THE EFFECTS OF HYPNOSIS ON FLOW AND IN THE PERFORMANCE ENHANCEMENT OF BASKETBALL SKILLS

By

BRIAN L. VASQUEZ

A dissertation submitted in partial fulfillment of
the requirements for the degree of

DOCTOR OF PHILOSOPHY

WASHINGTON STATE UNIVERSITY
College of Education

DECEMBER 2005

To the Faculty of Washington State University:

The members of the Committee appointed to examine the dissertation of BRIAN L. VASQUEZ find it satisfactory and recommend that it be accepted.

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Chair

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ACKNOWLEDGEMENTS

I must first express my gratitude to Dr. Arreed Barabasz and Dr. Marianne Barabasz for more reasons than will fit in this text. Thank you both for providing your expertise, foresight, personal time, guidance, and ideas for improving this study from the time of its original conception. Without your help this study would still be just a light bulb over my head. Your direction helped me navigate through the dissertation process and pushed me to completion. I also owe Dr. Dennis Warner sincere thanks for providing his words of wisdom about this study and his unlimited expertise in statistical analysis.

I am also very thankful for the voluminous help provided by Dr. Jesse Owen. From your countless weekends and evenings providing assistance in running participants to enduring the barrage of blank stares while discussing the myriad of intricacies involved with statistics, your patience and efforts were invaluable. I owe thanks to Dr. Fernando Ortiz and the assistance you provided in helping me with the early stages of this study. And thanks to Dr. Ross Flowers for your unwavering support and encouragement through the difficult process of procuring participants and conducting trials.

I would not be where I am today without the unwavering support and love from my mother, Melanie Jaquysh. Thank you for the infinite amount of encouragement and patience that only a mother could supply. You have always been there for me, helping me pursue my dreams.

Finally, my deepest gratitude goes to my beautiful fiancée, Michele. I simply do not know where to start. Your love, patience, support, optimism, unselfishness, and stubbornness were all things I needed from you at one point or another. You endured the setbacks and frustrations right along with me and always gave me your ear. Plus, you never kicked me out of the house. How lucky am I to be with you?

THE EFFECTS OF HYPNOSIS ON FLOW AND IN THE PERFORMANCE ENHANCEMENT OF BASKETBALL SKILLS

Abstract

by Brian L. Vasquez, Ph.D.
Washington State University
December 2005

Chair: Arreed Barabasz

On the basis of Hilgard's neodissociation theory of hypnosis, Czikszentmihalyi's concept of flow, and the similarities between them delineated by Unestahl, this study tested the ability of a hypnosis intervention to enhance an intermediate level athlete's basketball skills and ability to attain flow.

Participants (N = 43) were enrolled in a major university in northern California. Participants were matched within a scoring range of +/- 1 based upon their hypnotizability scores using the Waterloo-Stanford Group Scale of Hypnotic Susceptibility, Form C, then randomly assigned to one of two intervention groups (hypnosis group, relaxation group). The hypnosis group was exposed to six intervention sessions focused on age-regression to a previous flow experience (Barabasz & Barabasz, & Bauman, 1993; Barabasz & Watkins, 2005) and post-hypnotic suggestions to recall the experience. The relaxation group was exposed to six intervention sessions focused on progressive muscle relaxation techniques. Basketball performance skills, assessed by the American Alliance for Health, Physical Education, Recreation and Dance-Basketball Skills Test (AAHPERD-BST) and three-point shooting scores, and flow state, as measured by the Flow State Scale – 2 (FSS – 2), were measured at pre- and post-intervention.

Results showed the hypnosis group scored significantly better ($p < .05$) than the relaxation

group on dribbling scores, defensive scores and three-point shooting scores at post-intervention, but not for speed shooting scores. The hypnosis group also scored significantly better ($p < .05$) at post-intervention than at pre-intervention on dribbling scores, defensive scores and speed shooting scores of the AAHPERD-BST. No significant differences were found in flow state scale scores.

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Dedication

I would like to dedicate this milestone in my life to the memory of my grandmother, Roberta Jaquysh. Grandma, I wish you were here to enjoy this with me. And talk sports.

Chapter 1

Introduction

Sport Psychology

Like other concepts of psychology, there are many arbitrary places in which one can begin to discuss the early history of sport psychology. Different researchers vary in opinion as to the specifics of who investigated it first and when and where (Garfield, 1984; Vanek & Cratty, 1970; Weinberg & Gould, 1999). Most agree that the father of sport psychology in the United States is Coleman Griffith, who is credited with opening the first laboratory in sport psychology and helping to initiate one of the first coaching schools in North America. He also wrote two classic books in this field, *Psychology of Coaching* and *Psychology of Athletes* (Kroll & Lewis, 1970; Vealey, 1988; Weinberg & Gould, 1999; Whelan, Mahoney, & Myers, 1991).

Sport psychology may best be defined as the scientific study of people and their behaviors in sport contexts and the practical applications of that knowledge (Gill, 1979). Of the utmost relevance to this study is the aspect of sport psychology concerning itself with the development of psychological skills for enhancing competitive performance and training (Weinberg & Gould, 1999). Sport psychology is a relatively new field in psychology and has been called the youngest of the sport sciences (Williams & Straub, 1986). It is also a fast growing and developing field (Gould, Petlichkoff, Hodge, & Simons, 1990), and as Garfield (1984) points out, this can be said much more so for the United States than other parts of the world, since European countries have frequently been in the forefront of applied sport psychology.

Why research and apply sport psychology? What makes this a field worth investigation? As Murphy (1995) states, the primary reason is likely due to the changing of sport in the United States, indeed the world over. With the advent of sports television and sports sponsorship, large

amounts of money and large profitability margins became more of a focus for athletes and organizations, hence making success and failure in competition more valuable (Murphy, 1995). Much more is at stake in today's society for athletics and the participants in them. This has driven the monetary values of players and organizations higher, and made these same sports organizations, whether professional, Olympic or collegiate, more averse to losing valuable players to psychological reasons (Murphy, 1995). Also, higher monetary stakes, for better or worse, have placed more of an importance upon winning, causing a greater demand on individual and team athletic performance (Jones, 1995). The difference between winning a gold medal at the Olympics and the failure to even qualify in that same event may be as little as hundredths of a second. This has pushed athletes to seek every competitive edge they can possibly attain, legal and at times illegal, to hopefully allow them to achieve peak levels during performance (Suinn, 1997). Hence, the need for sport psychology, specifically performance enhancement, has been created.

Hypnosis

The Executive Committee of the American Psychological Association (APA), Division 30, Society of Psychological Hypnosis, chaired by President Arreed Barabasz during the 2002-2003 year provided the latest APA definition of hypnosis. It states that hypnosis, usually involving an introduction to a procedure in which the person is told that suggestions for imaginative experiences will be presented, typically includes one person (subject) being guided by another (hypnotist) to respond to suggestions for changes in their subjective experience, as in alteration of perception, sensation, emotion, thought, or behavior (APA, 2003). It further states that if subjects respond to the hypnotic suggestions, then it is generally inferred that hypnosis has been induced (APA).

Though this description sounds simple enough, hypnosis has been, and continues to be, a controversial topic for the public at large. For the average lay person, it usually means knowing only what popular culture mediums describe or define hypnosis to be, and most often this is not in a true light. Due to these often-negative messages, there are many misconceptions and misunderstandings about what hypnosis is, as well as what it can and cannot do.

Despite the misconceptions, research has shown hypnosis to have a powerful, wide ranging effectiveness as an adjunctive treatment. In their meta-analysis of hypnosis as an additional treatment to cognitive-behavioral psychotherapies, Kirsch, Montgomery, and Saperstein (1995) found that the addition of hypnosis substantially enhanced treatment outcomes in clients. In fact, the average client receiving hypnosis as an adjunctive treatment showed greater improvement than at least 70% of clients that did not receive hypnosis with cognitive-behavioral treatment. The effectiveness of hypnosis as an additional treatment has been shown in the treatment of depression (Yapko, 1993), smoking (Barabasz, Baer, Sheehan, & Barabasz, 1986), eating disorders (Barabasz, M., 1990; Nash & Baker, 1993), child sexual abuse (Rhue & Lynn, 1993), post traumatic stress disorder (Spiegel, 1993), pain management (Chavez, 1993; Smith, Barabasz, & Barabasz, 1996), rape (Smith, 1993), trichotillomania (Barabasz, 1987) and phobias and intense fears (Crawford & Barabasz, 1993), to name but a mere few.

Similarly, hypnosis has a long and extensive history in the area of sports psychology. As Liggett (2000) states, by using the characteristics of hypnosis, such as relaxation, focus, and suggestion, among others, hypnosis has the ability to make a major impact in mental training by helping athletes develop correct techniques, build willpower, concentration, and confidence essential for maximum performances.

A review of the literature indeed shows that hypnosis has been researched and clinically used

in the areas of, among others, increasing and decreasing strength and endurance (Howard & Reardon, 1986; Ito, 1979), ameliorating pain (Barabasz, & Barabasz, 1989; Freeman, Barabasz, Barabasz, & Warner, 2000; Smith, Barabasz, & Barabasz, 1996), enhancing imagery (Liggett, 2000; Liggett & Hamada, 1993), optimizing anxiety, arousal and relaxation (Krenz, 1984; Wojcikiewicz & Orlick, 1987), improving concentration and focus (Robazza & Bortoli, 1994, 1995; Schreiber, 1991), increasing self-confidence (Liggett, 2000), and using age regression and heightened recall to help athletes in developing skills or analyze errors in sport techniques (Onestak, 1991; Wolberg as cited in Taylor et al., 1993).

Flow

A study of collegiate athletes found that it is sometimes difficult for performance enhancement specialists to draw an athlete's attention to some types of performance enhancement techniques (Maniar, Curry, Sommers-Flanagan, & Walsh, 2001). Some aspects of sport psychology are more popular than others, and in the authors' own personal experience, this holds true. However, there is one area of performance enhancement that catches even the most doubting athlete's attention, and that is helping them get in "the zone," as it is commonly called by athletes. It is a concept also known to sport psychologists as attaining the state of flow (Csikszentmihalyi, 1975, 2000). Flow, for athletes, is associated with high levels of performance and a very positive, enjoyable experience. As Jackson (2000) states based upon her research with flow, everything is optimal, the mind and body are in harmony, negative thinking and self-doubts are absent, and functioning is enhanced. It may even be said that optimal performance, or flow, is often the ultimate end that athletes seek, while performance enhancement techniques of the sport psychologist and coach, at times including hypnosis, provide the means.

Theoretical Bases

The theoretical foundation for this research is based upon two fields of research that have been studied extensively, though rarely together. These fields include hypnosis and the state of flow. This research is conceptualized within a neodissociation theoretical conceptualization (Barabasz, 1982, 1984; Barabasz & Watkins, 2005) based upon Ernest Hilgard's (Hilgard, 1973, 1986, 1992, 1994) neodissociation theory of hypnosis. Mihaly Csikszentmihalyi (1975, 2000) first conceptualized and defined the state of flow and how it pertains to physical activity.

Hilgard's Neodissociation Theory

The concept of hypnosis has been around for over two hundred years, at least, and some would argue longer (Barabasz & Watkins, 2005). Despite this, and similar to other disciplines within psychology, researchers in the area of hypnosis have not come to a complete consensus on several factors of hypnosis, such as what exactly is occurring when a person is hypnotized, the different depth levels attained, a person's hypnotizability, etc. These problems existed when such notables as Mesmer, Faria, Liebeault, and Janet were investigating the theories that lay behind hypnosis, and they are still very much in existence today (Dixon & Laurence, 1992).

Contrasting theories exist that generate debates over whether hypnosis is a "special" or an "altered" state of consciousness (Kihlstrom, 1985). The theoretical basis used for the present study is that known as neodissociation by Ernest Hilgard (Hilgard, 1973, 1986, 1992, 1994). Neodissociation is currently recognized as being the most influential theory of hypnosis (Kirsch & Lynn, 1998). It is also meant to be a more generalized theory other than only a theory of hypnosis (Hilgard, 1994). Neodissociation also enters the realms of dissociative disorders, obsessive compulsive behavior, antisocial behavior, and hallucinations (Hilgard, 1986, 1992, 1994). The theory operates under the premise that a hierarchy of control and monitoring systems

exists at any one time in a person. Hypnosis enters the picture as modifying the hierarchical arrangement of these controls by taking much of the subject's control function away, such that some systems become dissociated from others (Hilgard, 1975, 1994). This is what happens when, among other occurrences associated with hypnosis, motor controls are altered, hallucinations are perceived as reality, and perception and memory are distorted (Hilgard, 1994). The theory of neodissociation will be discussed in more detail later.

Of primary concern for the present study is how the neodissociation theory of hypnosis accounts for the effects of hypnosis in the field of sport psychology, specifically the performance enhancement of athletes. Its similarities with Csikszentmihalyi's concept of flow are of interest, as well.

Csikszentmihalyi's Flow Theory

Mihaly Csikszentmihalyi (1975, 2000) first defined the state of flow as a very enjoyable psychological state that refers to a holistic sensation people experience when acting with total involvement in a number of different activities. It is also seen as a highly valued experience and source of motivation for many people undertaking any type of physical activity (Jackson, 1996). Much of Csikszentmihalyi's original theory of flow was developed from his studies conducted with not only athletic participants, like rock climbers and basketball players, but also players of chess, dancers, surgeons, and in artistic contexts with painters and musicians (Csikszentmihalyi, 1975,1990,1992).

The state of flow is a highly sought after experience and source of motivation by just about every athlete that takes the court, course, track, pitch, pool or field. It is desired by every athlete from the seasoned, veteran professional, to the collegiate athlete and the weekend warrior. There are several reasons for this. Csikszentmihalyi (1990) believes that, for most, experiencing flow is

to have the utmost enjoyable experience when participating in an activity, also often referred to as an optimal experience, where optimal levels of functioning often occur. In research with athletes, because it is often when optimal performance levels occur, flow has been shown to relate to positive performance outcomes, as well (Jackson & Roberts, 1992).

Also, as previously mentioned, the stakes are constantly being raised in Olympic, collegiate, professional and semi-professional sports. Any edge that a competitor can gain to succeed will be greatly pursued. And even though the primary reason some may want to enter flow is for the simple enjoyment of the experience, the further benefits of such a state are potentially innumerable and beneficial, as well. As an example, for individual sport athletes it may mean the difference between a world championship or Olympic gold medal or not even making the Olympic team. For a team, this may mean a world championship victory or not qualifying for the playoffs at all. It could also elevate a relatively unknown to the top of his sport in the world, thus meaning not only newfound notoriety and perhaps respect, but also a potentially large increase in salary, contracts or prize money.

So, if the state of flow is such a positive experience for an athlete or dancer or artist, why do people not enter this state when they want the desired effects? Therein lays the problem. It cannot be completely controlled and cannot be switched on and off at will. As Jackson and Csikszentmihalyi (1999) state, even though the sport setting is structurally designed to enhance flow, many athletes have trouble entering flow. And like the ever-elusive fountain of youth, the secrets for achieving this realm upon command have yet to be discovered.

Research has been conducted with athletes to assess and understand the factors that enhance or inhibit the occurrence of flow, with hope that by doing so, sport psychologists can help athletes achieve flow (Jackson, 1992, 1995; Kimiecik & Stein, 1992; Russell, 2001). This

research has been equivocal, however (Catley & Duda, 1997; Jackson et al, 1998; Stein et al, 1995). Csikszentmihalyi and Jackson (1999) outlined nine "flow fundamentals" or dimensions that characterize the state of flow in athletes. They are: a perceived balance between challenge and skill, a merging of action and actor, the presence of clear goals, the presence of unambiguous feedback, total concentration and complete focus, a total sense of control, a loss of self-consciousness, a transformation of time, and an autotelic experience. These will be discussed at length below. Csikszentmihalyi and Jackson also stress that the mind-set of the athlete is what opens the possibility for flow to occur, and that athletes have the ability to maximize the possibility of entering flow by manipulating some of the nine dimensions prior to and during competition (Jackson & Csikszentmihalyi, 1999).

However, simply identifying antecedent factors, having the knowledge of how to improve athletes' chances of attaining flow, or any other such information, does not guarantee an athlete will enter this state. Nothing, as of yet, has been shown to demonstrate this ability.

Similarities Between Flow in Sport and Hypnosis

It is interesting to note that many of the descriptions recorded in qualitative research from those that have experienced flow and the nine "fundamentals" that are characteristic of it are very similar to those involved with hypnosis. Having long worked in the field of hypnosis research, Lars-Eric Unestahl (1979, 1983, 1986, 1995) recognized that the state of hypnosis was similar in many ways to the state athletes enter when they are performing at their best, and designed a sport psychology concept around this called the Ideal Performance State (IPS). For Unestahl (1979, 1983), an IPS meant that the athlete was performing at a very high level which also bore many striking resemblances to the dissociative aspects of hypnosis. Specifically this included having an altered state of consciousness similar to hypnosis, an increase of focus and

concentration on task-relevant stimuli, a dissociated state from everything but the task-relevant stimuli, sometimes having amnesia of the past events, and changes in perception such as time slowing down, nonexistence of pain and an effortlessness in actions (Unestahl, 1979, 1983).

Very little research has been done investigating hypnosis and its ability to facilitate or control an optimal performance state or flow. However, the commonalities between the states of flow and hypnosis have led some to see the significance of using hypnosis to help athletes attain flow. Pates and colleagues (Pates, Cummings, & Maynard, 2002; Pates & Maynard, 2000; Pates, Maynard, & Westbury, 2001; Pates, Oliver, & Maynard, 2001), have researched the possibility of improving an athlete's attainment of flow in athletic skills in their groundbreaking series of studies. Though they are pioneering, these studies have limitations and have merely broken the surface, thus signifying further research is needed.

Rationale

There were six specific reasons for conducting this research:

1. It was necessary to further investigate and work toward the development of scientific evidence that supports the use of physical practice with performance enhancement techniques (Greenspan & Felts, 1989)
2. If techniques are developed and found to be performance enhancing, these techniques must be safe for use by athletes, reasonably accessible, minimally time consuming, professionally delivered, and within the legal and ethical guidelines for use as determined by sport governing bodies (Carney & Corcoran, 1990)
3. It was necessary to further investigate the effectiveness of a specific technique (hypnosis) that has shown preliminary evidence of enhancing an athlete's performance and

attainment of flow in previous controlled studies (Pates, Cummings, et al., 2002; Pates & Maynard, 2000; Pates, Maynard, et al., 2001; Pates, Oliver, et al., 2001).

4. This study attempted to enhance an intermediate level athlete's all-around basketball skills, including dribbling, defensive, and close range speed shooting skills as measured by the American Alliance for Health, Physical Education, Recreation and Dance-Basketball Skills Test (AAHPERD-BST). The AAHPERD-BST was selected as a task as it encompasses important components of the sport and participants were familiar with the skills involved. The AAHPERD-BST (AAHPERD, 1984; Kirkendall, Gruber, & Johnson, 1987) is also a well constructed, norm-referenced basketball skills test for males and females. Reliability and validity results regarding the AAHPERD-BST provide adequate substantiation of it as being a reliable and valid instrument (Kirkendall, Gruber, & Johnson, 1987).
5. This study attempted to enhance an intermediate level athlete's three-point shooting performance as measured by a modified five-point scoring system developed by Pates, et al. (2001, 2002). The three-point shooting performance was selected as a task due to its importance as a component of the sport and participants were familiar with the skill involved.
6. Csikszentmihalyi (1975, 2000) first defined and characterized the state of flow. This was soon followed by work further investigating flow within the realm of sports and athletes (Jackson, 1992; Jackson & Roberts, 1992). The Flow State Scale – 2 (FSS – 2) was developed, which provides a reliable instrument for measuring the state of flow in athletes during a specific event (Jackson & Eklund, 2002). Therefore, this research

investigated the effects of a hypnosis intervention on an intermediate level athlete's ability to enter flow as measured by the FSS – 2.

Definition of Terms

Anxiety: unpleasant emotional state involving qualities of uneasiness, dread, apprehension, and distress (Reber, 1995)

Arousal: activity readiness based on level of sensory excitability, glandular and hormonal levels, and muscular readiness (Reber, 1995)

Flow: a very enjoyable psychological state in which a person experiences a holistic sensation when acting with total involvement in an activity; a state of such focused concentration amounting to absolute absorption in a given activity that it inherently creates a state of mind where optimal performances are capable of occurring and usually do; where the mind and body are in harmony, negative thinking and self-doubts are absent, and functioning is enhanced (Csikszentmihalyi, 1990, 2000; Jackson, 2000; Jackson et al., 2001)

Hypnosis: a dynamic state of attentive, responsive concentration, even to the point of dissociation. Hypnosis is characterized by a contraction of peripheral awareness and an increase in focal attention (Spiegel, 1972)

Hypnotic susceptibility:

aptitude to produce a hypnotic state (Weitzenhoffer, 1997) as indicated by the behavioral responses to the suggestions provided by the Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C; Weitzenhoffer & Hilgard, 1962) or other hypnotizability scales

REST: Restricted Environmental Stimulation Technique: the reduction of normal levels of environmental stimulation (Suedfeld, 1980)

Three-point line: A line 19 feet 6 inches from the basket, in which each shot is worth three points in collegiate-level competition

Waterloo-Stanford Group C Scale of Hypnotic Susceptibility (WSGC): a group adaptation of the individually administered Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C) (Bowers, 1998)

Hypotheses

The following hypotheses were generated on the basis of the theories presented and the review of literature:

1. Participants in the hypnosis intervention group will score significantly lower ($p < .05$) on the dribbling skill test from the AAHPERD-BST at the post-intervention phase than participants in the relaxation intervention group.
2. Participants in the hypnosis intervention group will score significantly lower ($p < .05$) on the defensive skill test from the AAHPERD-BST at the post-intervention phase than participants in the relaxation intervention group.
3. Participants in the hypnosis intervention group will score significantly higher ($p < .05$) on the close range speed shooting skill test from the AAHPERD-BST at the post-intervention phase than participants in the relaxation intervention group.

4. Participants in the hypnosis intervention group will have significantly lower ($p < .05$) dribbling skill test scores from the AAHPERD-BST at the post-intervention phase than at the pre-intervention phase.
5. Participants in the hypnosis intervention group will have significantly lower ($p < .05$) defensive skill test scores from the AAHPERD-BST at the post-intervention phase than at the pre-intervention phase.
6. Participants in the hypnosis intervention group will have significantly higher ($p < .05$) close range speed shooting skill test scores from the AAHPERD-BST at the post-intervention phase than at the pre-intervention phase.
7. Participants in the hypnosis intervention group will score significantly higher ($p < .05$) on their three-point shooting scores at the post-intervention phase than participants in the relaxation intervention group.
8. Participants in the hypnosis intervention group will have significantly higher ($p < .05$) three-point shooting scores at the post-intervention phase than at the pre-intervention phase.
9. Participants in the hypnosis intervention group will score significantly higher ($p < .05$) on the FSS – 2 at the post-intervention phase than participants in the relaxation intervention group.
10. Participants in the hypnosis intervention group will have significantly higher ($p < .05$) FSS – 2 scores at the post-intervention phase than at the pre-intervention phase.

Chapter 2

Literature Review

The following sections review a history of hypnosis, the use and research of hypnosis in sport psychology, research involving the concept of flow, the similarities of hypnosis and flow, and research that combines hypnosis and the state of flow.

Historical Overview of Hypnosis

A starting point in which to begin discussing the history of hypnosis is often an arbitrary one. Many might start with the contribution made by Anton Mesmer and his success in bringing hypnosis into its current place within the realm of science (Barabasz & Watkins, 2005; Dixon & Laurence, 1992; Gould, 1988). Other notable figures would soon follow, such as Puysegur, Liebeault, and Janet, to name a few (Dixon & Laurence, 1992). Pierre Janet is an important person for this study due to his early work in dissociation theory (Hilgard, 1992). Moreover, much like other topics in the field of psychology, the explanatory concepts appropriate to hypnosis are a matter of discussion (Hilgard, 1973). In the past, the aforementioned predecessors of hypnosis research debated over many of the same matters that divide the experimental hypnosis community today. Indeed, throughout its history, most have agreed on the basic observations of hypnosis; however, they have disagreed upon how to interpret the observations (Kihlstrom, 1985). The current divisions of hypnosis research are much like the ones described by Shor (1979) as the conflict between insufficient skepticism on the one hand, and a failure to recognize that hypnosis offers something new to be discovered about the mind on the other. This study is based upon Hilgard's neodissociation theory of hypnosis.

The concept of hypnosis as a state of dissociation, defined as the splitting off of certain mental processes from the main consciousness with various degrees of autonomy, has been

considered for more than a century (Charcot, as cited in Hilgard, 1992; Hilgard, 1986, 1992). Janet is often credited with developing the concept of dissociation as systems of ideas that were split off from the consciousness and exist only in the subconscious (Hilgard, 1992). These systems of ideas were not available from the unconscious except through hypnosis (Hilgard, 1986). Hilgard's theory of neodissociation, having roots within Janet's work, takes the concept of dissociation further. As Kihlstrom (1985) points out, many of the classic hypnotic phenomena such as analgesia, motor automatisms, and amnesia, seem to support the concept of dissociation.

Neodissociation

Ernest Hilgard's neodissociation theory is defined by several important characteristics. First, it is assumed that our behavior is organized as a hierarchical series of subsystems of control that carry out actions, such as habits, pain perception, attitudes, interests, or movement (Hilgard, 1986). Each subsystem has some degree of unity, persistence, and autonomy of function. Hilgard (1994) contends there are lapses of consciousness in the control of such well-learned activities as playing an instrument or driving a car, and that the actions can proceed with a bare minimum of conscious control, remaining relatively self-sustained once they have begun. These subsystems may at any one point be either latent or actuated. Latency refers to an inoperative or dormant subsystem that is readily available to the person when called upon (Hilgard, 1994). An actuated subsystem is one that has been called upon to function at that moment (Hilgard, 1994). Hypnotic suggestion is one of the methods of actuating a specific set of subsystems (Hilgard, 1992). For example, as the person reads this line, their subsystems of vision, memory, and word recognition are being actuated, while subsystems such as pain perception or gross muscle movement may remain latent.

Next, a central control figure, known as the executive ego, initiates action sequences from subsystems, in addition to performing monitoring functions of those sequences once they have been actuated. According to Hilgard (1992), the executive ego is divided by mental processes that are available to the conscious and those that are unavailable to the conscious, the subconscious. Suggestions made during the altered state of hetero-hypnosis or self-hypnosis operate at that part that is unavailable to the conscious in the executive ego. These suggestions modify the control center, or executive ego, that hierarchically arranges these controls, thereby taking some of the participant's control function away and leaving some subsystems to become dissociated from others (Hilgard, 1975, 1994). According to Hilgard (1992), during the normal waking condition, the monitoring function is responsible for taking account of the information that is available from the external world and the body. Having committed to the altered state of hypnosis, the executive ego allows the monitoring function to relinquish some amount of critical scanning of information, becoming fractionated during hypnosis. This partial fractionation of the monitoring function allows the uncritical acceptance of a distorted reality to occur as though it were undistorted (Hilgard, 1992). The monitor does not conduct reality tests it would normally conduct. For example, during the ideomotor suggestion that the participant's arm will become stiff and cannot be bent (both sets of muscles contracting simultaneously), the monitoring function doesn't question the cause of the stiffness. In other words, suggestions during hypnosis may change the normal hierarchical arrangement of various subsystems of central cognitive control, thus causing the executive functions to recede (Hilgard, 1992). Meanwhile the monitoring functions remain active but lack their normal criticalness, allowing distortions in reality to occur (Kirsch & Lynn, 1995). Hypnotic suggestion is one of the methods for actuating a specific set of subsystems (Hilgard, 1994).

Hypnotic susceptibility and suggestion

Suggestion during a trance is a key component and characteristic of hypnosis that has been known to exist for at least a century (Hilgard, 1973). Hypnotic suggestions may be defined as a reaction that has a compulsive and automatic quality in response to an idea imparted by the hypnotist, which may vary in modality and complexity (Heap, 1988).

Many examples of suggestion types exist. Ideomotor suggestions may include arm levitation or postural sway. Sensory suggestions, like gustatory, olfaction, auditory, or visual experiences may consist of the person not smelling a strong ammonia solution or experiencing a positive hallucination, in which the hypnotized person recognizes something, a pesky mosquito for example, that is not actually present, or a negative hallucination, in which the hypnotized person does not see an object that is actually present. Still, other suggestions may alter the person's temporal experience such that time appears to move more quickly or slowly. Finally, an age regression, where the participant is instructed to go back in time to relive an event more vividly, is also a common suggestion (Heap, 1988).

A characteristic of hypnotic suggestions given by the hypnotist is that one's abilities to respond to them may differ. Among individuals there is a substantial continuum of hypnotic involvement or responsiveness (Killeen & Nash, 2003). Some participants show little or no response to hypnotic suggestion while others respond with ease. For example, a person may have an excellent response to an ideomotor suggestion, but not to a suggested amnesia of events, hallucination, or age regression. This continuum of ability to respond to different suggestions is referred to as a person's hypnotic susceptibility, and a number of standardized scales, which provide a rank order of hypnotic features, have been developed to measure a person's aptitude to produce a hypnotic state (Weitzenhoffer, 1997, 2002). These scales were developed to determine

the degree in which a person enters hypnosis and is involved in behaviors and experiences characteristic of hypnosis (Perry, Nadon & Button, 1992). This also meant that researchers interested in studying these characteristics, were now able to study the differences among the population in their responsiveness to hypnotic suggestion (Weitzenhoffer, 1997).

Most scales, such as the Stanford Hypnotic Susceptibility Scale, Forms A and B (SHSS:A; SHSS:B; Weitzenhoffer & Hilgard, 1959), the Harvard Group Scale of Hypnotic Susceptibility, Forms A and B (HGSHS:A; HGSHS:B; Shor & Orne, 1962), or the Waterloo-Stanford Group C Scale of Hypnotic Susceptibility (WSGC; Bowers, 1993, 1998) show essential similarity in outcomes, having high reliability and correlations despite some differences in detail (Bowers, 1993; Council, 1999; Hilgard, 1973). In general, hypnotizability appears to be a stable trait with some studies showing test-retest correlations as high as .71 over a 25 year period (Piccione, Hilgard, & Zimbardo, 1989).

Among these, the SHSS:A, and B, and the Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C; Weitzenhoffer & Hilgard, 1962) have been extensively scientifically researched, and the SHSS:C is largely considered to be the top instrument for evaluating hypnotizability (Balthazard, 1993; Benham, Smith & Nash, 2002; Bowers, 1981; Hilgard, 1965; Nash, 2001; Perry, Nadon, & Button, 1992). The SHSS:A,B,C, all 12-item measurements, were designed for individual administration, take approximately one hour to administer, and have simplified scoring systems consisting of individual items with progressively greater difficulty. However, in research settings, larger numbers of participants are often necessary, and group administrations of the hypnotizability scales were perhaps more advantageous and/or cost-effective for researchers. This necessity for group administration instruments to determine hypnotic susceptibility and facilitate sample selection, saw the development of additional scales to serve

this purpose, such as the group scales developed at Harvard and the Waterloo-Stanford group scale. Due to the advent of these group hypnotic susceptibility instruments, the SHSS:A and B are no longer as commonly used for purposes of research (Perry, Nadon, & Button, 1992).

A relatively new scale, the WSGC is a group hypnotic susceptibility scale developed to substitute for the individually administered SHSS:C. This new scale adds criterion validity to the measurement of hypnosis abilities. The two scales are correlated at .85, and the WSGC's internal consistencies are comparable (high range of .81 using the KR 20).

Age regression

Age regression has been a familiar part of hypnosis for around a century (Hilgard 1973). Regression, as Hilgard (1986) puts it, has many meanings, all of which imply a backward movement in time for the participant. Most often seen in hypnosis is the suggestion that the participant mentally go back in time to an event that they are encouraged to relive more vividly (Kihlstrom, 1985). The adult participant is often regressed to childhood.

From the neodissociation perspective, the monitoring function, which is responsible for absorbing information that is available from the body and external world in an altered state, is partially fractionated during the age regression progress. The monitor's partial fractionating allows the uncritical acceptance of a distortion of reality to occur, as though undistorted, and not making the normal reality tests (Hilgard, 1992). This allows the participant to regress to an earlier point during their life.

Several important components are thought to exist during the process of age regression. First, it appears that a temporary subtraction of memory occurs within the participant, where there is a functional loss of knowledge acquired after the age targeted by the suggestion. Next, a reinstatement is assumed to happen in which there is a developmental return to a previous mode

of psychological functioning. Both components have not been adequately studied (Kihlstrom, 1985). Lastly, Weitzenhoffer (1989) stated age regression is clearly related to forgotten material. This concept is sometimes known as revivification, the recovery of previously forgotten material, or simple hypermnesia, the improvement of a person's memory or recognition for events they experienced previously while not in a hypnotic state (Kihlstrom, 1985; McConkey, 1992).

Of relevance to this study is the ability of age regression to evoke a previous experience. Age regression is also important because performance enhancement or therapy with athletes sometimes involves little more than helping them reconnect with facets of their performing personality rendered inaccessible or dormant from their past, helping them regain images and feelings of success (Edgette, 1998).

Post-hypnotic suggestion

Another important component of hypnotic suggestion is post-hypnotic suggestions, where during hypnosis an idea is given to the person, for an event to occur later in their everyday waking state (Heap, 1988). Clearly stated by Weitzenhoffer (1989), a participant who is presumably no longer hypnotized will, at the appearance of some signal or trigger, produce a behavior that one would not ordinarily have expected. An example would be telling the participant that their throat will be so irritated upon opening their eyes that they will feel a strong urge to cough, thus doing so. Post-hypnotic suggestions are a familiar component of hypnosis, having been known to exist for at least a century, and are often a key component of therapeutic applications involving hypnosis (Barabasz & Watkins, 2005; Hilgard, 1973). Post-hypnotic suggestion triggers may also be anything the hypnotist chooses, can be very subtle, and their effectiveness has been shown to have a length of anywhere between 5 to 16 years, appearing to obey the laws that also pertain to long term memory (Weitzenhoffer, 1989).

Unestahl (1979) used post-hypnotic suggestions as a means for an individual to establish immediate concentration and to elicit positive feelings. Unestahl's use of posthypnotic suggestion was based from a study using highly hypnotizable participants (N = 7), that found a statistically significant increase in self-rating of well-being immediately after a posthypnotic suggestion was triggered (Unestahl, 1974). He also found that suggestions given for a general state, like an emotion or attitude, started with a very brief spontaneous trance, followed by a period where the posthypnotic effects are working without the signs of a trance (Unestahl, 1973).

Unestahl (1983) further breaks down the type of triggers or cues one may utilize for post-hypnotic suggestions into natural triggers or artificial ones. Natural triggers would consist of the participant using something which is usually part of their normal routine as a cue, such as a musician holding her instrument. An artificial trigger, which is not part of a normal routine for the musician, would be a particular word or movement that is specifically chosen by that participant to elicit the posthypnotic suggestion.

Hypnosis in Sport Psychology

The research and clinical areas in which hypnosis is used are numerous. Of interest here is its utilization in the area of sport psychology, an arena in which it has a long and varied history. Moll (1958) claimed that it was used as early as 1889, when hypnosis allowed a participant to have strength that would have otherwise been impossible without it. More evidence of its early clinical use involves a psychologist who successfully used it with professional baseball players during the 1940's (Tracy, 1951), in which he gives accounts of using hypnosis to strengthen confidence, relieve pain, and enhance performance. Performance enhancement involving hypnosis continues to be utilized by practitioners with numerous athletes in a wide variety of sport and exercise settings and in a multitude of methods (Liggett, 2000).

Despite the strong anecdotal evidence of hypnosis as a performance enhancement tool, as well as its effects in other areas outside of sport and exercise psychology, it is surprising how infrequently it is used by practitioners and athletes. This is especially interesting when one considers how much could be at stake for an athlete to succeed. The margin of victory, sometimes a mere one hundredth of a second, may be what separates the time necessary for a gold medal versus failure to qualify for the event (Morgan, 2002). A recent study conducted by Maniar and colleagues (Maniar, Curry, Sommers-Flanagan, & Walsh, 2001) employing NCAA Division I athletes, asked which performance enhancement technique they most preferred to use when preparing for competition. Overwhelmingly, the athletes chose goal setting and imagery, while hypnosis was among the least preferred.

One of the reasons for this sparing use of hypnosis in sport psychology could be the many misconceptions the general public and athletes more specifically have about hypnosis. Because of the misconceptions and discrepancies inherent within the field of hypnosis itself, sport and exercise psychologists themselves may shy away from using this technique. Empirical research and reviews of the literature involving hypnosis as a performance enhancement tool do not always convey confidence in its ability to improve an athlete's capabilities.

Reviews and research were conducted in the utilization of hypnosis in performance enhancement by Barabasz and Watkins (2005), Barber (1966), Gorton (1959), Hull (1933), Johnson (1961), and Weitzenhoffer (1953). Some of the research findings are equivocal. In several recent literature reviews of the field (Jacobs & Gotthelf, 1986; Onestak, 1991; Morgan, 1972, 1980, 1993, 2002; Taylor et al., 1993), for every study that shows hypnosis as beneficial in increasing an athletes' physical and motor performance or skill, there are just as many that fail to support its effectiveness in the same area. As Onestak mentions (1991), much of the positive

research results involve anecdotal or individual case history studies, and hence, are not conducted using rigorous empirical methods. As the research moved to more empirically based and standardized studies, the results sometimes failed to support the effectiveness of hypnosis in performance enhancement.

There are many reasons for the discrepancies involving the different findings of empirically based research. First, as the aforementioned reviews of literature discuss, there is a lack of standardized procedures and there are many design problems inherent in much of the research in this area (Onestak, 1991). Also, as Jacobs and Gotthelf (1986) point out in their review, participants involved in experimental studies may not have sufficient motivation to enhance their performance, whereas the opposite is likely to be true of athletes involved in case studies, who are generally more goal-oriented and have a decidedly stronger motivation. Onestak (1991) notes that the programs specifically designed for athletes in case studies tend to be more individualized for their benefit and focusing on their strengths, whereas those involved in experimental studies are not. Indeed, studies have shown that the wording of hypnotic scripts is crucial and that small differences in wording may significantly impact findings (Barabasz, 1990; Spiegel & Barabasz, 1988). Additionally, the participant's basic ability to perform the researched tasks, especially when involving motor skills, must be taken into consideration. Many experimental studies use participants who are not proficient in the task involved, unlike case studies that use athletes already adept at the required tasks (Onestak). For these reasons, the research involved in sport psychology and hypnosis must carefully be reviewed before conclusions are developed, regardless of which specific area in performance enhancement the study is involved.

Much like the disagreements that grip the field of hypnosis currently (i.e. state theories vs. social psychological theories), these same discrepancies plague research involving its use in

increasing the performance of athletes and exercisers. Also, like the number of disciplines in which hypnosis is used, many investigations have been conducted in a wide array of areas involving sport psychology. These include, yet are not limited to, muscular strength and endurance, concentration, self-confidence, age regression, imagery or visualization enhancement, relaxation and anxiety, and pain relief of minor injuries in athletes. Following is a more in depth look at the major areas of interest by sport psychology researchers.

Strength and endurance

Many studies involving hypnosis in performance enhancement have focused on increasing muscular strength and endurance in participants. Indeed, much of the early history of research concerning hypnosis and performance enhancement centered on strength and endurance research (e.g., Hottinger, 1958; Ikai & Steinhaus; Orne, 1959). The investigations utilized such tasks as grip strength, arm muscle endurance, finger strength, elbow flexion strength, bicycling, vertical jump, bench press, and treadmill running, among others (Onestak, 1991). Much of the research here is equivocal in its findings. A good example of this is the work of Jackson, Gass, and Camp (1979) in which they studied the improvement of endurance by having participants run on a treadmill. They found that posthypnotic suggestion in a group of high susceptible participants does produce a statistically significant improvement in endurance. Participants who were given motivational suggestions during the waking state performed statistically significantly better as well, and equal to the high susceptibles group.

The results of this study are a microcosm of the remainder of the research in the areas of strength and endurance improvement. For every study that shows enhancement, (e.g., Howard & Reardon, 1986; Hottinger, 1958; Ikai & Steinhaus, 1961; Ito, 1979; Roush, 1951) there are an equal amount that show no improvement in strength and/or endurance (e.g., Albert & Williams,

1975; Levitt & Brady, 1964; Johnson & Kramer, 1961; London & Fuhrer, 1961). The literature reviews on the subject find similar conclusions (Onestak, 1991; Morgan, 1993, 2002; Taylor et al., 1993; Jacobs & Gotthelf, 1986). The one unequivocal conclusion found in regards to affecting strength is that hypnotic suggestions designed to impair strength and/or endurance have been consistently successful, as found by Morgan (2002), Albert and Williams (1975) and Johnson, Massey and Kramer (1961).

Pain relief

Numerous studies demonstrating the efficacy of hypnosis in ameliorating pain have been conducted in an array of areas, including electric shock (Barabasz, 1982), cold pressor pain (Freeman, Barabasz, Barabasz, & Warner, 2000; Miller, Barabasz & Barabasz, 1991), chronic pain control in clinical settings (Barabasz, & Barabasz, 1989), and severely ill children undergoing painful medical procedures (Smith, Barabasz, & Barabasz, 1996**).** According to Barabasz and Watkins (2005), for conditions in which pain is prominent, hypnosis is a commonly recognized treatment and practiced clinically by many physicians, dentists, and psychologists properly trained in its techniques. Morgan (2002) also noted that the efficacy of hypnosis in reducing pain has been widely recognized and documented. Hypnosis often reduces or eliminates the necessity for pain relieving drugs, for instance during rehabilitation, surgical procedures or long term acute and chronic pain conditions, and hence reduces the possibility of side effects (Barabasz & Watkins, 2005; Liggett, 2000). However, there appears to be but one comprehensive study involving sports medicine and the relief of ailments and injuries suffered by athletes. Ryde (1964) successfully and effectively used hypnosis in the treatment of athletic injuries, such as tennis elbow, shin splints, and sprains, among other minor sports related conditions, such that he reportedly used only hypnosis and not conventional methods, unless it

was refused by the athlete. Ryde (as cited in Onestak, 1991) later conceded a more cautious approach, reporting that hypnosis had indeed been very effective in his practice with sport related minor injuries, but that more research of his technique's effectiveness was needed. Taylor et al. (1993) pointed out that many methodological problems in this research prohibit one from making any firm conclusions. Also, Morgan (2002) pointed out that in Ryde's work, there is no evidence shown to suggest that hypnosis is any more effective than placebo. It has been shown that placebos can be just as effective a treatment as morphine in anxious patients with moderate pain (Morgan, 1972).

Imagery

The positive effects of imagery in improving an athlete's performance have been well established by the research (Barabasz & Watkins, 2005; Feltz & Landers, 1983; Liggett, 2000; Murphy & Martin, 2002). Like enhancement of muscular strength and endurance, early research on the ability of hypnosis to improve imagery and visualization was equivocal. This was due largely to the lack of establishing sufficient hypnotic depth in many of the studies. However, as Taylor et al. (1993) stated, the latest increasing body of research points to hypnosis having the ability to enhance imagery. For example, much of the recent research has shown that hypnosis enhances imagery, is in turn effective in enhancing performance when combined with imagery, and in some studies, more so than if imagery is used alone (Barabasz & Watkins, 2005; Liggett, 2000; Liggett & Hamada, 1993; Lodato, 1990, 1991; McMaster, 1993; Robazza & Bortoli, 1994, 1995; Stanton, 1983; Taylor & Gerson, 1992; Ward, 1992). Research conducted by Barabasz and colleagues (McAleney, Barabasz, & Barabasz, 1990; Wagaman, Barabasz & Barabasz, 1991; Barabasz, Barabasz, & Bauman, 1993) has demonstrated that restricted environmental

stimulation therapy (REST) also improves performance when combined with imagery in several different sport environments.

It appears that hypnosis has the ability to increase the vividness and controllability of imagery by reducing the external and internal disturbances one faces, thus enabling the person to imagine performances skills the athlete has not yet mastered (Taylor & Gerson, 1992, Taylor et al., 1993). Hypnosis-induced imagery allows the athlete to mentally practice performances that cannot yet be accomplished physically, in a sense allowing the athlete to practice the performance. As Taylor et al. (1993) stated, the athlete can enhance motor learning in this method through low-level innervations that have been shown to occur in muscles during imagery.

Anxiety/Arousal/Relaxation

Anxiety has been operationally defined by sport psychologists as an emotionally negative state involving feelings of worry, nervousness, and apprehension as frequent characteristics that is also associated with physiological arousal of the person's body (Weinberg & Gould, 1999). The blend of psychological and physiological activity in a person which varies at different times on a continuum from intense excitement to sleep is known as arousal (Weinberg & Gould, 1999). Arousal, unlike anxiety, is not associated automatically with negative feelings, as a person may be aroused equally by either very bad or very good news. They are separate entities and a person may differ in their respective levels of each one. For example, an athlete may have a high level of physiological arousal in preparation for playing, but have little anxiety or worry about the event. The importance for sport psychologists, soon to be discussed, is that, for an athlete to perform at their best, neither arousal nor anxiety should be too high or too low.

Like the aforementioned effects of hypnosis involving pain relief, hypnosis has clearly been

shown to effectively reduce the state of debilitating anxiety of athletes prior to competition (Krenz, 1984; Naruse, 1965; Pressman, 1979; Wojcikiewicz & Orlick, 1987). A matter of small debate is the possibility that hypnosis, by reducing an athlete's level of anxiety, is, thereby, always enhancing the performance of that athlete. A problem with much of the empirical research involving the lowering of anxiety and arousal levels of participants, then testing for their concomitant improvement in a performance, is that the adjusting of these levels prior to a given task does not always lend itself well to a "cookie cutter" approach. Referring to the concept of the athlete's "Individual Zone of Optimal Functioning" (IZOF), which has been well established through research (Hanin, 1978, 2000; Morgan, 1993, 2002; Raglin, 1992), some of the respective athletes involved in such studies may not benefit from having a reduction in anxiety. Their IZOF, which can include both arousal and anxiety, prior to or during competition may need to be high in comparison to other participants. An example given by Vanek (1970) clearly illustrates the notion that an attempt to adjust an athlete's IZOF should be handled with caution and according to that individual's needs. He described a case in which an Olympic boxer was experiencing an anxiety attack prior to competition, the anxiety was relieved via a relaxation method, and the boxer consequently lost the match to a rival he had previously defeated on numerous occasions. Follow-up investigation later revealed that the boxer operated best in this panic induced state and that such occurrences prior to boxing matches were very common for him. Therefore, the lowering of his anxiety level adversely affected his performance, as may often occur in experimental studies in which every participant's relaxation level is increased, hence decreasing their anxiety prior to performance.

As Wojcikiewicz and Orlick (1987) stated in their study of hypnosis and its ability to increase performance by reducing anxiety, many of the previous studies, including their own,

that have investigated relaxation concepts, "suffered from the weakness of...non-individualized intervention" (p. 310). It appears that strategies are more effective when individualized intervention techniques are utilized and the wording of instructions during hypnotic suggestion is precise (Barabasz, 1990; Seabourne, Weinberg, Jackson, & Suinn, 1985; Spiegel & Barabasz, 1988). The correction of this error by subsequent studies may be the primary reason that much of the research (Garver, 1977; Marcuse, 1965**;** Robazza & Bortoli, 1994, 1995) and reviews on the literature of hypnosis and controlling anxiety and/or arousal levels in sport psychology (Jacobs & Gotthelf, 1986; Krenz, 1986; Morgan, 1993, 2002; Taylor et al., 1993) is stated as having the ability to enhance the performance of athletes. This may also be the reason why relaxation techniques, with or without hypnosis, are often integrated into mental training packages (Patrick & Hrycaiko, 1998; Thelwell & Greenlees, 2001).

Concentration

Of interest to researchers studying hypnosis and performance enhancement is concentration or increased focus. This is an especially effective skill for an athlete performing with a multitude of distracters present (Barabasz & Watkins, 2005). It appears to be a by-product of obtaining optimal levels of arousal together with the increased vividness and control of imagery. Limited research in this area has shown hypnosis to be successful in increasing an athlete's ability to focus or concentrate (Robazza & Bortoli, 1994, 1995; Schreiber, 1991), by possibly reducing the external and internal disturbances faced while using imagery (Taylor & Gerson, 1992**)** or performing. The paucity of research in the area of hypnosis and concentration is likely due to the questions that remain unanswered. As Liggett (2000) states, the appropriate breadth of focus is not the same in every sport, is not the same at all times within a sport, and like arousal levels, the optimal focus level likely differs between players. This means that any interventions involved

with athletes will need to be highly individualized, a notion that was only recently discovered.

Self-confidence, Self-concept, Self-efficacy

Self-confidence is an oft overlooked component of research and reviews involving hypnosis and sport psychology. For some studies, self-confidence appeared to be increased by hypnosis or was a major by-product where hypnosis was used for performance enhancement (Garver, 1977; Howard & Reardon, 1986; Liggett, 2000; McMaster, 1993; Stanton, 1983). A review of the literature involving self-efficacy by Gould, Hodge, Peterson, and Giannini (1989), found that positive relationships generally exist between an athlete's self-efficacy and motor performance, and that more successful athletes exhibit a higher amount than do less successful ones. It is clear to researchers, and those that participate in sport and exercise, that self-confidence plays a major role in the performance and sport arena. The role of self-confidence is even more relevant when one considers, as Fitts states (as cited in Howard & Reardon, 1986), that when two competing individuals are equal in physical ability, the one with higher self-concept will perform better. Howard and Reardon (1986) defined self-concept as, "an organizing superstructure giving impetus and direction to our affective, physiological, and behavioral functioning" (p. 249), and were able to enhance it considerably by using a combination of cognitive restructuring techniques and hypnosis. Other researchers have discussed the increases in the self-confidence of their participants as a by-product of the research conducted in enhancing visualization (McMaster, 1993), arousal level (Garver, 1977), and visualization and age regression (Stanton, 1983). The common goals of hypnosis and performance enhancement that include, among others, emphasizing improvements in techniques through visualization, reducing feelings of anxiety, and using imagery to visualize performance success are common methods to increase self-efficacy (Gould, et al., 1986). Also, as Liggett (2000) states, it is generally acceptable to

include suggestions about self-confidence when working with athletes on other problems.

Age regression

Heightened recall associated with the hypnotic state has been used to analyze errors in sport techniques, such as sprinting in track and a batter's swing in baseball, and through age regression techniques, retrieve repressed material (Onestak, 1991). Other researchers, as will be detailed in later sections, have used age regression to relive an earlier success and optimal performance (Pates, Cummings, et al., 2002; Pates & Maynard, 2000; Pates, Maynard, et al., 2001; Pates, Oliver, et al., 2001). Regardless of the method, hypnosis can be an effective adjunct to normal information gathering for the athlete, especially those that are not consciously aware of why their performance is poor (Wolberg as cited in Taylor et al., 1993). Oft cited cases of hypnotic age regression involve Johnson (1961 a,b) reporting successful treatments utilizing hypnosis to detect errors in technique of a professional baseball player's hitting, previously unattainable without the hypnotic trance, and uncovering previously repressed material that was negatively affecting the performance of a professional pitcher.

Flow

There are many areas within sport psychology and performance enhancement that have been explored in depth, including goal setting, concentration skills, and optimum arousal levels. Thoroughly researched, these techniques are applied by sports psychologists to assist athletes in attaining the very difficult goal of flow.

Csikszentmihalyi (1975, 2000) initially introduced the concept of flow as it pertained to enjoyment in a variety of areas of life. The state of flow was defined as a very enjoyable psychological state, in which an individual experienced a holistic sensation when acting with total involvement in a number of given activities (Csikszentmihalyi, 1975, 2000). The activities

could be playing an instrument, gardening, or painting. A critical precursor for obtaining flow was that there must be a perceived balance between the challenge of the activity and the person's skill in that activity (Csikszentmihalyi, 1975, 1990, 2000). An objective or realistic balance between challenge and skill need not exist. As long as the participant at least perceives there to be balance, flow will likely occur (Csikszentmihalyi, 1990). This balance of challenge and skill was also the primary dimension that Csikszentmihalyi relied upon to measure the occurrence of flow (Csikszentmihalyi & Csikszentmihalyi, 1988; Jackson & Eklund, 2002). Flow is also a state of such focused concentration amounting to absolute absorption in a given activity that it inherently creates a state of mind where optimal performances are capable of occurring (Csikszentmihalyi, 1990; Jackson et al., 2001). Jackson (2000) described flow as everything being optimal, where the mind and body are in harmony, negative thinking and self-doubts are absent, and functioning is enhanced.

Flow can occur in a number of different settings and, since the development of the concept, has been explored in a variety of ways. The psychological literature contains research from different areas including work and leisure (Csikszentmihalyi, 1975, 2000; Wells, 1988) education (Carli, Delle Fave, & Massimini, 1988; Larson, 1988; Nakamura, 1988), everyday life (Moneta & Csikszentmihalyi, 1996) mental health (Massimini, Csikszentmihalyi, & Carli, 1987) and creative achievement (Csikszentmihalyi, 1988b).

However, though the concept of flow has been in existence for almost thirty years, very little research had been conducted utilizing flow in sport until the early 1990's. The majority of Csikszentmihalyi's (1975, 2000) original theory of flow was developed from his research conducted with athletic events, like rock climbing and basketball, as well as playing chess, dancing, surgery, and artistic contexts such as painting and music (Csikszentmihalyi, 1975, 1992,

2000). Indeed, Csikszentmihalyi's original work in flow developed from these activities consisted of nine dimensions. They include a perceived balance between challenge and skill, a merging of action and actor, the presence of clear goals, the presence of unambiguous feedback, total concentration and complete focus, a total sense of control, a loss of self-consciousness, a transformation of time, and an autotelic experience. These dimensions are referred to and defined in more detail in following paragraphs.

In addition, Csikszentmihalyi (1990) argued that certain environments, like that of sport, are more likely to produce flow, and certain personal characteristics may help certain people achieve flow more easily and more often. Since flow is associated with high levels of performance and a very positive experience, it is surprising that more research had not been undertaken sooner. With the application of flow and sport as a backdrop, much of the recent research surrounding flow has focused upon discerning the athlete's psychological antecedents that will make flow attainment possible. In this regard, Csikszentmihalyi (1992) applauded efforts to return the focus of flow to the athletic environment.

Antecedents to flow

Presenting a challenge to practitioners and researchers is how one achieves what many athletes and coaches consider an elusive, yet highly sought after state in sport. Research has been conducted to discern if there are identifiable psychological characteristics or antecedents which may cause or lead to flow in athletes. Jackson's (1992) qualitative investigation with 16 former elite United States National Champion Figure Skaters was one of the first endeavors to ascertain the factors perceived as important for athletes attaining flow in sport, factors that prevent flow from occurring, and factors that disrupt flow once attained. The volunteer participants were nine females and seven males that had competed at the international level, with seven earning medals

at either World Championships or the Olympics. Due to the study's representation of elite level athletes, with many years of experience, this sample offered a rich data source on flow states.

Participants were interviewed about an optimal skating experience then questioned extensively about factors associated with achieving optimal or flow states during a performance. In addition, a questionnaire to assess flow was utilized to provide a means of measuring the degree of importance for each component of flow for the skaters. A limitation of the study was that, though a coefficient alpha of .75 was obtained for this questionnaire, it was determined on a very small sample. Also, only one sport was utilized, thus making it difficult to extrapolate the findings of such an elite pool to other non-elite and less experienced athletes and to other sports as well. Findings of this study are discussed below.

As a follow-up study, Jackson (1995) furthered the research by attempting to address some limitations from previous investigations. This extension of research was done by studying the factors that influence the occurrence of flow state in 28 elite athletes from seven different sports. Similar to earlier research, Jackson (1995) hoped to discover if factors that facilitate, prevent, or disrupt athletes in achieving the state of flow in figure skating also pertain to other sporting environments. Volunteers from track and field, rowing, swimming, cycling, triathlons, rugby, and field hockey were interviewed. Following this, inductive content analyses of the responses were used from the 14 female and 14 male participants to determine factors influencing flow.

Both studies found that nine factors influenced the occurrence of flow. They are as follows: pre-competitive and competitive plans and preparation, confidence and positive attitude, optimal physical preparation and readiness, achieving optimal arousal levels before competition, motivation to perform, the performance feeling good, focus, optimal environmental and

situational conditions, positive team play and interaction, and an experience factor (Jackson, 1992, 1995).

Extending these studies, qualitative research (Russell, 2001) conducted with forty-two collegiate athletes representing five team sports and four individual sports found the same antecedents as the Jackson (1992, 1995) studies. However, the Russell study also used quantitative analysis from the Flow State Scale (FSS) developed by Jackson and Marsh (1996). Russell (2001) used the FSS which showed that college athletes appear to have similar experiences of flow states, regardless of gender or individual or team sport type.

The FSS itself was developed and validated by Jackson and Marsh (1996) to measure state characteristics of flow in sport and physical activity settings. The nine dimensions of flow presented by Csikszentmihalyi (1990) were represented in the nine scales of the 36-item questionnaire. The items were developed based upon past investigations with flow from both within and outside the sport setting. The FSS scales also derived from qualitative analysis of interviews with elite athletes in a variety of sports and from quantitative analyses conducted as part of the Jackson and Marsh study. Participants for this study were 394 athletes from the United States (N = 244) and Australia (N = 150), representing 38 total nationalities, and varying in age from 14 to 50. A total of 41 different sports and physical activities were represented, including basketball, track and field, field hockey, hiking, aerobics, and jogging. The participants had been involved in their chosen sport or activity from 1 to 37 years (M = 9.7 years) with 71% participating in their event for over five years.

The study found good support for the underlying theoretical and conceptual structure of the flow construct. Evidence from a confirmatory factor analysis found high indexes of goodness of fit (NNFIs of .904). The nine dimensions displayed high intercorrelations and factor loadings,

suggesting clear and distinct dimensions measuring the unitary construct of flow.

There were several limitations to the study. A retrospective approach was taken to the study, in which participants were asked to respond to the questionnaire based upon a previous flow experience that stood out for them. This may have been more useful than asking the participants to complete the FSS immediately after an event in which they may or may not have experienced flow. However, the researchers are then relying on the participants to recall events that, given the average number of years of involvement in their respective sport or activity, may have occurred many years ago. Some of the participants had only been participating in their respective sports or activities for one year, which means their exposure to flow, and thus possibly their ability to adequately answer the questionnaire based from past personal experience, may have been severely restricted. The FSS was also designed to be given to a person immediately after a performance to assess the flow state characteristics of that performance, but was never done during this study.

Subsequent research utilizing the FSS has shown that the instrument displays acceptable internal consistency, with estimates of the nine subscales using Cronbach's alpha showing all coefficients to be greater than .70 ($p < 0.01$), with the exception of transformation of time (0.65) (Vlachopoulos, Karageorghis, & Terry, 2000). The relatively low factor loadings on transformation of time items resulted in a low internal consistency, which suggests questionable items.

Due to the difficulties of the original version of the FSS and the measurement of some of the flow dimensions, such as loss of self-consciousness and the transformation of time, item modifications were made and researched in a two-part study that developed the FSS – 2 (Jackson & Eklund, 2002). The FSS – 2 was the same as the FSS in design and in a majority of the 36

questions. The researchers, attempting to assess the usefulness of a few new items for the FSS – 2, made changes to one question from the loss of self-consciousness scale and two items from the time transformation scale. A total of five new items were designed and researched in the 2002 study.

The first part of the study used 391 participants, ranging in age from 17 to 72 years. For eligibility, the participants had to partake in a physical activity on a regular basis for at least twice a week. The activities were varied and ranged from highly competitive sports, such as rugby, track and field, and swimming, to exercise activities, such as weight training and touch football. The FSS – 2 was given to participants to complete after completing their main event. Some questionnaires were distributed and completed immediately after an event and some were given to the participants to take with them to their activity for them to complete after their event. The average time elapsed from completion of the event to completion of the questionnaire was 24.6 minutes.

Part two of the study, designed to cross validate the results from part one to ensure that the results were not sample-specific, consisted of 422 participants who ranged in age from 16 to 82 years. The eligibility requirements were the same as part one, as were the types of activities in which the participants were involved. The FSS – 2 was either distributed and completed immediately after an event or given to the participants to take with them to their activity for them to complete after their event. The average elapsed time from completion of the event to completion of the questionnaire was 24.8 minutes.

From these two subsequent studies investigating the FSS – 2, Jackson and Eklund (2002) reported similar findings to that of the FSS, providing further evidence of the robustness of the

Flow State Scale – 2… (i.e., strong support for both a 9-first order factor model and a higher order model with a global flow factor).

Among the limitations of the two-part study was the fact that the researchers ultimately had no control over when many participants actually completed the questionnaire. The questionnaire was also given to participants after completing an activity in which they may not have experienced a state of flow, and then promptly asked the participants to respond to their just-completed flow experience. Establishing whether participants in a wide range of physical activities experienced flow or not prior to having them complete the questionnaire, then statistically examining their results may be best suited for determining if the FSS – 2 measures what the researchers hope it measures, or more specifically, the nine characteristics of flow.

While these studies demonstrate what athletes perceive to be helpful in achieving a flow state, they are primarily qualitative in nature and lack empirical evidence of antecedents. The limited empirical investigations conducted on psychological correlates of flow attainment demonstrate the youth of this field and research. Empirical research of psychological correlates facilitating flow show equivocal results.

In a study designed to examine the possible psychological correlates of flow, Jackson, Kimiecik, Ford, and Marsh (1998) had older (over age 25) athletes (N = 213) complete dispositional questionnaires prior to competing at an international sport competition. The masters level competitors first completed, among others, the Sport Motivation Scale (SMS) developed by Pelletier et al., (1995). This is a questionnaire designed to assess the athlete's intrinsic or extrinsic motivation level, similar to the autotelic dimension of flow. Following results of previous research (Jackson, 1995; Jackson & Roberts, 1992), participants were next asked to rate their perceived sport ability on two, 10-point Likert questions. One measured ability from a

normative perspective, while the other evaluated ability from a personal perspective. The two items were significantly correlated (r = .77) and the average of the two was taken as a measure of the participants' perceived sport ability. The Sport Anxiety Scale (SAS), developed by Smith, Smoll, and Schutz (1990), assessed concentration disruption, somatic anxiety, and worry. Finally, the Trait Flow Scale (TFS), based upon the nine dimensions of flow espoused by Csikszentmihalyi and Jackson (1999), was given to assess the overall frequency in which athletes perceived flow experiences during their sport. The trait focused TFS scale was developed by Jackson and Marsh (1996) and was based on the FSS, which focuses on state measures.

After these assessments were completed, the participants were then asked to complete three more measures as soon after their competition as possible. These included two 11-point Likert scale questions designed to rate how challenging the event was for them and how skilled they were in the event, derived from the Experience Sampling Form by Csikszentmihalyi and Larson (1987). They also asked the participants to complete two 11-point Likert scale questions to determine their perceived success in the event they just completed. Finally, the participants completed the FSS, to determine the degree of flow experienced during the last event in which they participated.

The results showed that perceived ability seems to be crucial for facilitating flow states, a finding that supports previous research (Jackson, 1995; Jackson & Roberts, 1992). The authors hypothesized that those who believe in their abilities are more likely to experience a balance between challenge and skills more often and thus meet a requirement for attaining flow. The study also showed a negative relationship between anxiety and flow, as Csikszentmihalyi's (1975, 2000) flow model and qualitative research by Jackson (1992, 1995) would suggest. Thus, anxiety is counterproductive to flow states and optimal experiences. Similar to the autotelic

aspect of Csikszentmihalyi's (1975, 2000) dimensions of flow, this study also discerned that intrinsic motivation, the engaging in an activity because of the pleasure associated with the activity itself, was also a statistically significant psychological correlate.

There were limitations to this study. The sample of participants was limited to older athletes (over age 25), and the researchers had no control over when the athletes actually took the state assessments after their competition. Furthermore, the instruments used to assess the athlete's perceived sport ability, success, challenge of the event, and skill involved may not have been robust enough or psychometrically sound to accurately measure this information. Also, from a cognitive standpoint, a respondent will likely have a difficult time processing a 10- or 11- point anchored Likert scale. The researchers also acknowledged that the concept of flow does not lend itself well to empirical testing, and that a variety of methods, quantitative and qualitative, are necessary to continue the advancement of knowledge in the attainment of flow (Jackson, Kimiecik, Ford, & Marsh, 1998).

A study by Stein, Kimiecik, Daniels, and Jackson (1995) also attempted to discern psychological antecedents of flow. Focusing on recreational athletes in a tennis tournament, a college activity course in basketball, and older-adult golfers of average ability, this three part study investigated three potential antecedents to flow, such as goals, competence, and confidence. Results showed that there was no relationship between a high level of competence of participants and the existence of stated goals to the state of flow. The lone significant finding suggested that a high level of confidence had only a weak relationship to the participants experiencing flow. However, the study also demonstrated that optimal experience and flow does occur for recreational participants.

Limitations of this study may have negatively influenced the results. For one, the researchers

utilized the Experience Sampling Method (ESM) procedure for obtaining data. The ESM, which is designed to randomly assesses a person's subjective experience while they are actively involved in the activity or environment, was originally developed by Larson and Csikszentmihalyi (1983) to periodically assess for flow in everyday life. Therefore, it involved interrupting the activity of the participants to fill out a questionnaire concerning their thoughts and feelings, possibly disrupting flow. The golf portion design of the study also eliminated the randomness aspect of the ESM, as the participants new beforehand when they were to be assessed. This study also addressed the need for better techniques in obtaining pertinent information for flow antecedents (Stein et al., 1995).

Prevention, disruption, controllability of flow

As alluded to earlier, while attempting to discern the psychological antecedents that would improve one's chances of achieving flow, researchers were also exploring concepts that prevent athletes from attaining flow or that may disrupt flow once it occurs. In Jackson's (1992, 1995) aforementioned qualitative study with 28 elite athletes in seven different sports, the characteristics or situations that prevented flow were studied. Also, once in flow, the factors that disrupt athletes enough to lose this state were investigated as well. From her interviews, it was found that nine dimensions prevent flow, including: non-optimal physical preparation and readiness, non-optimal environmental and situational conditions, lacking confidence or a negative attitude, inappropriate focus, problems with pre-competitive preparation, a lack of motivation, non-optimal arousal level, negative team play and interaction, and performance going poorly.

The six characteristics that disrupt flow are similar to the aforementioned factors. They include: problems with environmental and situational conditions, problems with physical

readiness or physical state, problems with team performance or interactions, inappropriate focus, performance errors or problems, and doubting or placing pressure on oneself (Jackson, 1992, 1995).

Though there were a few minor differences found in the study concerning factors that prevent or disrupt flow from occurring within collegiate athletes, Russell (2001) primarily discovered similarities with the previous findings related to flow. While a majority of the research has been conducted on what components will facilitate the attainment of flow, the information about what prevents and disrupts it is also very pertinent to this study. It is not only necessary to be familiar with that which can facilitate an athlete's chance of attaining flow, for they may in fact all be present. If, however, several of the factors which inhibit or disrupt flow are present as well, the chances of attaining flow will be considerably diminished, as supported by previous studies (Jackson 1992, 1995; Russell, 2001).

Research has also been conducted on athletes' and their perceived ability to control the attainment of this goal during practice or competition. In Jackson's (1995) study with elite athletes in seven sports, it was reported that 79% of the athletes perceived flow to be a controllable state, while 21% said that it was an occurrence that just happened. Yet, in Jackson's (1992) study of elite figure skaters, 81% said they did not experience flow very often, thus demonstrating its elusiveness. One reason hypothesized by Jackson for this high number was that the athletes only reported their personal best performances, and did not include other performances that included flow in a lesser extent or intensity. Indeed, flow experiences are said to occur on a continuum of intensity, from relatively minor occurrences, micro-flow, to the peak experiences of amazing human accomplishments, macro-flow, that occur less often (Csikszentmihalyi, 1975, 2000; Jackson, 1992, 2000). In Russell's (2001) qualitative study with

less elite collegiate participants, he reported the percentage of athletes indicating flow as a controllable state was only 64%. The difference between the results of these studies may be explained by the higher skill levels elite athletes have, perhaps allowing them to enter and experience flow states more often (Jackson, 1995).

Flow in Sport – Similarities with Hypnosis

In addition to the primary rule of a perceived skill and challenge balance, Csikszentmihalyi (1975, 2000) described eight other dimensions or characteristics common with being in the state of flow. Subsequent qualitative and quantitative research, some involving sport, has supported these dimensions (Jackson, 1996, 2000; Jackson & Marsh, 1996). Jackson (1996) conducted an in-depth qualitative investigation with the primary purpose being to examine if Csikszentmihalyi's (1990) model of flow was applicable to elite level athletes' experiences (Jackson, 1996). Participants were from seven separate disciplines of sport, which included track and field, rowing, swimming, cycling, triathlon, rugby, and field hockey. This study operationally defined elite level as participation at an international level in the person's chosen sport. Additionally, all 28 athletes involved in the study had at least finished with a top ten placement in international competition. Four athletes from each sport were interviewed about their perceptions of flow during performances of their sport.

The participants were initially asked to describe an experience while participating in their events that stood out as being above average, such as an experience that was very rewarding and in which they were totally absorbed. An additional tool used was to read three quotes illustrating flow, to help the athletes understand what was being asked for or react to as a comparison to their own experience. After this initial discussion, athletes were next asked a series of questions about flow. Questions specifically included what the most distinguishing characteristics of the

experience were and what the athlete was most aware of during the state of flow.

Analysis of the 295 responses to questions about what athletes experienced during a very rewarding event in which they were totally absorbed revealed a high degree of association with Csikszentmihalyi's (1990) theory of flow. Thus, this study supported that the optimal state of flow, with its nine dimensions, is experienced by elite athletes (Jackson, 1996). Based upon Jackson's (1996) research, in combination with Csikszentmihalyi's (1990) psychological research on flow, the nine dimensions found to relate to athletes experiences with this state are as follows: a perceived balance between challenge and skill, a merging of action and actor, the presence of clear goals, the presence of unambiguous feedback, total concentration and complete focus, a total sense of control, a loss of self-consciousness, a transformation of time, and an autotelic experience. The definitions of these are described in detail below.

Similar to the dimensions in the state of flow is a concept in sport psychology developed by Unestahl (1979, 1983, 1986, 1995) and known as the Ideal Performance State (IPS). IPS is partially defined as when an athlete performs at their best and partially through its similar characteristics with the state of hypnosis. The IPS is described by Unestahl (1979, 1983) as having many striking similarities to the hypnotic state. They include having an altered state of consciousness similar to hypnosis, an increase of focus and concentration on task-relevant stimuli, a dissociated state from everything but the task-relevant stimuli, sometimes having amnesia of the past events, and changes in perception such as time slowing down, nonexistence of pain and an effortlessness in actions (Unestahl, 1979, 1983).

The following paragraphs describe in detail the nine dimensions of flow in sport as outlined by the psychological literature on flow, and by studies conducted with flow in the sport environment. In addition, concepts that are similar to both flow and the dissociative aspects of

hypnosis are also elaborated upon, as set forth by Unestahl (1979, 1983). Hypnosis effects are described using Hilgard's neodissocation theory (Hilgard, 1992, 1994).

Challenge and skill balance

Tantamount for flow to occur is the balance between challenge and skill that must be perceived by the individual. It is argued that both must be at high levels, with the challenges coming in a variety of forms, including technical, mental, and physical (Csikszentmihalyi & Csikszentmihalyi, 1988; Jackson & Csikszentmihalyi, 1999). Jackson and Csikszentmihalyi (1999) stress that what a person believes their skills are ultimately determines their experience more than will their actual abilities. If the challenges are perceived to be greater than the skills one has, anxiety will occur and prevent the person from attaining flow. Likewise, if one's perceived level of skill is higher than the challenge at hand, boredom will ensue, once again preventing flow. When the person's perceived challenges and skills are matched, yet less than that person's average experiences, then apathy is said to occur (Csikszentmihalyi, 1990). As Kimiecik and Jackson (2002) state, the quality of experience is typically most optimal in flow, less than optimal in boredom and anxiety, and least optimal in apathy.

However, there is research that has shown the condition in which skills are above average and challenge below average, a condition supposed to produce boredom, does not produce boredom. In one component of a three part study investigating the psychological antecedents of flow in recreational sport, 17 male golfers were used as participants (Stein et al., 1995). The players were an average age of 65, had been playing for 33 years, and played three to four days per week. The participants answered a brief quantitative questionnaire immediately after playing a demarcated hole of golf that measured, among other concepts, the challenges, their skills, and enjoyment and satisfaction for that particular hole. The participants completed this routine once

during the first nine holes of a total of eighteen and once on the last nine holes, thus twice per round of golf. The participants provided their thoughts and feelings after a total of 208 holes played.

The study found that the participants' quality of experience when the perceived skill level was viewed as greater than the challenge was equal to that when conditions were right for flow to occur. In this specific example, the golfers often participated in good-natured competition that involved small bets per hole and per round, bragging rights for the day, and positive social comparison among playing partners. Hence, having skills greater than the challenge of a hole could potentially create a low score, enjoyment, and money. It was thus hypothesized that situations where skills outweigh challenges are enjoyable during competition because good performance is practically guaranteed (Stein, et al., 1995). Similar results were found in Moneta and Csikszentmihalyi's (1996) study in the perceived challenges and skills on the quality of subjective experience. They also found that high skill/low challenge situations were found to be as optimal for the participant, if not more so as high skill/high challenge situations (Moneta & Csikszentmihalyi, 1996). Clearly more research is needed in this area. However, despite the equivocal findings showing differences between skill and balance, all of the studies supported the need for a high perceived skill.

Action and actor merge

The second dimension of flow is the merging of action and actor, where the person simply becomes one with the activity and everything becomes automatic (Csikszentmihalyi, 1990; Kimiecik & Jackson, 2002). In theory, the person is so focused that they cease to be aware of themselves as separate from the action and a feeling of oneness with the action ensues. For athletes, the predominant feeling is one of automaticity and unity with the environment, where

movements and actions are effortless and spontaneous. This unified consciousness, perhaps one of the most telling aspects of flow as shown by its frequent mention by athletes in studies, is one reason for the development of the term "flow" (Jackson, 2000; Jackson & Csikszentmihalyi, 1999). Athletes often report they are floating or flowing, and that they feel a sense of lightness and ease of movement as they experience the changed perceptions of their body in space (Jackson & Csikszentmihalyi, 1999). Noteworthy is the ease in which an event is accomplished, even for those participating in grueling, stamina driven events where experiencing pain is typical. Yet, athletes describe moments when they are able to ignore the pain or turn it into ecstasy during flow (Jackson & Csikszentmihalyi, 1999). Similar to this ability of increasing pain tolerance during flow, the success of hypnosis in alleviating pain in participants has been addressed here and is well documented in the literature (for a review, see Hilgard & Hilgard, 1983). The Hilgards (as cited in Barabasz & Watkins, 2005) state that the pain may be recorded at the covert or unconscious level, but the person does not feel pain at the overt or conscious level. From a neodissociation perspective, the pain stimuli may only be perceived by the dissociated part of the executive ego, the part unavailable to the person's consciousness. The executive ego could also dissociate that subsystem containing pain, placing it in a latent stage.

Clear goals and unambiguous feedback

Frequently discussed concurrently are the separate concepts of clear goals and unambiguous feedback, as the former allows the latter to be possible (Csikszentmihalyi, 1990; Jackson, 2000). Goal setting, an important aspect of psychological skills training technique, provides one with active direction and helps provide focus (Jackson & Csikszentmihalyi, 1999). As Jackson (2000) described it, during flow there is clarity about what needs to be accomplished by awareness of the right actions. The unambiguous, immediate feedback of one's successful actions are seen,

which, in turn, provide a clear idea of the next actions that are necessary. This creates an unending cycle of specific goals and clear feedback, which is easily provided in sport as an athlete can immediately discern if their goals are being met through a number of potential sources of feedback (Jackson & Csikszentmihalyi, 1999). The goals may be either predetermined or developed while engaging in an activity and better allow the person to become totally immersed or engaged in the activity (Kimiecik & Jackson, 2002).

Concentration/Focus

Next, a total concentration and complete focus on the task at hand is often perceived as the clearest indication of being in flow, and is mentioned most often by athletes (Jackson, 2000; Jackson & Csikszentmihalyi, 1999; Kimiecik & Jackson, 2002). Total absorption on the activity is allowed to happen by clear goals, clear feedback, and challenges and skills being heightened and balanced (Csikszentmihalyi, 1997; Jackson & Csikszentmihalyi, 1999). All distractions become nonexistent or are kept to a minimum, with only a select range of information that is pertinent to the activity being permitted into an athlete's awareness. This is not to say that focus must be narrow. As Liggett (2000) pointed out, the appropriate breadth of focus is not the same in every sport, is not the same at all times within a sport, and the optimal focus level likely differs between players. For example, as Jackson and Csikszentmihalyi (1999) stated, many athletic events, such as basketball, hockey, and middle-distance track races require that the person be hyper-aware of where competitors and teammates are. The athlete can include this in the realm of focus while remaining aware of the big picture while in flow. It is normally difficult, especially for athletes during competitions, to sustain this type of concentration for long periods of time; however flow allows this to occur with effortlessness (Jackson, 2000).

Hypnosis is a state sometimes defined as an increase in concentration (Unestahl, 1979). It is

also a widely held belief that during the state of hypnosis, the participant's attention is reduced and concentrated or focused upon a narrow range of stimuli, such as the hypnotist's voice or a feeling in some part of their body (Shor, 1959). The focus of attention narrows from the broad area typically found in the waking state. As Kihlstrom (1985) pointed out, the mere induction of hypnosis typically emphasizes the focusing of attention. Aforementioned research has shown that hypnosis can increase an athlete's ability to focus, and has prevented stimuli from producing electrophysiological responses in others due to the increase in focusing ability (Robazza & Bortoli, 1994, 1995; Schreiber, 1991; Spiegel et al., as cited in Taylor et al., 1993). From a neodissociation perspective, the executive ego or central control structure may relax, thus allowing the subsystem of focus to be actuated by the hypnotist's suggestion. The subsystems involving other more broad ranges of attention are left as latent subsystems.

Sense of control

Another domain of flow is that of the overwhelming sense of control one has during a performance or the ability to exercise control especially in difficult situations (Csikszentmihalyi, 1990; Jackson, 2000). This is also said to occur without the worry of losing control or the fear of failure. Often, difficult situations faced by downhill skiers descending mountains at life-threatening speeds or race car drivers risking wrecks that could literally kill them, are undertaken with an ease that belies the actual difficulty of the task they are performing. Athletes often refer to having the ability to do no wrong. This empowerment is overwhelming, which in turn releases a sense of power, confidence, and calm (Jackson & Csikszentmihalyi, 1999).

Loss of self-consciousness

The loss of self-consciousness dimension that occurs during flow is defined as a transcendence of ego, where the performer no longer worries about how they are perceived by

others (Jackson, 2000; Kimiecik & Jackson, 2002). No self-consciousness exists, resulting in the athlete feeling one with the environment. Because there is no room for self-concern or self-doubt, the person can be completely absorbed by the activity (Jackson & Csikszentmihalyi, 1999). This state does not imply a loss of awareness, as awareness is actually heightened through increase in concentration. Some athletes allude to this component as doing things instinctively or naturally (Jackson & Csikszentmihalyi, 1999). This is, however, one component of flow that has not fared as well as others during research. Qualitative studies showed that the loss of self-consciousness was not as universally endorsed as the other components (Jackson, 1992, 1996), while quantitative research also failed to show that it related well with the other components (Jackson & Marsh, 1996; Kowal & Fortier, 1999; Vlachopoulos & Karageorghis, 2000).

Unestahl (1979) described this dimension in hypnosis as the other side of increased concentration, in which dissociation or inattentiveness occurs for stimuli outside of the narrow focus of the hypnotized person. Neodissociation theory holds that one loses self-consciousness during hypnosis due to a cognitive subsystem carrying out a habitual action sequence. Simultaneously, the executive ego has limited involvement with the subsystem, for the task is indirectly self-monitored once it is activated. Jackson (2000) stated that while in flow, the athlete's evaluative ego recedes. This may occur as a process of the monitoring function becoming relaxed while in the altered state of flow, much like hypnosis. During the waking state, this is similar to arriving at a habitual location in one's automobile and not remembering the process of navigating.

Hilgard discussed lapses in consciousness in the activation of well-learned habits, such as driving a car or playing an instrument, as a type of dissociation. This concept is also important for the athlete. The activation of habitual cognitions and movements are important and

commonplace in skills involved with sports. Any conscious thoughts allowed to enter the mind will disturb and decrease results (Unestahl, 1973). For example, it would be detrimental for a hitter in fast-pitch softball to think about the mechanics of her swing while the pitch is coming. The fraction of a second the hitter has to decide will not allow it. The swing must be a finely tuned, well practiced motor skill already, thus allowing the hitter to focus solely on the softball, and permitting the swing motion to come instinctively. The hitter must lose self-consciousness regarding all other matters in order to be successful. A different type of event, long distance running, is also discussed as having a common occurrence of loosing self-consciousness, albeit not due to time limited decision making (Callen, 1983).

Time transformation

The transformation of time, often a controversial domain of flow, involves a loss of sense of the normal passage of time, in either direction (Jackson, 2000). During qualitative research in which athletes were interviewed by Jackson (1992, 1996), and in other quantitative research (Jackson & Marsh, 1996), this dimension could either speed up for the athlete or, interestingly enough, slow down for others. However, these studies could not discern a universal endorsement of this transformation as this particular concept of flow was the least mentioned. Meanwhile, quantitative research showed that time transformation did not relate well to the previously discussed flow dimensions either (Brewer et al., 1991; Kowal & Fortier, 1999; Vlachopoulos & Karageorghis, 2000). Csikszentmihalyi (1990) did say that time transformation may not always occur in flow, especially given that many events like surgery and especially athletic competition, require that participants maintain a constant awareness and management of time paramount to their success. This would make the dimension of time transformation very difficult for a person in flow to experience. The equivocal nature of research involving time transformation and loss of

self-consciousness does not necessarily mean they are irrelevant. Results by studies may simply show that these components are less important to some sport participants than others of the flow dimensions (Jackson & Marsh, 1996). Whether this is due to the importance of time management of some events or the necessity to be self-conscious and aware of one's body and its position in other events has yet to be determined. Further research in time transformation and loss of self-consciousness dimension is necessary before any conclusions may be drawn.

Fairly common to hypnotic states is the alteration of time. Many who experience hypnosis perceive that time passes rather quickly while they are in this state. Similar to the concept of a loss of time by hypnotized people is that of the temporary loss of memory, or amnesia. In this context, amnesia is defined as the person's failure to remember events that occurred while hypnotized, following a suggestion of this nature, and sometimes without a suggestion necessary. Hilgard (1994) discusses the commonplace occurrence of people forgetting some of the details of what happened during hypnosis, after they were given the suggestion that they would experience amnesia upon returning to a non-hypnotized state. In a study conducted with college students, approximately 25% displayed amnesia in response to suggested material while in a hypnotic state (Kirsch, Silva, Comey, & Reed as cited in Kirsch & Lynn, 1998). Unestahl (1979) stated that this is similar to what happens with athletes after an optimal performance, in that many forget aspects of the performance. Neodissociation theory approaches this phenomenon as some of the material being recorded in the memory subsystem, yet not available to the person's conscious part of the executive ego for recall (Hilgard, 1994). This is similar to the process that occurs during the tolerance of pain by the hypnotized person.

Autotelic experience

The last important component of flow is that of the autotelic experience, which is defined as

an activity that is done for its own sake because it provides its own reward of intrinsic enjoyment (Csikszentmihalyi, 1975, 2000; Jackson & Csikszentmihalyi, 1999). This dimension is the end product of those previously mentioned, for when all the positives emerge, the result is an experience that is very enjoyable and intrinsically rewarding (Csikszentmihalyi, 1990; Jackson, 2000). Flow is an experience that is such a positive subjective state that the person, in theory, desires to perform the activity again and again (Kimiecik & Jackson, 2002). This feeling also is described by athletes as feeling no pain, feeling strong, enjoying the effort, and having an endless supply of energy (Jackson & Csikszentmihalyi, 1999).

The aforementioned nine dimensions are important characteristics of the flow state. They are also concepts that can be manipulated by athletes, coaches and sport psychologists such that the athlete's chances of experiencing flow, or setting the stage for flow to occur, are improved (Jackson & Csikszentmihalyi, 1999). As previously mentioned, the environment of sport is likely to produce flow, and certain characteristics may help athletes achieve flow more easily and more often (Csikszentmihalyi, 1990). Even though psychological antecedents have been supported to set the stage for flow to occur, no characteristics have demonstrated the ability to allow athletes opportunities to control the occurrence of flow.

Hypnosis and Flow Research – Preliminary studies

Research combining any form of hypnosis with facilitating and controlling flow or optimal experience is sparse. Grove and Lewis (1996) investigated hypnotic susceptibility, prior experience, and heart rate as possible correlates to flow-like states during noncompetitive exercise over a period of six weeks. Participants (N = 96) were volunteers from circuit training classes at a university gymnasium. The sample consisted of 30 men and 66 women, with 55% of the participants having taken part in regular circuit training for more than six months, thus

making this the group with prior experience. To measure hypnotic susceptibility at the outset of the study, the 24-item Wickram Experience Inventory (WEI) was used. The WEI items focus on correlates of hypnotizability such as absorption, dissociation, sleep and dream familiarity, openness to experience, sensory vividness, and the ability to relax, and the items have been shown to discriminate between individuals high in hypnotic susceptibility and those who are not (Wichramasekera, 1985, 1988). The hypnotic susceptibility factor had two levels, high susceptibility (upper 40% of the WEI distribution) or low hypnotic susceptibility (lower 40% of the WEI distribution). Prior experience also had two levels, less than six months or greater than six months. The circuit training classes lasted about 45 minutes and combined anaerobic and aerobic activity. Twice during the training exercise, after the first approximately 15 and 30 minutes, the participants completed a questionnaire and a heart rate check. The questionnaire used was a subset of 10 items selected from the Privette Experience Questionnaire (PEQ), designed to evaluate various aspects of flow-like states and using a combination of qualitative and quantitative procedures. The subset of questions were chosen due to their direct reference to well-documented characteristics of flow states, such as joy, clear focus, playfulness, time distortion, freedom from restrictions, intentionality, absorption, responsibility, spontaneity, and intrinsic motivation. The volunteers were asked to indicate the extent these qualities described their exercise experience within the last 10 minutes. Responses were made on five-point bipolar scales anchored by strongly agree and strongly disagree. Participants measured their heart rate by using a 10-second check of the carotid or radial pulse each time the questionnaire was completed and wrote this value on the questionnaire sheet.

Results showed that from the first time participants were administered a flow scale after 15 minutes of exercise, with a second administration at 30 minutes, flow-like states increased for all

participants, $F(1,77) = 9.20$, $p < .003$. Follow-up analysis suggested that low-susceptibility participants (lower 40% of the WEI distribution) exhibited a trend toward increased flow ratings between the early and late assessments, but that high-susceptibility participants (upper 40% of the WEI distribution) showed a greater magnitude of change than their counterparts, $F(1,77) = 43.28$, $p < .0005$.

There were limitations to this study. First, the authors did not report any apriori criteria (i.e. psychometric properties) for selecting the 10 items form the 42-item PEQ inventory. Second, due to the fact that the 10 item scale measures subjective states (i.e. joy, playfulness, intrinsic motivation), it may be important to consider the extent the participants enjoyed or were intrinsically motivated by certain designated aerobic and anaerobic activities as this may have changed depending on the specific activities. Also, expectancy effects of the participants may have also influenced the results.

Based upon the notion that hypnosis and motor performances share common skills that may be modified through training, Robazza and Bortoli (1994, 1995) investigated hypnosis and improving performance. The case study involved the participant, an archer, being hypnotized before and/or during practice with a technique called active-alert hypnosis. This technique emphasized induction of hypnosis, in which suggestions of alertness, readiness, and physical activity replaced suggestions of relaxation and drowsiness, and thus did not lower arousal levels for the athlete. For 20 weeks during practice, the archer was active-alert hypnotized through exercises aimed to improve body awareness and imagery during stance, and focusing during the draw and aim phase. A dissociative state was emphasized such that the archer moved freely without conscious control of the draw and aim movement. Before and during shooting, various sensory channels were involved to induce hypnosis. For example, the archer was asked to pay

attention to somatic perceptions, visualize the whole shot process using multiple senses, and focus on the aiming point. Traditional hypnotic techniques were used after practice to establish connections between this phase and the active-alert phases of hypnosis, allowing the athlete to achieve mental skills for sport and hypnosis.

The whole treatment phase strategy comprised (a) during stance, a short version of bodily check-up, focusing on the target, multisensory imagery of the shoot, and mental repetition of the word "calm," (b) during draw and aim, automatic monitoring of sight-target alignment, bowstring contact on the face, bow and arm position, and (c) after release and follow through, evaluation of the result and the whole strategy. Eight shooting tests were carried out, two before treatment to establish a baseline with the remaining six during treatment. The six treatment phase tests took place at least two weeks apart. Each test consisted of 30 shots at a distance of 25 meters. The sum of scores, variable errors, and total errors were calculated.

Results of the study suggested that the procedures were helpful in increasing the archer's shooting performance (Robazza & Bortoli, 1995). Limitations existed in that there was only one participant, and the setting for the experiment was not controlled. Using a single-subject multiple baseline across individuals design, the archer also carried out only two baseline trials, while the intervention phase consisted only of six trials. In addition, this pre-post, one case study lacks statistical sophistication because of the simplicity of the design, and concurrent with this, had inherent threats to internal validity and lacks external validity (Campbell & Stanley, 1961).

Unestahl – Inner Mental Training

Only a series of studies conducted by Pates and colleagues has explored the effects of hypnosis improving the attainment of flow states, and thus performance, in an athletic skill (Pates, Cummings, et al., 2002; Pates & Maynard, 2000; Pates, Maynard, et al., 2001; Pates,

Oliver, et al., 2001). These studies were based upon Unestahl's (1979, 1983, 1986, 1995) work with athletes, hypnosis, mental training, and the aforementioned IPS theory in which optimal performance is similar in many respects to the dissociative state of hypnosis.

A mental skills training program, Inner Mental Training (IMT), was developed by Unestahl (1986, 1995) with the primary focus being to enhance the possibility of athletes achieving and developing control over IPS. The program involves such sport psychology standards as concentration skill development, goal setting, imagery, and arousal control with relaxation techniques, and was one of the first training programs to utilize multiple performance enhancement techniques. In addition, all of these mental skills are taught while the athlete is hypnotized or self-hypnotized. An important component of the IMT program is post-hypnotic trigger techniques utilized by athletes during training and competition to assist them in developing instant concentration and in reaching their idyllic arousal state.

Empirical results demonstrate IMT's effectiveness with athletes. In Straub's (1989) study, college aged men and women participated in one of five conditions. These conditions consisted of three different mental training program groups with minimal physical practice, a physical practice only group, and a control group. Results on dart throwing performance showed that the IMT program significantly differed from the control group, and equaled the performance of the physical practice only group despite its participants having a minimal amount of physical practice. The IMT program was the only mental training program to do this. IMT was also utilized by the 1980 Swedish Olympic athletes (Unestahl, 1983). Demonstrating the success of posthypnotic suggestion and the IMT program overall, only one third of the Sweden Olympic team had the training, while more than half of the Swedish finalists in the Olympics and two thirds of the medalists had this training. Unestahl (1983) readily admits that this success rate,

besides being related to the IMT program, may also be due to an over-representation of gifted athletes in the group. Nonetheless, there is strong enough evidence to support further research into the effects of hypnosis improving athletic performance.

Building upon the work of Unestahl's (1979, 1983, 1986, 1995) IPS theory, the Pates et al. studies (Pates, Cummings, et al., 2002; Pates & Maynard, 2000; Pates, Maynard, et al., 2001; Pates, Oliver, et al., 2001) were the first to utilize hypnosis as a means of inducing flow. This series of four investigations were very similar to each other and involved the effects of hypnotic intervention on flow states and golf or basketball performance.

Pates et al. Studies

The first of the series of studies by Pates et al. (Pates & Maynard, 2000) investigated golf-chipping performance. The participants were three male golfers, all aged 21 years, with handicaps ranging from 24 to 18. The volunteers also had at least six years of playing experience, previous experiences with flow, and attained performance levels higher than their handicaps indicated. They also had no previous experience with training methods in hypnosis. The golfers agreed not to practice or enter competitions involving golf for the duration of the study.

A single-subject multiple baselines across individuals research design was used to examine the effects of a hypnosis intervention on the dependent variables of flow states and golf-chipping performance. This design was used to examine whether behavior could be reversed, meaning "turned on or off" using trigger control techniques. The design also required the assessment of a stable baseline performance on the dependent variable of golf-chipping or a trend in the opposite direction of the change anticipated when the treatment was introduced to each golfer. The first baseline was assessed over seven trials, and when a stable performance was achieved, the

hypnotic intervention was introduced. The intervention phase also consisted of seven trials. After this phase, a second baseline assessment phase involving seven trials was used.

The two dependent variables for the study were golf-chipping shot performance and the frequency and intensity of flow reported by the participants. Golf-chipping was used because the golfers were familiar with the technique involved and it was an important component of their performance. Additionally, it was a closed motor skill, meaning the environment does not change and the performer can plan the movement well in advance. The performance of the golf shot was assessed by measuring the distance the ball finished from the hole. Flow state intensity and frequency analysis was assessed by using the FSS. The 36-item questionnaire was given to each participant immediately after each of the twenty-one total trials.

A Practical Assessment Questionnaire (PAQ) was also administered after each trial to determine the internal experience of each player across baseline and treatment sessions, and to provide information about effectiveness of the intervention. Questions included: "How did you feel during the performance? What were you thinking during the performance? Were there any outside thoughts distracting you? Did you use the trigger? Did you experience any problems? Were you satisfied with the results following the intervention? Were the procedures acceptable to you? What was the effect of the intervention? What were your general beliefs about your performance? How much effort did you put into today's performance?"

To maximize effort and motivation, along with providing conditions normally experienced during competition, a prize was awarded to the player displaying the best average performance score for the 21 trials. The researchers did not state the nature of the prize. The site of the competition was a specially prepared, flat, outdoor golf course with a target green and fairway. The scoring system was explained to the golfers, and prior to each trial they were allowed 10

practice attempts to familiarize themselves with the course. A shot was then performed by each person from 20 meters away and the results measured. The golfer with the closest shot began the next round of attempts. A total of 12 shots were completed for each trial, with a mean score determined for each performance trial. The FSS and PAQ were administered after each trial. Reliability of performance observations was assessed by comparing the judgments of two independent observers measuring the target distances simultaneously.

The hypnosis training of the participants began after the completion of the first baseline and consisted of three stages. The first stage involved encouraging the golfer to sit comfortably while focusing on breathing deeply and releasing air slowly while counting backwards from the number 10. Then a fifteen minute session with a progressive muscle relaxation (PMR) technique developed by Jacobsen (1938) was given that involved tensing and relaxing parts of their body while deeply inhaling. This technique, as noted by Barabasz and Watkins (2005), was developed to teach patients how to lower their blood pressure before the advent of pharmacological treatments. Suggestions to contrast differences between tense and relaxed muscles were also given.

The second stage consisted of an Ericksonian technique of hypnosis known as the staircase induction, in which the players imagined a journey down a flight of 20 stairs. At the bottom of the stairs they were told they would see a door, and beyond it they would see a comfortable chair in a room. They were then asked to sit in the chair, focusing on a small movie screen with images displayed. The participants were encouraged to direct their attention to relaxing images, such as a warm comfortable beach or the sensation of floating in water. During this process, suggestions were used to reinforce the experience of PMR and deep breathing.

The last phase involved giving suggestions for the participant to regress and remember an

optimal performance and a state of flow. They were asked to include visual, auditory, tactile, olfactory, and gustatory memories of this experience. After a memory was produced, a post-hypnotic trigger, a personal choice of music, was next introduced so an association would develop between the trigger and the variables responsible for and emotions that stem from their optimal performance. The participants were then asked to imagine a climb up the stairs, slowly come out of their hypnotized state, and resume their waking state, feeling refreshed and alert. After this, the players were asked to access the ideal performance state by using the trigger, a technique shown to be effective in recalling a desired feeling state (Hammond, 1990; Unestahl, 1973). Training was considered complete upon the players' reporting an emotion, normally associated with their optimal performance state, that could be experienced when they remembered the music trigger. The participants then practiced the aforementioned techniques by listening to an audio tape recording of the initial live session every day over a seven day interval before the trial phase was to begin. The golfers were contacted daily to ensure they were listening to the tape.

Following this training, the intervention phase started in which the players were to imagine the music trigger with each shot. It is important to note that during the actual performance trial participants were not hypnotized, but simply using the trigger conditioned to elicit their emotional state during a previous optimal performance state. Throughout the intervention the tapes were listened to every day until this phase was terminated. In total, one live session and seven taped sessions were used prior to the intervention and 35 tape sessions were used during the intervention phase itself. Prior to the second baseline, the tapes were retrieved from the players and they were asked to perform their shots without using the trigger. Confirmation that the trigger was not used during the second baseline was obtained by questionnaire.

The internal experience of each participant (i.e., feelings, thoughts, and cognitions) was assessed by asking each participant to complete a PAQ after each trial. Data were recorded as ratings and summed for analysis by comparing ratings on the baseline trials with those on treatment trials. Players were also given a social validation questionnaire upon completion of the study to provide information on the importance of the study and the effectiveness of the intervention. Questions here included: "Did you perceive the golf task to be important? Were the procedures of the study acceptable? Are you satisfied with the results?"

The performance scores obtained from the participants were plotted according to the accuracy of their attempts. Via visual inspection of the data, the researchers used the following criteria to establish the occurrence of a significant experimental effect: (a) when baseline performance was stable or in the opposite direction to that predicted for the treatment, (b) the greater the number of times that an effect was replicated both within and across subjects, (c) fewer overlapping data points between baseline and treatment phases, (d) the sooner the effect was observed following the introduction of the treatment, and (e) the greater magnitude of the effect judged relative to baseline. An effect was considered to have occurred when at least one of the criteria had been reached.

Each player showed an increase in performance accuracy, suggesting the intervention consistently improved golf-chipping scores. Player 1 improved from a mean of 260 cm during baseline to a mean of 170 cm during the intervention. Player 2 improved from a mean of 300 cm during baseline to a mean of 190 cm during intervention. Player 3 improved from a mean of 360 cm to 240 cm during the intervention. In baseline 2, the scores for Players 1 and 2 returned to levels similar to those prior to the intervention. Player 3, however, did not return to baseline 1 levels, and it appears he retained the effect of the intervention throughout baseline 2.

Concerning the FSS, two players had an increase in scores after the hypnotic intervention, suggesting the intervention increased the intensity of the experience of flow. Player 1's mean score of 135 during baseline 1 improved to 146 during the intervention. Player 3's scores improved from a mean of 141 to 152 during the intervention. Upon receiving the intervention, Player 2's scores on the FSS decreased from a mean of 123 during baseline 1 to 113 during the intervention. Scores for each player during baseline 2 indicated no effect of the intervention, as all showed decreased mean scores on flow throughout baseline 2 relative to the intervention scores.

The PAQ responses indicated that each player had used the trigger and that the intervention improved their performance. The players also stated that they felt more relaxed, confident, in control, and were better able to concentrate during the task. The players reported being satisfied with the results of the intervention and recognized more consistent play on the social validation questionnaire.

The limitations of the study included a possibility of experimenter and participant bias, as neither party was blind to the expected outcome. Regarding the PAQ and social validation questionnaire administered, participants may have exhibited a social desirability bias that was not taken into consideration. The items of the social validation questionnaire, for example, may have induced this bias because they specifically asked about the appropriateness or acceptability of the interventions. There is the possibility of a Hawthorne effect (Drew, 1976), as well, in which a change in performance occurs merely as a function of participating in a study, especially in a single-subject design. The experiment also utilized a rudimentary, basic design that does not allow statistical comparisons between or within groups by using correlations, analysis of variance, or a comparison of means. Instead, the data are "visually inspected" and this criterion

is used to establish occurrence of an effect. From a methodology standpoint, this is not a rigorous enough procedure to establish the occurrence of an experimental effect. Thus, the conclusion that the hypnosis intervention consistently improved performance may not be warranted. The researchers contacted the participants asking if the intervention tapes were listened to, yet did not actually monitor the participants while they listened to the tapes. Also, the researchers did not state the amount of time that elapsed between the final shots taken and the administration of the FSS and other questionnaires, nor did they consider the amount of time that elapsed between the present study and each participant's past experience of flow or an ideal performance. This interval that exists for each player is a variable that may affect the outcome of the interventions. Additionally since the investigation consisted of interventions during practice only, there is the prospect that the increase will not generalize to competitive situations. The study used questionnaires to obtain qualitative information concerning the perceived effectiveness and importance of the intervention, as well as the internal experience of each player, such as their "thoughts, feelings, and cognitions." The data were analyzed by comparing the comments obtained in the baseline sessions to the comments obtained during the intervention, yet no mention is made of exactly how this information was analyzed. For example, was the information coded, if so how and by how many raters, and how was it analyzed beyond this? Finally, as the sample size of this study is particularly small (N = 3), group based and controlled empirical investigations may contribute to these findings.

The series of four studies by Pates et al. were very similar and therefore, for purposes of brevity, the remaining three studies and their respective differences from the first study will be the primary topics of review.

The second study (Pates, Oliver, et al., 2001) examined the effects of hypnosis on flow states

and performance on golf-putting in five male competitive participants. The golfers had handicaps ranging from 24 to 11, at least four years of competitive playing experience, and no experience with hypnosis training. The golfers also had previous experiences of flow, and agreed not to practice or enter competitions involving golf for the duration of the study.

A single-subject multiple baseline across individuals design was used to examine the effects of a hypnosis intervention on the dependent variables of flow states and golf-putting performance. This type of design allowed participants to serve as their own source of control for the experiment. The design also required the observation of baseline performance and treatment phase for each of the golfers with the length of pre-intervention baseline increasing for each succeeding player. The intervention was introduced when a stable baseline or a trend in the opposite direction of the change anticipated became evident for each participant. Sequential application of the intervention was applied until all participants received it. Participant 1 had a baseline phase of four trials and an intervention phase with seven trials, Participant 2 had five baseline and six intervention trials, Participant 3 had six baseline and five intervention trials, Participant 4 had seven baseline and four intervention trials, and Participant 5 had eight baseline and three intervention trials.

The two dependent variables for the study were golf-putting performance and the frequency and intensity of flow experienced by the participants. The putting task consisted of 11 trials for each participant, with 10 putts for each trial form a distance of four meters. All trials were started after each golfer has completed 20 practice putts to familiarize themselves with the speed, pace, and condition of the carpet green. Measuring the distance the ball finished from the center of the hole assessed the performance of the golf shot. Putting performance was measured by calculating the average radial error score for the 10 putts. Flow state intensity and frequency analysis was

assessed by using the FSS. The 36-item questionnaire was given to each participant immediately after each of the eleven total trials.

As in the previous study, a PAQ was also administered after each trial to determine the internal experience of each player across baseline and treatment sessions, and to provide information about effectiveness of the intervention. Upon completion of the study, participants were given a social validation questionnaire which used the same questions as the first study.

The hypnosis training of the participants began after the completion of the first baseline and consisted of similar stages as the previous study. There was a difference in the third stage, however, which involved giving suggestions for the participant to regress and remember their best competitive performance. After a memory was produced, a post-hypnotic natural trigger, the grip of the putter, was next introduced so an association would develop between the trigger and the variables responsible for and emotions that stem from their optimal performance.

After this, the players were asked to access the ideal performance state by using the trigger, a technique shown to be effective in recalling a desired feeling state (Hammond, 1990; Unestahl, 1973). Training was considered complete when the players felt that an experience of their best performance was under trigger control.

The hypnosis intervention was administered to the players in a small, quiet room and lasted about 40 minutes. The participants then practiced the aforementioned techniques by listening to an audio tape recording of the initial live session every day over a seven-day interval after the baseline trial and before the trial phase was to begin. To ensure they were listening to the recording, the tape was played with the participant and experimenter present. Therefore, one live session and seven taped sessions were used prior to the intervention trials. Following this

training, the intervention phase started in which the players were to imagine the trigger with each shot.

The performance scores obtained from the participants were again plotted according to the accuracy of their attempts. The researchers also used visual inspection of the data to establish the occurrence of a significant experimental effect.

After the intervention, all players experienced an immediate performance effect with no overlapping data points between the baseline and the intervention phase. Player 1 improved from a mean of 28 cm during the baseline to a mean of 12 cm during the intervention, Player 2 from 25 cm to 17 cm during intervention, Player 3 from 28 cm to 17 cm, Player 4 from a mean of 24 cm to 18cm, and Player 5 improved from a mean of 26 cm to 19 cm during intervention. These results suggest that each player improved putting performance accuracy after the hypnosis intervention.

The players also experienced an immediate flow effect with no overlapping data points between baseline and intervention phase. Specifically, Player 1 improved from a mean FSS score of 114 during baseline to a mean of 155 during the intervention, Player 2 went from a mean of 110 to 136, Player 3 increased from 131 to 148, Player 4 improved from a mean of 114 to 138, and Player 5 form 134 to 172.

The PAQ was also administered after the study in which all participants indicated that they felt more relaxed, confident, and focused when compared to the baseline. Also, three of the five golfers indicated they had reduced concerns about performing and more control over their putting stroke. The social validation questionnaire revealed that all participants reported they

were satisfied with the results of the intervention and realized it helped their putting performance.

The limitations of this study were very similar to the first, yet there were other shortcomings here as well, as this study differed in several, small components. For example, the researchers did not state the amount of time that elapsed between the final shots taken and the administration of the FSS and other questionnaires, nor did they consider the amount of time that has elapsed between the present study and each participant's past experience of flow or an ideal performance. This interval that exists for each player is a variable that may affect the outcome of the interventions. Also, the researchers reported that "a favorable social validation assessment…provided further support for the intervention effect," yet there is a scarcity of actual results or statements reported to substantiate this statement.

The next study involving the effects of hypnosis on peak performance states investigated basketball jump- and set-shooting performance (Pates, Maynard, et al., 2001). The participants were three male community college basketball players, aged between 17 and 19 years, who were competing in a basketball league. The volunteers were starters with at least six years of competitive basketball playing experience.

A single-subject replication-reversal ABA design was used to examine the effects of hypnosis intervention on the dependent variables of jump- and set-shooting performance. This design was used to examine whether or not behavior could be reversed using trigger control techniques. The design required the establishment of a stable baseline assessment on the dependent variable or a demonstration of a trend in the opposite direction of the change anticipated when the treatment was introduced to each participant. Baseline assessment involved eight trials and occurred over a period of approximately four weeks. When a baseline became

apparent for each player, the treatment was introduced. The baseline and intervention phase had equivalent intervals, with eight trials taking place over four weeks.

Following withdrawal of the intervention, the baseline phase was reinstated. This second baseline also involved eight trials over four weeks. All trials were initiated about one hour prior to a competition and took place on the participants' home court. The jump- and set-shooting tasks were presented to the participants in random sequence.

For set-shooting, the participants stood on the free throw line and shot 20 set shots. The jump-shooting task required the player to run from left to the right side of the court, stopping to shoot outside of the basketball key approximately level with the free throw line until a total of 20 shots were performed. Each of these were recorded on a point system that consisted of: 1 for a backboard and out or a complete miss, 2 for a rim and out, 3 for backboard and in, 4 for a rim and in, and 5 for a clean basket. Performance was measured by summing the scores for 20 shots.

Reliability of the performance observations was assessed by comparing the judgments of two independent observers, simultaneously measuring the target behaviors. The assessment occurred prior to the study and the result of the correlation for both set- and jump-shooting was found to be 1.00.

The hypnosis training of the participants began after the completion of the first baseline and consisted of the same three stages as the previous two studies. In the third stage, suggestions were again given to help players regress, and remember a polysensory experience of their best performance. They were asked to include visual, auditory, tactile, olfactory, and gustatory memories of their best performance from an internal perspective.

Each of the participant's best performance was conditioned to be released by a trigger. To achieve this, the players were asked to choose a word they felt described their ideal performance

state. Suggestions were given to enable the use of the work as a trigger for accessing the optimal performance state at a future time. The participants were then asked to climb the stairs, slowly come out of their hypnotized state, and resume their waking state, feeling refreshed and alert. Once the players re-acclimatized to the environment they were asked to access their ideal performance state by using their triggers. Training was complete when they felt that an experience of their best performance was under trigger control.

The hypnosis intervention was administered to the players in a small, quiet, and comfortable room and lasted about an hour. The participants then practiced the aforementioned techniques by listening to an audio tape recording of the initial live session every day over a seven day interval between the first baseline and intervention phase of the study. The players were contacted daily to ensure they were listening to the tape. Following this training, the intervention phase started in which the players were to use the trigger word each time they took a shot. Throughout the intervention the tapes were listened to everyday until this phase was terminated.

Before the second baseline was initiated the tapes were retrieved from the players. In every session of the second baseline the players were instructed to perform the shooting tasks without using the triggers. Confirmation that the triggers were not used during the second baseline was obtained from a follow-up questionnaire.

The internal experience of each player was monitored by asking each to complete a PAQ after each testing session that permitted an ongoing assessment of the quality of the participants' feelings, thoughts, and cognitions across the baseline and treatment sessions. The questions here differed slightly from previous questionnaires, and the data was measured using a Likert scale and analyzed by comparing the scores obtained in the baseline sessions to the scores obtained in the treatment sessions. Questions included: "How did you feel during the performance? What

were you thinking during the performance? Were there any outside thoughts distracting you? How confident were you with regard to performing? Did you experience feelings of calm? Did you experience feelings of strength? Did you experience feelings of vitality? Did you feel relaxed? Did you experience narrowed attention? Were you focused on the task? Did you use the trigger? Did you experience any problems? Did you use the trigger to enhance performance?"

Upon completion of the study, participants were given a social validation questionnaire which used the same questions as the previous studies. The performance scores obtained from the participants were again plotted according to the accuracy of their attempts. The researchers also used visual inspection of the data to establish the occurrence of a significant experimental effect.

During the intervention phase each player improved their jump-shooting performance during the two baseline phases. This finding indicates that the intervention led to an increase in performance for all participants. Player 1 had an increase from 50 during the first baseline to a mean of 59 during the intervention. Player 2 increased from 67 during the first baseline to a mean of 83, and Player 3 increased from a mean of 54 during the first baseline to a mean of 64 during the intervention. In the post-intervention phase each of the player's performance scores returned to similar level as those prior to the intervention, thus indicating that the effect of the intervention was not demonstrated in the second baseline phase.

During the intervention phase each player improved their set-shooting performance during the two baseline phases. This finding again indicates that the intervention led to an increase in performance for all participants. Player 1 had an increase from 64 during the first baseline to a mean of 80 during the intervention. Player 2 increased from 71 during the first baseline to a

mean of 83, and Player 3 increased from a mean of 47 during the first baseline to a mean of 54 during the intervention. The number of overlapping data points between the intervention and baseline two for each participant was negligible, indicating that the effect of the intervention was not demonstrated in the second baseline phase of the study.

The interview data collected after each trial indicated that the players had used the triggers, felt the intervention was useful in keeping them focused, confident, and relaxed, and gave them stronger feelings of self-confidence, more positive thoughts, and were less distractible during the tasks. Also, all players reported that the intervention had enabled them to experience feelings and thoughts associated with their peak performance. All participants reported they felt more calm, relaxed, focused, stronger, and full of vitality during the intervention. Participants 2 and 3 felt that time slowed down. All participants reported they were satisfied with the results of the intervention and realized it helped them be more consistent players.

The limitations of this study were very similar to the previous ones, yet there were other shortcomings here as well, as this study differed in several, small components. For example, the researchers contacted the participants asking if the intervention tapes were listened to, yet did not actually monitor the participants while they listened to the tapes. Also, the researchers did not state the amount of time that elapsed between the final shots taken and the administration of the FSS and other questionnaires, nor did they consider the amount of time that has elapsed between the present study and each participant's past experience of an ideal performance. This interval that exists for each player is a variable that may affect the outcome of the interventions. The study used questionnaires to obtain qualitative information concerning the perceived effectiveness and importance of the intervention, as well as the internal experience of each player, such as their "thoughts, feelings, and cognitions." The data were analyzed by comparing

the Likert scale scores obtained in the baseline sessions to those obtained during the intervention, yet no mention is made of exactly how this information was analyzed. For example, was the information coded, if so how and by how many raters, and how was it analyzed beyond this? Also, there is no mention of whether or not the players were allowed to practice shots during the experiment.

The last study involved the performance enhancement of three-point shooting performance in basketball players (Pates, Cummings, et al., 2002). The participants were five male collegiate basketball players from northern England, aged between 19 and 23 years old, with at least seven years of competitive basketball playing experience, and no experience with hypnosis. A single-subject multiple baselines across individuals design was used to examine the effects of hypnosis intervention on the dependent variables of flow states and shooting performance. The experimenters recorded each three-point attempt on the same five point scale system used for the previous study. The reliability of the performance observation was assessed by the same means as the previous study and also resulted in a correlation of 1.00 for the scores of the two independent observers.

The performance was measured by summing the scores for ten attempts per trial. Information on the intensity and frequency of the flow state experienced was assessed by the FSS. The 36-item questionnaire was given to each participant immediately after each of the eleven intervention trials.

The intervention phase began after a stable baseline or a trend toward the opposite direction of the change anticipated became apparent for each player. This ranged from a four trial baseline to an eight trial baseline. Next, based from Unestahl's (1979, 1983) premise that flow is similar

to the dissociative experience during hypnosis, there were three treatment phases involving hypnosis.

The first two stages of hypnosis training were similar to those of the previous studies. The third stage involved giving suggestions for the participant to regress and remember their best competitive performance. They were asked to include visual, auditory, tactile, olfactory, and gustatory memories of this experience. This was based from research demonstrating that hypnosis-induced imagery has been shown to increase the person's controllability and vividness of imagery (e.g., Liggett & Hamada, 1993; Taylor & Gerson, 1992). Hypnosis research has also shown to increase a person's ability to concentrate (e.g., Schrieber, 1991, Spiegel, as cited in Taylor et al., 1993). Hypnosis has, therefore, shown the ability to increase imagery and focusing skills.

After a memory was produced, a post-hypnotic trigger, a basketball, was next introduced so an association would develop between the trigger and the variables responsible for and emotions that stem from the optimal performance. This is supported from research showing post hypnotic suggestions as having the ability to produce a behavior one would not normally expect (e.g., Erickson & Erickson, 1941; Unestahl, 1973, 1974). The participants were then asked to climb the stairs, slowly come out of their hypnotized state, and resume their waking state, feeling refreshed and alert. After this, the players were asked to access the flow state by using the trigger, a technique shown to be effective in recalling a desired feeling state (Hammond, 1990; Unestahl, 1973). Training was considered complete upon the players reporting an emotion, normally associated with their flow state, could be experienced when they remembered the basketball trigger.

The participants then practiced the aforementioned techniques by listening to an audio tape

recording of the initial live session every day over a seven day interval before the shooting trial phase was to begin. Therefore, the players listened to a total of eight sessions. To ensure participants listened to the audio tapes, the players were contacted and asked to listen to them in a room in the presence of an experimenter. After each performance trial, flow and the internal experience of each player were assessed using the FSS and PAQ. The internal experience of each player was monitored by asking participants to complete the PAQ after each testing session that permitted an ongoing assessment of the quality of the participants' feelings, thoughts, and cognitions across the baseline and treatment sessions. The data was analyzed by comparing the scores obtained in the baseline sessions to the scores obtained in the treatment sessions. Questions on the PAQ were the same as the first study.

Also, upon completion of the study, participants were given a social validation questionnaire designed to provide information on the importance of the study and effectiveness of the intervention, and used the same questions as the previous studies.

The performance scores obtained from the participants were again plotted according to the accuracy of their attempts. The researchers also used visual inspection of the data to establish the occurrence of a significant experimental effect.

The results showed that for each participant, the hypnosis intervention led to an increase in performance accuracy of three-point shooting. Player 1 improved form a mean of 30 during the first baseline to a mean of 36 during the intervention phase, Player 2 went from a mean of 29 to 39 during the intervention phase, Player 3 improved from 31 to 39, Player 4 from 27 to 35, and Player 5 from 28 to 36 during the intervention phase. This finding suggests that the hypnosis intervention consistently improved three-point shooting performance.

The hypnosis intervention also led to an increase in flow state scores for every participant,

which suggests that the hypnosis intervention increased the intensity of each player's experience of flow. Player 1 improved from a mean flow score of 130 during baseline to a mean of 144 during the intervention, Player 2 went from a score of 147 to 164 during the intervention, Player 3 from 119 to 171, Player 4 from 114 to 142, and Player 5 increased his mean score of 134 to 155. The social validation questionnaire results indicated that the players felt more relaxed, calm, composed, in control, and confident when compared to baseline phase.

The limitations of this study were very similar to the previous ones, yet there were other shortcomings here as well, as this study differed in some components. For example, the researchers again did not state the amount of time that elapsed between the final shots taken and the administration of the FSS and other questionnaires, nor did they consider the amount of time that has elapsed between the present study and each participant's past experience of flow or an ideal performance. Also, it is stated that the players were instructed to "imagine the trigger (basketball), each time they attempted a shot." This could be problematic for two reasons. First, the players are instructed to "imagine" the basketball while they are simultaneously holding a basketball preparing to shoot. Second, in the sport of basketball players continuously see the ball during competition. Therefore, how does this affect the trigger of imagining a basketball?

Conclusion

The preceding review of the literature has shown the recent trends in regards to hypnosis, hypnosis in sport, recent research directions concerning the state of flow, and areas of similarity between flow and hypnosis.

Psychological characteristics that help a person attain flow have been an area of growing research, in addition to the area of sport psychology in general. Hypnosis has been shown to be a safe, reliable and legal technique in enhancing the performance of athletes. As more research is

conducted surrounding flow in sport and hypnosis, a better understanding of them as separate entities, as well as their inherent similarities will follow. Also, no known formula or psychological antecedent exists to allow an athlete the controllability of the state of flow. What remains at issue is the ability of hypnosis and hypnotic techniques to help the athlete direct flow.

Chapter 3

Methodology

Participants

An initial pool of male participants (N = 43) were volunteers from physical education and sport psychology classes, intramural participants, and students using the recreation center on the University of California at Davis (UCD) campus. Participants averaged 23.3 years of age and ranged from 19 to 30 years of age. To be included in the sample, the participants met the following criteria: (a) had at least three to four years of interscholastic high school basketball playing experience, (b) were at least 18 years of age, or no more than 30 years of age at the time of participation, as this helped limit the time elapsed from their last flow experience, (c) had experience prior to the beginning of the study with the state of flow or a flow-like experience, as delineated on the Demographic and Information Form (see Appendix A), (d) had no experience with hypnosis, (e) were in good physical and mental health, (f) agreed to document, in hours per week, the amount of time spent in practice or competition for the duration of the study, and (g) did not currently use psychotropic or recreational drugs.

A Kavussanu, Crew, and Gill (1998) study investigating free-throw shooting, screened participants to include only those who were at an intermediate level (shooting at least a .30 percentage from the free-throw line). An inverse relationship exists in basketball shooting, in which the greater the distance from which a player attempts a shot, the lower their success rate. The present study opted to use three-point shooting as a skill test due to the higher level of difficulty involved from being further from the basket. With this in consideration, and similar to the Kavussanu, et al. (1998) study, participants in this study were required to perform at a lower minimum shooting percentage of .15 over one trial period consisting of 30 three-point shot

attempts before being admitted to the study. Two participants were excluded due to the inability to meet the shooting percentage criteria. A total of 10 volunteers withdrew, leaving 31 participants that completed the study.

During their participation in the study, all participants were asked to monitor the number of hours per week they participated playing basketball outside of the study, including practice and competition. Participants recorded outside basketball activity in logs, which were reviewed and recorded prior to each trial session. For the pre-intervention phase of the study, the hypnosis group averaged 2.4 hours per week participating in basketball, the relaxation group 2.81 hours per week. During the post-intervention phase, the hypnosis group averaged 1.73 hours per week and the relaxation group 1.63 hours per week.

Experimental Design

This study utilized a pretest-posttest, between and within group design with volunteer participants. The present study had one independent variable with two levels which consisted of a hypnosis intervention group and a relaxation intervention group. There were five dependent variables used, which consisted of three components from the American Alliance for Health, Physical Education, Recreation and Dance – Basketball Skills Test (AAHPERD-BST), the dribbling, defensive, and close range speed shooting skill tests, as well as a three-point shooting performance skill, and the Flow State Scale – 2 (FSS – 2).

Instrumentation

Waterloo-Stanford Group C Scale of Hypnotic Susceptibility (WSGC)

The WSGC (Bowers, 1998) was given to obtain a measure of each person's hypnotizability. The WSGC is a hypnotic susceptibility group scale developed to substitute for the individually administered Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C; Weitzenhoffer &

Hilgard, 1962). It adds criterion validity to the measurement of hypnosis abilities with the two scales being correlated at .85. The WSGC's internal consistencies are comparable (high range of .81 using the KR 20). The WSGC was used to allow for group administration to minimize the time involved with individual administration.

American Alliance for Health, Physical Education, Recreation and Dance – Basketball Skills Test (AAHPERD-BST)

The AAHPERD-BST (AAHPERD, 1984; Hastad & Lacy, 1998; Kirkendall, Gruber, & Johnson, 1987) was selected as it contains important all-around components of the sport, including dribbling, passing, defensive, and close range speed shooting skills, and the participants were familiar with the skills involved. The AAHPERD-BST is also a well-constructed, norm-referenced basketball skills test for males (Kirkendall, Gruber, & Johnson, 1987). The test was normed on 10,000 students from four age groups: elementary, junior high, high school, and college, and reliability and content, construct, and concurrent validity results provided adequate substantiation of it as being a reliable and valid instrument (Kirkendall, et al., 1987). The passing component of the AAHPERD-BST was not administered due to the confinements of the gymnasium used. Directions for administering and scoring the components used from the AAHPERD-BST can be found in Appendix C.

Three-point shooting skill

Three-point shooting performance was selected as another task, as it is an important component of the sport and the participants would be familiar with the skill involved. The task required the participants to run/dribble starting from the right side of the three-point line moving to the left side of the three-point line, stop and shoot outside of the college basketball three-point arc at a predetermined area marked with tape. This area was approximately level with the free

throw line. After the shot attempt on the left side of the court, the participants would run/dribble from the left to the right side of the three-point line, stop and shoot from behind the college basketball three-point arc at a predetermined area marked with tape approximately level with the free throw line on the right side of the court. Participants went between these two spots clearly marked with tape, shooting five attempts from each side, until a total of 10 three-point shots were performed. Participants had a total of 90 seconds to finish the trial.

The experimenters recorded each three-point shot attempt on a modified five-point scale scoring system developed by Pates and colleagues (Pates, Cummings, et al., 2002; Pates, Maynard, et al., 2001). The scoring system consisted of:

1 point – ball hitting backboard and rim and coming out
– ball missing backboard and rim
2 points – ball hitting backboard and going in
3 points – ball hitting rim and coming out
4 points – ball hitting rim and going in
5 points – ball hitting net only and going in

The participant received fewer points for the ball hitting the backboard and going in than the ball hitting the rim and coming out. As the rim is the target for a player attempting a three-point shot, a ball hitting the rim and coming out is closer to their ultimate target than the backboard. Shot attempts that hit the rim and backboard simultaneously were scored as a three.

Flow State Scale – 2 (FSS – 2)

Information on the intensity and frequency of the flow state experienced by each participant was assessed using the FSS – 2 (Jackson & Eklund, 2002). Internal consistency for the FSS – 2 has shown to be acceptable with a mean coefficient alpha = .85 (Jackson & Eklund, 2002). A single, global FSS – 2 score was calculated for participants in this study due to the contention by Jackson (1999) that a multidimensional approach tends to reveal incomplete information concerning the total experience of flow for athletes. A subsequent study (Jackson & Eklund,

2002) used a confirmatory factor analysis and found the global FSS – 2 score fits the data adequately with NNFIs and CFIs above .910 and RMSEA < .05. The current study found the reliability coefficient for the pre-intervention FSS – 2 was Cronbach's alpha = .95. The reliability coefficient for the post-intervention FSS – 2 was Cronbach's alpha = .96.

Apparatus

The basketballs used for this study were five Wilson National Collegiate Athletic Association "Solution" official composite indoor game basketballs. Three mechanical digital stopwatches made by Sportline were used to time the participants. Equipment used for the study also included six 12-inch vinyl soccer training cones, blue masking tape, and a Stanley tape measure. A standard basketball court, complete with a goal, backboard, and a basketball lane was also used. Three standard Wilson green tennis balls were used for the WSGC administrations.

Procedures

Prior to the study beginning, independent observers received specific training in scoring methods for the AAHPERD-BST and three-point shooting performances. The training consisted of reviewing written instructions for the skills tests, answering questions from the independent observers, then comparing scores on practice sessions with the AAHPERD-BST components and three-point shooting trials. Following the training and to ensure the independent observers were scoring consistently, an agreement index was calculated and resulted in over 90% agreement for the AAHPERD-BST and three-point shooting skill, which exceeds adequate standards (Gay, 1990). The scores of the three-point shooting and AAHPERD-BST were then measured by comparing the scores of at least two independent observers simultaneously observing the performances.

Participant recruitment

UCD students participating in intramural basketball competition, using the recreation center on campus, or enrolled for courses in physical education or in sport psychology were approached and given cursory information about the study. The researcher briefly presented himself to possible participants as a current Sport Psychology Intern at UCD conducting a study on basketball performance for his doctoral dissertation. The students were invited to volunteer for participation in the study. Those interested in participating were given a "Demographics and Information Form" (see Appendix A) in which they provided their name and current contact information along with other information pertinent to the study. Participants were ensured that this information would remain in a secured location for the duration of the study, that access to it would be limited to this researcher only, and that it would be destroyed seven years after the completion of the study per APA requirements. Participants were also informed that they could terminate their participation at any time (see Institutional Review Board - Informed Consent, Appendix B). Participants were provided with contact information to access the services of the Counseling and Psychological Services (CAPS) at UCD should they feel the need to address any adverse reactions associated with their participation in this study.

Potential participants were then contacted and asked to attend a group meeting held in a gymnasium on the UCD campus. The meeting was designed to clarify and explain the purposes and expectations of the study, and answer any questions. The meeting also served as an orientation session to debunk myths concerning hypnosis, explain the concepts of flow, and give them the opportunity to decline participation in the study. This information was read from a standardized form. A copy of the Informed Consent Form (see Appendix B) to sign was given to the participants should they meet criteria necessary for the study and choose to participate.

Participants were also instructed to avoid discussing their participation in this study with anyone but the researcher until the study concluded. Participants were informed about a debriefing session at the end of the study in which the specifics and results of the research would be provided to them. Questions participants may have about the design of the study would be answered during the debriefing session.

After all the players had met the initial criteria for being included and agreed to be in the study, the participants were next required to perform at a minimum shooting percentage of .15 over 30 shot attempts to meet the three-point shooting criteria.

The participants, upon meeting all criteria, then scheduled a time and date to be given the WSGC (Bowers, 1998). All hypnotizability scale administration took place in a quiet room at CAPS on the UCD campus and lasted about 90 minutes. Participants were matched within a scoring range of +/- 1 based upon their WSGC scores and then randomly assigned to one of two intervention groups. This matching procedure was adopted out of the need to prevent the possibility that a majority of high scoring (e.g., 10) or low scoring (e.g., 2) WSGC participants were in one treatment group. The possible scoring range on the WSGC is between 0 and 12.

Participants then were provided times and dates for sessions to attend in which they began the basketball skills tests and completed the FSS – 2, all of which were administered in Hickey Gymnasium on the UCD campus.

At the start of the pre-intervention sessions, participants were given approximately 10 minutes to warm-up before the actual basketball skill testing started. The method of warm-up was left to the discretion of each participant, e.g., stretching, running, shooting, etc. Participants first completed a trial run on all components of the AAHPERD-BST to familiarize themselves with the skills involved. Participants then completed in sequential order the three separate skills

of the AAHPERD-BST, consisting of the dribbling skill test, defensive skill test, and close range speed shooting skill test. Directions for administering and scoring each basketball skill test used can be found in Appendix C. The result of each participant's score was recorded as their respective pre-intervention performance measure on components of the AAHPERD-BST.

Next, the participants completed the three-point shooting skill. Participants first completed a trial run on the three-point shooting drill to familiarize themselves with the skills involved. The performance was measured by summing the scores for 10 attempts. The result of each participant's score was recorded as their pre-intervention measure on three-point shooting.

Information on the intensity and frequency of flow was next assessed using the FSS – 2 (Jackson & Eklund, 2002). All 36-item FSS – 2 measures were administered within one minute of participants completing the three-point shooting portion of the basketball skill testing.

The completion of one dribbling, defensive, and close range speed shooting component from the AAHPERD-BST, one three-point shooting skill, and one FSS – 2 constituted 1 of 10 total trials each participant was to complete during the pre-intervention phase. The 10 trials were completed over a 21-day period.

Upon completion of the pre-intervention phase, the participants next started either the hypnosis intervention or the relaxation intervention, based upon their previously determined WSGC hypnotizability scores.

Independent variable – First level – Hypnosis intervention group

Those participants in the hypnosis group started the intervention within a few days after the completion of the pre-intervention basketball skills tests and FSS – 2 administrations. All hypnosis interventions took place in a quiet room at CAPS on the UCD campus and lasted about one hour. Based on Unestahl's (1979, 1983) premise that flow is similar to the dissociative

experience during hypnosis, there were three treatment phases involving hypnosis.

The first stage involved encouraging the player to sit comfortably in a relaxed position and recall the last experience they had with the state of flow. The first portion of the SHSS:C (Weitzenhoffer & Hilgard, 1962), a hypnotic induction technique using a common passive muscle relaxation method in which participants progressively relax parts of their body while breathing deeply, was then given. This technique often allows easier entry into hypnosis and assists in preparing those participants that are initially tense and resistant, helping them to relax and facilitate their entry into a hypnotic state (Barabasz & Watkins, 2005).

The second stage consisted of using a hypnosis technique in which the players imagined a journey down a staircase. At the bottom of the staircase they were told they could see a beach with a comfortable chair. They were then asked to sit in the chair and relax. The participants were encouraged to direct their attention to relaxing images, such as feeling the breeze and hearing the ocean on the beach. During this process, suggestions were used to reinforce the experience of relaxation, deep breathing, and the use of imagery.

The last stage involved giving suggestions for the participant to regress and remember the last performance in which they experienced flow or an ideal performance. They were asked to include visual, auditory, tactile, olfactory, gustatory, and memory of this experience. This was based from research demonstrating that hypnosis-induced imagery has been shown to increase the person's controllability and vividness of imagery (Barabasz & Watkins, 2005, p.411 - 440; Liggett & Hamada, 1993; Taylor & Gerson, 1992) and to increase a person's ability to concentrate (e.g., Schrieber, 1991, Spiegel, as cited in Taylor et al., 1993).

After a memory was produced, a post-hypnotic suggestion, referred to as a "trigger" to the athletes, of holding the basketball in each participant's natural jump-shooting position, was next

introduced so an association would develop between the post-hypnotic suggestion or trigger and the variables responsible for and emotions that stem from their optimal performance.

The participant was then asked to imagine climbing the staircase, slowly coming out of their hypnotized state, and resume their waking state, feeling refreshed and alert. After this, the player was asked to access the flow state by using the trigger, a technique shown to be effective in recalling a desired feeling state (Hammond, 1990; Unestahl, 1973).

The hypnosis intervention was individually administered to each person in the hypnosis intervention group a total of six times before the post-intervention phase began. During the post-intervention performance trials participants were not hypnotized, but simply using the post-hypnotic suggestion or trigger conditioned to elicit their emotional state during a previous flow state performance. The post-intervention phase began after the six hypnosis intervention sessions were completed.

Independent variable – Second level – Relaxation intervention group

The relaxation intervention group received a similar treatment as the hypnosis group's first stage only, which involved encouraging the player to sit comfortably while focusing on breathing deeply and releasing air slowly. A session lasting about thirty minutes and using a common passive muscle relaxation technique, modified from Jacobsen's (1938) progressive muscle relaxation (PMR) technique, was given that involved progressively relaxing parts of their body while breathing deeply (Bourne, 2000). This relaxation technique, used extensively and well received with athletes at Washington State University, was designed to help athletes reduce anxiety or arousal levels, such that they may better control their individual zone of optimal functioning (IZOF), as levels outside this may be detrimental to their performance (Hanin, 1978, 2000; Morgan, 1993, 2002; Raglin, 1992). Similar to the hypnosis intervention group, the

relaxation treatment participants received six sessions involving breathing and relaxation sessions. The post-intervention phase began after the six relaxation sessions were completed.

Upon ending the hypnosis and relaxation interventions, both groups participated in 10 post-intervention AAHPERD-BST trials, three-point shooting trials, and completed the FSS – 2 in the same manner in which they completed the pre-intervention trials to complete the study.

Chapter 4

Results

Prior to conducting analyses, all data were screened for accuracy of data entry and missing values by reading output data aloud to an assistant who checked each data entry. The data were replaced by using the mean imputation. Inspection of z scores indicated no outliers (e.g. +/- 3 SD). All data were analyzed using SPSS version 11.

Waterloo-Stanford Group C Scale of Hypnotic Susceptibility (WSGC) scores, which has a scoring range of 0 to 12, were given to all participants. The WSGC mean of the hypnosis intervention group was 4.07, with scores ranging from 1 to 9 (SD = 2.12). The WSGC mean of the relaxation intervention group was 3.88, with a range of scores from 0 to 9 (SD = 2.42). Hypnotizability scores for both groups were gathered at the lower end of the hypnotizability scale (median = 4, mode = 4).

The study consisted of one independent variable with two levels, a hypnosis intervention group and a relaxation intervention group. The outcome (dependent variables) measures were dribbling skills, defensive skills, and close range speed shooting skills components of the American Alliance for Health, Physical Education, Recreation and Dance – Basketball Skills Test (AAHPERD-BST)., their three-point shooting ability, and the Flow State Scale – 2 (FSS – 2).

Analyses of covariance (ANCOVA) were used to statistically control for differences in the groups at pre-intervention. Table 1 (p. 90) shows the means and standard deviations at pre- and post-intervention for the hypnosis and relaxation intervention groups.

Table 1

Means and Standard Deviations for Intervention Groups – On Pre- and Post- intervention Outcome Measures

	Hypnosis Group				Relaxation Group			
Measure	Pre		Post		Pre		Post	
	M	SD	M	SD	M	SD	M	SD
Dribble Skill[1]	14.65	.67	14.18	.54	15.83	.97	15.72	.91
Defense Skill[1]	16.60	1.15	16.18	1.00	17.31	1.47	17.28	1.31
Speed Shooting Skill[2]	24.51	2.44	25.71	1.72	23.86	2.35	24.83	2.16
Three-point Shooting[2]	35.57	2.64	36.16	1.91	34.14	2.76	33.83	2.71
FSS – 2	133.91	13.38	138.45	12.13	134.13	16.52	135.98	13.05

[1] Lower numbers indicate more proficient scores in seconds. [2] Higher numbers indicate more proficient scores in points.

Hypothesis One

It is important to note that a more proficient score in the dribbling skills test would actually be a lower score, as participants attempted to lower or decrease their times measured in seconds in the skill. Therefore, the first hypothesis predicted that participants in the hypnosis intervention group would score significantly lower on the dribbling skill test component of the AAHPERD-BST at the post-intervention phase than participants in the relaxation intervention group.

An ANCOVA was conducted with the intervention groups as the IV (i.e. hypnosis and relaxation groups), the post-intervention dribbling skill score as the DV, and pre-intervention dribbling skill score as the covariate. The results of the ANCOVA are presented in Table 2 (p. 92). The ANCOVA shows a significant difference between the groups in dribbling scores, $F(1,28) = 16.03$, $p = .001$. The strength of the association between intervention groups and dribbling scores was modest. The partial eta squared was at .36, meaning the intervention group variable accounted for 36% of the variance. The hypnosis group produced lower scores at post-intervention than the relaxation group after controlling for the pre-intervention dribbling skill score differences. Hypothesis one was supported.

Table 2

Analysis of Covariance for Post-intervention Scores Between Groups – Dribbling Skill

Source	SS	df	MS	F	*p*	n^2
Between Groups	1.74	1	1.74	16.03	.001	.36
Covariate	13.42	1	13.42	123.24	.001	.82
Error	3.05	28	.11			

Hypothesis Two

Similar to hypothesis one, a more proficient score in the defensive skills test would actually be a lower score, as participants attempted to lower or decrease their times measured in seconds in the skill. Therefore, hypothesis two predicted that participants in the hypnosis intervention group would score significantly lower on the defensive skill test component of the AAHPERD-BST at the post-intervention phase than participants in the relaxation intervention group. An ANCOVA was conducted with the intervention groups as the IV, the post-intervention defensive skill score as the DV, and pre-intervention defensive skill score as the covariate. The results from the ANCOVA are presented in Table 3 (p. 94). The results show a significant difference between the groups in the defensive scores, $F(1,28) = 8.20$, $p = .008$. The strength of the association between the intervention groups and the defensive skill scores was small to modest, however, with partial eta squared at .23. Therefore, the intervention group variable accounted for 23% of the variance. After controlling for the differences on pre-intervention defensive skill scores, the hypnosis group produced lower scores at post-intervention than the relaxation group. Hypothesis two was supported.

Table 3

Analysis of Covariance for Post-intervention Scores Between Groups – Defensive Skill

Source	SS	df	MS	F	*p*	n^2
Between Groups	1.95	1	1.95	8.20	.008	.23
Covariate	32.82	1	32.82	137.75	.001	.83
Error	6.67	28	.24			

Hypothesis Three

The third hypothesis predicted that participants in the hypnosis intervention group would score significantly higher on the close range speed shooting skill test component of the AAHPERD-BST at the post-intervention phase than participants in the relaxation intervention group. The speed shooting skill component was measured in points scored. ANCOVA was next conducted with the intervention groups as the IV, the post-intervention close range speed shooting skill score as the DV, and pre-intervention close range speed shooting skill score as the covariate. The results from the ANCOVA did not show a significant difference in the scores between the groups in close range speed shooting scores, $F(1,28) = 2.15$, $p = .15$. The results suggest that the hypnosis group did not produce higher scores than the relaxation group at post-intervention after controlling for the pre-intervention close range speed shooting skill scores. Hypothesis three was not supported.

Hypotheses Four, Five, Six

As previously mentioned, a more proficient score in dribbling and defensive scores would mean a decrease in the magnitude of the score measured in seconds, as participants attempted to lower or decrease their times in the two skills. Therefore, hypothesis four predicted that participants in the hypnosis group would have significantly lower dribbling skill test scores from the AAHPERD-BST at post-intervention phase than at pre-intervention phase, while hypothesis five predicted that participants in the hypnosis group would have significantly lower defensive skill test scores from the AAHPERD-BST at post-intervention phase than at pre-intervention phase. Additionally, hypothesis six predicted that the AAHPERD-BST close range speed shooting skill test scores of the participants in the hypnosis group would be significantly higher at the post- intervention phase than the pre-intervention phase, as a more proficient result on this

skill test means an increase in scores. The speed shooting skill component was measured in points scored.

To test these hypotheses, within group paired sample t-tests were conducted to compare the pre- to post-intervention scores for the dribbling skill test, the defense skill test, and the close range speed shooting skill test of the AAHPERD-BST. At post-intervention participants in the hypnosis group produced significantly lower dribbling skill scores, $t(14) = 5.07$, $p < .001$ (two-tailed) lower defensive skill scores, $t(14) = 2.78$, $p < .05$ (two-tailed), and significantly higher close range speed shooting skill scores, $t(14) = -3.92$, $p < .01$ (two-tailed) than at pre-intervention. The t-test summary is presented in Table 4 (p. 97). These results suggest that the hypnosis group was able to produce significantly lower scores at post-intervention on the dribbling and defensive skill components of the AAHPERD-BST, and produce significantly higher scores at post-intervention on the close range speed shooting skill. Hypotheses four, five and six were supported.

Table 4

Within Group Paired Sample T-test – Hypnosis Intervention Group

	Pre-intervention		Post-intervention		
AAHPERD-BST	M	SD	M	SD	t
Dribble Skill[1]	14.65	.67	14.18	.54	5.07***
Defense Skill[1]	16.60	1.15	16.18	1.00	2.78*
Speed Shooting Skill[2]	24.51	2.44	25.71	1.72	-3.92**

[1] Lower numbers indicate more proficient scores in seconds. [2] Higher numbers indicate more proficient scores in points.
*p < .05, two-tailed. **p < .01, two-tailed. ***p < .001.

Hypothesis Seven

This hypothesis predicted that participants in the hypnosis intervention group would have significantly higher three-point shooting scores at the post-intervention phase than participants in the relaxation intervention group. The three-point shooting was measured by points. To test hypothesis seven, a one-way analysis of covariance (ANCOVA) was conducted with the intervention groups as the IV, the post-intervention phase three-point shooting score as the DV, and pre-intervention three-point shooting score as the covariate. The results from the ANCOVA are presented in Table 5 (p. 99). The results show a significant difference between groups in three-point shooting scores, $F(1,28) = 6.62$, $p = .016$. The strength of the association between the intervention groups and the three-point shooting scores was small, with partial eta squared at .19. Therefore, the intervention group variable accounted for 19% of the variance. The results suggest that after controlling for the pre-intervention three-point shooting score differences, there still was a significant difference between groups. Hypothesis seven was supported.

Table 5

Analysis of Covariance for Post-intervention Scores Between Groups – Three-Point Shooting

Source	SS	df	MS	F	*p*	n^2
Between Groups	12.19	1	12.19	6.62	.016	.19
Covariate	109.38	1	109.38	59.38	.001	.68
Error	51.58	28	1.84			

Hypothesis Eight

The eighth hypothesis predicted that participants in the hypnosis intervention group would have significantly higher three-point shooting scores at the post-intervention phase than at the pre-intervention phase of the study. The three-point shooting was measured by points. To test this, a within group paired samples t-test was conducted to compare the pre- to post-intervention scores for three-point shooting. The t-test revealed no significant difference, $t(14) = 1.17$, $p = .26$. The eighth hypothesis, therefore, was not supported.

Hypothesis Nine

Hypothesis nine predicted that participants in the hypnosis intervention group would score significantly higher on the FSS - 2 at the post-intervention phase than participants in the relaxation intervention group. A one-way analysis of covariance (ANCOVA) was conducted with the intervention groups as the IV, the post-intervention FSS - 2 score as the DV, and pre-intervention FSS - 2 score as the covariate. The results from the ANCOVA did not show a significant difference between the groups in the FSS – 2 scores, $F(1,28) = .87$, $p = .36$. The findings indicate that after controlling for the pre-intervention FSS - 2 score differences, there was no significant difference between groups. Hypothesis nine was not supported. Hypnosis was no better than the relaxation group at getting participants into flow, as measured by the FSS – 2.

Hypothesis Ten

The tenth hypothesis predicted that participants in the hypnosis intervention group would have significantly higher FSS – 2 scores at the post-intervention phase than the pre-intervention phase. To test this, a within group paired sample t-test was conducted to compare the pre- to post-intervention FSS – 2 scores, which revealed no significant difference, $t(14) = -1.84$, $p = .09$. These findings suggest that the hypnosis intervention group was not able to produce significantly

higher scores from pre- to post-intervention on the FSS – 2. Therefore, hypothesis ten was not supported.

These results fail to support hypotheses nine and ten. The hypnosis intervention did not significantly produce higher FSS – 2 scores nor did it enhance an athlete's ability to attain the state of flow as measured by the scale.

Chapter 5

Discussion

The results of this study suggested that participants receiving the hypnosis intervention were able to demonstrate significantly higher all-around basketball performance skill scores at post-intervention than participants receiving the relaxation intervention as measured by the dribbling and defensive skill components of the American Alliance for Health, Physical Education, Recreation and Dance – Basketball Skills Test (AAHPERD-BST) and three-point shooting. Additional findings of the study also indicated that participants who were exposed to the hypnosis intervention significantly enhanced their all-around basketball performance scores, as measured by dribbling, defense, and close range speed shooting skill components of the AAHPERD-BST at the post-intervention phase than at the pre-intervention phase. Results of the study, however, did not demonstrate that a significant difference occurred between or within groups on flow state measure.

Upon initial inspection, the AAHPERD-BST differences in the dribbling and defensive skills may appear minimal. However, as these skills are scored using tenths and hundredths of a second, a statistically significant score may initially appear unimportant. However, to use an example, in norms conducted by AAHPERD (1984) on male college students, a .6 second lower score for the dribbling skill test is the difference between scoring in the 75th percentile group and the 95th percentile group. In the sport of basketball a player being a few tenths of a second quicker is important and often may be the difference between a collegiate level athlete and a professional level athlete.

The basis of this study is founded on the distinctive characteristics of Ernest Hilgard's (1973, 1986, 1992, 1994) neodissociation theory of hypnosis and Mihaly Csikszentmihalyi's (1975,

2000) theory of flow. This study is further founded on Unestahl's (1979, 1983) concept of an Ideal Performance State (IPS). In developing the IPS, partially defined as when an athlete performs at their best and partially through the characteristics IPS shares with the state of hypnosis, Unestahl (1979, 1983) outlined the similarities that exist between flow and hypnosis. These parallels include having an altered state of consciousness, an increased focus and concentration on task-relevant stimuli, a dissociated state from all but the task-relevant stimuli, sometimes having amnesia of the past events, and changes in perception such as time slowing down, the nonexistence of pain and an effortlessness in actions. For a thorough review of these hypnotic characteristics see Barabasz and Watkins (2005).

The findings of the present study partially support previous research that found hypnosis to be an effective tool for enhancing an athlete's performance (Pates, Cummings, et al., 2002; Pates & Maynard, 2000; Pates, Maynard, et al., 2001; Pates, Oliver, et al., 2001). The results of the study, however, did not support previous research that found hypnosis to be an effective tool for enhancing an athlete's ability to attain the state of flow (Pates, Cummings, et al., 2002; Pates & Maynard, 2000; Pates, Oliver, et al., 2001).

Previous research exploring the effects of hypnosis enhancing performance and the attainment of flow states has failed to address several important limitations. The present study attempted to use a more rigorous methodological procedure to establish the occurrence of an effect. Specifically, the present study allowed for the statistical comparisons between and within groups by using comparisons of means in analyses of covariance and paired-sample t-tests. The hypnosis group intervention consisted of a hypnotic induction technique, a hypnotic deepening technique, regression to a previous experience in which the participant experienced a state of flow, and a post-hypnotic suggestion technique. An extensively trained researcher performed all

hypnosis interventions in-person during individual sessions. Participants in the hypnosis group were compared to participants in the relaxation group, who were administered a common progressive muscle relaxation exercise similar to that administered during the hypnosis induction and to Jacobsen's (1938) technique. The present study also limited the amount of time that elapsed between the participants completing the basketball trials and the administration and completion of the flow state scale.

Hypnosis and Flow Similarities

The hypnosis intervention group demonstrated significantly better dribbling and defensive skill scores, as well as three-point shooting scores than the relaxation intervention group. The positive results of this study further add to the literature that hypnosis, as a performance enhancement tool, appears to be an effective technique. The findings are also of importance to those sport psychologists and athletes interested in enhancing performance through the use of safe, legal, accessible, and minimally time consuming techniques. The present study did not methodologically address the potential underlying mechanisms at work. This may be an important area for further investigation. However, there are some plausible explanations for the findings of the study based upon the theoretical bases of both hypnosis and flow.

On the basis of the neodissociation theory of hypnosis and the concept of flow, the present study generated hypotheses about the potential ability of a hypnosis intervention to significantly enhance an intermediate level basketball player's ability to attain the state of flow. Further, flow has been described as a state of mind in which optimal performances are capable of occurring and functioning is enhanced (Csikszentmihalyi, 1990; Jackson, 2000; Jackson et al., 2001). Flow experiences are also said to occur, at times, with peak experiences of amazing human accomplishments (Csikszentmihalyi, 1975, 2000; Jackson, 1992, 2000). Therefore, as flow was

often associated with higher levels of performance and positive experiences, further hypotheses developed. These hypotheses predicted that the hypnosis intervention would produce significantly better scores for an intermediate level basketball player's all-around basketball playing skill as well as their three-point shooting ability.

Two primary findings of Unestahl's also helped develop the aforementioned hypotheses. The first recognized the similar characteristics between hypnosis and the state of flow (Unestahl, 1979, 1983). For example, a number of theories, not surprisingly, have been proposed to explain hypnosis (Barabasz & Watkins, 2005). However, as Barabasz and Watkins state (2005), most agree that hypnosis may be viewed as an altered state of consciousness. The same may be said for the flow state (Csikszentmihalyi, 1975, 2000). Also, much like flow, "hypnosis is characterized by the person's ability to sustain a state of attention, receptive, intense focal concentration with diminished peripheral awareness," (Barabasz & Watkins, 2005, p. 76). Both may occur in an alert individual, with the capacity for intense involvement on a single point in space and time, attending only to a given task while simultaneously freeing themselves from distraction (Barabasz & Watkins, 2005). Another hypnotic phenomenon, similar to the experience of those in flow, is the apparent ability of hypnotized persons to experience greater or lesser amounts of experiential time within a given period of "real" time (Barabasz & Watkins, 2005). A typical characteristic of those deeply hypnotized is the apparent spontaneous, usually partial amnesia for that which has transpired while in the hypnotic state, as well (Barabasz & Watkins, 2005). This also is an experience frequently reported by those in flow (Jackson, 1995). For a full review of the many types of hypnotic phenomena that may occur, see Barabasz and Watkins (2005).

The second finding from Unestahl (1979, 1983) involved using regression and post-hypnotic

suggestion techniques of hypnosis. In age regression, closely related to hyperamnesia, a re-experience seems to occur with the emotions and motor movements that are presumed to have accompanied the original event (Barabasz & Watkins, 2005). As discussed in Chapter 2, post-hypnotic suggestions occur when, during hypnosis, an idea is given to the person for an event to occur later in their everyday waking state at the appearance of some signal or trigger (Heap, 1988; Weitzenhoffer, 1989). Unestahl (1973) found that post-hypnotic suggestions started with a very brief spontaneous trance, followed by a period in which the posthypnotic effects are working without the signs of hypnosis. The post-hypnotic suggestion has then briefly recalled the state of hypnosis such that participants will experience the dissociative reactions associated with hypnosis, which are similar to the feelings involved with flow. The hypnosis intervention for the current study utilized the hypnotic techniques of regression and post-hypnotic suggestion.

The participants in this study did not score significantly higher on the FSS – 2 at post-intervention. However, the elevated FSS – 2 scores of the hypnosis intervention group, more than a standard deviation above a mid-range score of 108, indicated they were already experiencing flow-like characteristics. The hypnosis group then may have experienced characteristics of flow, and thus performed better, but did not demonstrate significantly higher flow state scores. Therefore, the positive results found for the hypnosis intervention groups' ability to perform significantly better in some basketball skill tests might be attributed to the shared characteristics between hypnosis and flow, due to the post-hypnotic suggestion having briefly recalled the shared characteristics of flow and hypnosis.

Flow State Scale – 2

Determining if participants were in the state of flow proved difficult due to limitations regarding the FSS – 2. First, to interpret the FSS – 2 for the present study, a global flow construct

approach was used which received satisfactory psychometric support (Jackson & Eklund, 2002; Marsh & Jackson, 1999). There is, however, no cutoff score or range of scores to determine if the participant is in a state of flow or not. According to the FSS – 2 manual, those participants that give strong endorsements of the scales above the "mid-range" (108) are endorsing an experience where flow-like attributes existed (Jackson & Eklund, 2004). As the athlete's score increases, scale interpretation allows a researcher to determine only that an athlete had more of a flow-like experience. What cannot be determined, however, is whether a participant was in the state of flow or not.

Second, the mean FSS – 2 scores were relatively high for both groups at pre- and post-intervention. As all the mean scores were higher than a mid-range score of 108, it may be said that participants experienced flow-like attributes before intervention trials began. Scores that are initially high would then make any further significant increase in scores more difficult to produce and detect.

Third, questions surrounding the reliability of the FSS – 2 may have also been a factor in the failure to find a significant difference in scores. Because the FSS – 2 is a recently developed scale, initial tests of reliability have not yet been completed. For example, currently there is no data on test – retest reliability of the scale, which may provide more information regarding the test and its ability to measure actual state characteristics of flow. The limitations concerning the FSS – 2 mentioned here hinder the drawing of conclusions regarding if athletes were actually in the state of flow, as well as the possible enhanced performances capable of occurring when athletes were in flow.

An interesting point considered by Spiegel (2005) about hypnosis and flow is if a person is able to actually perceive their experience of flow. As Spiegel states (2005), "The very focus of

the hypnotic state in the central percept may hamper or eliminate the type of superordinate awareness that is required to make an accurate observation of being in that state, as in states of flow (Csikszentmihalyi, 1991)" (p.32).

Post-hypnotic Suggestion

Another possible basis for higher performance scores involving hypnosis and flow involves the post-hypnotic suggestion given to participants in the hypnosis intervention. As Barabasz and Watkins state (2005) hypnosis is a physiological state that can be induced where behavioral, perceptual, affect, and cognitive changes are possible. These suggestions administered under hypnosis have the ability to occur posthypnotically (Barabasz & Watkins, 2005). The suggestion for this study stated that when the participants assumed their own natural shooting position, with the basketball in their hands, they would experience the feelings of being in flow similar to a previous experience of flow. The participants then, due to the post-hypnotic suggestion, may have experienced flow-like characteristics because they recalled and had these same feelings.

Therefore, the results that found the hypnosis intervention groups' ability to perform significantly better in some basketball skill tests could be attributed to the effects of the post-hypnotic suggestion recalling the feelings of being in flow, in which optimal performances also usually occur. However, the aforementioned limitations regarding the FSS – 2 make discerning whether significantly higher performance scores in basketball were due to participants being in flow difficult.

Hypnosis and Performance Enhancement Skills

An alternative possibility for the significant differences found within the hypnosis group pre- and post-intervention performance scores, as well as the significant differences found between the hypnosis and relaxation groups post-intervention performance scores, may be the

components of performance enhancement the hypnosis intervention participants received. For example, the researcher used a hypnotic deepening technique that helped with imagery skills, such that participants could gain from the many benefits of imagery (Barabasz & Watkins, 2005; Feltz & Landers, 1983; Liggett, 2000; Murphy & Martin, 2002). Hypnosis is also believed to be a state of deep concentration, another component in which performance enhancement specialists do a significant amount of work with athletes (Barabasz & Watkins, 2005; Robazza & Bortoli, 1994, 1995; Schreiber, 1991). The hypnosis intervention group then could gain from the benefits of an improved ability to focus. Also, remembering and reliving a time in which the athlete experienced an optimal performance, as studies have shown would also likely enhance the participant's self-confidence (Barabasz & Watkins, 2005; Gould, et al., 1986; Stanton, 1983).

Any one of the aforementioned speculated explanations would seem enough to account for the findings in which participants in the hypnosis group demonstrated significantly better scores at post-intervention on the dribbling and defensive skill components of the AAHPERD-BST, as well as three-point shooting scores, than the relaxation group. The three speculated operating mechanisms would also explain the results that found the hypnosis group had significantly better scores in dribbling, defensive, and speed shooting skills of the AAHPERD-BST at post-intervention than at the pre-intervention phase. Indeed, it may have been that the enhanced overall basketball performance scores seen at post-intervention occurred due to either of the aforementioned methods operating alone or to the interaction of the separate effects.

For sport psychologists, the positive findings suggest that the hypnosis techniques, combined with other performance enhancement techniques used in this study, are effective at producing enhanced performance scores in basketball skills. It is also probable that these hypnosis techniques may be generalized to other sports, as well. The positive results of this study also

serve to reiterate the additional benefits that hypnosis can provide to sport psychologists and the athletes with whom they work.

Hypnotizability Levels

A significant limitation to this study, and a possible explanation for the results that showed that participants in the hypnosis group scored no higher on the FSS – 2 at post-intervention than relaxation group participants, was the low hypnotizability levels of hypnosis group participants. Components of the hypnosis intervention in this study revolved around the hypothesized ability of participants to age regress to a previous experience of flow, as well as use a post-hypnotic suggestion to recall the feelings of flow. Each are considered more difficult suggestions which assumes the individual will score in the midrange or better. Yet the hypnosis groups responded in the predicted directions and the relaxation group did not.

Only five participants in the hypnosis group exhibited the ability to age regress on the Waterloo-Stanford Group C Scale of Hypnotic Susceptibility (WSGC), while three demonstrated the ability to use the post-hypnotic suggestion, which likely limited their ability to effectively use either technique. This may have proved detrimental to the results of the study. If these hypnotic components were inaccessible for a participant due their inability to use them, that person would not have the hypnotic capacity to allow for sufficient use of the extensively documented benefits of hypnosis. The inability of participants to fully use these components likely hindered them from significantly raising their FSS – 2 scores. Further research would address this matter and ensure that participants are able to make use of the aforementioned techniques.

Further complicating matters were concerns regarding the WSGC group hypnotizability scales. It has been noted (e.g., Register & Kihlstrom, 1986) that rather than genuine hypnotic responsiveness taking place, group administrations may be more likely to elicit compliance from

participants. However, the opposite may be true, as well. Participants may also refrain from giving genuine hypnotic responses in a group setting for fear of appearing foolish in front of their athlete peers. This was evident to the researcher, as it was commonplace for participants to look at their cohort members during the eye closure induction of the WSGC as well as during the administration of the 12 hypnotic suggestions of the WSGC.

In his work with athletes, Unestahl (1979) used post-hypnotic suggestion with highly hypnotizable participants as a means for an individual to establish immediate concentration and to elicit positive feelings. This use of post-hypnotic suggestion was based from previous research using highly hypnotizable participants that found a statistically significant increase in the rating of well-being immediately after a post-hypnotic suggestion (Unestahl, 1974). Similar to the work of Unestahl, future hypnosis research might then involve participants with higher hypnotizability levels that could fully utilize the benefits of these supported hypnosis techniques.

Exacerbating matters were two additional concerns that likely influenced the hypnotizability scores from the group administration. First, the use of an individually administered hypnosis scale allows rapport to be achieved more easily than a group hypnosis scale. The lack of rapport building then may also have negatively impacted the hypnotizability scores. Second, there appeared to be frequent underreporting of completed suggestions by the participants. This experimenter observed scorable responses to test suggestions yet the participants failed to score them as positive. It seems very likely that given these actions, the hypnotizability scale data should not be used to interpret the positive findings for the hypnosis group as being due to something other than hypnosis per se.

Neodissociation Theory

Participants in the hypnosis group appeared to be no better than participants in the relaxation

group at enhancing their FSS – 2 scores or ability to attain flow. Results also showed that the hypnosis group did not have higher scores on the FSS - 2 from the pre- to post-intervention phase.

As previously mentioned, a person who experiences the state of flow often has optimal performances and enhanced functioning. Given this information, how were some of the hypnosis intervention group's basketball performances significantly better at post-intervention, yet their FSS – 2 scores were not significantly higher at post-intervention along with these enhanced performances? Just as the exact basis by which hypnotic interventions enhanced basketball performance is not known, exact reasons for the intervention's failure to produce significantly higher FSS – 2 scores, and thereby enhance an athlete's ability to attain flow are not known. Delving into Hilgard's neodissociation theory to search for reasons why FSS – 2 scores were not significantly higher in the current study may provide some insight.

Hilgard (1986, 1994) stated that an actuated subsystem is a subsystem that has been called upon to function at that moment in time, and is responsible for carrying out such actions as habits, pain perception, attitudes, interests, or movement. Further, Hilgard (1994) contends there are lapses of consciousness in the control of well-learned activities, like playing an instrument or driving a car, and that the actions can proceed with a bare minimum of conscious control. The well-learned actions can remain relatively self-sustained once they have begun due to some degree of unity, persistence, and autonomy of function of that subsystem. The executive ego, which controls and monitors these subsystems once they have been actuated, is then able to relinquish control and monitoring functions of these well-learned activities. The relaxing of the executive ego and its functions allows the subsystems, such as playing an instrument, to be put on a sort of automatic pilot, provided the activity is a well-learned one. The relaxing of functions

would then also free the executive ego to control and monitor other functions or subsystems, as well.

Applying these concepts of neodissociation theory, in which the control and monitoring functions of the executive ego are relinquished for well-learned subsystems, might explain some findings of the present study. For example, results suggested that the hypnosis intervention group produced significantly better scores in their dribbling and defensive skill scores at post-intervention than the relaxation intervention group. Neodissociation theory might also explain the results in which participants in the hypnosis group had significantly better scores from pre- to post-intervention dribbling and defensive skill scores. For the intermediate level athletes involved in this study these skills are simple and well-learned enough for the actuated subsystem to run itself, without the controlling and monitoring functions. The executive ego, now released from the need to monitor and control the well-learned subsystem of defensive movement, for example, then allowed the athlete to focus on other minute aspects of skill involved in the drill that enabled them to enhance their performance.

However, what if the subsystem involved is not a "well-learned" activity? What if the skill involved is complicated or the intermediate level athlete has not practiced it enough? A skill not well learned would then, according to neodissociation theory, not free the executive ego from the responsibility of controlling and monitoring this actuated subsystem. Further, the attention provided this not well-learned actuated subsystem would diminish the executive ego and its ability to monitor other functions or subsystems of a more complicated activity, such as three-point shooting. For example, there are a myriad of intricate mechanisms involved in successfully completing a three-point shot (e.g., body squared to the rim, proper leg lift, correct focus on the target, full extension of the arm and wrist, proper finger and hand placement on the ball, correct

amount of strength used from the arm and wrist, etc.) The same mechanisms are used in close range speed shooting.

Speculating from the neodissociation perspective, the complicated skill of three-point shooting, for example, would need to be a well-learned subsystem that allows the executive ego to relinquish control and monitoring functions. Limiting the executive ego's ability to monitor other subsystems that may also be involved in attempting a three-point shot would then diminish that player's ability to focus on other minute aspects of skill involved in the drill that would allow them to enhance their performance. For example, the athlete attempting a three-point shot during this study must also consider distractions, complications involved in the surrounding environment, or contend with conditions in which the player is attempting the long-range shot (e.g., lighting of the gym, time remaining to complete the drill, others observing the participant during the drill, and visual and auditory distractions in the environment). All of these conditions were common distractions for participants completing drills.

Therefore, possibly due to the participants involved with the current study primarily having an intermediate basketball ability level, their lower levels of skill or lack of practice time for the more complicated skills may have not allowed for the actuated subsystem of three-point or close range speed shooting to be released by the executive ego. The executive ego would then not be able to focus on other aspects involved with the drill, thus limiting the participant's ability to achieve flow or produce a significantly better performance in the complex skill activity. The difficulty lower skill level athletes may have in releasing the executive ego from a complicated subsystem, thus preventing them from entering flow involving such activities, corresponds with previous studies in which it was found that higher skill levels in elite athletes perhaps allows them to enter and experience flow states more often (Jackson, 1995).

To summarize, the neodissociation component of releasing control and monitoring functions of the three-point shooting or speed shooting subsystem may be lacking due to the complexity involved in the skill in relation to the ability levels of participants in this study. The dribbling and defensive skills, conversely, involve less complex activity and also resulted in significant differences. This would seem to explain the mixed results found in this study involving the speed shooting skill scores and the three-point shooting scores. It could also possibly account for the lack of significantly higher scores found at post-intervention for the FSS – 2.

Importance of Findings

The findings of the present study may be important for several reasons. First, the positive results found for enhancing performance add to the substantial literature involving the benefits of hypnosis in general, sport psychology in specific. Hypnosis as a method for performance enhancement is severely under utilized in the sport environment, indicating a substantial research to practice gap. Reasons for the sparing use could be due to misconceptions that athletes and sport and exercise psychologists have about hypnosis. This under utilization occurs despite the numerous researchers and studies that have shown the abilities of hypnosis to enhance an athlete's performance.

Also, flow is a highly sought after state by athletes at every level due to its association to high levels of performance and enhanced functioning. Despite the sport providing an ideal setting for flow to occur, it has proved to be an ever-elusive one for athletes. Methods that might enhance one's ability to attain flow will be an important breakthrough. Perhaps enough promise was demonstrated in this study to warrant further investigation and help close the research to practice gap of hypnosis.

Second, the hypnosis group in this study, as part of the hypnosis intervention, received

interventions which consisted of several components of performance enhancement skills. These techniques, such as improving the ability to focus, improving the ability to use imagery, and improving self-confidence have been found to be effective for increasing performance in previous research (Barabasz & Watkins, 2005; Gould, et al., 1986; Liggett, 2000; Schreiber, 1991).

Further, the benefits of simultaneously using hypnosis, including age regression and post-hypnotic suggestion, with these techniques is demonstrated by the positive findings of enhanced performance in this and previous studies. The techniques were also safe, accessible, minimally time consuming, professionally delivered, and within the legal and ethical guidelines for use. Thus, sport psychologists are provided here with another tool to use with athletes at all levels, and one that combines several important components of sport psychology into one technique.

Third, as the concept of flow continues to grow and expand in the literature, more than just athletes will become interested in flow. Csikszentmihalyi (1975, 2000) initially introduced the state of flow as it pertained to enjoyment in a variety of areas of life and defined it as a very enjoyable psychological state, in which an individual experienced a holistic sensation when acting with total involvement in a number of given activities. These activities could be many things. Indeed, Csikszentmihalyi (1975, 2000) developed the original theory of flow from research in such events as playing chess, dancing, surgery, and different artistic contexts such as painting and music, as well as athletic events. Since the development of the flow concept, the psychological literature contains research from diverse areas. Many aspects of life can benefit from the focus and absolute absorption involved with an activity, creating a state of mind where optimal performances and enjoyable experiences occur. Therefore, any research on such a

concept, which could positively influence people in so many different areas, would thus be important.

Limitations

As in all research that involves experimental studies the internal validity may be high. However, due to the fact that it is an experimental study, the results found here may not generalize to normal basketball performances. Steps in the present study attempted to improve the external validity of the results. For example, using the dribbling, defensive, and close range speed shooting skill components in the AAHPERD-BST, in addition to the three-point shooting, ensured that several aspects encompassing the experience of playing basketball were being considered. These skills include, among others, rapidly shooting, agility, basketball handling ability, and defensive movement (Hastad & Lacy, 1998; Kirkendall, Gruber, & Johnson, 1987). While it is hoped the results will generalize to the sport of basketball, future research has yet to be conducted in a competition setting.

Another limitation to the study is that the results may lack generalizability to the competitive environment of basketball or other sports. The lack of a competition component is a common limitation in sport psychology research and this study did not address this component, as well. Shooting, defending, or dribbling in a game situation where there is no opponent or time pressure to be considered is rare, as was the case in the basketball skill tests conducted here. This lack of generalizability detracts some from the external validity of the findings.

Some sampling concerns present limitations for the present study. Participants of the study were recruited using convenience sampling and therefore may not be truly representative of the population in general. Due to this apparent non-representative sample, the results of the study may not generalize to lower or higher skill level athletes, or other forms of sport.

Due to the drop out of some participants, the sample size was lower than anticipated, which might have caused the results to be under-powered. This possibility may have also limited the ability to detect significant differences in the study. The low participant number would also reflect poorly when considering generalizability, as it may not adequately address the wide range of possibilities provided by a larger sample.

None of the participants were actively competing in collegiate level basketball, thus causing them to have different priorities than a college level player. For example, the primary focus for participants centered upon academics, versus the motivation of a college basketball player, which may also include helping the team win or regaining their starting position. This, in turn, meant the motivation level for most of the participants was lower than would be hoped for by the researcher which may have negatively affected the study.

The design of the basketball skill tests in this study involved participants frequently starting, stopping, and waiting for others. If a participant experienced flow, this frequent stopping likely limited their ability to maintain the flow state. A better design would be to have participants continue through all four skills, without stopping until all skills are completed. The participant would complete the FSS – 2 afterward. This would limit the amount of time a participant waited and perhaps lost the state of flow.

Future Research

The statistically significant results found here warrant further investigation into the ability of the specific hypnosis techniques used in this study to enhance performance. Further research using these hypnosis techniques, either in basketball or other sport environments, seems warranted to shed further light on the effects of hypnosis on sports performance.

Of interest for future research may be to determine what possible underlying mechanism is

responsible for producing the positive results found in this study. If this mechanism can be found and isolated, then more research may follow that focus and expand upon this specific component. With the underlying mechanism found, perhaps further research will be able to enhance the chances of attaining flow.

Future research may also use rigorous methodological procedures to establish the occurrence of an effect with athletes currently involved in more formal competitive settings. With more to gain from the performance enhancement techniques involved the motivation of elite level participants may not be of concern. Researchers may also include a self-report measure to determine the participant's level of commitment or level of effort for future studies. The level of motivation may then be factored into the statistical analysis allowing for comparisons between those high and low in motivation.

This study lacked a competitive component and, therefore, the question still remains as to whether the positive results found here will generalize to a competitive environment for athletes. Future research should address this component and introduce, in some manner, a competition among the participants completing the basketball skill tests.

Conclusion

The results from the present study found that participants in the hypnosis intervention group scored significantly higher than the relaxation intervention group at post-intervention in dribbling and defensive skill scores from the AAHPERD-BST, and in three-point shooting scores. Participants in the hypnosis intervention group also performed significantly better at post-intervention than at pre-intervention in the dribbling, defensive and speed shooting skill components of the AAHPERD-BST. Results did not demonstrate that a significant difference occurred between or within groups regarding flow state scores.

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Appendix A

Demographic and Information Form

Age Gender Year in School

Years of Interscholastic High School Basketball Playing Experience

Years of Total Competitive Basketball Playing Experience

Do You Have Experience with Hypnosis? Yes No

Are You Currently Using Any Prescription Medications? Yes No

Are You Currently Under the Care of a Physician and/or a Mental Health Professional? Yes No

Rate Your Ability as a Three-point Shooter:

1	2	3	4	5	6	7
Poor			Average			Excellent

Indicate Last (approximate month/year) Flow or Flow-like Experience:

(Flow - a very enjoyable psychological state in which a person experiences a holistic sensation when acting with total involvement in an activity; a state of such focused concentration amounting to absolute absorption in a given activity that it inherently creates a state of mind where optimal performances are capable of occurring and usually do; where the mind and body are in harmony, negative thinking and self-doubts are absent, and functioning is enhanced (Csikszentmihalyi, 1990, 2000; Jackson, 2000; Jackson et al., 2001))

Appendix A - Continued

Contact Information

Name:

Preferred method to be reached: Phone E-mail

Phone #:

E-mail address:

Appendix B

INFORMED CONSENT

THE EFFECTS OF HYPNOSIS ON FLOW AND IN THE PERFORMANCE ENHANCEMENT OF BASKETBALL SKILLS

The information in this consent form is provided so that you can decide whether you wish to participate in the study. The purpose of this study is to determine the effects of hypnosis on flow and in the performance enhancement of basketball skills. The Institutional Review Board of Washington State University and the University of California at Davis have approved the participation of volunteers for this research.

Prior to being admitted to this study, participants will be asked to pass a screening test of three-point shooting ability. As this is a hypnosis study, your hypnotic capacity will be assessed by a standardized test of hypnotizability. Participating in these scales will involve relaxation instructions and the opportunity to see how you respond to hypnosis. Participation will also involve age regression. Age regression involves imagining that you are back at certain ages and describing where and what you are doing at that time. You will be informed about hypnosis and have an opportunity to have all your questions answered. The amount of time for this task will be approximately one hour. All hypnotic inductions will be performed by an advanced graduate student trained in hypnosis.

Upon admission to the study, participants will complete pre-intervention phase basketball skills, three-point shooting and all around basketball skills as measured by the American Alliance for Health, Physical Education, Recreation and Dance – Basketball Skills Test (AAHPERD-BST) and flow states, as measured by the Flow State Scale – 2 (FSS – 2). Upon completion of this, they will be divided, using their Waterloo-Stanford Group C Scale of Hypnotic Susceptibility (WSGC) scores, into two groups, a hypnosis intervention group and a relaxation exercise group.

The hypnosis group will receive a relaxation induction of hypnosis (the first portion of the Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C), followed by a staircase to a beach deepening technique, and asked to remember a previous experience of flow or an optimal performance in basketball, and involve a post-hypnotic suggestion to help them recall this event in detail and at will.

The relaxation group will receive training in a progressive muscle relaxation technique, designed to help athletes reduce anxiety or arousal levels, such that they may better control their individual zone of optimal functioning (IZOF), as levels outside this may be detrimental to their basketball skills performance. Both groups will then be asked to complete post-intervention phases of three-point shooting, AAHPERD-BST, and the FSS – 2, with both utilizing their training techniques.

You will have the opportunity to ask questions at any time and seek further information about the procedures or the results of the study. We will inform you should we become aware of any new information which might affect your decision to participate in the study.

Data obtained will be coded and maintained in a locked confidential file in the investigator's office. Confidentiality will be maintained. In any research reports, participants will be listed only by number code.

The risks of hypnosis are considered minimal with normal university student volunteers.

Benefits of participating in this hypnosis study may be a new experience in hypnosis, a better understanding of how you respond to hypnosis, as well as a feeling of relaxation. You may also feel different temporary experiences happening with your body such as heaviness, increased swallowing or a temperature change. You may also temporarily experience an imagined event. However, should a counseling session be needed it will be made available, through the services of the Counseling and Psychological Services (CAPS) at University of California at Davis. You may choose to not answer any questions asked of you, as well as end your participation in the study at any time without penalty. If during the course of the study or thereafter you wish to discuss your participation in or concern regarding this study you may contact Brian Vasquez at 530-297-5759, or Arreed Barabasz at 509-335-8166.

I certify that I (a) have at least three to four years of interscholastic high school basketball playing experience, (b) am between the ages of 18 and 30 years old at the time of participation, as this will help to limit the time elapsed from my last flow experience, (c) have experience prior to the beginning of the study with the state of flow or a flow-like experience, as delineated on the Demographic and Information Form, (d) have no experience with hypnosis, (e) am in good physical health, (f) am not currently in counseling nor have been previously for any psychological disorder (g) agree to document, in hours per week, the amount of time spent in practice or competition for the duration of the study, and (h) do not currently use psychotropic or recreational drugs. The requirements have been explained to me and my questions have been answered. I understand I am free to ask additional questions, choose not to answer any questions asked, and/or withdraw from the experiment at any time without penalty. You will receive a copy of this form which you should keep for your records.

Thank you for your time,

_____

Brian Vasquez, Graduate student in Counseling Psychology, 530-297-5759

I have read the above comments and agree to participate in this experiment. I give my permission under the terms outlined above. I understand that if I have any questions or concerns regarding this project I may contact the principle investigator Brian Vasquez at 530-297-5759 or the faculty advisors, Dr. Kristee Haggins at 530-752-0871 or Dr. Arreed Barabasz at 509-335-8166 or 208-301-3818. I may also contact the WSU Institutional Review Board at 509-335-9661 or the UC Davis Institutional Review Board at 916-734-6866 if I have any questions concerning participant rights.

Signature	Date
Print Name	
Phone	
E-mail Address	

Appendix C

AAHPERD-BST Administration and Scoring

Speed Spot Shooting.

The purpose of the speed spot shooting test item was to measure skill in rapidly shooting from specified floor locations and, to a certain extent, agility and ball handling. Standard equipment for this item included a standard inflated basketball, standard goal, stopwatch, and tape for marking floors. For this test five floor markers (two feet long and one inch wide) were placed on the floor. The distances for spots B, C, and D were measured 15 feet from the center of the backboard; spots A and E were measured 15 feet from the center of the basket (see Figure C1).

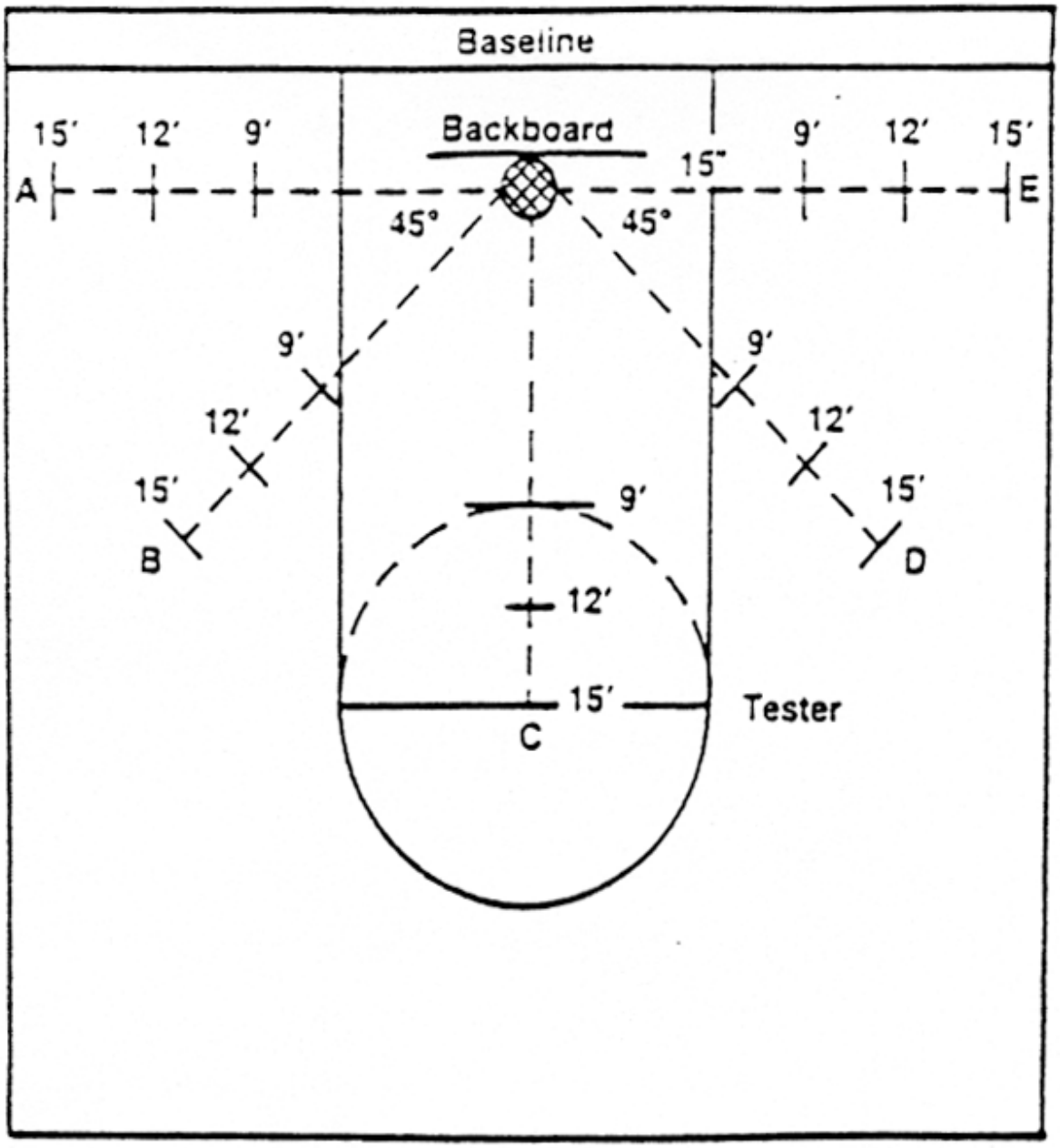
The administration of this test is conducted in three, one-minute trials. The first will be a practice trial and the next two will be recorded for scoring. The performer will stand behind any marker and on the signal, "Ready? Go!" the performer will shoot, retrieve the ball, and dribble to and shoot from another designated spot. One foot must be behind the marker during each attempt. A maximum of four lay-up shots will be attempted during each trial, but no two may be in succession. The performer will attempt at least one shot from each designated spot.

Rule infractions will be penalized as follows:

1. For ball-handling infractions (traveling, double dribble, etc.), the shot following the violation will be scored as 0 points.
2. If two lay-up shots are made in succession, the second lay-up will be scored as 0 points.
3. If more than four lay-ups are attempted, all excessive lay-ups will be scored as 0 points.
4. If the subject fails to shoot from each of the five designated spots, the trial will be repeated.

Two points are awarded for each basket made, including lay-ups. One point is awarded for an unsuccessful shot that hits the rim. Final score will be the total points from the two trials.

Figure C1. AAHPERD-BST – Speed Spot Shooting Skill Test.



Dribbling Skill Test

The purpose of the control dribbling skill test item is to measure skill in handling the basketball while the body is moving. Standard equipment will include an inflated basketball, six vinyl soccer training cones, and a stopwatch. An obstacle course marked by the six cones will be set up in the free throw lane of the court.

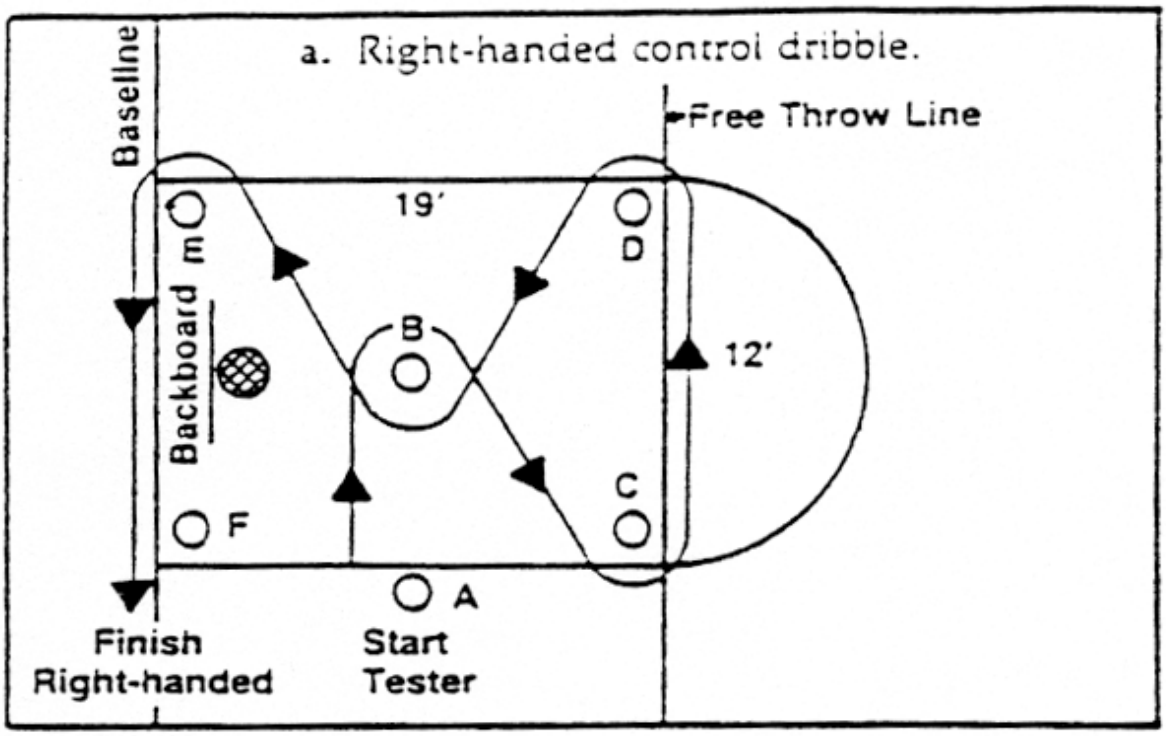
Three timed trials will be administered with the first as a practice trial and the last two scored for the record. With the basketball, the performer will start on his nondominant-hand side of Cone A. At the signal, "Ready? Go!" the performer will dribble with the nondominant-hand to the nondominant-hand side of Cone B. The performer will then proceed to follow the course using whatever hand is deemed appropriate until the finish line is crossed by both feet (See Figure C2).

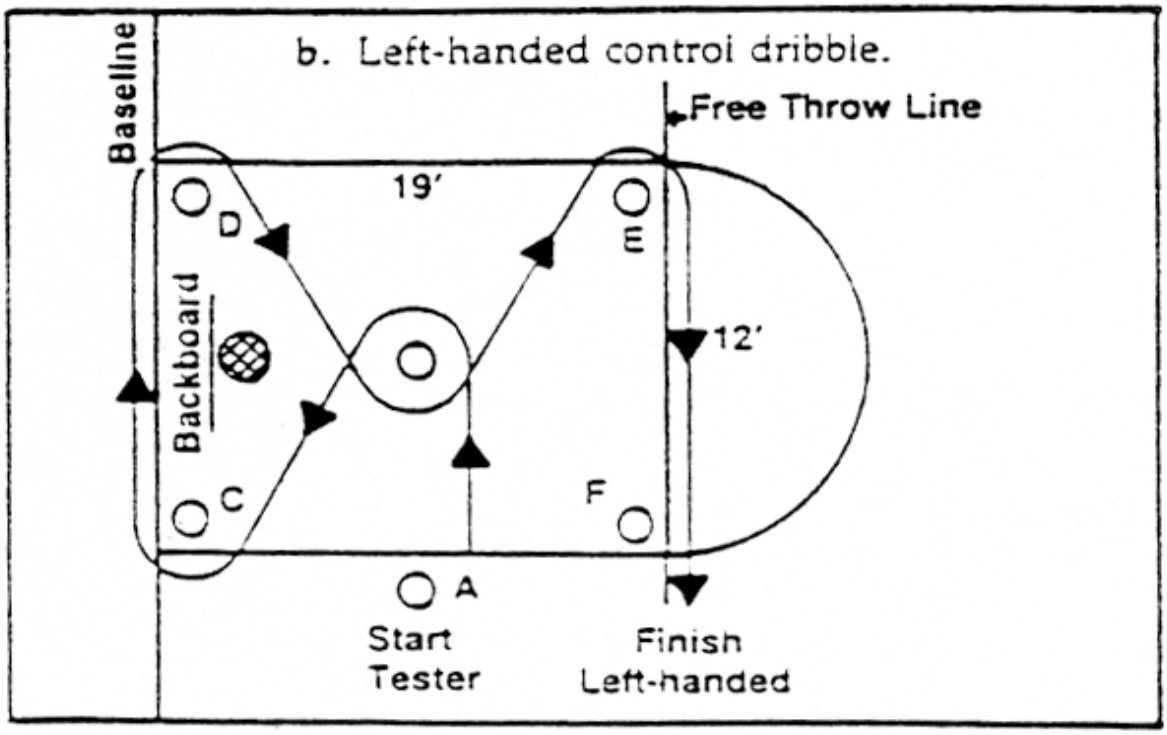
Rule infractions will be penalized as follows:

1. For ball-handling infractions (traveling, double dribble, etc.), the trial will be stopped, the participant will be returned to the starting point, and the trial will be restarted.
2. If the performer or the ball fail to remain outside the cone (including dribbling the ball either inside or over the cone), the trial will be stopped, the participant will be returned to the starting point, and the trial will be restarted.
3. If the subject looses control of the ball and fails to begin at the point in the course where control is lost, the trial will be stopped, the participant will be returned to the starting point, and the trial will be restarted.

The score for each trial will be the elapsed time required to legally complete the course. Scores will be recorded to the nearest .10 of a second for each trial and the final score will be the sum elapsed time of the two trials.

Figure C2. AAHPERD-BST – Dribbling Skill Test.





Defensive Skill Test

The purpose of the defensive movement skill test is to measure performance of basic defensive movement. Standard equipment will include a stopwatch, standard basketball lane, and tape for marking change-of-direction points. The test perimeters will be marked by the free throw line, the boundary line behind the basket, and the rebound lane lines, which will be marked into sections by a square and two lines. Only the middle line (rebound lane marker) will be a target point for this test. Additional spots outside the four corners of the area will be marked with tape at points A, B, D, and E (See Figure C3).

There will be three trials to the test with the first being a practice trial and the last two being scored for the record. The performer will start at point A and face away from the basket. On the signal, "Ready? Go!" the performer will slide to the left without crossing his feet and continue to Point B, touch the floor outside the lane with the left hand, execute a drop-step, slide to Point C, and touch the floor outside the lane with the right hand. The performer will continue the course as diagrammed. Completion of the test will occur when both feet cross the finish line.

Rule infractions will be penalized as follows:

1. If the performer crosses his feet during the slide or turns and runs, the trial will be stopped, the participant will be returned to the starting point, and the trial will be restarted.
2. If the performer's hand fails to touch the floor outside the lane, the trial will be stopped, the participant will be returned to the starting point, and the trial will be restarted.
3. If the performer executes the drop-step before his/her hand touches the floor, the trial will be stopped, the participant will be returned to the starting point, and the trial will be restarted.

The score for each trial will be the elapsed time required to legally complete the course. Scores will be recorded to the nearest .10 of a second for each trial and the sum elapsed time of the two trials will be the final score.

Figure C3. AAHPERD-BST – Defensive Skill Test.