A Model System: Resilience and Performance Strategies as Predictors of Flow State in Elite Three-Day Event Equestrians

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Accessibility
A Model System: Resilience and Performance Strategies as Predictors of Flow State in Elite Three-Day Event Equestrians

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A Thesis in the Field of Psychology
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Abstract

This study investigated the roles of resilience and performance strategies on flow state outcomes in elite three-day event riders by examining (i) baseline resilience levels, (ii) performance strategies used in specific competitions, (iii) flow state of riders in those same competitions, and (iv) the correlations among these three variables in participants as a whole and in subgroups of competitors differentiated by the highest level each individual had competed. Given the scarcity of research on elite three-day eventing athletes, this study aims to bridge the current gap between studies of competitors in other equestrian disciplines as well as studies of personality traits and states of athletes and individuals in other sporting and performance domains that involve high-risk and sustained focus. The study hypothesized that elite three-day eventing athletes would demonstrate higher baseline resilience and dispositional flow characteristics than members of the general population, and that higher baseline resilience levels and better use of performance strategies would predict higher levels of flow state within the group of elite three-day eventing athletes. Participants consisted of international level three-day eventing athletes competing in the United States in the Spring 2021 Fédération Equestre International (FEI) eventing season. Athletes were recruited through Facebook and emails. A self-report questionnaire format was used to collect data. Flow state during specific competitions was measured using the Flow Short Scale. Baseline resilience levels were measured using the Connor-Davidson Resilience Scale-10 (CD-Risc 10). Use of performance strategies in relation to the same specific competitions was assessed using
the Test of Performance Strategies-3 (TOPS 3). The results showed significance in correlation between baseline resilience levels and flow state for all athletes, as well as significant correlations in the performance strategies sub-scales of emotional control and negative thinking in relation to flow state and significant correlations in the performance strategies sub-scales of automaticity, emotional control, activation, self-talk, negative thinking, and attention control in relation to resilience. Additionally, there were no significant findings between an athlete’s highest level of experience and their resilience scores or flow scores, but both resilience levels and flow state scores were higher than that of the general population. This study is the first of its kind conducted on three-day eventing athletes and indicates a self-selection of riders in the elite levels of three-day eventing based on riders who already demonstrate high levels of resilience as well as high propensity for experiencing flow state in competition.
Frontispiece
Author’s Biographical Sketch

After graduating Suma Cum Laude with a BA in English and theater from Rutgers University in 1998, Ashley E. B. Johnson has competed at the international level in three-day event riding since 2001. In 2002 she was invited to participate in the United States Equestrian Team’s Developing Rider Program. In 2014 she had a top 25 finish with her horse Tactical Maneuver at the Fair Hill International CCI4* fall eventing championship and in 2015 a top 15 finish at the Jersey Fresh CCI4*. In 2016 and 2018 Ashley and Tactical Maneuver completed the Land Rover Kentucky CCI5* with clear cross country rounds, and in 2017 the pair finished 26th at the Fair Hill International CCI4*. Ashley also holds a United States Dressage Federation Bronze Medal and competes in straight jumper competitions through 1.35 m with her mare FireFly. Ashley is a Graduate ‘A’ of the United States Pony Club and is the head coach for the University of Florida Eventing Team as well as holding her United States Equestrian Federation ‘r’ judge’s license and technical delegate’s licenses. In 2018 Ashley returned to school to study psychology through Harvard University’s Studies in Extension.
Dedication

I dedicate this work to my parents Pamela B. Johnson and Dr. James Turner Johnson for teaching me to think critically and openly and for inspiring me to cultivate my intellect since my earliest childhood, as well as for their unfailing support in my passions and studies throughout my life.
Acknowledgments

I would like to express my deepest gratitude to my thesis advisor Dr. Shelley Carson and my research advisor Dr. Adrienne Tierney for pushing me to refine my ideas and clarify my purpose in creating this study and seeing it through, and for being inspiring teachers by always helping me feel that my questions were good ones. It was through their support and guidance that this thesis has become a reality.
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Chapter I

Introduction

A professional fireman is dropped onto a mountainside to battle a raging forest fire. A Navy SEAL is sent on a covert mission to capture enemy personnel. An elite athlete in a high-risk sport tackles competition against the best in the world. These three situations demand both physical and mental fortitude over an extended period of time. What differentiates the good from the best, and what enables the best to maintain emotional control and focus while enduring extreme pressure and discomfort? Examining elite outliers in different domains helps to shed light on the arsenal of personal tools that these individuals have developed to eventuate positive performance outcomes. The technical, high-risk equestrian sport of three-day event riding is one such domain worth examining.

Three-Day Event Riding as a Model System

Three-day event riding is an equine triathlon derived from cavalry training. In the modern era it is one of the few international sports where men and women compete against each other as equals. During a competition, each horse and rider combination is judged in three specific phases — dressage, cross country jumping, and show jumping — over a multi-day competition. The dressage phase entails executing a set pattern in an arena in front of a judging panel and is akin to asking the horse, a 1,200-pound live animal, to dance. Dressage necessitates harmony, fluid physical strength for both horse
and rider, and correct timing of rider cues, or aids. The two jumping phases involve courage, speed and accuracy. Show jumping is performed in an arena over a course of jumps and points are assessed if jumps are knocked down. In the cross country phase of three-day eventing, however, the obstacles are solid and do not collapse. This, in particular, makes three-day event riding a high-risk sport (Rules for Eventing, 2020). Performance levels range from introductory through Olympic caliber. In colloquial terms, three-day event riders at all levels are considered to be “brave” because of the challenges inherent with riding horses while galloping at solid obstacles. Resilience, emotional regulation, mood control and personality traits may all play a role in influencing performance within this sport. Further, equestrian sport as a whole is different than other types of sport in that there is a live animal involved. The dyadic relationship between the horse and rider team makes the psychology of successful performance more intricate. The equine athlete is the one who will clear the obstacles, however the rider, who is the leader, must use invisible cues to direct the horse's actions.

The emotionality of the rider has been shown to influence the performance of the horse (Bridgeman et al., 2013; Chamove et al., 2002; Keeling et al., 2009). See Figure 1. In addition to the clear influence of rider emotion on equine performance outcomes, three-day event riding is a worthwhile sport to explore because of the unique skills necessary for each of the three phases of competition, and because of the unpredictable nature of the cross country element of the sport. Dressage and show jumping demand focus, accuracy, and correct execution in an arena setting. In addition, in the cross country phase the horse and rider combination must contend with speed, natural obstacles, weather, and changing terrain. See Figure 2.
Figure 1. Sydney Elliot praises QC Diamante at the 2021 Rolex Kentucky CCI5*.

*Photo credit U.S. Equestrian.*

The combination of these three phases into a whole sport makes psychological hardiness and mental clarity under pressure even more important. Finding flow state during competition may facilitate safe execution because of the clear merging of action and awareness that is achieved during flow state in sport (Jackson & Csikszentmihalyi, 1999). The multi-day format of three-day eventing also necessitates that athletes have a high level of competency over an extended period of time. Given that high-level three-day eventing is a sport where physical and psychological preparedness and sustained engagement under pressure are critical, do athlete performance strategies and baseline resilience levels predict levels of athlete flow state?
Figure 2. Lauren Nicholson and Vermiculus competing cross country in the rain at the 2021 Land Rover Kentucky CCI5*.

*Photo credit U.S. Equestrian.*

Building on the concept of flow state (Csikszentmihalyi, 1975; Csikszentmihalyi, 1996; Csikszentmihalyi and Csikszentmihalyi, 1988) researchers began to quantify the experience of flow in athletics (Cathcart et al., 2014; Jackson, 1995; Jackson et al., 1998; Jackson & Csikszentmihalyi, 1999). In equestrian sport and other high-risk domains, research on flow state is limited, but points to flow state as a desired psychological state for optimal performance (De La Vega et al., 2015; Jackman et al., 2019; Meyers et al., 1999; Wolfram et al., 2010). The concept of resilience and its various dimensions has been looked at extensively in recent years (Dweck, 2006; Galli & Vealey, 2008; Luthar et al., 2000; Masten, 1994; Masten, 2001; Ryff & Singer, 2003; Tedeschi & Calhoun, 2004; Skodel, 2010). Certain researchers have translated resilience studies to athletes (Galli &
Gonzalez, 2014; Galli & Vealey, 2008; Van Rossum, 1996). Additionally, the use of performance strategies is predominantly studied in the sporting domain (Hardy et al., 2010; Taylor et al., 2008) with Iungano et al., (2019) studying both resilience levels and performance strategies in show jumping equestrians. By and large, however, only very limited research has been conducted concerning these concepts and performance in equestrian sport.
Study Aim and Hypotheses

The purpose of the current study is to use equestrian three-day eventing as a model system to determine the psychological factors involved in accessing and maintaining peak performance under these challenging and complex conditions. The research question asks whether higher baseline resilience scores and stronger usage of performance strategies in elite three-day event riders contribute to accessing higher levels of automated flow state during competition. In short, the better an elite athlete will have honed his/her cognitive and emotional performance strategies and the higher his/her level of baseline resilience, the more likely he/she will be to experience flow states during competition. Specific hypotheses of the study are as follows:

_Hypothesis 1:_ Elite eventers will demonstrate higher levels of flow disposition and resilience than the general population.

_Hypothesis 2:_ Elite eventers at the highest levels of competition will demonstrate higher levels of flow disposition and resilience than those at lower levels of competition.

_Hypothesis 3:_ Positive performance strategies will predict both flow disposition and resilience among elite eventers.

Significance of Study

To date, no other studies have specifically evaluated flow state, resilience levels, and performance strategies in elite three-day event riders. This study builds towards athletes creating a personal arsenal of self-management tools that relate to emotional control, developing resilience, and limiting psychological arousal under pressure. The broader implications of this study involve situations necessitating mental strategies and
resilience such as military and first responder experiences, elite performance in athletics, and even individuals working with anxiety, depression, and PTSD. In a society that often prescribes drugs to stabilize mood states, the tools that these athletes use are skills that could be honed by an individual in the general population to help to inform the treatment of anxiety, depression, and other mood-altering conditions.

Definition of Terms

Elite three-day event equestrians: competitive three-day event riders who compete at the internationally sanctioned levels of Fédération Equestre International (FEI) CCI1*-S to CCI5*-L (Olympic Level).

Emotional regulation: a facet of emotion control wherein an individual manages the generation, experience and manifestation of emotions (Gross, 2010).

Flow state: the positive mental state of being completely absorbed, involved and aware in an activity, or the feeling of being ‘in the zone’ (Csikszentmihalyi & Csikszentmihalyi, 1988).

Peak Performance: the moment when an individual is most successful in performing a task (Hornby et al., 2015).

Resilience: dynamic change in the face of adversity that results in positive adaptation (Luthar et al., 2000).

Three-day eventing: an equine triathlon derived from cavalry training. Each horse and rider dyad compete within the same competition in three specific phases — dressage, cross country jumping, and show jumping. Dressage requires the execution of skilled movements. The two jumping phases involve speed and accuracy, making three-
day event riding a high-risk sport. In the cross country phase, the jumps are solid, adding additional risk. Performance levels range from introductory through Olympic caliber.

Figure 3. Doug Payne and Vandiver in the dressage phase of three-day eventing at the Tokyo Olympics.

*Photo credit U.S. Equestrian.*

Background of the Problem

Three-day event riding is considered an all-around test of horsemanship and stamina. Derived from cavalry training, the modern three-day eventing horse and rider combinations perform dressage, cross country jumping, and show jumping over a multi-day competition with men and women as well as male and female horses competing against each other in a co-ed format (Rules for Eventing, 2020). Dressage is the first phase. This is a test of harmony and skill between horse and rider. Combinations perform
athletic movements such as flying changes of lead in the canter and extended trot segments in a predetermined set pattern that is scored according to the accuracy and execution of each movement. See Figure 3.

The cross country phase, or the endurance phase of three-day eventing, tests the bravery and stamina of horse and rider combinations. At the highest level, competitors gallop for three to five miles on cross-country with speed and accuracy over a marked course that is different at every competition. The course is set on natural terrain and at the highest level is comprised of thirty-five to forty-five solid obstacles measured at approximately four feet high and six feet wide, as well as ditches, banks, brush, and water (Rules for Eventing, 2020). Some obstacles are set in the gallop lane as an individual jumps, while other “combinations” have multiple elements that are sequentially marked and must be completed with a short number of steps between the obstacles (Rules for Eventing, 2020). These combination obstacles are often narrow or necessitate quick changes in balance for horse and rider, such as dropping into a water complex, continuing for three strides, jumping a narrow wedge in the water itself, continuing for four strides, and then jumping up a bank. Three-day eventing athletes contend with a need for extended focus and strategy, the ability to compete in raging heat or driving rain with possible equipment malfunctions, and the ability to perform throughout while in harmony with a live animal as a partner.

The final phase, which is the show jumping phase, consists of jumping ten to sixteen obstacles in an arena set by a course designer in a unique pattern for each competition. Examples of show jumping challenges include jumping three jumps in a row that are each only one stride apart, or jumping one jump off of a left turn and the next
jump off of a right turn (Rules for Eventing, 2020). Show jumping obstacles are of a similar height to the cross country jumps of the same level, but they are created with rails and planks and are able to be knocked down by the horses, which then incurs penalties (Rules for Eventing, 2020). This phase tests continued effort, accuracy and focus of the horse and rider dyad. See Figure 4.

![Image of horse and rider in show jumping phase](image)

Figure 4. Will Coleman and Off the Record competing in the show jumping phase of the 2021 Land Rover Kentucky CCI5*.

*Photo credit U.S. Equestrian.*

Risk is an inherent factor in three-day eventing. Resilience, flow, performance strategies, and emotional regulation may all play roles in influencing peak performance in this Olympic discipline. By studying elite three-day event riders, we have an opportunity to understand the relationship among these factors. This can illuminate how to achieve
optimal performance under sustained pressure high-risk circumstances and provide a model system of necessary tools for individuals in broad reaching situations.

Flow

Csikszentmihalyi and Csikszentmihalyi (1988) describe flow state as the positive psychological experience of being completely absorbed, involved and aware in an activity, or the feeling of being ‘in the zone’. In order for flow to occur, an individual must move into a realm of optimal balance between challenge and skill. One key principle of flow is that it relies heavily on individual, subjective perception of an experience (Jackson & Csikszentmihalyi, 1999). Thus, when individuals feel that they have the necessary skills to meet the challenges set forth, they are more likely to attain flow state. This optimal state, however, can be elusive. If the challenges are perceived to be too great, anxiety will result; if the challenges are perceived to be too small, boredom will result. The attainment of flow state, therefore, hinges on subjective perception.

Jackson (1995) interviewed 28 elite level athletes from seven different sports about their experience of flow state. These elite athletes perceived flow to be potentially within their control. They identified that factors such as preparation, confidence and focus as well as optimal arousal level influenced whether or not flow occurred.

Csikszentmihalyi (1996) labels flow as an ideal and focused state of having a high quality of experience, or a state where the discovery of novelty stimulates the pleasure centers in the brain. Flow, once entered, is an almost automatic state, and it aids in creating clarity of goals. Flow often comes through “painful, risky, difficult activities that stretched the person’s capacity and involved an element of novelty and discovery” (Csikszentmihalyi, 1996, p. 110). With elite athletes, eminent individuals in other fields,
and professionals in high-risk occupations, quality flow state enhances performance (De La Vega et al., 2015; Jackson, 1995). Csikszentmihalyi (1996) notes that, “While in flow, the individual becomes less aware of self, and more aware of what needs to happen next. Action and awareness are merged.” (p. 111).

In equestrian sport, flow state is both a mental experience for the athlete and a physical experience between the athlete and the equine, indicating an enhanced level of bodily awareness and kinesthetic ‘feel’. In interviewing 10 professional national hunt jockeys in the United Kingdom, Jackman et al. (2019) found that jockeys experiencing flow state noted alterations in balance, strength of touch, and arousal in relation to sensory information received from the horse. This interspecies study highlights the addition of a physical balancing of challenges and threats, on top of mental cognizance, needed to attain flow state in high-risk equestrian sport.

Once optimized, individuals in a flow state are also able to internalize criteria of judgement within their own field, which allows them to give self-feedback (Csikszentmihalyi, 1996). This is critical in a broad range of situations. Using both quantitative and qualitative measures, De La Vega et al. (2015) studied flow in six professional firefighters during a high-risk simulated training exercise. Higher states of flow were correlated with higher levels of expected or perceived performance. This study reinforces the utility of achieving flow state in optimal execution of a task and the relevance of studying flow states and positive outcomes in high-risk environments.

For the elite athlete, flow states are a result of mastery (Jackson et al., 1998). During flow state, intrinsic reward is high and generally outweighs the motivation of extrinsic reward (Csikszentmihalyi, 1996). The predisposition of an athlete to experience
flow has also been studied (Cathcart et al., 2014), with higher Dispositional Flow Scale scores being related to improved athletic performance. When an athlete is able to be “in the zone” the flow state boosts optimal productivity and goal achievement in sport.

Due to the grueling nature of three-day event riding, successful performance over three days of competition hinges on partnership and perseverance. Flow is crucial to elite level three-day event riders both because of the potential for enhanced kinesthetic partnership between horse and rider (Jackman et al., 2019) and because of the decreased risk potential in the sport through automated action associated with flow state (Cathcart et al., 2014; De La Vega et al., 2015). For an individual to perform at his/her best during a three-day eventing competition, flow state is a desirable goal. Through investigating the levels of flow state in elite level three-day eventing athletes in this study, more concrete data will be gleaned that will add to the body of knowledge on flow state in high-risk circumstances as well as flow state in a demanding athletic endeavor that requires extended focus and both physical and mental engagement.

Resilience

Whereas flow state is measured in response to a specific activity, resilience is a quality that is stable across a longer period of time. Resilience refers to the ability to engage in dynamic change in the face of adversity, resulting in positive adaptation (Luthar et al., 2000). Thus, baseline resilience contributes to how one responds to adversity. Skodel (2010) notes that certain personality factors such as hardiness, a positive ego and a future-oriented thought process are predictive of resilience. Strong interpersonal relationships are also predictive of resilience in individuals and act as protective factors (Skodel, 2010). Dweck (2006) shows that a growth mindset, defined as
a mindset that uses purposeful engagement to move forward, is another predictive factor in determining how resilient an individual is, as well as optimism, self-efficacy, and a sense of ultimate purpose. Combined, these tools increase adaptive functioning and resilience at the highest levels.

Resilience, however, can also be developed (Galli & Vealey, 2008, Ryff & Singer, 2003). Some individuals become more resilient as an outcome of one specific adversity. For example, Tedeschi and Calhoun (2004) describe psychological growth that occurs following single events that disrupt world views or self-perceptions as post-traumatic growth. These events could be surviving cancer, near death experiences, or the loss of a loved one. Post-traumatic growth is often signified by greater spirituality, a sense of personal strength, closer interpersonal relationships, and appreciation for the small things in life. Further, Masten (1994), in studying at-risk children, posits yet another dimension by suggesting that resilience can be viewed as a process of adapting to adversity rather than as an outcome of a specific adverse event.

For top athletes, resilience is not the outcome of a single adversity, but rather a process of adaptation to adversity over time. This gradually builds resilience (Galli & Vealey, 2008). Elite athletes must overcome adversity repeatedly, through years of training and perseverance. Athletes that move into the highest echelons of sport must overcome failure and stay future-oriented, demonstrating sustainability, hardiness, and a growth mindset (Galli & Gonzalez, 2014).

The development of resilience in high-level athletes is an in-sport process wherein the athlete grows in response to adversities, skill development, perspective, and psychological development (Galli & Vealey, 2008). Conversely, however, in-sport
stressors, if not in the correct balance for the individual athlete, can lead to future 
sensitivity and negative reactions to future adversity, which can engender psychological 
vulnerability (Masten, 2001). In horseback riding, this is called ‘over facing’. A rider 
who has suffered a traumatic fall from a horse over a specific type of jump will innately 
fear that type of jump unless allowed to practice the same jump at an easier scale 
(Wofford, 1995).

One group of individuals with high levels of baseline resilience are special forces 
candidates in the United States Military. This elite group of individuals submit to 
rigorous training that is physically and psychologically beyond the scope of endurance 
for most people. Ledford et al. (2020) studied physiological biomarkers of resilience as 
well as psychological resilience in 113 Navy SEAL candidates in their First Phase of 
Basic Underwater Demolition/SEAL (BUD/S) training. During BUD/S training, 
candidates must exhibit high levels of physical prowess while enduring sleep deprivation 
and other antagonistic experiences such as crawling through mud or operating in freezing 
cold water. The First Phase, lasting 54 days, generally has the highest attrition rate of the 
training sequence. In this study, 47 candidates completed First Phase while 66 dropped 
out or were rolled to another training session for administrative or medical reasons. All 
candidates scored higher than population averages on the CD-RISC resilience 
measurement; however, candidates who successfully completed the First Phase of BUD/S 
had higher CD-RISC resilience scores than those who did not. The difference in baseline 
resilience scores accounted for approximately 9.0% of the variance in a candidate’s 
ability to complete First Phase. Thus, even among highly resilient individuals, 
differences in baseline resilience levels influence performance outcomes.
In equestrian sport, Iungano et al. (2019) studied the correlation between resilience and performance strategies in 101 British competitive show jumping riders. Scores on the CD-RISC Scale and responses to the Test of Performance Strategies (TOPS-3) inventory were assessed. The TOPS-3, developed by Thomas, Murphy, and Hardy (1999) focuses on nine factors: Self-talk, emotional control, automaticity, goal setting, imagery, activation, relaxation, negative thinking, and attention control (distractibility). In this study, resilience scores had positive correlations to the ‘emotional control’ facet of the TOPS-3. Additionally, higher levels of ‘emotional control’ positively predicted higher levels of underlying resilience. Conversely, there was a negative correlation between ‘negative thinking’ and resilience scores. Iungano et al. (2019) concluded that the use of performance strategies in competitive show jumping may be beneficial in the development of resilience. Specifically, through the use of positive self-talk, automaticity and increased emotional control, an equestrian’s ability to recover from adversities in this sport may be a malleable skill that is under the control of the individual.

Assessing athlete resilience in this study is important for two reasons. First, baseline levels of resilience may influence a three-day event rider’s ability to attain flow state. Given that resilience in athletes can develop over time with consistent exposure to adversity that does not ‘over-face’ an athlete, the correlation between resilience and flow state in the data could suggest that riders who are having trouble attaining flow state may wish to utilize resilience interventions to increase baseline resilience levels. This dynamic could also be explored in other high-risk, sustained pressure environments that benefit from flow state and high levels of resilience. Second, the relation between
resilience and flow may be relevant in assessing resilience as a protective agent against psychological trauma such as PTSD or mental illness. Knowing that resilience has been implicated as a mediator in the development of mental illness after exposure to trauma, Rakesh et al. (2019) propose that levels of resilience can quantifiably determine PTSD risk. Just like in flow state where there is an optimal balance between challenge and skill, there may also an appropriate amount of adversity that can be meaningfully assimilated by an individual. This adversity level would be directly related to a baseline resilience profile. Understanding the utility of this type of metric in high stress and high-risk environments could lead to developing stronger protocols for protective assessments as well as developmental programs to increase individual resilience, and thereby help to prevent psychological trauma.

Performance Strategies

Many inventories specific to athletes have been established to measure sport-related behaviors because of the link between key psychological characteristics and positive performance outcome (Hardy et al., 2010). These inventories target the measurement of psychological skills utilized by athletes and have been used in an effort to refine sport training programs. The Test of Performance Strategies (TOPS) is one of the most commonly accepted instruments in sport research (Weinberg & Gould, 2011). Elite athletes utilize different performance strategies to optimize competitive performance. TOPS addresses both competition and practice settings with two different sub-scales. The original TOPS instrument (Thomas et al., 1999) consisted of eight sub-scales in both competition and practice settings: self-talk, emotional control, automaticity, goal setting, imagery, activation, relaxation, and negative thinking. After
further review (Hardy et al., 2010), the sub-scale of emotional control was divided into the two sub-scales of emotional control and attention control (distractibility), leading to nine sub-scales in the 68 item TOPS 3 instrument: self-talk, emotional control, automaticity, goal setting, imagery, activation, relaxation, negative thinking, and attention control (distractibility).

In a study focused on the performance strategies of Olympic athletes, 176 participants in the 2000 Sydney Olympic Summer Games filled out the TOPS inventory in relationship to both practice and competition performance strategies (Taylor et al., 2008). Significant differences were noted in both realms for medalists and non-medalists. Specifically, in competition itself, non-medalists used imagery more than medalists, whereas medalists used higher levels of emotion control and automaticity than non-medalists. Age and gender differences were also identified for competition strategies. Female athletes reported more positive self-talk than their male counterparts. In discriminating between two different age groups of the Olympians (18-28 years and 29-45 years) the younger group relied more heavily on automaticity while the older group had higher imagery scores. The gender and age analysis of this study directly relates to three-day event riding as it is one of only a handful of Olympic sports where men and women compete together, and the age range of competitors often spans several decades.

The use of performance strategies, although widely touted for sport-specific use, is applicable across a wide realm of psychological situations. Studying how elite athletes in a high-risk environment channel sport-specific mental skills may give insights into how to utilize similar strategies in a wide array of other outputs. Performance strategies such as positive self-talk, goal setting, visualization, emotion control, and relaxation
optimize emotional hardiness in ways that could be useful in other areas such as habit change, addiction recovery, and anxiety and depression interventions. If low levels of resilience are predictive of PTSD risk (Rakesh et al., 2019) then perhaps programs that utilize both performance strategy development and resilience interventions could be implemented in military and first responder training. If flow state can be attained in elite athletic situations to optimize performance and psychological well-being, then perhaps through utilizing performance strategies and by growing resilience levels, flow state could be trained as a tool in treating or preventing mental illness. The current study seeks to find out if baseline resilience levels influence the ability of elite three-day event riders to reach flow state, and additionally if performance strategies in three-day event riders have any relations to baseline resilience or flow state.

Utility in the General Population

Flow state and strong personal baseline resilience levels are also shown to be protective factors in the general population for disorders such as anxiety and depression, and PTSD (Dowrick et al., 2008; Mao et al., 2020; Rakesh et al., 2019). Mao et al. (2020) studied 590 Chinese university students to determine the influence of the flow experience on levels of anxiety. Through the use of self-report questionnaires, the authors found that flow was negatively associated with anxiety in that the more the flow experience the students felt, the less the anxiety experience. The students with better quality flow experiences also showed stronger levels of academic self-efficacy. In addition, Dowrick et al. (2008), focusing on the relationship of resilience and depression, conducted a longitudinal study in Australia with 100 subjects struggling with the management of depression. Through the use of semi-structured interviews, the authors concluded that the
key elements of personal resilience such as close personal bonds, expanding positive emotions, and building personal strengths, were mediating factors to participant depression.

Summary

Flow state in sport is a rewarding, high quality psychological experience that enables optimal execution of skills (Jackson & Csikszentmihalyi, 1999). It is achieved when an athlete performs challenges that are in balance with his/her skill level. It is also subjective, aligning with the perceived difficulty that an athlete feels. Elite athletes, by their nature, consistently push themselves to the edge of their capacity and challenge their physical and cognitive resources. As an athlete improves, therefore, the manifestation of flow state will adapt as well. Over time, performing a skill that once seemed difficult will eventually be done with automaticity. Thus, for elite athletes, flow is an adaptation (Jackson et al., 1998). The development of greater levels of resilience in high-level athletes is also adaptive (Galli & Vealey, 2008). As an athlete meets adversity over time, resilience grows. Iungano et al. (2019) showed that the use of performance strategies positively influenced baseline resilience levels with athletes in equestrian sport. Taylor et al. (2008) showed the correlations in elite athletes between the use of performance strategies and positive outcomes in sport. Individually, flow state, resilience levels, and performance strategies each have a distinct role in peak performance. This study investigates flow state as a desired characteristic in high-risk sport that is influenced by baseline resilience levels and trained by the execution of performance strategies.

Researchers in the field of sport performance have become increasingly focused on excellence in sport-specific characteristics and requirements. Elite athletes in sports
have honed the ability to calm the parasympathetic nervous system and accentuate certain mood states, exhibiting emotional control during competition (Jackson, 1995).

Equestrian sport is an intricate endeavor related to both the external pressures of the sport and to the mutual collaboration of a horse and rider dyad. Competitive three-day event riding is particularly complex because of the risk factors involved and the mental and physical stamina needed to complete the three phases of competition. Hardiness and sustained emotional composure are considered critical. Past research in equestrian sport has focused primarily on participants in racing and the two Olympic disciplines of dressage and show jumping. In contrast, the current study aims specifically to address athletes in the third, higher-risk Olympic discipline of three-day event riding by examining whether resilience levels and performance strategies predict the ability of three-day event riders to achieve flow. In accordance with this, the current study (a) provides expanded knowledge of three-day eventing equestrian athletes that could help promote success in competition; (b) aids in the development of better mental training programs for athletes and other individuals needing to manage emotional regulation and flow in sustained high-pressure and high-risk environments; and (c) informs skills that could be honed by individuals in the general population to help the treatment of anxiety, depression, or other mood altering conditions.
Chapter II.

Method

This study was conducted using an online study format that included established survey questionnaire metrics (explicit measures) with Likert scale responses. The study was administered via Qualtrics, with a target sample of 100 participants and was approved by the Harvard University Committee on the Use of Human Subjects, which serves as the University’s Institutional Review Board (IRB). Participants were recruited through Facebook posts and emails (Appendix C) sent directly to the qualified athletes (see inclusion criteria below) competing at ten targeted FEI competitions between March 1, 2021 and April 31, 2021. Authorization was granted from all competition organizers.

Participants

A total of 100 participants completed this study. Inclusion criteria for participation were: 18 years of age or older and a competitor at one of the FEI competitions (see below) that took place in the United States between March 1, 2021 and April 31, 2021. Three participants were eliminated due to being under 18 years of age. Additionally, the data from the three 1* athletes was also removed. The 1* level is new to the FEI and is easier than traditional FEI levels. Thus, due to the small sample size, this data was not used. Participants included male \((n = 15)\), female \((n = 78)\), and non-binary \((n = 1)\). Athletes were aged 18 to 55 years of age, with a mean age of 31.49 (\(SD = 8.85\)). Athletes represented nine different countries including America \((n = 77)\), Canada \((n = 9)\), New Zealand \((n = 2)\), Australia \((n = 1)\), Brazil \((n = 1)\), France \((n = 1)\), Norway \((n = 1)\),
Sweden \((n = 1)\), and the United Kingdom \((n = 1)\). Many participants had already competed at the 5* level \((n = 33)\) indicating a greater level of experience. For a full list of demographics see Figures 5, 6 and 7. Seventeen participants did not complete all of the measures; therefore, their data is used in some of the analyses, but not all of the analyses. Of the qualified participants, 94 completed partial data and 77 completed total data.

![Figure 5. Participant Age](image)

Figure 5. Participant Age
Figure 6. Participant Gender

Figure 7. Participant Nationality
Data was collected at every Fédération Equestre International (FEI) competition in the United States that took place between March 1, 2021 and April 31, 2021. These competitions ranged from FEI 1* to FEI 5* in level. The different FEI levels signify different levels of mastery at the international level. Each star level represents the standard of training required as well as indicating the height and difficulty of jumping efforts and of the dressage test. “Longs” at each star level are harder than “Shorts” because of the length of the cross country course and the difficulty of the dressage tests. Thus, at the international level, the FEI One Star Short and Long (1*-S and 1*L) are the most introductory level. From there, the levels get continuously harder in both the short and long formats until the 5*-L level, which is the pinnacle of the sport and the level at which Olympic games are contested. Competing at any FEI level, however, indicates a high level of competence as an eventing athlete. Below the FEI levels there are many national levels required to qualify to compete in FEI sport (Rules for Eventing, 2020).

In total, data was collected from athletes competing at ten competitions including Red Hills International CCI2*-S to CCI4*-S in Tallahassee, FL; Carolina International CCI2*-S to CCI4*-S in Southern Pines, NC; Stable View International CCI2*-S to CCI4*-S in Aiken, SC; Galway Downs International CCI2*-S to CCI4*-S in Temecula, CA; The Fork CCI2*-S to CCI4*-S in Tryon, NC; Twin Rivers International CCI2*-S to CCI4*-S in Paso Robles, CA; Fair Hill International CCI2*-S to CCI4*-S in Elkton, MD; Chattahoochee Hills International CCI2*-S to CCI4*-S in Fairburn, GA; The Ocala International CCI2*-L to CCI3*-L in Ocala, FL, and the Land Rover Kentucky CCI4*-S and CCI5*-L in Lexington, KY. All riders participating in these events were recruited through Facebook as well as emails sent out through the competition organizers.
(Appendix C). Letters of informed consent (Appendix A) as well as participant information forms (Appendix B) were attached to an online Qualtrics survey. Participants completed the Qualtrics survey online within two weeks of the completion of each competition. All participants were members in good standing of the United States Eventing Association and at least 18 years of age or older with no upper age limit specified.

The United States Eventing Association (USEA) reported 12,913 members in 2017 with less than 10% competing at the FEI level (United States Eventing Association Membership, 2020). Because they are internationally sanctioned, Red Hills International, Carolina International, Stable View International, Galway Downs International, The Fork, Twin Rivers International, Fair Hill International, Chattahoochee Hills International, The Ocala International, and Land Rover Kentucky represent some of the most difficult three-day events in North America during the calendar year, and in 2021 several of these competitions were also qualifiers for the Tokyo Olympic Games. All of the athletes participating in these competitions represented the most elite three-day event equestrians competing in the United States in 2021.

Measures

Participants completed three metrics summarized in Table 1. The assessments took approximately 15 minutes to complete and could be completed in any order.
Table 1. Assessment Overview

<table>
<thead>
<tr>
<th>Variable</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow State</td>
<td>Flow Short (Jackson et al., 2010)</td>
</tr>
<tr>
<td>Resilience</td>
<td>Connor-Davidson Resilience Scale-10 (Campbell-Sills &amp; Stein, 2007)</td>
</tr>
<tr>
<td>Performance Strategies</td>
<td>Test of Performance Strategies-3 (Hardy et al., 2010)</td>
</tr>
</tbody>
</table>

*Flow state:* The first measure (Appendix D) investigates the dependent variable of flow utilizes the Flow Short (Jackson et al., 2008) which assesses the frequency of flow experience in athletic endeavors. An early attempt to quantitatively examine flow state during a particular event in relation to other psychological factors was the Flow State Scale (FSS) developed by Jackson and Marsh (1996). The FSS built on the work of Csikszentmihalyi (1975), Csikszentmihalyi and Csikszentmihalyi (1988), and qualitative interviews by Jackson (1995). Jackson et al. (1998) then developed the Dispositional Flow Scale (DFS) and the DFS-2 (Jackson & Eklund, 2002) which improved the goodness of fit for certain flow dimensions (sense of control, loss of self-consciousness, and unambiguous feedback). The DFS-2 focuses on flow experience in a chosen physical activity and dispositional tendency to experience flow during physical activity through assessing the nine key dimensions of flow (merging actions and awareness, clear goals, loss of self-consciousness, challenge/skill balance, autotelic experience, transformation of time, sense of control, concentration on a task, and unambiguous feedback) with a 36-item self-report questionnaire containing four items for each element of flow. Jackson et al. (2008) refined the DFS-2 to create the Flow Short. The Flow Short utilizes nine
questions to measure the nine key dimensions of flow. It is a self-report instrument that utilizes a 5-point Likert scale. Questions include “I was not worried about what others may have been thinking of me.” and “I had a good idea about how well I was doing while I was involved in the task/activity.” Scores range from 1 = ‘strongly disagree’ to 5 = ‘strongly agree.’ Final scores range from 1.0 to 5.0 with higher scores representing individuals experiencing better quality of flow state. This task has been shown to possess both adequate reliability and validity. Jackson et al., (2008) found the Flow Short reliability to range from 0.81 to 0.90 and validity ranges from balance (0.51) to merging 0.83 (\(M = 0.73\)).

**Resilience:** The second measure (Appendix E) assesses the independent variable of resilience through the use of the Connor-Davidson Resilience Scale-10 (CD-RISC-10) (Campbell-Sills & Stein, 2007) which is commonly used for athletes but was originally developed in a longer format by Connor and Davidson (2003) while working with individuals with PTSD. The CD-RISC-10 is a ten question self-report psychological inventory that addresses concepts such as past successes and confidence, response to failure, adaptability to change, sadness and fear, the ability to not get discouraged in the face of failure, and the ability to attain goals. Final scores range from 0-40. Individuals with higher scores exhibit greater psychological resilience. Questions are answered on a 5-point Likert scale with 0 = ‘not true at all’ and 4 = ‘true nearly all of the time.’ The CD-RISC-10 measure includes items such as: “I believe that coping with stress strengthens me.” and “I tend to bounce back after illness or hardship.” Campbell-Sills & Stein (2007) found good reliability and validity in this task with the Cronbach’s alfa
value of 0.85 indicating good reliability and validity ranging from able to adapt to change (0.44) to thinks of self as strong person (0.74).

**Performance Strategies:** The final questionnaire (Appendix F) measures the independent variable of performance strategies through the Test of Performance Strategies-3 (TOPS-3) (Hardy et al., 2010) which was originally conceived by Thomas et al. (1999). The TOPS-3 assesses actual sport-related behaviors rather than simply testing baseline psychometric measures. The TOPS-3 instrument focuses on nine sub-scale factors of self-talk, emotional control, automaticity, goal setting, imagery, activation, relaxation, negative thinking, and attention control. Questions include: “I have specific cue words or phrases that I say to myself to help my performance during competition.” and “I have difficulty controlling my emotions if I make a mistake at competitions.” It is a 68 question self-report questionnaire with nine sub-scales each for practice and competition. Although participants were asked to complete the whole metric, for the purpose of this study only the competition sub-scales were used. Questions are answered on a 5-point Likert scale with 0 = ‘never’ to 4 = ‘always.’ Select items are inversely scored. This task has been shown to possess both adequate reliability and validity with Hardy et al. (2010) finding the reliability of Cronbach’s alfa = 0.70 and the validity of sub-scales ranging from self-talk (0.74) to automaticity (0.52).

**Procedure**

The study was conducted using three main protocols — data collection protocol, data cleaning protocol, and data analysis protocol. These are outlined below.
Data Collection Protocol

Following ethics clearance from the Harvard University IRB, recruitment began through a letter posted on Facebook by the primary researcher and via direct emails sent by competition organizers from the primary researcher (Appendix C). This letter contained a direct link to the survey through Qualtrics where interested participants could complete the study. Within Qualtrics, participants first completed an online consent form (Appendix A), which provided general information about the study and as well as outlining the study duration and confidentiality of participant responses. After giving consent, participants were directed to a brief demographic survey (Appendix B) to ascertain age, gender, nationality, highest level competed, and current competition level. Each participant was an internationally sanctioned competitor with the Fédération Equestre International (FEI) aged 18 or over competing in one or more of ten FEI United States based competitions between March 1, 2021 and April 31, 2021. As competition days are exceptionally busy, the surveys were filled out online post-competition, but within two weeks of the close of competition itself. The surveys were set up through Qualtrics and could be completed in any order, but were completed in one sitting with the said competition in mind. Each assessment was scored by the researcher in accordance with the guidelines for each metric. The surveys were completed anonymously. The three metrics within the Qualtrics link were the Flow Short metric (Appendix C), the CD-Risc-10 metric (Appendix D), and the TOPS-3 metric (Appendix E). The study yielded predominantly parametric data (e.g., overall and sub scores on the Flow Short, CD-RISC-10 and TOPS-3 metrics) but nonparametric data was also collected (e.g., age, sex, nationality, current competition level and highest competition level).
Data Cleaning Protocol

After data collection was complete, the following procedures were followed to clean the data. First, any participants under the age of 18 were excluded. Second, the three 1* participants were removed. Third, each entry was checked for complete data. Seventeen participants did not complete all three of the measures, therefore their data is used in some of the analyses, but not all of the analyses. Of the participants 18 years of age and over competing from the 2* to 5* level, 94 completed partial data and 77 completed total data. All of the data points were complete in the Flow Short and CD-RISC-10, however there were 13 missing data points in the TOPS-3 data. Missing data were replaced by the mean value for each variable. Participants were asked to fill out the entire 68 question TOPS-3 metric, however this study related directly to specific competitions, so for the purpose of this study, only the data from the TOPS-3 competition sub-scales were used. The data from the nine TOPS-3 sub-scales of performance strategies used in practice were not used. Additionally, to make the analyses at each level of competition more robust, the data from riders competing at the 2*-Short and 2*-Long level were combined, the data from riders competing at the 3*-Short level and 3* Long level were combined, and the data from riders competing at the 4*-Short and 4*-Long level were combined.

Data Analysis Protocol

Data analysis was completed separately for each study aim, followed by further analysis. SPSS software version 25 was used for data analysis. Means and standard
deviations were calculated for each dependent variable (flow state and resilience), with comparisons done on each independent variable (flow state and resilience), with comparisons done on each independent variable (each of the nine performance strategy sub-scales in relation to flow state and resilience as well as resilience in relation to flow state). Multiple one-way analyses of variance (ANOVAs) and correlational analyses were performed to indicate statistical significance. The following were examined:

- Examine any correlations between baseline resilience, flow, and performance strategies.
- Determine if level of current competition or highest level of competition indicates statistical significance in data findings.
- Determine if age or gender show statistical significance in findings.
- Determine through a regression analysis what performance factors contribute to higher flow scores and higher resilience scores.
Chapter III

Results

Correlation Matrix

The correlations of flow, resilience and competition performance strategies are presented in Table 2.

Table 2. Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>Flw</th>
<th>Res</th>
<th>Goal</th>
<th>Auto</th>
<th>Emot</th>
<th>Imag</th>
<th>Acti</th>
<th>ST</th>
<th>Relax</th>
<th>Neg</th>
<th>Att</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flw</td>
<td>1</td>
<td>.28**</td>
<td>-.13</td>
<td>.21</td>
<td>.35**</td>
<td>.08</td>
<td>.22</td>
<td>.08</td>
<td>-.09</td>
<td>-.36**</td>
<td>.14</td>
</tr>
<tr>
<td>Res</td>
<td>.28**</td>
<td>1</td>
<td>.20</td>
<td>.38**</td>
<td>.49**</td>
<td>.08</td>
<td>.37**</td>
<td>.30**</td>
<td>.16</td>
<td>-.42**</td>
<td>.34**</td>
</tr>
<tr>
<td>Goal</td>
<td>-.13</td>
<td>.20</td>
<td>1</td>
<td>-.15</td>
<td>-.08</td>
<td>.32**</td>
<td>.12</td>
<td>.30**</td>
<td>.41**</td>
<td>-.06</td>
<td>.03</td>
</tr>
<tr>
<td>Auto</td>
<td>.21</td>
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<td>-.15</td>
<td>1</td>
<td>.53**</td>
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<td>.29**</td>
<td>-.06</td>
<td>-.11</td>
<td>-.35**</td>
<td>.47**</td>
</tr>
<tr>
<td>Emot</td>
<td>.35**</td>
<td>.49**</td>
<td>-.08</td>
<td>.53**</td>
<td>1</td>
<td>.12</td>
<td>.28*</td>
<td>.04</td>
<td>.00</td>
<td>-.43**</td>
<td>.57**</td>
</tr>
<tr>
<td>Imag</td>
<td>.08</td>
<td>.08</td>
<td>.32**</td>
<td>-.01</td>
<td>.12</td>
<td>1</td>
<td>.06</td>
<td>.36**</td>
<td>.49**</td>
<td>-.11</td>
<td>.24*</td>
</tr>
<tr>
<td>Acti</td>
<td>.22</td>
<td>.37**</td>
<td>.12</td>
<td>.29**</td>
<td>.28*</td>
<td>.06</td>
<td>1</td>
<td>.30**</td>
<td>.23*</td>
<td>-.46**</td>
<td>.37**</td>
</tr>
<tr>
<td>ST</td>
<td>.08</td>
<td>.30**</td>
<td>.30**</td>
<td>-.06</td>
<td>.04</td>
<td>.36**</td>
<td>.30**</td>
<td>1</td>
<td>.58**</td>
<td>-.34**</td>
<td>.12</td>
</tr>
<tr>
<td>Relax</td>
<td>-.09</td>
<td>.16</td>
<td>.41**</td>
<td>-.11</td>
<td>.00</td>
<td>.49**</td>
<td>.23*</td>
<td>.58**</td>
<td>1</td>
<td>-.07</td>
<td>.21</td>
</tr>
<tr>
<td>Neg</td>
<td>-.36**</td>
<td>-.42**</td>
<td>-.06</td>
<td>-.35**</td>
<td>-.43**</td>
<td>-.11</td>
<td>-.46**</td>
<td>-.34**</td>
<td>-.07</td>
<td>1</td>
<td>-.45**</td>
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<tr>
<td>Att</td>
<td>.14</td>
<td>.34**</td>
<td>.034</td>
<td>.47**</td>
<td>.57**</td>
<td>.24*</td>
<td>.37**</td>
<td>.12</td>
<td>.21</td>
<td>-.45**</td>
<td>1</td>
</tr>
</tbody>
</table>

*= p = <.05; **= p = < .001
Flw = Flow; Res = Resilience; Goal = Goal Setting; Auto = Automaticity; Emot = Emotional Control; Imag = Imagery; Acti = Activation; ST = Self-Tal; Relax = Relaxation; Neg = Negative Thinking; Att = Attention Control

The correlation was significant between overall scores of resilience and flow ($r = .28; p = .01$). Further, flow state had a positive correlation with the competition sub-scale of emotional control ($r = .35; p = .00$) and a negative correlation with the negative
thinking competition sub-scale ($r = -.36; p = .00$). There was no correlation between the disposition for flow and goal setting, automaticity, imagery, activation, self-talk, relaxation, or attention control. Resilience had a positive correlation with the five competition sub-scales of automaticity ($r = .38; p = .01$), emotional control ($r = .49; p = .00$), activation ($r = .37; p = .00$), self-talk ($r = .30; p = .01$), and attention control ($r = .34; p = .00$) and a negative correlation with negative thinking ($r = -.42; p = .00$). Resilience levels had no significant correlations with goal setting, imagery, or relaxation. Thus, neither flow state nor resilience correlated with goal setting, imagery, or relaxation, and both flow and resilience correlated with emotional control and negative thinking. These findings support the validity of Hypothesis 3.

**Age and Gender**

There were no significant differences between males ($M = 34.33, SD = 6.59$) and females ($M = 30.92, SD = 9.20$) on the measure of flow ($t(91) = .235; p = .814$). Nor were there significant differences between males ($M = 34.33, SD = 6.59$) and females ($M = 30.92, SD = 9.20$) on the resilience measure ($t(90) = -.665; p = .508$).

In reference to age, neither flow and age ($r = .02; p = .83$) nor resilience and age ($r = .16; p = .12$) were significantly correlated. Thus, the main analyses were run as a whole, rather than by grouping for age or gender.
Flow State and Resilience

For all athletes \((n = 94)\), the mean of the flow scores from the Flow Short were 4.24, \(SD = 0.41\). The mean resilience score from the CD-RISC-10 was 32.37, \(SD = 4.51\) \((n = 93)\). The population average for the Flow Short metric is 3.82 (Jackson et al., 2008). The population average for the CD-RISC-10 is 31.40 (Paulus et al., 2012). See Table 3. These findings support the validity of Hypothesis 1.

Table 3 Mean Flow State and Resilience Scores

<table>
<thead>
<tr>
<th>Flow</th>
<th>Flow Short Mean</th>
<th>Resilience Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.24</td>
<td>32.37</td>
</tr>
<tr>
<td>N</td>
<td>94</td>
<td>93</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.41</td>
<td>4.51</td>
</tr>
<tr>
<td>Population Average</td>
<td>3.82 (Jackson et al., 2008)</td>
<td>31.40 (Paulus et al., 2012)</td>
</tr>
</tbody>
</table>

Performance Strategies

Within the means of the competition sub-scales of performance strategies, goal setting \((M = 4.12)\) and Imagery \((M = 4.11)\) were the most used by athletes, with Relaxation \((M = 2.95)\) and Negative Thinking \((M = 2.40)\) being the least used. See Table 4.
Table 4. Means of Competition Sub-Scales of the TOPS-3

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal Setting</td>
<td>4.12</td>
<td>77</td>
<td>0.74</td>
</tr>
<tr>
<td>Automaticity</td>
<td>3.76</td>
<td>77</td>
<td>0.56</td>
</tr>
<tr>
<td>Emotional Control</td>
<td>3.46</td>
<td>77</td>
<td>0.42</td>
</tr>
<tr>
<td>Imagery</td>
<td>4.11</td>
<td>77</td>
<td>0.75</td>
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<tr>
<td>Activation</td>
<td>3.85</td>
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<td>0.48</td>
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<tr>
<td>Self-Talk</td>
<td>3.30</td>
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<tr>
<td>Relaxation</td>
<td>2.95</td>
<td>77</td>
<td>1.00</td>
</tr>
<tr>
<td>Negative Thinking</td>
<td>2.40</td>
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<td>0.76</td>
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<tr>
<td>Attention Control</td>
<td>4.07</td>
<td>77</td>
<td>0.52</td>
</tr>
</tbody>
</table>

Levels of Competition

This study collected descriptive statistics from athletes concerning both the highest level at which they had ever competed as well as the level of competition at which they were competing when they completed the study (see Figures 8 and 9). In the current study, 35% \((n = 33)\) of riders had competed at the 5*-L level as their highest level
of experience. This was the largest group of athletes compared to rider’s experience at the other levels. For the level of current competition, the most frequent levels of competition for which athletes filled out surveys were 4*-S ($n = 33$), 3*-S ($n = 25$), and 2*-S ($n = 15$).

Figure 8. Level of Current Competition
Figure 9. Highest Level of Experience

In assessing further statistics, analyses were performed using both the current level at which an athlete was competing and the highest level to which an athlete had ever competed. The rationale behind this was that some riders with 5*-L experience may have been competing a young horse at the 2*-S level when they filled out the survey, therefore in examining whether experience level correlated with resilience levels, flow state and use of performance strategies, it was important to investigate both the current competition level and the highest level to which the athlete had experience. After performing a one-way ANOVA, there was no significant relationship between either flow state ($F_{(3,88)} = .477, p = .699$) and highest level of competition or resilience ($F_{(3,87)} = .160, p = .923$) and highest level of competition, thus indicating that although as a group the more resilient
athletes experienced more reliable flow state, the athletes experiencing this were not necessarily the highest level athletes (those who had competed at the 5* level). Ergo, Hypothesis 2 was not confirmed by this study.

Further analysis among groups separated the means for flow state and resilience levels at each level of current competition for study participants. See Figures 10 and 11. Although the means varied by the level within a certain range, all means were higher than population averages of other athletes (Jackson et al., 2010; Paulus et al., 2012). With flow state, the means by the levels were as follows: 2* riders ($M = 4.16, n=21$), 3* riders ($M = 4.29, n = 27$), 4* riders ($M = 4.41, n = 34$), 5* riders ($M = 4.23, n = 10$). In contrast, Jackson et al. (2010) found average flow scores for athletes on the Flow Short to be 3.82. With resilience levels, the means by the levels were as follows: 2* riders ($M = 32.52, n = 21$), 3* riders ($M = 32.88, n = 26$), 4* riders ($M = 32.09, n = 34$), 5* riders ($M = 32.20, n = 10$). Paulus et al. (2012) found average resilience scores for elite athletes on the CD-RISC-10 to be 30.6.
Figure 10. Mean Flow Scores by Level for Eventing Athletes

Figure 11. Mean Resilience Scores by Level for Eventing Athletes
Regression Analyses

In order to determine whether performance strategies predicted baseline resilience in elite three-day eventing athletes, a multiple regression analysis was performed with resilience as the dependent variable and the eight competition performance strategies as the independent variables. A model with four competition performance strategies as significant predictors accounted for almost 40% of the variance in resilience ($R^2 = .38$, $F(4,72) = 11.27, p = .000$). See Table 5.

Because resilience was related to so many performance strategies, it was considered it to be a confounding variable if entered alongside performance strategies in predicting flow state. Therefore, a hierarchical regression was performed using flow state as the dependent variable with regression in the first block of independent variables and the performance strategies in the second block ($R^2 = .13$, $F(2,74) = 5.71, p = .005$). See Table 6.

Table 5. Performance Strategies Predicting Resilience in Elite Eventing Athletes

<table>
<thead>
<tr>
<th>Variable</th>
<th>Beta</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal Setting</td>
<td>.194</td>
<td>.052</td>
</tr>
<tr>
<td>Automaticity</td>
<td>.224</td>
<td>.046</td>
</tr>
<tr>
<td>Emotional Control</td>
<td>.377</td>
<td>.001</td>
</tr>
<tr>
<td>Self-Talk</td>
<td>.243</td>
<td>.015</td>
</tr>
</tbody>
</table>
Table 6. Variables Predicting Flow State in Eventing Athletes

<table>
<thead>
<tr>
<th>Variable</th>
<th>Beta</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resilience</td>
<td>.228</td>
<td>.046</td>
</tr>
<tr>
<td>Negative Thinking</td>
<td>-.316</td>
<td>.010</td>
</tr>
</tbody>
</table>

These findings support the validity of Hypothesis 3.
Chapter IV
Discussion

General Discussion

As a high-risk and physically demanding sport, three-day event riding takes an athlete with mental fortitude and perseverance but also an athlete who is sensitive enough to be able to form a partnership with another living animal. Previous studies in high-risk activities and also in equestrian sport have touched on the parameters of flow state, baseline resilience levels and use of performance strategies in competition, but few have focused on three-day eventing athletes, or the combination of these three metrics. The current study examined three-day event riding as a model system for determining psychological factors necessary for top performance under challenging conditions in equestrian sport and other disciplines. The current study addressed the following hypotheses:

*Hypothesis 1:* Elite eventers will demonstrate higher levels of flow disposition and resilience than the general population.

*Hypothesis 2:* Elite eventers at the highest levels of competition will demonstrate higher levels of flow disposition and resilience than those at lower levels of competition.

*Hypothesis 3:* Positive performance strategies will predict both flow disposition and resilience among elite eventers.
Findings showed that baseline resilience and flow state were in fact higher than the general population, supporting Hypothesis 1. Hypothesis 2, however, was not supported. Data showed that flow and resilience were significantly correlated in the study group as a whole, however the level of athlete experience did not predict the level of resilience or flow state. The use of positive performance strategies was then examined with the nine TOPS-3 competition sub-scales (Hardy et al., 2010) in relation to flow state and resilience levels. Two sub-scales (emotional control and negative thinking) correlated to heightened flow state, and six sub-scales (automaticity, emotional control, activation, self-talk, negative thinking, and attention control) correlated to resilience, with the sub-scales of emotional control and negative thinking correlating to both resilience and flow. Regression analyses showed that in elite three-day eventers, certain performance strategies predict resilience (goal setting, automaticity, emotional control and self-talk), and both resilience and negative thinking predict flow. This supports Hypothesis 3 and gives a direction for specific strategies to improve both resilience and flow state in high-pressure atmospheres.

Flow and Resilience

The findings of this study shed light on these hypotheses in various ways. Although level of competition did not show statistical significance in relation to baseline resilience and flow state, this group of three-day eventing riders as a whole showed significantly higher levels of both resilience and dispositional flow state than population norms. The mean for athletes in this study on the Flow Short Scale was over .4 points higher than the mean for a broad range of athletes in sporting activities in the Jackson et
al. (2008) study that validated the scale. For the CD-RISC-10, the elite athletes in this study had a mean almost one point higher than the mean of healthy adult controls in Paulus et al. (2012). This is in line with studies of other highly resilient individuals in other professions. Prabhakaren et al. (2012) found the CD-RISC-10 mean of active-duty air force personnel to be .4 higher than population average and Warren et al. (2013) found the mean level of surgeons taking the CD-RISC-10 to be close to two points higher than population average. Using the CD-RISC 25 measure, Ledford et al. (2020) found the resilience levels of Navy Seals candidates undergoing BUDS training to be significantly higher than population averages as well, although of their two sub-groups the resilience levels of the dropped/rolled candidates were slightly lower on average than the candidates who successfully completed training.

The results from this study coupled with these other findings indicate that resilient individuals seem to self-select for certain professions and are able to maintain higher levels of resilience during the consistently challenging conditions of their work than population norms. The group of elite three-day eventing athletes represented in this study also showed higher levels of resilience than a similar population of equestrian jumper riders (Iungano et al, 2019), with the show jumping riders taking the CD-RISC-10 showing a mean level over 1.5 points lower than the elite athletes in the current study. This may be because three-day event riding is a higher risk sport than jumper riding.

Additionally, however, resilience is developed through utilizing the correct tools while engaging in challenging activities. Skodel (2010) and Dweck (2006) indicate personality factors such as hardiness and future-oriented thinking to be predictive of resilience. Masten (1994) and Ryff & Singer (2003) suggests that resilience is a malleable
process and more specifically Galli and Vealey (2008) and Galli and Gonzalez (2014) point to resilience being developed through in-sports achievements and failures. Although elite three-day event riders may self-select for this high-risk sport, the current data shows higher levels of resilience for 2* and 3* riders than 4* and 5* riders, indicating that there may be a sweet spot for resilience, beyond which the greater challenges of the sport actually work against resilience levels. Thus, the FEI 4* and 5* levels may be an opportune place to bolster strategies that grow resilience.

The data from this group of elite three-day event riders also indicates that as resilience grows, flow experience improves. Again, however, the balance between challenge and skill that is a crucial part of optimizing flow state (Csikszentmihalyi & Csikszentmihalyi, 1988) seems to improve between the FEI levels of 2* and 4*, as the flow scores increased level by level, only to dip again at the 5* level. The high-quality experience of flow is an optimal state for elite athletes as it enhances performance (De La Vega et al., 2015; Jackson, 1995) and helps individuals enter a state of automaticity that improves perceived performance and intrinsic reward (Csikszentmihalyi, 1996, De La Vega et al., 2015). Thus, it is critical at the most difficult levels of performance for elite three-day event riders to attempt to optimize flow state.

Performance Strategies

Within the TOPS-3 competition sub-scales, emotional control positively correlated to flow state and resilience, and negative thinking negatively correlated to flow state and resilience. Additionally, automaticity, activation, self-talk, and attention control correlated to resilience. These findings echo those of Iunango et al. (2019) in their study looking at the relationships between performance strategies, resilience qualities, and
competitive performance of national level show jumping riders. Iunango et al (2019) found a positive correlation between emotional control and resilience, as well as a negative correlation between negative thinking and baseline resilience. They also found positive correlations between activation and automaticity and resilience (p. 71). The current study found correlations with resilience with each of those same four performance strategies used in competition, as well as correlations with self-talk and attention control in relation to resilience. The overlap in findings could indicate that equestrian athletes who perform in jumping competitions have similar performance strategies that influence individual resilience levels. The fact that only two of these performance strategies (emotional control and negative thinking) were correlated to flow with elite event riders in the current study indicates that performance strategies used in competition influence resilience levels more than the disposition to experience flow. This is important because higher resilience levels aid in athletes recovering from adversities within the sport and promote better flow during competition for elite eventing athletes.

Conclusion
The results from the present study indicate that emotional control and negative thinking are both factors that relate to resilience and flow in elite three-day event riders, and that the performance strategies of goal setting, automaticity, emotional control and self-talk predict resilience, with baseline resilience and negative thinking predicting flow. Additionally, since competition level did not show positive correlations with either flow state or resilience, but both flow state and resilience were positively correlated for the group of elite athletes as a whole, the findings for this study indicate that as a group the more resilient athletes experienced more reliable flow state, but that these athletes were
not necessarily the highest level athletes or the ones who had competed at the 5* level. This coupled with the flow state and baseline resilience scores being higher than population average suggest an internal self-selection for the type of athlete who will thrive in the sport of three-day eventing at the international level as individuals who possess high levels of personal resilience and a keen ability to access automated flow state. The findings also suggest that there is a sweet spot for resilience levels and flow states within the FEI levels of the sport, with the highest levels of flow actually being experienced at the 4* level and the highest resilience levels being reported at the 3* level. This indicates that the extreme demands of the 5* level actually hinder resilience levels and quality of automated flow state by athletes.

In applying these findings to the concept of three-day event riding as a model system for broader reaching implications in high-risk high-pressure activities or for individuals undergoing challenging life situations such as trauma or depression, two important concepts come to light. First, the present study supports the use of performance strategies to improve levels of flow state and baseline resilience. This concept could be included into interventions developed for training first responders, surgeons or military personnel, as well as for interventions for individuals struggling with addiction, depression, or PTSD. Second, this study demonstrates that three-day eventing athletes as a group experience high levels of automated flow state and have high levels of baseline resilience. Although this could indicate a self-selection for the type of athlete that will thrive in this sport, it also points to a potential in-sport process wherein the balance of challenge and skill that a rider experiences as he/she moves from the national levels to the FEI levels actually hones his/her personal resilience and ability to access flow. This
concept of developing resilience and the ability for accessing flow within an endeavor is important in many types of domains and should be investigated further.

Research Limitations and Future Directions

The purpose of this research was to assess the propensity to experience flow state in elite three-day event riders in competition with regards to baseline resilience and performance strategies. It was hypothesized that those riders who experience higher levels of flow state would also have higher baseline levels of resilience as well as stronger performance strategies. The data collected, however, showed varied findings and has theoretical and methodological implications. Theoretical implications include differences in baseline resilience levels and/or performance strategies as important moderators in optimizing flow state in elite three-day event riders as a group but not necessarily by the level of experience of the athlete. It may be worthwhile to investigate differences in performance strategies, flow state, and baseline resilience further, including why certain performance strategies were more useful than others for this group of athletes and what interventions could be developed for different subgroups.

Methodological implications include having the participants take the Flow Short and TOPS-3 questionnaire at two separate competitions in the future. As resilience levels are relatively stable within short periods of time, tailored interventions based on individual rider results from the flow state and performance strategies sub-scales could be employed between competitions to potentially influence performance outcome.

The present investigation should be examined with respect to limitations that may impact the findings. The limitations of this study include the use of a convenience sample instead of a random sample. Further, the sample size is small and related to the
limited number of elite three-day event equestrians competing at select designated competitions. Additionally, as equestrians are constantly on the move, another practical limitation of this study is the difficulty in recruiting a high number of participants to complete the study within the given timeframe. Of approximately 600 athletes who were eligible to participate in this study, only 100 completed metrics. Although some of the competition entries were minors and could not participate, many athletes simply did not complete the surveys.

Further limitations include the lack of knowledge as to how the participants fared in the competition. Within every competition, there are athletes who complete the competition and possibly place in the rankings, and there are athletes who fail to complete due to elimination or injury. In the present study, it is a possibility that the responses are coming largely from the riders who completed the competition, not from the riders who did not complete and/or were eliminated. This is important because the riders who did not complete the competition could have had generally lower scores on each of these three metrics.

Another limitation of the study is that it covered multiple competitions across the country. Due to three-day eventing being an outdoor sport, each competition had unique factors concerning terrain and weather. Certain competitions may have been more comfortable to compete in than others. Three-day eventing also has three unique phases, but the present study asked riders to complete the metrics with the entire competition in mind. As certain thoughts or techniques are used in some phases, and riders may be stronger in certain phases, some of the questions may have been difficult for certain athletes to answer for the competition as a whole.
Lastly, this study relies on three self-report metrics, and self-report can be a biased form of data collection. Nonetheless, the intention of the study was to provide insight as to how potentially to assess and improve flow state during performance for athletes and other individuals in sustained pressure, high-risk environments and thus tailor mental training programs more effectively.

For future research, using a qualitative research measure such as in-person interview would add depth and breadth to any data obtained in this study. Future empirical investigations might conduct brief qualitative in-person interviews directly before or after competitive efforts. Another measure that may help to control for the bias found in self-report measures would be the use of additional physiometric measures of stress such as heart-rate monitors or pupil-dilation tests to indicate actual physical levels of arousal directly before and/or during competition. Lastly, conducting this study in a competition with ultimate pressure, such as at the Olympics, and comparing the results to a qualifying competition would possibly yield more refined data due to the increased pressure of competition at the Olympics. This comparison may yield more accurate results in the relationship of the predictor variables of baseline resilience and performance strategies on the outcome variable of flow state.

Future research could also look at the difference in flow scores between lower-level and FEI level athletes. The high Flow Short scores in this study indicate a propensity for FEI caliber three-day eventing athletes to experience flow. This could be a developed skill, or a self-selecting characteristic that lends to the developing of athletes at this level. In future work, researchers could focus on the measures that influence elite three-day event riders in attaining flow state as well as developing theories about how to
evaluate and integrate findings into other areas of high-pressure performance.

Researchers could also focus more on the relations between horse and rider in the high-risk sport of three-day eventing. For example, does the length of the horse/rider partnership influence performance outcomes? Does the bond between horse and rider influence rider resilience or function as a moderator? In the end, mental training for high-risk athletes, and possibly other high-pressure, high-risk occupations, will benefit from an expanded body of research and knowledge that can be helpful in promoting safer and more successful outcomes.
Appendix A: Consent Form

HARVARD UNIVERSITY EXTENSION SCHOOL

LETTER OF INFORMED CONSENT

Study Title: A Model System: Resilience and Performance Strategies as Predictors of Flow State in Elite Three-Day Event Equestrians

Researcher: Ashley Johnson

Faculty Advisor: Dr. Shelley Carson

What is the purpose of this research?

Three-day event riding is an Olympic discipline. It is an equestrian triathlon consisting of three dynamic phases that demand focus and bravery. Additionally, there is a dyadic relationship between horse and rider. Athletes in other equestrian sports and individuals in other high-risk domains have demonstrated certain personality features, but there is very little scientific literature on three-day eventing athletes. The current study aims to look at types of performance strategies used as well as certain personality traits of elite level three-day event riders.

What can I expect if I take part in this research?
You are invited to take place in this research because you are 18 year and older and competing at the FEI CCI2*-S level and above at designated competitions where data is being collected. If you agree to participate, at the close of competition itself or within four days of the close of the selected competition you will fill out this online questionnaire that will assess your performance strategies for the competition as well as some of your personality traits. The study will take approximately 15 minutes. There is no direct benefit to you for participating in this study, however, your responses will contribute to our understanding of the relations between resilience levels, flow state, and performance strategies in elite three-day event riders. There are no anticipated risks. The information you provide here is anonymous and will only be accessed by researchers involved in the study.

What should I know about a research study?

Your participation is completely voluntary. You can choose not to take part. You can agree to take part and later change your mind. Your decision will not be held against you. Whether or not you take part is up to you. Your refusal to participate will not result in any consequences or any loss of benefits that you are otherwise entitled to receive. You can ask all the questions you want before you decide.

Who can I talk to?
If you have questions, concerns, or complaints, or think the research has hurt you, talk to the research team at alequesrian@gmail.com or (610) 212-0294. This research has been reviewed and approved by the Harvard University Area Institutional Review Board (“IRB”). You may talk to them at (617) 496-2847 or cuhs@harvard.edu if:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research subject.
- You want to get information or provide input about this research.

Agreement:

Now that you’ve read about the study, if you wish to participate, click the “I agree to participate” button to continue; if you do not consent to participate, close this window.
Appendix B: Eligibility Form

Participant Information:

Gender:  
- Male  
- Female  
- Nonbinary  
- Prefer not to answer

Current Age: ______________

What is your Nationality? ______________

What FEI competition level(s) did you just compete in this weekend?

Please indicate which competition you just competed in:

- ___ Red Hills International  
- ___ Carolina International  
- ___ Stable View International  
- ___ Galway Downs International  
- ___ The Fork  
- ___ Twin Rivers International  
- ___ Fair Hill International  
- ___ Chattahoochee Hills International  
- ___ The Ocala International  
- ___ Land Rover Kentucky

What is the highest FEI level that you have competed?  
Have you already participated in this study?  
If yes, at which event(s)?
Appendix C: Recruitment Letter

Dear FEI Riders!

I am conducting research this spring for my master’s thesis in psychology with the Harvard University Extension School. I would love for you to participate! My study is focusing on the connections between use of performance strategies, baseline levels of resilience, and flow state during competition in elite three-day event riders.

Participating is easy! Visit https://harvard.az1.qualtrics.com/jfe/form/SV_cAZX5IYaWSwEpBI or contact me for a survey link, and fill out the three surveys on that link (approximately 15 minutes total) within two weeks of any 2* to 5* competition that you have participated in between now and April 31st! Specifically, if you are competing at Red Hills International, Carolina International, Stable View International, Galway Downs International, The Fork, Twin Rivers International, Fair Hill International, Chattahoochee Hills International, The Ocala International, or Land Rover Kentucky, please participate! All participants must be 18 years of age or older. I am excited to conduct this research! Please help me by contacting me for a link and submitting your data!

Sincerely,

Ashley Johnson
FEI 5* rider
“r” judge and TD
ALM Candidate in Psychology
Harvard University, Studies in Extension
Appendix D: Flow Short Questionnaire

Flow Short Questionnaire (Jackson et al., 2010):

Please answer the following questions in relation to your experience in the event or activity you have just completed. These questions relate to the thoughts and feelings you may have experienced while taking part. There are no right or wrong answers. Think about how you felt during the event/activity, then answer the questions using the rating scale below. For each question, select the button that best matches your experience. Rank the answers on a scale of 1-5.

1 = Strongly Disagree
2 = Disagree
3 = Neither Agree nor Disagree
4 = Agree
5 = Strongly Agree

1) I felt I was competent enough to meet the demands of the situation.
2) I did things spontaneously and automatically without having to think.
3) I had a strong sense of what I wanted to do.
4) I had a good idea about how well I was doing while I was involved in the task/activity.
5) I was completely focused on the task at hand.
6) I had a feeling of total control over what I was doing.
7) I was not worried about what others may have been thinking of me.
8) The way time passed seemed to be different than normal.
9) I found the experience extremely rewarding.

Directions for scoring: The procedure for scoring the SHORT scales is to sum the 9 items together, and then divide by 9 to obtain a SHORT Flow score.
Appendix E: CD-RISC-10 Questionnaire

CD-RISC 10 Questionnaire (Campbell-Sills & Stein, 2007):

Please select how true each of the following statements is of you as you have felt over the past month. Rank the answers on a scale of 0-4.

0 = Not true at all
1 = Rarely true
2 = Sometimes true
3 = Often true
4 = True nearly all of the time

1) I am able to adapt to change.
2) I can deal with whatever comes.
3) I can see the humorous side of things.
4) I believe that coping with stress strengthens me.
5) I tend to bounce back after illness or hardship.
6) I believe that you can achieve your goals.
7) Under pressure, I can focus and think clearly.
8) I am not easily discouraged by failure.
9) I think of myself as a strong person.
10) I can handle unpleasant feelings.
Directions for Scoring: Scoring of the CD-RISC 10 scale is based on summing the total of all items, each of which is scored from 0-4, with higher scores reflecting greater resilience. For the CD-RISC 10, the total score ranges from 0-40.
Appendix F: TOPS-3 Questionnaire

TOPS - 3 Questionnaire (Hardy et al. 2010):

This questionnaire measures performance strategies used by athletes in various sport situations. Because individual athletes are very different in their approach to their sport, we expect the responses to be different. We want to stress, therefore, that there are no right or wrong answers. All that is required is for you to be open and honest in your responses.

Each of the following items describes a specific situation that you may encounter in your training and competition. Please rate how frequently these situations apply to you in relation to how you felt during your recent activity. Rank your responses on a scale of 0-4.

0 = Never
1 = Rarely
2 = Sometimes
3 = Often
4 = Always

1) I set realistic but challenging goals for practice.
2) I say things to myself to help my practice performance.
3) During practice I visualize successful past performances.
4) My attention wanders while I am training.
5) I practice using relaxation techniques at workouts.
6) During competition I set specific result goals for myself.
7) My self-talk during competition is negative.
8) I rehearse my performance in my mind before practice.
9) During competition I have thoughts of failure.
10) I use practice time to work on my relaxation technique.
11) I manage my self-talk effectively during practice.
12) I visualize my competition going exactly the way I want it to go.
13) I am able to control distracting thoughts when I am training.
14) I get frustrated and emotionally upset when practice does not go well.
15) I have specific cue words or phrases that I say to myself to help my performance during competition.
16) I evaluate whether I achieve my competition goals.
17) I set very specific goals for competition.
18) At practice, I can allow the whole skill or movement to happen naturally without concentrating on each part.
19) I keep my thoughts positive during competitions.
20) I say things to myself to help my competitive performance.
21) At competitions, I rehearse the feel of my performance in my imagination.
22) I manage my self-talk effectively during competition.
23) I set goals to help me use practice time effectively.
24) At practice, when I visualize my performance, I imagine what it will feel like.
25) During practice I focus my attention effectively.
26) I set personal performance goals for a competition.
27) I motivate myself to train through positive self-talk.
28) I have trouble maintaining my concentration during long practices.
29) I talk positively to myself to get the most out of practice.
30) I have very specific goals for practice.
31) I imagine my competitive routine before I do it at a competition.
32) I imagine screwing up during a competition.
33) I talk positively to myself to get the most out of competitions.
34) I don't set goals for practices, I just go out and do it.
35) I rehearse my performance in my mind at competitions.
36) I can control my emotions when things are not going well at practice.
37) My emotions keep me from performing my best at competitions.
38) My emotions get out of control under the pressure of competition.
39) At practice, when I visualize my performance, I imagine watching myself as if on a video replay.
40) I can allow the whole skill or movement to happen naturally in competition without concentrating on each part.
41) I use relaxation techniques as a coping strategy at competitions.
42) I can psych myself to perform well in practice.
43) I am able to perform skills at practice without having to consciously think about them.
44) I can get myself ready to perform when I am at competitions.
45) I have difficulty with my emotions at competitions.
46) During training sessions I use relaxation techniques to improve my performance.
47) I need to monitor all the details of each move in order to successfully execute skills in practice.
48) I have difficulty controlling my emotions if I make a mistake at competitions.
49) My attention wanders during competition.
50) My emotions keep me from performing my best during practice.
51) I am able to control distracting thoughts during competition.
52) I have difficulty getting into an ideal performance state during training.
53) I can psych myself to perform well in competitions.
54) I use relaxation techniques during competitions to improve my performance.
55) I can get myself “up” if I feel flat at practice.
56) I am able to perform skills at competition without having to consciously think about them.
57) If I’m starting to “lose it” at a competition, I use a relaxation technique.
58) I can get my intensity levels just right for competition.
59) During practice, I can perform automatically without having to consciously control each movement.
60) I am able to trust my body to perform skills in competition.
61) I relax myself before competition to get ready to perform.
62) In competition, I am sufficiently prepared to be able to perform on automatic pilot.
63) I can get myself “up” if I feel flat at a competition.
64) I focus my attention effectively during competition.
65) My practice performance suffers when something upsets me at training.
66) I use workouts to practice relaxing.
67) I have trouble maintaining concentration during competition.
68) I can get my intensity levels just right for practice.

Directions for scoring: Add up each sub-scale categories (as noted below) and divide by the number of items in that category. Certain items (noted with an R) are reverse scored.

Competition:

Goal setting: 6, 16, 17, 26

Automaticity: 40, 56, 60, 62
Emotional control: 37(R), 38(R), 45(R), 48(R)

Imagery: 12, 21, 31, 35

Activation: 44, 53, 58, 63

Self-talk: 15, 20, 22, 33

Relaxation: 41, 54, 57, 61

Negative thinking: 7, 9, 19(R), 32

Attention Control: 49(R), 51, 64, 67(R)

Practice:

Goal setting: 1, 23, 30, 34(R)

Automaticity: 18, 43, 47(R), 59

Emotional control: 14(R), 39, 50(R)

Imagery: 3, 8, 24, 39

Activation: 42, 52(R), 55, 68

Self-talk: 2, 11, 27, 29

Relaxation: 5, 10, 46, 66

Negative thinking: 65

Attention Control: 4(R), 13, 25, 28(R)
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