

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

**THE  
HOT HAND PHENOMENON  
IN AMATEUR GOLF:  
EXAMINATION OF  
PSYCHOLOGICAL MOMENTUM**

A thesis presented in partial fulfillment of the requirements for  
the degree of Master of Arts in Psychology

at Massey University, Albany, New Zealand

**Gavin J Hamlyn**

**2007**

---

## ABSTRACT

---

This dissertation explored the notion of the hot hand phenomenon and psychological momentum in the sport of amateur golf within two separate but interrelated studies. Study one investigated the hot hand phenomenon with a sample of amateur golfers ( $N = 3238$ ). Participant's hole-by-hole scores for rounds played over a two-year period were analysed. The results showed performance on a hole was influenced by prior performance for a greater number of golfers than would be expected by chance, thus supporting the notion of the hot hand phenomenon. The results are discussed in relation to previous hot hand research. The aim of Study Two was to investigate reasons behind individual and gender differences in psychological momentum after an error. A selection of participants from study one were assigned to a negative momentum, negative facilitation, or no-momentum group, by virtue of how they tend to perform after an error and completed questionnaires measuring fear of failure, telic dominance, rumination, trait anxiety, self-confidence, perfectionism, and motivation orientation. The results suggest an individual's self-confidence, telic dominance, and task orientation influence one's performance after an error. These findings provide some supporting evidence for the Vallerand et al.'s (1988) antecedents-consequences psychological momentum model and Taylor and Demick's (1994) multidimensional model of momentum.

---

## ACKNOWLEDGEMENTS

---

Researching and writing this dissertation has been very challenging but yet extremely rewarding. I was able to complete my thesis due to the help of some exceptional people. I would like to take this opportunity to thank those involved.

Firstly, I would like to thank my supervisor, Dr Richard Fletcher. Thanks for your assistance, guidance, expert advice, and the confidence you instilled in my ability to complete the task. I appreciate your patience and the time you set aside for me within your very busy schedule.

I would also like to thank my IT ‘guru’ Warren Chung for the many hours he personally sacrificed to write the software program used in this research. Without this program the research would not have been possible.

Also, I would like to thank my employers, Clive, Surinder, and Owen, who provided me with a supportive and flexible environment that facilitated the completion of this dissertation.

I am forever grateful to my wife Cheryl, for all the support she provided. She helped me so much and in so many ways that it will take a lifetime to repay. Also I would like to thank my children, James and Rebecca (and any future possible additions) for the motivation you provided, and the many wonderful timely distractions you supplied.

Finally, I would like to thank my Dad, Garrick for his support and the many hours spent proof reading. Also, to my late mother Irene for her unconditional love, and to my late Pop and Nana, who introduced me to the great game of golf, thus planting the seed for this research. I miss you guys very much. I hope I made you proud.

---

---

## TABLE OF CONTENTS

---

---

<b>ABSTRACT</b> .....	<b>i</b>
<b>ACKNOWLEDGEMENTS</b> .....	<b>ii</b>
<b>TABLE OF CONTENTS</b> .....	<b>iv</b>
<b>LIST OF FIGURES</b> .....	<b>iii</b>
<b>LIST OF TABLES</b> .....	<b>ix</b>
<b>LIST OF APPENDICES</b> .....	<b>x</b>
 <b>CHAPTER ONE</b>	
<b>INTRODUCTION</b> .....	<b>1</b>
<b>AIMS OF THE DISSERTATION</b> .....	<b>4</b>
General Aims.....	4
Objectives.....	4
 <b>CHAPTER TWO</b>	
<b>LITERATURE REVIEW</b> .....	<b>5</b>
<b>OVERVIEW</b> .....	<b>5</b>
<b>PSYCHOLOGICAL MOMENTUM MODELS</b> .....	<b>5</b>
The Antecedents-Consequences Psychological Momentum Model.....	5
The Multidimensional Model of Momentum in Sport.....	9
The Projected Performance Model.....	14
<b>PSYCHOLOGICAL MOMENTUM RESEARCH</b> .....	<b>18</b>
Overview.....	18
Initial Research.....	18

Laboratory Studies.....	21
Gender Differences.....	25
HOT HAND RESEARCH.....	28
Closed Skill Analysis.....	32
Supporting Research.....	34
Non-Supporting Research.....	36
Statistical Limitations.....	39
CURRENT INVESTIGATIONS.....	40
 <b>CHAPTER THREE</b>	
<b>STUDY ONE: THE HOT HAND PHENOMENON IN AMATEUR GOLF.....</b>	<b>42</b>
INTRODUCTION.....	42
METHOD.....	43
Participants.....	43
Materials.....	45
Measures.....	45
Procedure.....	47
RESULTS.....	50
Prior to Analysis.....	50
Analysis.....	50
DISCUSSION.....	54
Limitations.....	59
Future Research.....	60
Conclusion.....	61

## CHAPTER FOUR

### STUDY TWO: GENDER AND INDIVIDUAL DIFFERENCES IN

<b>PSYCHOLOGICAL MOMENTUM AFTER AN ERROR.....</b>	<b>63</b>
INTRODUCTION.....	63
Trait Anxiety.....	67
Fear of Failure.....	68
Negative Perfectionism.....	68
Positive Perfectionism.....	69
Rumination.....	70
Telic Dominance.....	71
Self-Confidence.....	72
Approach Coping.....	73
Avoidance Coping.....	73
Ego Orientation.....	74
Task Orientation.....	74
METHOD.....	75
Participants.....	75
Materials.....	76
Measures.....	77
Confirmatory Factor Analysis.....	77
Perception of Success Questionnaire.....	79
Coping Scale.....	80
Performance Failure Appraisal Inventory.....	81
Public Rumination Questionnaire.....	82
Sport Competition Anxiety Test.....	83



Positive and Negative Perfectionism Scale.....	83
Trait Sport Confidence Inventory.....	84
Telic Dominance Scale.....	85
Procedure.....	86
<b>RESULTS.....</b>	<b>87</b>
Prior to Analysis.....	87
Preliminary Analyses.....	90
Gender Analyses.....	91
Psychological Momentum Group Analyses.....	92
<b>DISCUSSION.....</b>	<b>94</b>
Task Orientation.....	95
Self-Confidence.....	98
Telic Dominance.....	100
Limitations and Future Research.....	102
Conclusion.....	104
<b>CHAPTER FIVE</b>	
<b>GENERAL CONCLUSIONS.....</b>	<b>106</b>
<b>REFERENCES.....</b>	<b>109</b>
<b>APPENDICES.....</b>	<b>116</b>

---

## LIST OF FIGURES

---

Figure 1	The Antecedents-Consequences Model of Psychological Momentum.....	7
Figure 2	The Multidimensional Model of Momentum in Sports.....	10
Figure 3	The Projected Performance Model.....	17
Figure 4	Frequency of Females Z Scores.....	53
Figure 5	Frequency of Males Z Scores.....	54
Figure 6	Pictorial Example of Psychological Momentum Group Categorisation Based on Individual Z Scores.....	86

---

## LIST OF TABLES

---

Table 1	Example of 2 X 2 Contingency Table .....	51
Table 2	Significant Results for Gender and Psychological Momentum Type.....	52
Table 3	Questionnaire Goodness of Fit Indexes.....	79
Table 4	Means and Standard Deviations of Personal Variables by Gender .....	92
Table 5	Means and Standard Deviations of Personal Variables by Psychological Momentum Groups.....	93

---

## LIST OF APPENDICES

---

Appendix A: The Perception of Success Questionnaire .....	116
Appendix B: The Coping Scale .....	117
Appendix C: The Performance Failure Appraisal Inventory .....	118
Appendix D: The Rumination Questionnaire .....	119
Appendix E: The Sport Competition Anxiety Test .....	120
Appendix F: The Positive and Negative Perfectionism Scale in Sport .....	121
Appendix G: The Trait Sport Confidence Inventory .....	122
Appendix H: The Telic Dominance Scale .....	123
Appendix I: Example of Questionnaire Pack Cover Sheet .....	126
Appendix J: Questionnaire Pack Information Sheet .....	127

## CHAPTER ONE

---

### INTRODUCTION

---

It is mental power that separates the exceptional from the very good. When they line up in the 100-metre sprint in Barcelona there will be nothing to choose between them, talent for talent, training for training. What separates them is what goes on behind the eyes. (*p. 2*)

*Frank Dick, former coach of the Great Britain track and field team*

*(Bull, Albinson, & Shambrook, 1996).*

The above quote illustrates the importance leading sportspeople place on the psychological aspects of sport. The difference between winning and losing in sport is not solely dependent upon physical skills but on psychological factors as well (Richardson, Adler, & Hanks, 1988; Miller & Weinberg, 1991).

Momentum is one such factor widely believed by the sporting community to have an influential role on the outcome of sporting events. Athletes, commentators, and fans alike often refer to ‘critical’ moments in a game that are perceived as momentum ‘starters’ or ‘shifters’ which seemingly alter the dynamics of a contest (Silva, Cornelius, & Finch, 1992; Miller & Weinberg, 1991).

Psychological momentum is the term used by sport psychologists to describe the notion that performance is influenced by the outcome of a preceding event or events (Adler,

1981). Adler (1981), a pioneer of psychological momentum research in sport, defined psychological momentum in terms of a bidirectional concept. I.e. psychological momentum can manifest in either a positive or negative manner.

Positive momentum refers to an increase in an athlete's probability of future success following a successful performance, because of his/her positive reaction to success. For example, the athlete will experience a rise in feelings of self-confidence, perceptions of control, motivation, satisfaction, etc, which increases his/her chance of future success. Whereas negative momentum refers to an increase in an athlete's probability of future failure following an unsuccessful performance, due to his/her negative reaction to failure (Adler, 1981; Vallerand, Calavecchio, & Pelletier, 1988).

Scoring just before the halftime break or scoring a slam-dunk in basketball are examples of events that are believed to generate positive psychological momentum. The following is an excerpt from a book called *Rugby Tough* written by Hale and Collins (2002) that perfectly captures how a particular moment in a game can be perceived as a momentum shifter.

One example of legitimate instrumental aggression that may have influenced the self-confidence of teammates was the tackle Mickey Skinner (England) put on one of the back row of France in the Five Nations encounter in Paris in the 1980's...The single tackle was symbolic of England's defence and marked a change in the psychological momentum of that period of the game. (p. 189)

The importance placed on psychological momentum emanates from the belief that it influences an athlete's performance. Coaches have been known to change their line-ups and game strategies to accommodate athletes experiencing momentum (Vergin, 2000). For example, a basketball coach may advise players in his/her team to give the ball as often as possible to the player with momentum, in the belief that player has an increased chance of future success.

There is little doubt the notion of psychological momentum is inherently compelling to the sporting public and the belief in its power is widespread. However, empirical research investigating the existence of psychological momentum and its influence on performance has hitherto produced inconclusive findings. Studies within a number of different sports, such as pocket billiards (more commonly referred to as pool), horseshoe pitching, and tenpin bowling (Adams, 1995; Smith, 2003; Dorsey-Palmateer & Smith, 2004), have shown the majority of athletes perform better after a successful performance compared to after an unsuccessful performance, supporting the notion of psychological momentum. Also Iso-Ahola and Mobily (1980) and Weinberg, Richardson, & Jackson (1981) have reported gender differences in psychological momentum. Iso-Ahola and Mobily reported a greater positive momentum effect for males, and Weinberg, Richardson et al. showed women were less likely to improve their performance when losing. These findings suggest men and women react differently to performance outcome and generate different perceptions of psychological momentum.

However, researchers such as Gilovich, Vallone, and Tversky (1985), Albright (1993), and Clark (2005) found for the vast majority of participants, prior performance did not produce any significant changes in future performance, which they claimed provided no

evidence for the existence of psychological momentum. Gilovich et al. argued that people held an erroneous belief in psychological momentum, a cognitive illusion emanating from memory bias, and a misconception of randomness.

## **Aims of the Dissertation**

### **General Aims**

Clearly more research is required before any meaningful conclusions can be reached. Therefore, the aim of this project is to add to the existing knowledge by investigating psychological momentum's effect on performance within the game of golf. A further aim is to investigate the gender and individual differences in psychological momentum, which to date has been sparsely researched.

### **Objectives**

1. To examine whether a golfer's score on a hole is influenced by their score on the previous hole.
2. To test for gender differences in psychological momentum.
3. To investigate potential reasons behind gender and individual differences in psychological momentum, by examining whether men and women golfers differ on personality components, specifically anxiety, rumination, confidence, fear of failure, motivation orientation, perfectionism, coping style, and telic state.