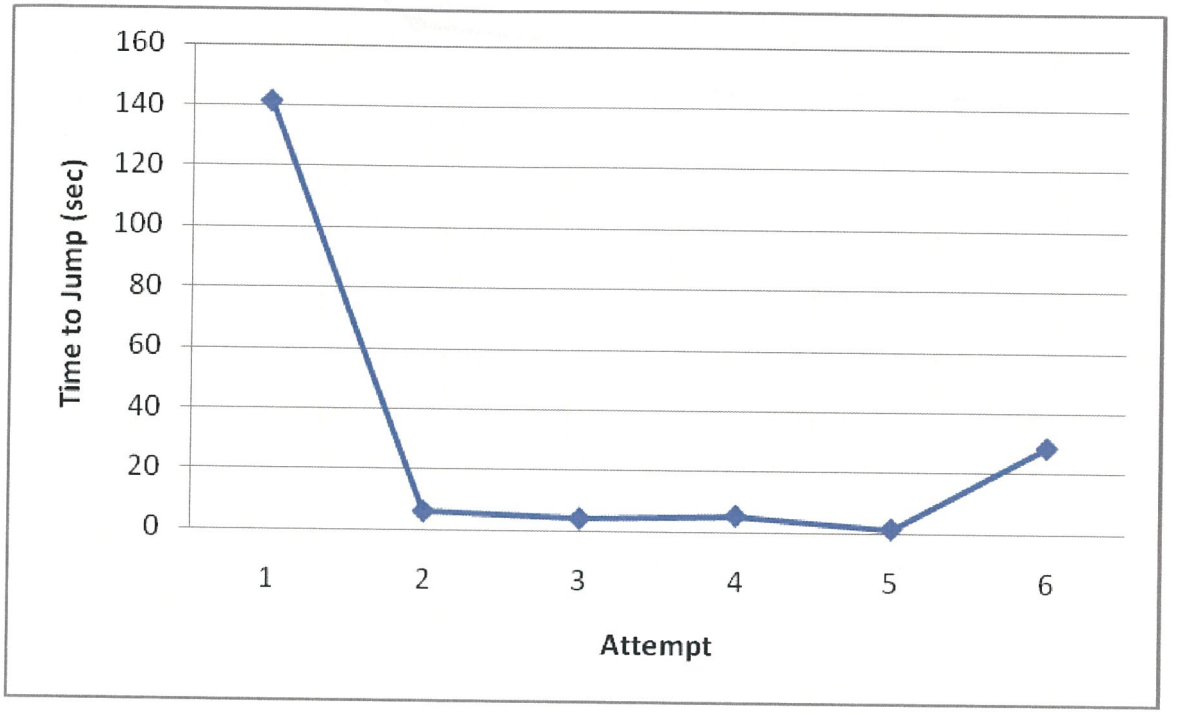


Figure 7: Time required for the participant to jump after countdown.

All measures of anxiety significantly decreased following the first attempt. The analyses revealed a significant decrease in CA from attempt one ($p < 0.01$); however no further reductions occurred after attempt 4 (Figure 8). Somatic state anxiety significantly decreased after the first attempt ($p = 0.03$) and continued to the final attempt, although a reasonable amount of the reduction (approximately 40 per cent) had occurred by the third attempt (Figure 9). The heart rate data (Figure 10) demonstrated considerable between-subject variance yet there was still a significant decrease from the first to second attempt ($p < 0.01$). The percentage reduction in each of the measures with each attempt is shown in Table 2.

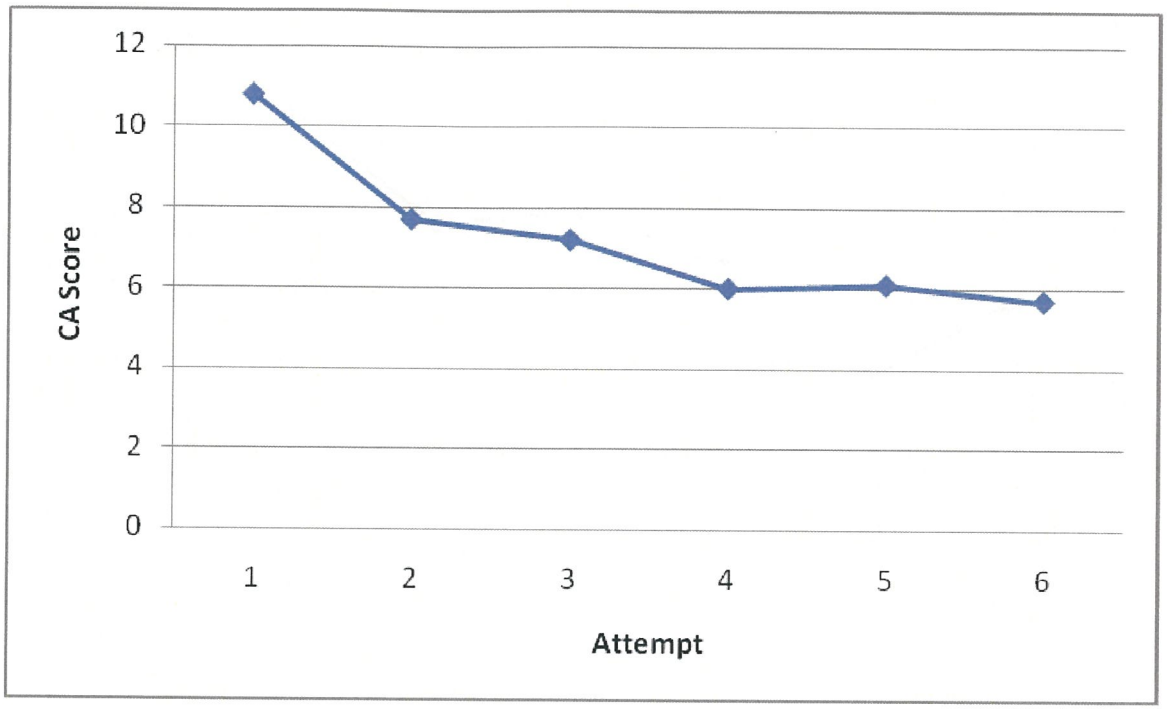


Figure 8: Changes in CA the self-reported cognitive anxiety scores over the course of the six attempts.

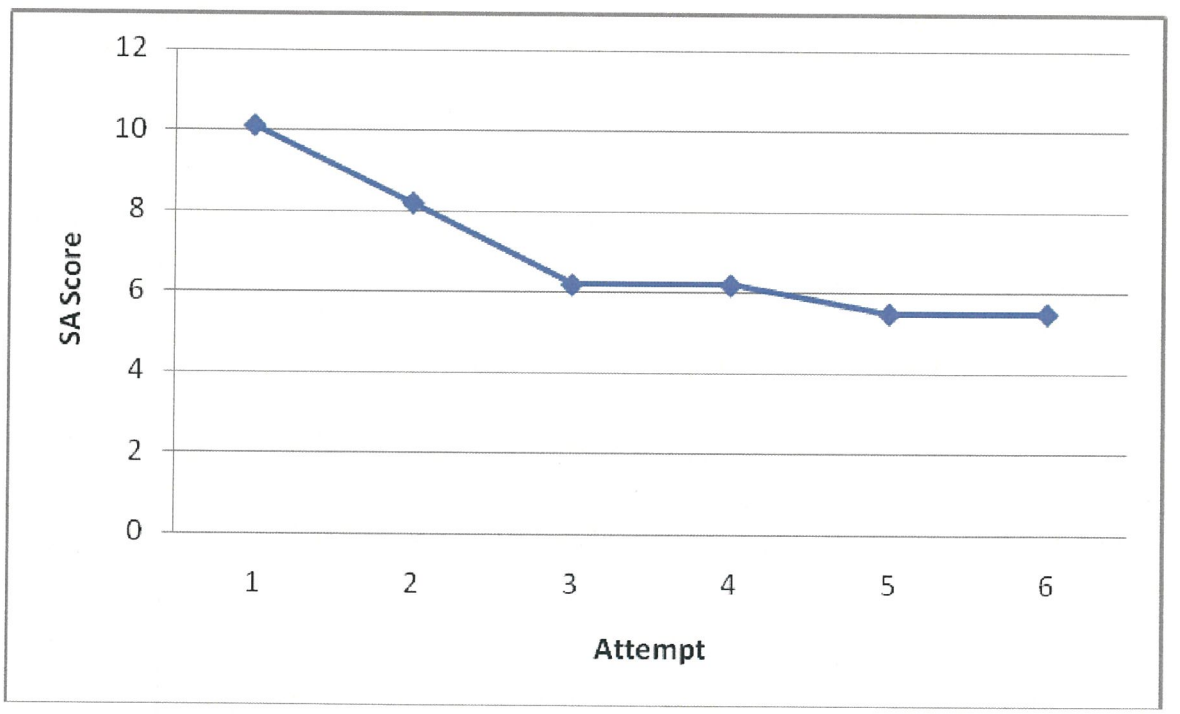


Figure 9: Changes in SA over the course of the six attempts.

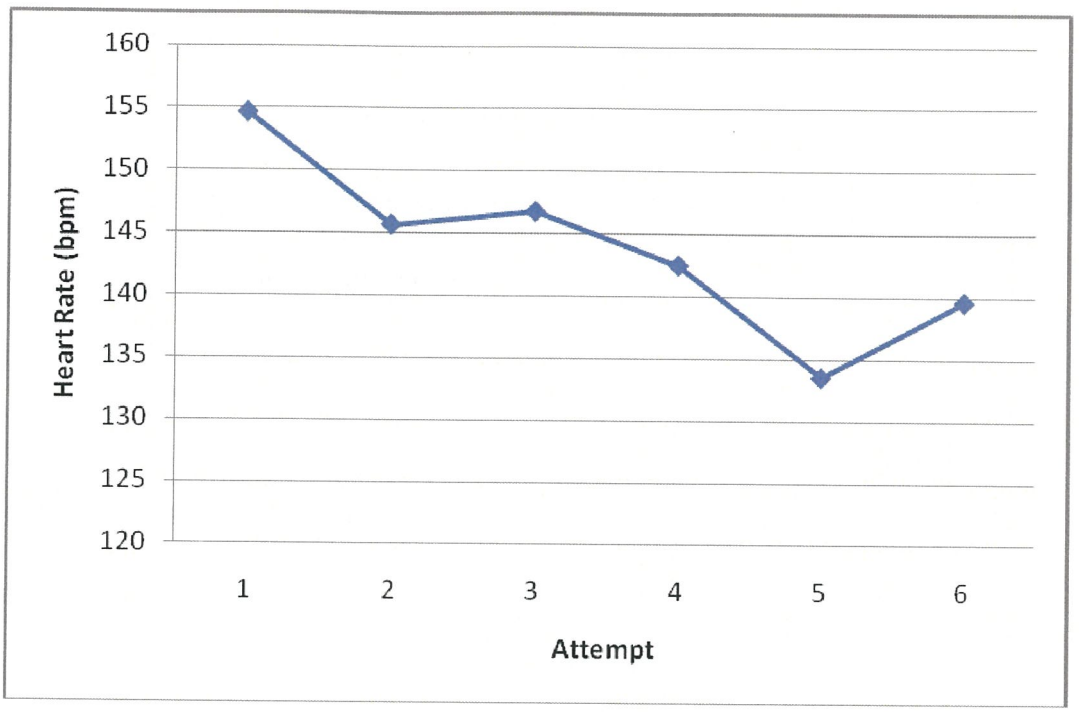


Figure 10: Changes in HRjump over the course of the six attempts.

Table 2: Decrease in measures of anxiety as a percentage (%) of the first attempt scores.

Attempt	1	2	3	4	5	6
CA	-	29	34	45	44	47
SA	-	19	39	39	46	46
Tjump	-	96	97	96	99	80
HRjump	-	6	5	8	14	10

Arousal and Recall

The pooled data for all subjects for all attempts revealed a significant relationship between the subjects' level of somatic and cognitive state anxiety and their recall of both visual cues (Vscore) and auditory cues (Ascore) (see Table 3).

Table 3: Correlations between the measures of anxiety and recall. * and ** denotes significance at the 0.05 and 0.01 level, respectively.

	SAscore	CAscore	HR	Tm jump
Ascore	-0.18*	-0.33**	0.17	-0.16
Vscore	-0.18*	-0.26**	0.09	-0.16

When compared to the control conditions the subjects' recall ability was significantly compromised in the first attempt for both the visual cues (3.8 ± 0.9 versus 2.6 ± 0.9) and auditory cues (2.6 ± 1.4 versus 1.6 ± 0.9). However, by the second attempt their recall ability had improved such that there was no significant difference to the control state data for the Ascore ($p = 0.60$) or Vscore ($p = 0.12$).

When compared to the first lunge, the Ascore was significantly higher in all further attempts with the exception of the sixth (Figure 11). The best auditory recall results were achieved in the second attempt.

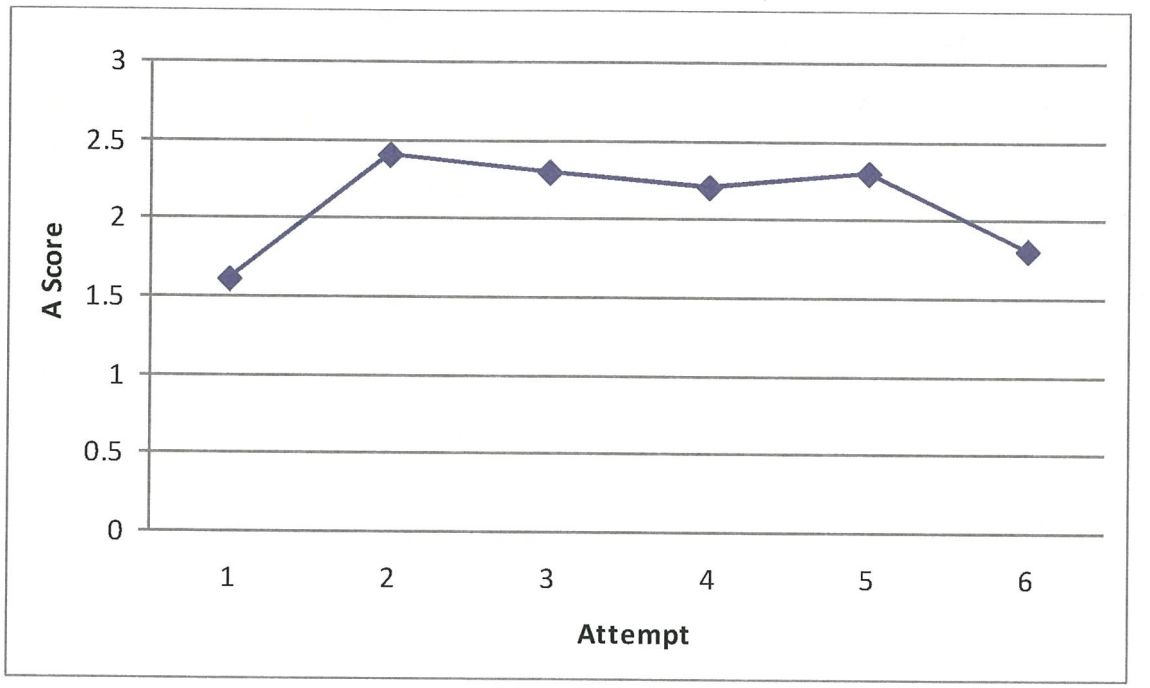


Figure 11: Mean auditory recall results (out of a possible score of five) for the six attempts.

The Vscore results showed a similar trend to the Ascore results with a near significant increase from the first to second attempt ($p = 0.05$). The Vscore peaked in the fourth attempt after which there was a trend for it to drop off (Figure 12). The reason for the poor result in the fifth trial is unexplained.

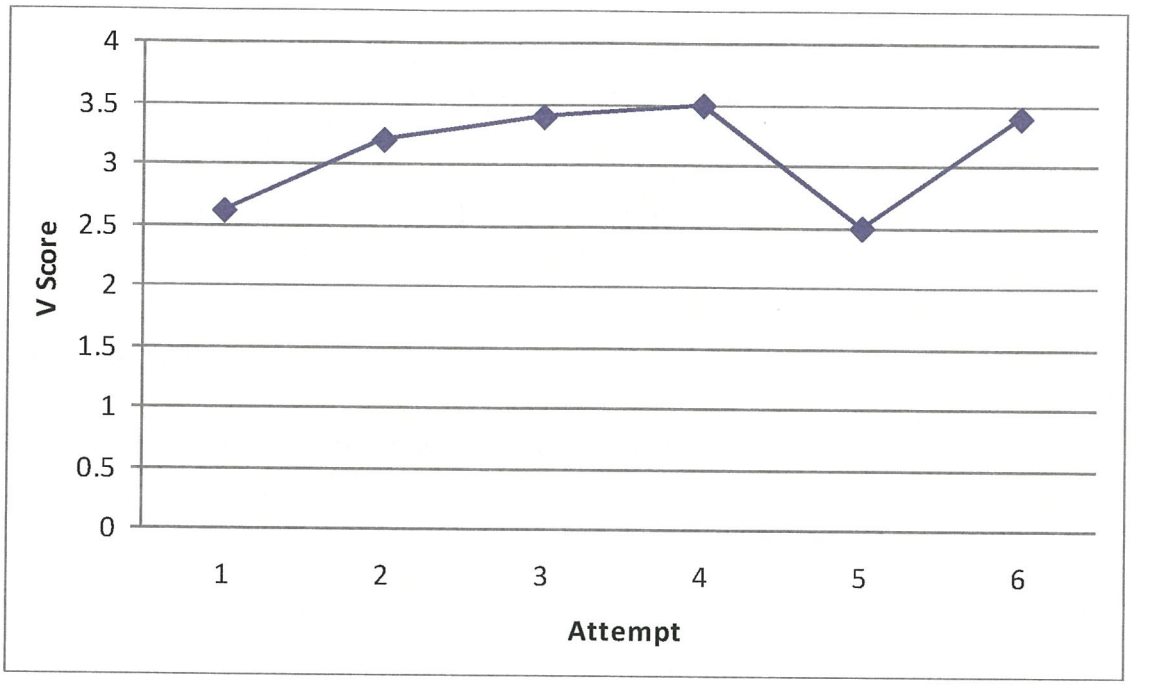


Figure 12: Mean visual recall results (out of a possible score of five) for the six attempts.

Chapter 5

- Discussion -

Introduction

The present study investigated how repetition of an activity of perceived high risk impacts on an individual's level of arousal. The intent was to determine how many repetitions of a task an individual needs to perform before their level of arousal subsides to be conducive to optimal performance. Also of interest was the degree to which visual and auditory information is processed during high arousal situations. While it is acknowledged that the sample size of the study is small, the results and trends presented in the previous chapter are novel and informative. In this chapter the findings are discussed in the context of the research questions nominated in the introductory chapter.

Attrition

The fifty percent attrition rate was unexpectedly high, especially considering that the subjects were enthusiastic about participating. Those who did not continue in most cases were quite determined to succeed but were simply not able to perform. It is further surprising that the subjects in the Withdraw Group were able to perform the initial jump. In fact, five of the participants were able to complete the first five jumps and yet could not complete the sixth. None of the subjects had an apparent 'bad' experience on any of the attempts that could explain this unusual rate of attrition. One clear conclusion is that

individuals can demonstrate markedly different responses when repeatedly exposed to a situation that they find anxiety-producing.

Although ethically unsound, it would be interesting to hypothesise what the participants' levels of anxiety would have been if they had not had the option of withdrawing. In a rat model study, Torres (1961) found animals that could escape a negative situation exhibited less fear than those unable to. Likewise, it could be argued that if the study participants were forced to perform the six attempts their levels of anxiety would have been greater still than the high levels observed.

Influence of Repetition on Arousal

The Tjump results (Figure 7) are a little skewed as they suggest a dramatic change for the Complete Group between attempts 1 and 2, however this was attributable to one subject hesitating for 1725s on the first attempt but then leaping without hesitation on subsequent jumps. After the first attempt all the Complete Group leapt on command except for the final attempt in which one individual inexplicably hesitated.

While the subjects leaping without hesitation after the first trial could be interpreted as an overcoming of anxiety, the apparent reduction in anxiety was not immediately reflected in their CA, SA or HRjump data. These measures of anxiety showed a more progressive pattern of reduction across the six trials. However, the results indicate that no further significant reductions in these measures occurred after the fourth attempt. Accordingly, it can be stated that the experience of the first three trials resulted in anxiety levels in the approach

to the fourth attempt which were not further reduced by subsequent trials. From the small sample size involved in the present study, it would seem that when learning new anxiety-evoking skills it is beneficial to perform at least three attempts before pursuing more complex or advanced variants of the skill.

Anecdotally, it appeared that many of the Complete Group participants become bored with the activity by the fifth attempt. This may have been due to the turn-around time of each jump or that the participants no longer felt challenged by the task. Indeed, heart rate was lowest during attempt five and the other markers of anxiety had essentially reduced to their lowest levels. Yet, while it might be assumed that overcoming the anxiety of the earlier trials is desirable, the Inverted U Hypothesis asserts that performance may be compromised if the levels of arousal are too low. Certainly, the visual and auditory recall results suggest that the participants in the Complete Group may have been under-aroused by attempt five.

Influence of Repetition on Recall

Yerkes & Dodson's (1908) 'Inverted U Principle' appears to be reflected in the results of the recall data. An Inverted U pattern is evident in the Ascore results (Figure 11) and similarly in the Vscore results (Figure 12), with the exception of the fifth attempt in which the Vscore results were unexplainably poor.

It is acknowledged that factors other than anxiety may have influenced the participants recall results. For example, not leaping on command increased the time over which the participant was required to remember the auditory and visual cues presented to them in the

countdown. However, this was not an issue for the Complete Group on which the analyses were performed as only one subject from that group recorded a lengthy time delay, as explained above.

A second factor that may have influenced the subjects' recall is the relevance of the cues to their current situation. Farrow (2007) has noted that individuals commonly miss blatant cues if they are unrelated to the task at hand. He describes a case in point in which subjects asked to count the number of basketball passes made by players were oblivious to another person dressed in a black gorilla suit walking through the middle of the court. Over half the observers did not notice the gorilla when later questioned.

In the study carried out by Mühlberger et al. (2008) on social anxiety, it was demonstrated that people avoid cues given off by other people whom they find threatening such as those expressing anger on their face. Conversely, it is reasonable to assume that highly relevant cues might be more readily processed and remembered. In the present study, one subject commented that the image of the cow was easy to remember because they are scared of them. They indicated that being anxious (about leaping) made remembering that anxiety-inducing image easier to recall. In further studies it would be ideal to control for this effect by ensuring that there were no anxiety-producing images or sounds in the countdown, or alternatively the same number in each attempt. In fact, it would be interesting to include some 'scary' images and sounds in further research to consider whether they are more readily processed and recalled.

Despite the limitations associated with the recall data, there are several implications that arise from the findings. Once again acknowledging the small scale of the study, it does seem

that receiving both visual and auditory cues is significantly compromised during the first attempt of an anxiety-evoking skill. A significant improvement in 60-second recall ability was observed after the first attempt especially in the auditory results. An implication of this observation is that attempting to provide individuals with too much instruction when learning a new task is redundant and potentially counter-productive (Pappas, 2009).

A second implication of the finding that the recall results appeared to obey an Inverted U pattern is that it implies a zone of optimal functioning. In the present study, the fourth attempt appears to be the point in which the Complete Group participants were achieving optimal information processing, as measured by their 60 second recall. Interestingly this relates to the point where the bulk of the participants' reduction in anxiety had been achieved. As discussed previously, some of the subjects appeared bored with the experience in the fifth and sixth attempt and this could explain the decrease in recall performance in these trials. As theoretically predicted by the Inverted U Hypothesis, performing too many repetitions might once again be counter-productive to learning and could potentially even be dangerous.

Pagen (1995) describes the dangers of the 'intermediate syndrome' that is commonly witnessed in the sport of hang gliding. In this stage, pilots have not yet developed a high level of proficiency such that their responses are automatic, yet they become complacent. Essentially, while the pilots are still functioning in the verbal-cognitive stage of learning in which their responses still require cognitive input (Schmidt, 2005), their low levels of arousal result in poor attention and information processing. Pagen (1995) suggests that these pilots are at high risk of mishap.

The practical implication is that beyond about four attempts it is important that learners are encouraged to remain vigilant. Further, optimal learning is likely to occur at around three to four attempts presenting a valuable opportunity from the viewpoint of achieving educational objectives. Finally, it would seem that four attempts are an adequate number for a learner to perform before progressing to the next level of the skill.

It should be noted that these results are based on the response of the 13 participants who successfully completed all six attempts. Analysing the mean changes in the measures of anxiety in the Withdraw Group was invalid due to the progressive rate of attrition from one attempt to the next. However, given that the Withdraw Group members completed the first lunge but then at a later time were unable to continue, it seems reasonable to suggest that their levels of anxiety actually increased during the experimental protocol. This trend was unexpected as it was anticipated that the participants' anxiety levels would all progressively decrease, as observed in the Complete Group. Given that half the subjects demonstrated this unanticipated response it cannot be considered an anomaly. Indeed, further research is required involving greater sample sizes, to further explore the influence of repetition on anxiety and elucidate the factors that may contribute to the varying responses observed in the present study.

Information Processing Under Varying Levels of Arousal

One important observation of the study is that visual recall is better than auditory recall and this trend was observed for the low anxiety conditions of the classroom environment (3.8 ± 0.9 versus 2.6 ± 1.4) and throughout the various levels of arousal experienced in the six

lunge attempts. Clearly, visual cues were more readily processed than auditory cues regardless of the level of arousal.

An obvious implication of this finding is that a visual mode of instruction is likely to be more effective than an auditory based one. Yet many instructional techniques are solely auditory based. The results of this study suggest that whenever practical, educators need to incorporate visual methods as the preferred mode of delivery while taking into consideration differences in learning styles. Further, endeavouring to integrate visual cues and encourage visual attention is highly recommended. Visual techniques may include the use of illustrations, diagrams, flow charts and flash cards. Modelling is also an important visual instruction technique, whether the learner observes a skilled performer demonstrate the task step by step in person, or through the use of multimedia facilities (Helterbran, 2008). The value of visualisation for promoting the learner's visual engagement with the task should not be discounted.

Research by Kock, Chatelain-Jardón & Carmona (2009) found that even the use of visual information unrelated to a task can assist the learning process. In their study using web-based multimedia to model a procedure, a snake in an attack position was randomly placed on the screen to surprise the participants. They found that retention of information was significantly greater immediately before and after the appearance of the snake. Obviously, the very nature of some tasks dictates the most effective mode of instruction, such as the impracticality of underwater communication in scuba diving, but the results of the present study testify to the importance of incorporating, and even giving preference to, visual strategies wherever possible.

Research has found that during incidents of high arousal such as a car crash or mugging, people often confuse the auditory and visual information surrounding the event. For example, individuals will report hearing smashing glass even though there was none, or victims of crime will confuse the ethnicity of the assailant. Coleman (2009) describes this phenomenon as Episodic Amnesia, characterised by an inability to recall certain (usually emotionally laden) experiences, while other memory functions remain intact (Kapur, 1999).

A further investigation of the extent to which visual or auditory information is either invented or confused would make an interesting adjunct to the present study. An extension to the current project would be to document how many times the subjects volunteered images or sounds in their memory recall test that were not actually presented to them in the countdown. The subjects could also be quizzed as to details surrounding the cue such as the colour of the ball or whether the dog bark came from a big or small dog.

It is perhaps not surprising that the subjects in the study were able to recall visual information more effectively than auditory given that the majority of individuals demonstrate a visual dominance (De Romero & Dwyer, 2005). No attempt was made in this study to ascertain the learning style of the participants, whether it be visual, auditory or kinaesthetic. An interesting direction for further research would be to include this element to determine whether visual recall is superior in high anxiety situations even for individuals with an auditory or kinaesthetic predisposition.

Chapter 6

- Conclusions -

Summary and Conclusions

While the present study only involved a relatively small sample size, the findings are novel and their implications might be far reaching. In response to the research questions identified in the introductory chapter, the following conclusions may be drawn:

1. *How does repetition of an activity of perceived high risk influence an individual's level of state anxiety?*

   The results suggest that when faced with repeating an anxiety-inducing task, individuals will either experience a progressive decrease in their arousal level or a progressive increase.

   For the subjects in the present study who displayed a progressive decrease, all measures of anxiety were significantly decreased after only one attempt. The majority of the decrease in the anxiety measures had occurred by the third attempt and no further significant decreases in any measures of state anxiety occurred after four attempts.

2. *How, and to what degree, is the ability to process visual and auditory cues affected by high levels of state anxiety?*

For those subjects who demonstrated a progressive decrease in arousal, the relationship between arousal and the recall of both visual and auditory information appeared to follow an Inverted U pattern. The high levels of state anxiety experienced in the first attempt compromised their ability to process visual and auditory cues. Optimal recall occurred in the fourth attempt, after which there was a trend for it to decrease as the subjects became complacent.

3. *Are visual or auditory cues more effectively received during periods of high arousal?*
   Visual information was processed more effectively than auditory information at all levels of arousal.

Practical Implications

Arising from the findings of the study are the following practical implications that may be relevant in many sporting, educational and vocational settings:

- When individuals are asked to repeatedly perform a high anxiety task their level of anxiety might progressively decrease or conversely increase.

- When learning anxiety-evoking skills, it is advisable to perform at least three attempts before pursuing more complex or advanced variants of the skill.

- Individuals can become complacent after four attempts, even of a task that evokes anxiety on the first attempt. This complacency can influence information processing ability, which could in turn impede decision-making ability.

- Optimal information processing appears to occur on the third or fourth attempt of a task that initially evokes anxiety and this might offer an opportunity for optimal learning outcomes.

- Visual cues are more readily processed than auditory cues at all levels of arousal, highlighting the importance of employing visual instructional methods.

Future Directions

There are numerous questions that arise from the findings of this study, some of which have been alluded to in the discussion chapter. Many of the questions could be addressed by conducting a study similar in design to the present one, but on a larger scale. Such a study might provide better perspective on why some individuals apparently grow more anxious with repetition of a task while others become complacent.

Other interesting questions include whether 'scary' visual or auditory cues are processed more readily in the anxious state. Also, it would be interesting to determine the extent to which details of the images and sounds presented in an anxious state can be recalled, and whether individuals will indeed invent or confuse information.

One issue that has not been considered in this thesis is the effect of time on anxiety. For example, at the end of the testing session some of the subjects reported very low levels of arousal, but what would happen if they returned six months later to repeat the process? A study of this 'detraining effect' might be very relevant for informing the process of

'retraining' individuals who have not performed a characteristically high anxiety task for a long time.

Finally, further research into the differences in the response of males and females, the young and old, different personality types, and different learning styles to high anxiety tasks is warranted.

Indeed there is potential for much more work exploring the nature of high levels of arousal and anxiety and their impact upon skill performance. The results of such studies would be well placed to inform best educative practice as well as optimise safety.

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Appendix I

Appendix I: Study Trait Anxiety Questionnaire and Control Test.

PERSONAL DETAILS

Name: _____

Age: _____

Date: _____

Time: _____

Logfile: _____

TRAIT ANXIETY

		Hardly Ever	Sometimes	Often
Q1	Heights make me feel uneasy	☐	☐	☐
Q2	When heights are involved, I worry about not performing well	☐	☐	☐
Q3	When exposed to heights I worry about making mistakes	☐	☐	☐
Q4	Heights give me a funny feeling in the stomach	☐	☐	☐
Q5	Heights cause my heart to beat faster than usual	☐	☐	☐
Q6	Heights make me nervous	☐	☐	☐
Q7	Before ascending to heights I usually get uptight	☐	☐	☐

Study Control Visual and Auditory Test

	Correct?	Variation
Visual		
Computer Chip	☐	
Salvador Dali 'The Persistence of Memory'	☐	
Butterfly	☐	
iPhone	☐	
Crazy Frog	☐	
Sound		
Squeaky Kiss	☐	
Tom Tom Drums	☐	
Can Meow	☐	
Canary Call	☐	
Child Laughter	☐	

Appendix II

Appendix II: Study Data Sheets.

ATTEMPT ONE **Peak Heart Rate:** _____

STATE ANXIETY

		Not At All	Somewhat	Moderately	Very Much
Q1	I am concerned about this activity	☐	☐	☐	☐
Q2	I feel nervous	☐	☐	☐	☐
Q3	I have self-doubts	☐	☐	☐	☐
Q4	My body feels tense	☐	☐	☐	☐
Q5	I feel tense in my stomach	☐	☐	☐	☐
Q6	My heart is racing	☐	☐	☐	☐
Q7	I'm concerned about reaching my goal	☐	☐	☐	☐
Q8	My hands are clammy	☐	☐	☐	☐

POWERPOINT ONE

	Correct?	Variation
Visual		
Bicycle	☐	
Soccer Ball	☐	
Striped Shoes	☐	
Apple	☐	
Kitten	☐	
Sound		
Bell	☐	
Burp	☐	
Telephone Ring	☐	
Doorbell	☐	
Dog Bark	☐	

ATTEMPT TWO **Peak Heart Rate:**

STATE ANXIETY

		Not At All	Somewhat	Moderately	Very Much
Q1	I am concerned about this activity	☐	☐	☐	☐
Q2	I feel nervous	☐	☐	☐	☐
Q3	I have self-doubts	☐	☐	☐	☐
Q4	My body feels tense	☐	☐	☐	☐
Q5	I feel tense in my stomach	☐	☐	☐	☐
Q6	My heart is racing	☐	☐	☐	☐
Q7	I'm concerned about reaching my goal	☐	☐	☐	☐
Q8	My hands are clammy	☐	☐	☐	☐

POWERPOINT TWO

	Correct?	Variation
Visual		
Sliced Bread	☐	
Doctor	☐	
Cricket Ball	☐	
Spider	☐	
Pink Shoes	☐	
Sound		
Arrow 'Twang'	☐	
Aeroplane	☐	
Cow	☐	
'Yahoo'	☐	
'A-choo'	☐	

ATTEMPT THREE **Peak Heart Rate:** _____

STATE ANXIETY

		Not At All	Somewhat	Moderately	Very Much
Q1	I am concerned about this activity	☐	☐	☐	☐
Q2	I feel nervous	☐	☐	☐	☐
Q3	I have self-doubts	☐	☐	☐	☐
Q4	My body feels tense	☐	☐	☐	☐
Q5	I feel tense in my stomach	☐	☐	☐	☐
Q6	My heart is racing	☐	☐	☐	☐
Q7	I'm concerned about reaching my goal	☐	☐	☐	☐
Q8	My hands are clammy	☐	☐	☐	☐

POWERPOINT THREE

	Correct?	Variation
Visual		
Chocolate	☐	
Christmas Tree	☐	
Syringe	☐	
Red Door	☐	
Aqua Bird	☐	
Sound		
'Yipee'	☐	
Small Burb	☐	
Telephone Ring	☐	
Yawn	☐	
Train Horn	☐	

ATTEMPT FOUR _____ Peak Heart Rate: _____

STATE ANXIETY

		Not At All	Somewhat	Moderately	Very Much
Q1	I am concerned about this activity	☐	☐	☐	☐
Q2	I feel nervous	☐	☐	☐	☐
Q3	I have self-doubts	☐	☐	☐	☐
Q4	My body feels tense	☐	☐	☐	☐
Q5	I feel tense in my stomach	☐	☐	☐	☐
Q6	My heart is racing	☐	☐	☐	☐
Q7	I'm concerned about reaching my goal	☐	☐	☐	☐
Q8	My hands are clammy	☐	☐	☐	☐

POWERPOINT FOUR

	Correct?	Variation
Visual		
Coca Cola Logo	☐	
Wooden Chair	☐	
Four Leaf Clover	☐	
Puppy in a Flower Pot	☐	
Bandaid	☐	
Sound		
Dropped Stick	☐	
Small Hiccup	☐	
Cow Bell	☐	
Kitten Meow	☐	
Magic Sound (xylophone)	☐	

ATTEMPT FIVE **Peak Heart Rate:**

STATE ANXIETY

		Not At All	Somewhat	Moderately	Very Much
Q1	I am concerned about this activity	☐	☐	☐	☐
Q2	I feel nervous	☐	☐	☐	☐
Q3	I have self-doubts	☐	☐	☐	☐
Q4	My body feels tense	☐	☐	☐	☐
Q5	I feel tense in my stomach	☐	☐	☐	☐
Q6	My heart is racing	☐	☐	☐	☐
Q7	I'm concerned about reaching my goal	☐	☐	☐	☐
Q8	My hands are clammy	☐	☐	☐	☐

POWERPOINT FIVE

	Correct?	Variation
Visual		
Cobra Snake	☐	
Digital Camera	☐	
Bed	☐	
Safety Head Phones	☐	
Sydney Harbour Bridge	☐	
Sound		
Drum Roll	☐	
Kitten Meow	☐	
Small Sneeze	☐	
Deep 'Yeah'	☐	
Owl Hoot	☐	

ATTEMPT SIX **Peak Heart Rate:** _____

STATE ANXIETY

		Not At All	Somewhat	Moderately	Very Much
Q1	I am concerned about this activity	☐	☐	☐	☐
Q2	I feel nervous	☐	☐	☐	☐
Q3	I have self-doubts	☐	☐	☐	☐
Q4	My body feels tense	☐	☐	☐	☐
Q5	I feel tense in my stomach	☐	☐	☐	☐
Q6	My heart is racing	☐	☐	☐	☐
Q7	I'm concerned about reaching my goal	☐	☐	☐	☐
Q8	My hands are clammy	☐	☐	☐	☐

POWERPOINT SIX

	Correct?	Variation
Visual		
Eye	☐	
Cher (Female Singer/Actor)	☐	
Kitten	☐	
Metal Nails	☐	
Cooking Steak	☐	
Sound		
Taxi Horn	☐	
Glass Shattering	☐	
Chimpanzee	☐	
Gasp	☐	
Children 'Yay'	☐	

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