

The Effects of Pre-Performance Routines on the Fundamental Relationship Between Horse and Rider, Flow States, and Performance Outcomes in the Equestrian Sport of Eventing

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Ch. 1: Introduction

The Horse and Rider Relationship

Understanding the psychological, physical, and relational components of the horse and rider dynamic provides an opportunity to increase the duration and consistency of flow states during performance, thereby increasing successful performance outcomes (Hogg, 2015). The performance-related pressures of equestrian sport are compounded by the horse and rider relationship that can be instrumental or detrimental to performance if not properly maintained by the rider (Hobday, 2011; Silva, 1990). The interspecies relationship between horse and rider is developed and maintained through largely physical, nonverbal communication (Argent, 2012; Evans & Franklin, 2010). While it is integral to optimal performance outcomes, there has been little research that has examined the horse and rider dynamic. According to Hogg (2015), a functioning relational dynamic between horse and rider is fundamental to performance success.

Horses are directly influenced by the riders emotional and psychological states (Christensen, et al., 2021; Keeling, et al., 2009). The behavior and performance of a horse reflects the psychological state of the rider. The rider has a significant impact on the emotional reactivity of the horse, and, in turn, has the responsibility to control their emotional state to ensure that the horse does not suffer from transmitted anxiety that may negatively impact performance (Christensen, et al., 2021; Hada, et al., 2001; Heird, et al., 1986; McCann, et al., 1988). The rider's psychological and physiological state are reflected in the horse's behavior (Christensen, et al., 2021; Hama, et al., 1996). Horses display more positive behaviors, such as confidence and relaxation, when associating with riders who have positive attitudes and confidence (Bentley, 2018; Chamove, et al., 2002). An anxious rider on the other hand causes

negative behaviors in the horse, such as tension, distractibility, and disobedience (Christensen, et al., 2021; Lynch, et al., 1974).

The Features that Influence the Horse and Rider Relationship

A rider signals a horse through the nonverbal communication of pressure and release cues (Brandt, 2004). Focus and tension from the rider also send signals that can support or override a horse's ability to perform. Unwanted tension from an anxious rider can disrupt the nonverbal communication signals, leading to confusion and hindering performance in the horse (Hogg, 2015; Bartle & Newsum, 2004; Wipper, 2000; Whinton & Beauchamp, 2014). The rider must control their psychological and physiological state in order to establish an appropriate mindset that supports their performance and promotes a functional horse and rider dynamic for optimal performance. Additionally, the unique nature of equestrian sports directly challenges a horse's natural instinct for self-preservation, contributing to the significance of the horse and rider dynamic achieving an optimal state to support performance success (O'Callaghan, 2015; Wolframm, 2013; Pretty & Bridgeman, 2005). The horse and rider dynamic deserve considerable attention, as a horse in fear, can be unmanageable, dangerous, and a safety hazard to the horse and rider (Game, 2001; Janelle, 2002).

Positive Outcomes of Functional Horse and Rider Relationships

The horse and rider relationship has also been a source of motivation for riders, which contributes to competitive success (Heuschmann, 2011; Pretty & Bridgeman, 2005; Buchanan & Dann, 2006; Pelletier, et al., 1995; Vallerand, 2007). The following examples are horse and rider relationships that demonstrate the significance of the horse and rider dynamics that allow for

such achievement in competition: Olympic and World Champions Reiner Klimke and Ahlerich, John Whitaker and Milton, Mark Todd and Charisma, and Isabel Werth and Gigolo, Anky van Grunsven and Bonfire, Edward Gal and Totilas, and Charlotte Dujardin and Valegro. For several of these horses, under different riders the horses reflected tension and decreased in their performance rankings. The horse and rider relationships were integral to the performance success (Bartle & Newsum, 2004; Forrest, 2012; Heish, 2013).

The Horse and Rider Relationship in the Sport of Eventing

The horse and rider relationship has also been seen as a source of confidence for the rider (O'Callaghan, 2015; Bentley, 2018; Parent, 2016; Beauchamp & Whinton's, 2005). Confidence is associated with peak performance (Williams & Krane, 2015). In an equestrian sport, as demanding as eventing, maintaining a source of confidence is integral to performance success, as well as safety (Beauchamp & Whinton, 2005). Eventing is the equestrian equivalent of the triathlon (FEI, 2021) composed of three phases of competition, dressage, eventing, and showjumping.

The dressage phase tests the horse's obedience and physical ability; the cross-country phase at top levels asks horses to complete approximately forty jumping efforts over natural, solid obstacles at speed, including logs, stone walls, water obstacles, and ditches, as a test of horse's stamina and jumping ability, as well as rider's ability to control and navigate various terrain and obstacles safely and competently (FEI, 2021). The showjumping phase, designed to assess the horse's agility and recovery from the previous day of cross-country jumping; testing the horse's speed, agility, and courage, are tested over a course of ten to thirteen unstable obstacles, with penalties awarded for knocking a rail, refusing a jump, and/or exceeding the time

limit, and elimination from the competition from a fall of horse or rider, or two or more refusals at an obstacle (Bryant, 2008; FEI, 2021).

The Horse and Rider Relationship in Eventing and Flow States

Eventing is also considered an open sport. According to Birrer, et al., (2010), open sports are environments where outside stimuli and even the horse's natural instincts in a high-pressured environment can influence the performance. A strong partnership between horse and rider is integral to confidence and overall performance success (Beauchamp & Whinton's, 2005). According to Csikszentmihalyi's (2002) concept of flow, the unity that can be developed between horse and rider with the appropriate mindset and fostering of the horse and rider relationship, such as with confidence and relaxation (i.e., developed through mental skills training (MST), specifically pre-performance routines (PPR)), can create opportunities for horse and rider to experience flow states, ultimately supporting peak performance (Jackman, 2015; Wolf, et al., 2015; Parent, 2016; Argent, 2012; Williams & Krane, 2015).

MST in the Development of PPR

A rider's unmanaged psychological and physiological state, often characterized by anxiety and excessive fear, can be detrimental to the horse and rider dynamic, debilitating, dangerous, and, ultimately, hinder performance (Morgan, 2015; Bentley, 2018; Cerin, 2003; Wolframm, et al., 2014; Keeling, et al., 2009; Pretty, 2001; Tenenbam, et al., 2002). Mental skills training (MST) provides athletes with the opportunity to control their psychological and physiological state, through energization and relaxation techniques, confidence boosting techniques, and concentration techniques (O'Callaghan, 2015; Burton & Raedeke, 2008; Smith,

2020). MST can help athletes to develop their ideal PPR to support the horse and rider relationship to establish the optimal psychological and physiological state and communication between horse and rider to support performance (Burton & Raedeke, 2008; Wolframm, et al., 2013; Beauchamp & Whinton, 2005; Smith, 2020; O’Callaghan, 2015; Weinberg, 2018).

A PPR is a systematic sequence of task-relevant actions in which an athlete engages in prior to his or her performance (Burton & Raedeke, 2008; Stranger, et al., 2018). PPRs are designed to address the psychological and physiological states of athletes to support optimal performance (Burton & Raedaeke, 2008; Lidor & Singer, 2000; Hardy, et al., 2018; Stranger, et al., 2018). Designing PPRs that are individualized and systematic for horse and rider will support the horse and rider dynamic and establish the appropriate psychological and physiological states to direct their attention accordingly on task-relevant cues to achieve optimal performance (Burton & Raedeke, 2008; Wolframm, 2013; Borstel, 2007). An effective PPR supports both the rider and horse and rider dynamic (Wixcey, 2015; Wolframm, 2014; Wolframm & Micklewright, 2011).

Purpose of the Study

The purpose of this present study is to explore: (a) the current status of the horse and rider relationships in horse and rider pairs in the sport of eventing; (b) the current use of any PPR; (c) the effects of implementing various PPR on the horse and rider relationships; (d) performance outcomes and associated flow states as a result of the implementation of individualized PPR in horse and rider pairs in the sport of eventing.

Research Questions

Based on the outlined purpose of the study, the following research questions were formulated:

- 1) What effect does the horse and rider relationship have on performance outcomes?
- 2) What effect do PPR have on the horse and rider relationship?
- 3) What conditions lead to more successful performance outcomes in the sport of eventing?
- 4) What conditions lead to flow states in horse and rider pairs in eventing?

Hypothesis

Upon completion of the study, the following hypothesis will be answered:

- 1) Hypothesis: PPR do enhance the horse and rider relationship, increase opportunities for flow states, and lead to more successful performance outcomes.

Null Hypothesis: PPR do not enhance the horse and rider relationship, do not increase opportunities for flow states, and do not lead to more successful performance outcomes.

Research Design and Participants

The following research acknowledges, the limited research on the horse and rider dynamic, the use of PPR to support the horse and rider relationship, increase the opportunity for flow states and, in turn, successful performance outcomes. The horse and rider dynamic is

integral to both horse and rider safety and successful performance outcomes. The mixed-method, predominantly quantitative study will examine the influence of various PPR techniques on horse and rider dynamics in 90 horse and rider pairs in developing riders aged 13-21, in regions of the United States on a volunteer basis, through completion of the following research procedures. Rider's affiliations with various equestrian organizations, such as the United States Pony Club (USPC) and Young Riders Program (YRP) will be considered in the study, as they have various educational and training components that may influence the results of the study (USPC, 2021; YRP, 2021).

Research Procedures

Participants will complete: baseline measures with an electroencephalogram in practice and competition, with the approval of the Technical Delegate at the competition (FEI, 2021), prior to the implementation of the PPR and then follow up measures after the implementation of the PPR, as this is an objective measurement of the riders' psychological and physiological state (Wixcey, 2014; Wolf, et al., (2015); Stranger, et al., 2018; Christensen, et al., 2021); e-surveys, questionnaires, and semi-structured interviews at the beginning of the study, to understand the current horse and rider relationship and confirm any use of PPR; the implementation of various PPR for each respective rider; follow up e-surveys and semi-structured interviews to examine the effects of PPR on the horse and rider relationship and performance (Butler-Coyne, et al., 2019; Wixcey, 2015; Smith, 2020).

Participants will complete the following e-surveys and questionnaires: A Sport Emotion Questionnaire (Jones, et al., 2005), to examine the presence of emotions in performance (e.g., anger, anxiety, excitement); Test of Performance Strategies (Hardy, et al., 2010), to determine

the presence of current mental skills training to support performance; The Sport Motivation Scale (SMS-28), to measure the athlete's intrinsic and extrinsic motivations for sport engagement as well as amotivation; a specifically designed questionnaire to determine changes in behavior in the horse associated with anxiety, tension, stress, and resistance; A Mental Readiness Form-3 (MRF-3), will measure cognitive anxiety, somatic anxiety, and self-confidence scores; A 17-item Thought Occurrence Questionnaire for Sport, will measure self-talk. Participants will also fill out self-reflection forms to note their own experiences of the use of PPR and the effects on their performance and the horse and rider relationship.

Additionally, each horse and rider pair will be provided a Equisense Motion S (Equisense, 2018), an ergonomic electrode system that attaches to the girth, to measure the horse's heart rate and locomotion in practice and competition, with the approval of the Technical Delegate (FEI, 2021), in order to objectively measure the horse's behavior via movement and heart rate patterns. The rider will also be provided a Fitbit Inspire HR (Hardwick, 2020), to objectively measure the rider's heart rate patterns and examine any relationship between horse and rider heart rate patterns (Christensen, et al., 2021).

PPR Techniques and the Independent and Dependent Variables

The following PPR techniques are considered effective psychological and physiological state management techniques (Burton & Raedeke, 2008), and will be considered as the independent variables in the study: confidence techniques (e.g., positive self-talk, affirmation statements), relaxation techniques (e.g., imagery relaxation, diaphragmic breathing, music), concentration techniques (e.g. narrow-broad focus exercises); energization techniques (e.g., imagery energization, psych-up breathing) (Burton & Raedeke, 2008; Williams & Krane, 2015).

The rider's psychological and physiological state, the horse and rider dynamic, flow states, and performance outcomes are considered the dependent variables. Each respective technique highlighted in the preceding will be defined in the literature review and the methods section of the study.

Effective PPR are individualized, therefore, each rider will be matched with suitable techniques that will be incorporated into the development of their PPR. The initial design of the PPR will be completed with participants over a two-four-week process, via Facetime and Zoom, due to current COVID-19 travel restrictions and gathering considerations (WHO, 2020), to allow for trial and error and availability for each participant to implement each respective technique with the support of a professional in the field. There will be three groups, including: the volunteer group, who will be assisted in the design of their PPR to use independently without the presence of a sport and performance consultant; the control group with no PPR; and a group of riders who consistently use PPR with the presence of the consultant. After the initial design, the use of PPR and the effects of PPR on horse and rider relationships and performance outcomes will be assessed three times every two months with the use the preceding questionnaires and semi-structured interviews over a 6-month period to allow for riders to experience the long-term effects of PPR with various competition opportunities (Burton & Raedeke, 2008; Wolframm, 2013; Borstel, 2007; Smith, 2020).

PPR and the Horse and Rider Relationship

The use of PPR will support the horse and rider dynamic, the rider's safety, and increase successful performance outcomes, characterized by the following being reported: improved horse and rider relationship, improved concentration, improved confidence, improved

motivation, decreased anxiety, better behavior from the horse, increased relaxation, decreased tension, and improved scores in competition. The rider will experience less anxiety, improved confidence, increased motivation, decreased tension, and, in turn, support the optimal physiological state of the horse, and ultimately communicate more effectively with their horse in a calm and tactful manner to create more harmony between the horse and rider relationship, and, in turn, improve performance.

The Outcomes of the Research Study

The positive outcomes of developing effective means of supporting the horse and rider relationship, such as through the use of an effective PPR, will increase the opportunities for successful performance outcomes, maximize the safety and well-being of horse and rider, as well as support the sport of eventing, through continuous entry fees, volunteering, sponsorship, and inspiration for others to participate in the thrilling sport of eventing, keeping the sport alive for following generations. Additionally, the positive outcomes will reflect the integral role mental skills training and sport and performance consultants play in all successful sport outcomes.

Chapter 2: Literature Review

Introduction to the Literature Review

As stated in chapter 1, a functional horse and rider relationship is considered fundamental to successful performance outcomes. Further, the use of PPR in various athletic populations is associated with successful performance outcomes. The aim of the study is to determine if PPR influence both the horse and rider relationship, flow states, and their performance outcomes. The following is a review of the limited existing literature on this topic, illustrating the clear gap in literature and the need for more research on this topic.

Literature on the Horse and Rider Relationship

Christensen, et al., (2021) investigated whether professional riders agree on the scoring of rideability, whether rein tension, heart rate, horse conflict behavior, and salivary cortisol levels influenced rideability scores, and whether riders induce different levels of conflict behavior and physiological responses in the horses. Ten female, professional riders each rode ten dressage horses for a total of 100 combinations. Each rider was asked to complete a ten-minute warm up followed by a four-minute dressage test. Horse rideability was scored on a scale of 1-10 (1=poor; 10=excellent). Rein tension, horse heart rate, saliva cortisol and conflict behavior were measured for each rider-horse pair.

The scoring for horse rideability varied per rider (e.g., one of the horses rideability ranged from 1 to 8). The riders' effect on conflict behavior in the horses was statistically significant. The horses' heart rates ($F_{9,63} = 67.5$, $P < 0.001$) and saliva cortisol concentrations ($F_{9,53} = 3.9$, $P < 0.001$) were significantly affected by rider. The riders caused evasive behavior ($F_{9,77} = 1.8$; $P = 0.07$) and frequency of tail swishing ($F_{9,77} = 1.9$; $P = 0.07$). Some riders caused more behavioral conflict in the horses. The horses that displayed more conflict behaviors were scored more negatively and considered more difficult to ride.

According to Christensen, et al., (2021), future studies should examine which styles and strategies reduce conflict behavior in horses and improve the objectivity, consistency, and heart rate measurements in the horses. Additionally, future research should examine how variabilities in horse and rider relationships affect both subjective and objective outcomes. For example, identify if a strong horse and rider relationship decreases conflict behaviors, improves rideability scores, and decreases salivary cortisol concentrations and heart rates in the horses.

According to Bentley (2018), the horse and rider relationship supported riders in their performance. When the horse and rider relationship was accounted for, such as through fostering attachment, it helped the rider to regain confidence and overcome performance anxiety.

According to Parent (2016), the horse and rider dynamic is an attachment system that reflects similar features that are associated with other attachment figures and could assist individuals in overcoming their fears. The increase in rider self-awareness is a result of the connection, empathy, intuitive listening, and non-verbal communication between horse and rider, ultimately establishing a bond between the two. These features are also associated with right brain functions (Parent, 2016).

Hogg (2015) examined the horse and rider relationship in elite sports to gain a greater understanding of the horse and rider relationship in performance settings. Hogg (2015) utilized an interpretive, constructionist qualitative research methodology. Data was collected via a series of semi-structured in-depth interviews lasting anywhere from fifteen minutes to two hours. There were 36 participants with more female participants than males, highlighting a gap in the literature. Further, while the horse and rider dynamic are deemed fundamental to performance, only a small body of literature exists concerning the relationship between horse and rider in elite sports (Hogg, 2015).

According to Hogg (2015), the psychological significance surrounding the horse and rider relationship is a “new” area of scientific research. While the relationships within the human population prove to be challenging to comprehend, the horse and rider dynamic add another challenging layer as the relationship is predominantly nonverbal. Emotional resilience is valuable in other performance settings, however it is considered integral to equestrian sports, as horses are susceptible to being influenced by strong emotions from their riders (Hogg, 2015). Horses

experience a range of emotions, including fear and anxiety, and benefit profoundly from the support of a calm and confident rider, as they lack the capacity to analyze their emotions (Hogg, 2015).

According to Hogg (2015), the sensitive temperaments that make horses highly attuned to their riders, also have the potential to make them high strung and susceptible to transference of anxiety from the rider, which decreases rideability, especially in competitive environments. Therefore, the horse and rider dynamic deserve careful consideration to avoid conflict, which can result in accidents, injuries, and horse wastage. A lack of empathy and strong emotions were detrimental to the horse-rider relationship (Hogg, 2015). Emotional regulation in the rider and established relationships between the horse and rider are integral to successful performance outcomes, especially for horse's with sensitive temperaments (Hogg, 2015). Horses and riders have a reciprocal relationship that benefits from a functional dynamic. When the horse and rider dynamic were considered in performance, a sense of harmony could develop between the horse and rider, which facilitated sport participation and performance outcomes (Hogg, 2015).

According to Hogg (2015) harmony between the horse and rider was contingent on a rider's ability to develop a "feel" for horses, which is considered the most important quality of an equestrian athlete. "Feel" is a psychological and physical construct, developed as the rider learns to intuit and synchronize with the horse allowing seamless nonverbal communication, allowing the rider to maximize the horse and rider dynamic. Another key finding was that the rider's ability to view the environment from the horse's point of view contributed to more successful performance outcomes (Hogg, 2015). The development of connection and the relationship between horse and rider should be emphasized in the training process (Knijnik, 2013).

Harmonization between horse and rider were associated with experiences of flow. Flow in equestrian sports is often defined as an effortless communication between horse and rider that was often associated with successful performance outcomes. Future research should examine the physical, psychological, and relational components that are integral to the development of flow states in equestrian sport. The findings in Hogg (2015) contribute to a greater understanding of the horse and rider relationship in elite sport and provide different ways for equestrian populations, scientific researchers, sport psychology practitioners alike to understand and support the horse and rider relationship.

The findings from Burgon (2013), a qualitative, ethnographic study regarding the benefits of therapeutic horsemanship involving seven participants aged 11-21, revealed that a strong horse and rider relationship led to reduced anxiety and increased self-awareness in the rider (Burgon, 2013). The small sample size was considered a limitation. The qualitative nature of the study was believed to provide valuable insights to the field. The limited research on the link between horses, nature, and mindfulness is a valuable area for future research (Burgon, 2013).

Literature on the Presence of Anxiety and Confidence in Equestrian Populations in Competition Environments and the Effects on the Horse and Rider Dynamic and Performance

Morgan (2015) examined the different levels of anxiety on competitive dressage performances using a mixed method approach. Eight female amateur dressage riders aged 15-50 volunteered to participate. The Mental Readiness Form-3 (MRF-3) identified the participants' cognitive anxiety (CA), which is associated with negative thoughts, somatic anxiety (SA), which is associated with the physical features of anxiety, such as rapid heart rate or sweating, and self-confidence (SC), which is the belief in one's abilities and knowledge. CA, SA, and SC scores

were identified before a competitive dressage test performance. Semi-structured interviews took place after competition and anxiety scores before increase and decrease scores were examined. Referencing the MRF-3 to identify anxiety scores, participants explained the causes and impacts of anxiety on each movement and about any coping strategies used. A cross-analysis revealed that participant's perceptions of the cause of their anxiety impacted their performance. For example, errors on movements increased anxiety levels, while on the other hand improved scores increased the rider's self-confidence and led them to believe that their anxiety was facilitative (Morgan, 2015).

According to Morgan (2015), tension was associated in riders whose scores decreased. A high self-confidence prevented anxiety from inhibiting performance. When riders experience anxiety, their performance aids and cues can be transmitted incorrectly from the rider to the horse and confuse the horse with miscommunication, resulting in negative performance outcomes. Relaxation in the rider allows the rider to communicate effectively with the horse, which helps calm the horse and support positive performance outcomes (Morgan, 2015).

The practical implications of the study findings suggested using various mental skills and methods to improve participants' preparation before competition in an attempt to decrease debilitating causal factors of anxiety and improve overall self-confidence levels (Morgan, 2015). Morgan (2015) identified the following future research suggestions: examine the relationship between anxiety and performance during competitive dressage test performances; conduct research at different events throughout the competitive season to see if participant's anxiety levels differ in relation to the perceptions of competition significance; use more than one judge to eliminate any subjective opinions; use a larger, mixed gender sample; consider participant experience, as that can effect performance outcomes; repeat the current study with elite

performers to see if experience effects anxiety levels; and compare males and females interpretations of anxiety in equestrian populations.

Literature Illustrating the Connection Between Horse and Rider Relationships and Pre-Performance Routines

According to Wolframm (2013), effective riders seamlessly consider how environmental variability influences their horse. The environment can have significant impacts on the horse's natural instincts. Therefore, the relationship between the rider and horse is critical for successful performance outcomes. Stress, associated emotions and anxiety experienced by the rider are also felt by the horse (Wolframm, 2013). According to Wolframm (2013) riders that maintain emotional regulation prior to and during performance have greater harmony in the horse and rider relationship.

According to Wolframm (2013), establishing facilitative emotions in the preparation phase supports a harmonious horse and rider relationship that results in successful performance outcomes (Wolframm, 2013). Routines help develop facilitative emotions and provide safety and security for the rider and horse. The use of PPRs may provide the consistency that is required to perform successfully. This is consistent with the literature which suggested that in addition to relevant riding techniques the development of strategies to help the rider deal with irrelevant or detrimental thoughts, moods or emotions would be vital for success (Wolframm, 2014).

Literature on Mental Skills Training and Pre-Performance Routines in Athletic & Equestrian Populations

Mental skills training (MST) is used by sport psychologists, coaches, and athletes in a variety of sports and result in successful performance outcomes (O'Callaghan, 2015).

O'Callaghan (2015) examined the effects of a MST intervention involving relaxation, imagery,

and goal setting on performance outcomes and the effects of increased self-efficacy on performance outcomes in equestrian sports. 14 amateur equestrians (three males, 11 females), who all competed in two combined training competitions, participated in the study. MST proved beneficial for performance and self-efficacy in equestrians (O'Callaghan, 2015).

Mental imagery is the cognitive process that allows an individual to imagine a future performance or activity in the mind's eye (O'Callaghan, 2015). The brain cannot discern between what is real and imagined; the same neuro circuitry that is activated in the brain in a real experience is activated when a person imagines an experience (Burton & Raedeke, 2008). According to O'Callaghan (2015), mental imagery assists athletes in mental preparation for performance, such as improving relaxation, enhancing confidence, managing anxiety and optimal arousal levels. Mental imagery can also assist athletes in skill development and practice (O'Callaghan, 2015). Self-talk is a cognitive technique that allows athletes to control their thoughts and feelings. For example, self-talk proved effective when supporting tennis players. After using positive self-talk the tennis players performance outcomes improved (O'Callaghan, 2015).

High levels of anxiety (e.g., somatic and cognitive) are associated with poor performances, further increasing anxiety (O'Callaghan, 2015). Somatic anxiety, as mentioned is associated with the physical features of anxiety, could benefit from relaxation techniques, such as imagery relaxation. Cognitive anxiety, as mentioned is associated with negative thoughts, could benefit from positive self-talk. Managing anxiety in the rider is integral to optimal performance and the horse and rider dynamic (O'Callaghan, 2015).

According to O'Callaghan (2015), the horse and rider relationship should be considered in the sporting environment. Equestrian sport remains the only competitive sport with two

teammates each from a different species. The horse and rider have their own unique experiences and the union between the horse and rider dynamic is integral to successful performance outcomes (O'Callaghan, 2015). As highlighted, communication between horse and rider is nonverbal, involving various cues characterized by various pressure and release patterns, referred to as aids, that optimally influence the horse. The nonverbal communication between horse and rider is easily influenced by psychological and physiological experiences from both the horse and rider, therefore, it is important to consider not only the mental challenges of the equestrian athlete but also those of the horse (O'Callaghan, 2015).

The rider is challenged to keep the horse's attention to perform the required task, while the horse is challenged by its natural instincts to evade the highly stressful competition environment, which can be exacerbated by the tension and performance anxiety from the rider (O'Callaghan, 2015). The unity in the horse and rider relationship supports the mutual trust in the horse and rider relationship that allows both horse and rider to perform optimally in stressful performance environments that both challenge the instincts of the horse and the confidence of the rider. The more attuned a rider is to their horse's experience the more the rider is able to be empathetic to the horse's experience, which results in more successful performance outcomes (O'Callaghan, 2015).

As highlighted in O'Callaghan (2015), the horse's natural instincts are generally triggered in stressful environments, such as competition environments, which can manifest behaviorally in negative ways that can be detrimental to performance. For example, a negative behavior could be refusing to jump a fence, as a result of anxiety in the horse due to the jump being unfamiliar or sensing tension from anxiety in the rider. A strong bond between horse and rider gives the horse the confidence to submit to the rider and trust that the rider will keep them safe (O'Callaghan,

2015). MST training would allow the rider to reduce anxiety, increase their confidence, and manage optimal arousal levels to support a functioning relationship between horse and rider to achieve successful performance outcomes (O'Callaghan, 2015).

The findings in O'Callaghan (2015) revealed a statistically significant difference in both combined training performance scores and domain specific self-efficacy scores before and after completing the MST intervention. There was no significant relationship between self-efficacy and performance ($r(14) = .19, p = .538$) which was inconsistent with previous research (Moritz and Feltz, 2000). The hypothesis that there would be a statistically significant relationship between MST and performance was supported, as was the hypothesis that there would be a relationship between MST and self-efficacy. MST enhances performance in equestrian sports (O'Callaghan, 2015).

The limitations of the study included: a small sample size, due to difficulties in recruiting participants; there was no control group; and there was a higher number of females than males. Future research should focus on using MST with a larger sample size, a younger population, a more balanced ratio of males to females, and a control group (O'Callaghan, 2015). Future research should examine MST intervention for younger riders and examine if this affected their domain specific self-efficacy and performance in equestrian competitions (O'Callaghan, 2015). MST are compiled in PPR to support performance.

As highlighted in chapter 1, a PPR is designed to address the psychological and physiological states of athletes to support optimal performance (Burton & Raedaeke, 2008; Hardy, et al., 2018). Designing PPRs that are individualized and systematic for horse and rider are believed to support the horse and rider relationship and establish the appropriate

psychological and physiological states to direct their attention accordingly on task-relevant cues to achieve optimal performance (Burton & Raedeke, 2008; Wolframm, 2013).

Wixcey (2014) examined the use of PPR in six female, non-elite equestrian athletes aged between 20 and 59 ($M= 45.5$ $SD= 13.72$). Participants were selected based on their use of PPRs prior to competition. Semi-structured interviews, lasting 30 minutes, were conducted to discuss the participants' use of PPRs in the week leading up to competition, and impact of PPRs on the horse and rider relationship. The findings revealed that the riders used imagery, self-talk and various multimodal strategies within their PPRs, and the horse and rider relationship was influenced by the PPR (Wixcey, 2014). According to Wixcey (2014), the rider's behavior influenced the horse's behaviors, which in turn impacted performance. Wixcey (2014) emphasized the significance of tailored PPRs, the importance of recognizing the impact of PPRs on the horse and rider relationship, and in turn, performance outcomes. The researcher was an equestrian rider, and it was believed that the preceding supported the research process, as the researcher could relate to the content.

According to Wixcey (2014), there is a lack of sport psychology research literature in regard to equestrian sports, with no insight into the use of PPRs with equestrian athletes. PPRs are considered an effective tool for psychological and physiological management of the self and consequently performance (Wixcey, 2014). According to Wixcey (2014), PPRs help athletes to appraise their anxiety as advantageous. Further, a rider's ability to manage their psychological and physiological state directly effects their performance and should be considered by practitioners, coaches, and athletes when determining behavior in performance environments (Wixcey, 2014).

The preparation phase is integral to performance in equestrian sports, in order to manage psychological and physiological states that facilitate a harmonious horse and rider relationship that promotes flow states (Wolframm, 2013). Wixcey (2014) was the first study to examine PPRs in equestrian riders and has provided multiple contributions to knowledge of PPR and associated literature (Wixcey, 2014). The horse and rider relationship proved to be positively influenced by the PPR and supported performance (Wixcey, 2014).

For example, when the rider maintained optimal arousal levels through the use of a PPR, the horse remained calm and resulted in successful performance outcomes (Wixcey, 2014). The findings revealed the value of using individualized PPR. Future research should incorporate a larger, mixed gender sample, a control group, various age groups, and measure the actual impact on performance (e.g., improved scores and performance marks) (Wixcey, 2014). The emergence of the horse and rider relationship, the impact that the horse and rider dynamic have on PPR and, in turn, performance outcomes are vital areas to be considered by riders and practitioners (Wixcey, 2014).

Future research should examine the ‘why’ of the data, not just the ‘what’ and ‘how’ that is common in exploratory designs and answer the question, why specific psychological skills were effective in high pressured performance environments? (Wixcey, 2014). The findings in Wixcey (2014) revealed new themes that contribute to the PPR and equestrian literature including: The horse and rider relationship was identified as an integral theme when considering the development of PPR and PPR positively supported the horse and rider relationship and subsequently performance.

Smith (2020) examined the use of psychological skills training (PST) (i.e., MST) with equestrian athletes. Smith (2020) used an online survey to: collect coaching demographics,

determine specific skills use and frequency of use, ask follow-up questions regarding performance improvements, gauge PST education, and understand limitations of use. The survey was distributed via social media (e.g., Facebook), emails, and equine organizations' social media, newsletters, and email blasts. The survey link was made available on April 15, 2020 and closed on May 18, 2020 (Smith, 2020).

According to Smith (2020), 133 of the 186 participants coached riders, 85% of the participants were female while 15% were male, and coaches involved in team settings were most likely to use PST with their riders (Smith, 2020). The results reflected various skill use along with different occasions of use of the skills, such as practice, pre-competition, competition, and post competition. There were no significant differences in coaching demographics or with the age and level of riders (Smith, 2020). The results revealed that 91% of equestrian coaches use PST with their riders, which was contrary to the hypothesis. Smith (2020) concluded that coaches attempt to find the best methods to support riders. Future research should examine the best PST methods to use with equestrian athletes (Smith, 2020).

Weinberg (2018) defined MST as the systematic and consistent application of psychological skills to enhance performance (Weinberg, 2018). MST consist of various psychological skills, including the following. For example, relaxation strategies, such as various imagery techniques, lower arousal levels (Weinberg, 2018). Teaching the rider relaxation techniques will allow the rider to communicate with their horses most effectively. Using imagery in pre-performance and competition routines increases an athlete's success rate (Kanthank et al, 2014).

Attention focus strategies help riders to direct their attention to prevent distractions from impeding performance (Wixcey, 2015). Attention focus can be internal, external, narrow and

broad. Internal focus is the attention to a motor skill that performs movement. External focus is the mental focus on the surrounding environment (Smith, 2020). Narrow focus is like a camera lens zooming in on a specific skill or movement. Broad focus is like a camera lens panning out to gather more stimuli in an environment (Williams & Krane, 2015).

The skill to use more positive and constructive self-talk to be focused on the task at hand minimizes negative thoughts, especially when an individual is subjected to performance pressures (Wixcey, 2015). Developing a routine helps the rider to control their attention, decrease their anxiety and stress, and establish consistency in their performance. The consistency gives the horse and rider a sense of familiarity in the performance environment, which can help the horse and rider to feel more relaxed (Wixcey, 2015). For example, using the same warm-up process before each competition is an example of establishing a routine to promote peak performance (Wolframm, 2014). A calm, more unified partnership between horse and rider will lead to greater success (Smith, 2020).

Little research has been done in equestrian sports determining the long-term effects of PST and performance related to competition (Smith, 2020). According to Smith (2020), PST leads to successful performance outcomes, which results in increased motivation and, in turn, sport participation. Prolonged participation in equestrian sports means growth within the industry and a future for equine sport (Smith, 2020).

Literature on the Use of Various Methods When Examining Pre-Performance Routines and the Effects of Pre-Performance Routines in Athletic Populations

Stranger, et al., (2018) examined 100 five-team sport players (58 males and 47 females, Mage= 20.62, SD=1.54) in two studies. After using a Sport Emotion Questionnaire, 17-item Thought Occurrence Questionnaire for Sport, Competitive State Anxiety Inventory 2-Revised,

and the Emotion Regulation Questionnaire, the findings indicated that in-game emotions effectively interfere with cognitive functioning in performance, specifically that anxiety proved to disrupt performance (Stranger, et al., (2018).

The findings suggested that athletes may benefit from emotional control training and strategies that reduce the effects of anxiety. PPR, such as those that use positive self-talk and positive imagery prior to performance, result in positive performance outcomes, perhaps becoming a suitable method to minimize disruptive emotions (Stranger, et al, 2018). The limitations included that performance was not assessed in the two studies, so they were assumptions that cognitive interference disrupted performance. There may be a lack in reliability in the measures of emotion and confidence that were experienced, which could alter the findings. For example, the results could have been affected by recall bias due to the subjective measures of self-reports from the participants. Future research should use other measures such as electroencephalograms to track participant experiences and should consider the effects of other emotions and disrupted performance (Stranger, et al., 2018).

Literature on Pre-Performance Routines and Flow States in Equestrian Populations

As highlighted in Jackman (2015), there is a gap in literature with regard to the features that characterize the state of flow in equestrian sports. Jackman (2015) examined the conditions influencing the occurrence of flow, the characteristics of flow, and flow in professional jump jockeys. Ten professional jump jockeys (M age =28.1, SD=5.21) participated in semi-structured interviews exploring the occurrence of flow in national hunt horse racing. According to Jackman (2015), 29 antecedents of flow in jump jockeys immersed-12 facilitative conditions, 10 inhibitive conditions, and seven disruptive conditions. According to Jackman (2015), no previous published work has described the experience of flow in horse and rider relationships.

Ten characteristics embodied the flow state in jump jockeys: concentration, sense of control, optimal relationship between horse and rider, altered cognitive perceptions, altered kinetic perceptions, automaticity, intrinsic rewards, confidence, enhanced performance, and the suppression of negativity (Jackman, 2015; Koehn, Pearce & Morris, 2013). Jackman (2015) was the first study to describe the occurrence of flow within the horse and rider relationship. He concluded that confidence and relaxation were antecedents to the reciprocal optimal arousal state between horse and rider that preceded flow states. Automaticity was reflected by a sense of effortlessness and the belief that everything happens naturally during such performances (Jackman, 2015). PPR have been found to promote automaticity, confidence, optimal concentration, sense of control, and, in turn, may assist flow states (Burton & Raedeke, 2008; Jackman, 2015; Csikszentmihalyi (2002). Further, a functional horse and rider relationship has been found to increase intrinsic motivations, confidence, and, in turn, successful performance outcomes.

Right-hemisphere activation was also associated with heightened flow (Wolf, et al., 2015). The right hemisphere is associated with intuition and amplified by the horse and rider relationship (Parent, 2016), reflecting a link between a strong horse and rider relationship and flow states. Additionally, Thomson & Nesci (2013) and Jackman (2015) asserted that the experience of flow in equestrian sports differs from other sports, due to the influence of the horse. According to Jackman (2015) the horse and rider relationship has the potential to facilitate flow, while on the other hand, lack of harmony and an unbalanced horse and rider relationship prevented flow states (Jackman, 2015).

The limitations in Jackman (2015) included: the subjective nature of the data analysis; flow is still considered a phenomenon and the actual commencement of the experience is

unknown; the neurobiological factors that are involved in flow states are not fully understood; and there was a small sample size. The future research suggestions are to: explore the evolution of jockeys over their career; explore flow states in amateur riders; explore female jockeys, since males were the primary focus; explore flow states in other equine sports; explore flow states in more complex sports like eventing, dressage and show jumping, as they may yield different findings, and therefore may be a valuable research study; gain a greater understanding of the transition from normal states to flow states; explore brain activity during flow states, such as exploring the link between mindfulness and affect reactivity, given that flow is associated with affective alterations (Teper & Inzlicht, 2014); explore mental toughness and flow states; use innovative methods to assess “near-experiences,” to prevent interview bias or interview within a specific period from last flow experiences.

Literature on Heart Rate Monitors for Horses and Riders to Objectively Measure Relationship Components Between Horse and Rider

The Equisense Motion S (EM-S) is an ergonomic electrode system that measures horse's heart rate and locomotion. The EM-S has two electrodes that send data via Bluetooth to a mobile app that records and analyzes the data. The EM-S is encased in a smart textile that attaches at the girth with a leather attachment that is adaptable to all girths and protects the electrodes from the impacts of movement and water (Equisense, 2018). The EM-S effectively measures the horse's heart rate, locomotion, calories burned, and gauges the horse's training intensity. The EM-S provides data to develop appropriate training and exercise programs and effective training management (Equisense, 2018). Most significantly, the EM-S provides data to track cadence and movement patterns in the horse

to objectively measure the behavior of the horse, as horse behaviors are manifested in their movement patterns (Christensen, et al., 2021;).

The Fitbit Inspire HR (FI-HR) effectively measures heart rate patterns in individuals and athletes alike (Hardwick, 2020). The FI-HR is affordable, light weight, waterproof, and ergonomically attaches on the athlete's wrist (Hardwick, 2020). The FI-HR automatically tracks data and keeps statistics for the athlete's heart rate patterns (Hardwick, 2020).

Summary of the Literature Review and Associated Research Implications

Currently there is no research that examines the effects of PPR on the horse and rider relationship and its direct influence on performance outcomes and flow states. Only a small body of literature exists regarding the horse and rider dynamic in elite sports, while the horse and rider relationship is considered fundamental to performance (Hogg, 2015). As highlighted in Hogg (2015), the psychological significance surrounding the horse and rider relationship is a “new” area of scientific research and the findings indicated a link between harmonization between the horse and rider and successful performance outcomes (Hogg, 2015). Future research should examine the psychological, physical, and relational components that are integral to the development of flow states in equestrian sport (Hogg, 2015). As highlighted in Jackman (2015), there is a gap in literature with regard to the features that characterize the state of flow in equine sports.

The qualitative nature of the studies provided valuable insights to the field. Semi-structured interviews proved to be an effective qualitative method on this topic. Semi-structured interviews can be 30 minutes to two hours. The Mental Readiness Form-3 (MRF-3) effectively identified the participants' cognitive anxiety, somatic anxiety, and self-confidence scores. Sport

Emotion Questionnaire, 17-item Thought Occurrence Questionnaire for Sport, Competitive State Anxiety Inventory 2-Revised, and the Emotion Regulation Questionnaire effectively measured self-talk, anxiety, emotions, and confidence.

PPR, such as those that use positive self-talk and positive imagery prior to performance, result in positive performance outcomes and could be a suitable method to minimize disruptive emotions (Stranger, et al, 2018). As highlighted in Wixcey (2014), there is a lack in sport psychology research literature with regard to equestrian sports, with no insight into the use of PPRs with equestrian athletes, while PPRs are considered an effective tool for psychological and physiological management of the self and consequently performance. Therefore, as highlighted by Wixcey (2014), a rider's ability to manage their psychological and physiological state should be considered by practitioners, coaches, and athletes. Additionally, there is a disproportionate number of females to males examined in literature. The limited and relatively outdated research illustrates a clear gap in the literature.

Future research should incorporate a larger, mixed gender sample, a control group, various age groups, and measure the actual impact on performance (e.g., improved scores and performance marks) and associated flow states. Future research should use other measures such as electroencephalograms to track participant experiences and should consider the effects of other emotions and disrupted performance. Future research should also consider the link between a strong horse and rider relationship and flow states. As highlighted in Wolf, et al., (2015) and Parent (2016) right-hemisphere activation was associated with heightened flow states and the right hemisphere activation was increased by intuition and empathy, which was amplified by the horse and rider relationship. Future research should examine the best PST methods to use with equestrian athletes, as PST increases positive sport outcomes (Smith, 2020). As highlighted by

Smith (2020) & Hogg (2015), successful performance outcomes will result in prolonged sport participation in equestrian sports which means growth within the industry.

The current literature lacks research on the use of PPR in equestrian populations, few studies have examined the horse and rider relationship and its influence on performance outcomes. PPR have been found to promote automaticity, confidence, optimal concentration, sense of control, and, in turn, may assist flow states in equestrian populations (Burton & Raedeke, 2008; Jackman, 2015; Csikszentmihalyi (2002). Further, a functional horse and rider relationship has been found to increase intrinsic motivations and confidence, which are associated with flow states (Jackman, 2015; O'Callaghan, 2015; Smith, 2020). Jackman (2015) was the first of its kind to examine flow states in equestrian populations. However, there are no studies examining the effects of individualized PPR on the horse and rider relationship and its potential to promote flow states and, in turn, successful performance outcomes.

If the current literature lacks evidence on the effects of PPR on the horse and rider relationship and the horse and rider relationship is considered fundamental to the safety and well-fare of horse and rider as well as successful performance outcomes and, in turn, the continuation of the equestrian sport, then this research would be a significant contribution to the current literature, the field of sport and performance consulting, and equestrian populations alike. Additionally, the current literature has many consistent themes associated with the horse and rider relationship, flow states, and PPR despite the limited research, indicating that it is a valid area of research.

Chapter 3: Methodology

Purpose of the Study

As highlighted in Chapter 1 and Chapter 2, the horse and rider relationship in equestrian sports is considered fundamental to successful performance outcomes (Hogg, 2015). PPR are associated with optimal psychological and physiological states in equestrian athletes which is associated with successful performance outcomes (Burton & Raedeke, 2008). Additionally, the increased right brain functions as a result of the horse and rider relationship have been linked with flow states (Parents, 2016; Wolf, 2015). Flow states have been associated with successful performance outcomes and peak performance (Jackman, 2015; Williams & Krane, 2015). The purpose of this study is to understand how PPR can support a functional horse and rider relationship that can lead to flow states in horse and rider dynamics that result in successful performance outcomes in the sport of eventing.

The results of this study can provide integral information for horse and rider dynamics in the sport of eventing that lead to more successful performance outcomes and minimize horse and rider injuries and deaths that result in: better application of PPR for sport and performance consultants and professionals alike; continuous participation from athletes; and increased support and funding from spectators and sponsors that maintains a healthy, safe, and exciting sporting environment for generations to come. The purpose of this present study is to explore: (a) the current status of the horse and rider relationships in horse and rider pairs in the sport of eventing; (b) the current use of any PPR; (c) the effects of implementing various PPR on the horse and rider relationships; (d) performance outcomes and associated flow states as a result of the implementation of individualized PPR in horse and rider pairs in the sport of eventing.

Research Questions

Based on the outlined purpose of the study, the following research questions were formulated:

- 1) What effect does the horse and rider relationship have on performance outcomes?
- 2) What effect do PPR have on the horse and rider relationship?
- 3) What conditions lead to more successful performance outcomes in the sport of eventing?
- 4) What conditions lead to flow states in horse and rider pairs in eventing?

Hypothesis

Based on the research questions and the purpose of the study, the following hypothesis will be answered:

- 1) Hypothesis: PPR do enhance the horse and rider relationship, increase opportunities for flow states, and lead to more successful performance outcomes

Null Hypothesis: PPR do not enhance the horse and rider relationship, do not increase opportunities for flow states, and do not lead to more successful performance outcomes.

Research Design

As stated in Chapter 1, the mixed-method, predominantly quantitative study will examine the influence of various PPR on horse and rider dynamics. Participants will complete baseline

measures with an electroencephalogram in practice and competition, with the approval of the Technical Delegate (FEI, 2021) at the competition, prior to the implementation of the PPR and then follow up measures after the implementation of the PPR, as this is an objective measurement of the horse and riders' psychological and physiological states (Wixcey, 2015; Christensen, et al., 2020). Participants will also complete e-surveys and questionnaires, followed by semi-structured interviews at the beginning of the study, to understand the current horse and rider relationship and confirm any use of PPR.

Following the semi-structured interviews, the researcher will develop various PPR for and with each respective rider. The PPR will be adjusted as needed to maximally support the riders. Follow up e-surveys, questionnaires, and semi-structured interviews will be completed throughout the research study to examine the effects of PPR on the horse and rider relationship, flow states, and performance outcomes (Butler-Coyne, et al., 2019; Wixcey, 2014; Smith, 2020). Performance outcomes will be measured by performance score changes. The scores after commencement of the study, following the implementation of PPR, will be compared to the scores prior to the study. Scores will be tracked throughout the study to compare at the end.

Participants

In accordance with the recommended sample size for causal-comparative mixed method studies in order to establish the existence of any relationship, there will be a total number of 90 horse and rider pairs divided evenly via random sampling into the three groups: 30 horse and rider pairs in the volunteer group; 30 horse and rider pairs in the experimental group; and 30 horse and rider pairs in the control group (Sheperis, et al., 2017). The riders will be in the developing rider age group between the ages of 13-21. Riders will be recruited on a volunteer

basis from various regions of the United States to gather a broad range of participants, which could provide more information of certain regions that may need more sport and performance consulting support for riders. Rider's affiliations with various equestrian organizations, such as the United States Pony Club (USPC) and Young Riders Program (YRP) will be considered in the study, as they have various educational and training components that may influence the results of the study (USPC, 2021; YRP, 2021).

Independent and Dependent Variables

The following mental skills training techniques are considered effective psychological and physiological state management techniques that are incorporated in PPR (Burton & Raedeke, 2008) and will be considered as the independent variables in the study: confidence techniques (e.g., positive self-talk and affirmation statements), relaxation techniques (e.g., imagery relaxation, diaphragmic breathing, and music), concentration techniques (e.g. narrow-broad focus exercises); energization techniques (e.g., imagery energization and psych-up breathing) (Burton & Raedeke, 2008; Williams & Krane, 2015). The rider's psychological and physiological state, the horse and rider dynamic, flow states, and performance outcomes are considered the dependent variables.

Procedures and Instruments

Following the review and approval of the researcher's and sport and performance consultant's multicultural competency and research proposal from the Ethics Committee, participants will be contacted via email and social media (e.g., Facebook and Instagram). Participants will be informed of the study as being a volunteer opportunity to contribute to the

future of the sport of eventing based on their genuine participation in the study. They will sign a contract agreeing to participate in the study that informs them: of their rights and protection to confidentiality as a participant in research and of the procedures of the study (O'Callaghan, 2015). Participants will be provided the opportunity to ask any questions at any time. All questions aside from those that may disrupt the validity or reliability of the study will be answered (Sheperis, et al., 2017). Email format (Appendix: 1) and contract (Appendix: 2) are provided in the Appendices.

Each horse and rider pair will be provided a Equisense Motion S (Equisense, 2018), an ergonomic electrode system that attaches to the girth, to measure the horse's heart rate and locomotion in practice and competition, with the approval of the Technical Delegate (FEI, 2021), in order to objectively measure the horse's behavior via movement and heart rate patterns. The researcher will assist the rider in assembling and operating the Equisense Motion S, via zoom due to the current COVID-19 travel restrictions and gathering considerations (WHO, 2021). The researcher will track, record, and code all of the data that is recorded in the equisense mobile app for each horse and rider pair to analyze at the end of the study.

Each horse and rider pair will also be provided a FitBit Inspire HR (FI-HR) (Hardwick, 2020), to wear during training and competition to measure the rider's heart rate patterns to objectively measure the rider's psychological and physiological state and examine any relationship between horse and rider heart rate patterns (Christensen, et al., 2021). The researcher will record and code all of the data from the FI-HR for each horse and rider pair to analyze at the end of the study.

Participants will complete: baseline measures with an electroencephalogram in practice

and competition, with the approval of the Technical Delegate (FEI, 2021) at the competition, prior to the implementation of the PPR and then follow up measures after the implementation of the PPR, as this is an objective measurement of the horse and riders' psychological and physiological state (Wixcey, 2014; Stranger, et al., 2018; Christensen, et al., 2021); A Demographic Questionnaire (O'Callaghan, 2015; Appendix: 3), to provide age, geographical region, experience, and gender.

Additionally, participants will complete: A Sport Emotion Questionnaire (Jones, et al., 2005), to examine the presence of emotions in performance (e.g., anger, anxiety, excitement); A Test of Performance Strategies (Hardy, et al., 2010), to determine the presence of current mental skills training to support performance; The Sport Motivation Scale (SMS-28) (Briere, et al., 1995), to measure the athlete's intrinsic and extrinsic motivations for sport engagement as well as amotivation; a specifically designed questionnaire to determine changes in behavior in the horse associated with anxiety, tension, stress, and resistance (Appendix: 7); A Mental Readiness Form-3 (MRF-3) (Morgan, 2015), to measure cognitive anxiety, somatic anxiety, and self-confidence scores in the rider; A 17-item Thought Occurrence Questionnaire for Sport (Stranger, et al., 2018), will measure self-talk.

Participants will also fill out self-reflection forms to note their own experiences of the use of PPR and the effects on their performance and the horse and rider relationship (Appendix: 6). After the questionnaires are completed, the participants will participate in individual 60-minute semi-structured interviews to gather further understanding of the rider's experiences with PPR, the horse and rider relationship, and flow states. All semi-structured interview forms (Appendix:

4; Appendix: 5), specifically designed questionnaires (Appendix: 7), and self-reflection forms (Appendix: 6) are provided in the Appendices.

After completion of the baseline measures of the horse and rider relationship and current use of PPR, the riders will each be placed in one of the three groups: the volunteer group, who will be assisted in the design of their PPR to use independently without the presence of a sport and performance consultant; the control group with no PPR; and a group of riders who consistently use PPR with the presence of a consultant. After group placement, riders in their respective groups will begin the design of their PPR with the assistance of a Sport and Performance Consultant. As stated in Chapter 1, effective PPR are individualized, therefore, each rider will be matched with suitable techniques that will be incorporated into the development of their PPR, including confidence techniques (e.g., positive self-talk, affirmation statements), relaxation techniques (e.g., imagery relaxation, diaphragmic breathing, music), concentration techniques (e.g. narrow-broad focus exercises), and energization techniques (e.g., imagery energization, psych-up breathing) (Burton & Raedeke, 2008; Williams & Krane, 2015).

The initial design of the PPR will be completed with participants over a two-four-week period, via Facetime and Zoom, in individual 60-minute sessions, due to current COVID-19 travel restrictions and gathering considerations (WHO, 2020), to allow for trial and error and availability for each participant to implement each respective technique with the support of a professional in the field. After the initial design, the use of PPR and the effects of PPR on horse and rider relationships and performance outcomes will be assessed three times every two months with the use of the preceding questionnaires and semi-structured interviews over a 6-month period to allow for riders to experience the long-term effects of PPR with various competition

opportunities (Burton & Raedeke, 2008; Wolframm, 2013; Smith, 2020). Performance outcomes will be tracked and recorded to compare at the end of the study.

Riders will be instructed to apply the use of their PPR in their regular practice and competition. Participants will take regular notes on their experiences with the use of the PPR and the effects on their horse and rider relationship after each use. The semi-structured interviews will be recorded and then reviewed and transcribed twice for data analysis by the researcher and a qualified impartial observer to ensure research credibility and content validity (Terrell, 2016).

Data Storage

All data will be stored in accordance with appropriate data management and confidentiality measures highlighted in Sheperis, et al., (2017). All identifiable information will be removed from all data sources (e.g., written or recorded); all paperwork will be stored in locked filing cabinets and all electronic data bases will be pass-coded, so that only the researcher and designated authority has access to the data; and all data will be disposed of upon completion of the study via paper shredding, deletion, and erasing of the files (Sheperis, et al., 2017).

Data Analysis

The data will be appropriately coded, and each participant will be assigned a unique number (Sheperis, et al., 2017). The data analysis for the quantitative data will involve various statistical procedures that will examine the means, standard deviation, medians, modes, and percentages from the data collected from the questionnaires, electroencephalograms, EM-S, FI-HR, and e-surveys. Repeated measures of ANOVA will be utilized to identify improvements in each rider's psychological and physiological state, the horse and rider relationship, performance

outcomes, and flow states for each horse and rider pair, and across control and experimental groups after the implementation of PPR. The quantitative data gathered from the questionnaires and electroencephalograms will be graphically plotted to visually display any patterns of distribution associated with the horse and rider relationship, the use of PPR, associated flow states, and performance outcomes (Sheperis, et al., 2017). The results will be tabulated twice in order to ensure the accuracy of the results (Terrell, 2016).

The data analysis for the qualitative data will involve reviewing and transcribing the recorded semi-structured interviews twice by the researcher and a qualified impartial observer to ensure research credibility and content validity (Terrell, 2016) through the process of content analysis. Content analysis will help the researcher to identify themes found in the transcripts that are related to answering the research questions (Terrell, 2016). The researcher will also use content analysis to analyze the data gathered from the self-reflection forms and notes taken from the participants to identify any themes associated with the research questions. The data will be analyzed and plotted using a tree structure to help identify themes and address the research questions (Sheperis, et al., 2017).

The results of the study and data analysis will be presented in Chapter 4: Results. The conclusions, strengths, limitations, and future research suggestions of the study will be presented in Chapter 5: The Discussion.

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Appendices

Appendix: 1 Email (O'Callaghan, 2015)

My name is _____. I would like to invite you to take part in the following research study. This is a volunteer opportunity to contribute to the future of the sport of eventing based on your genuine participation in the study.

Aims of the Study

To identify how Pre-Performance Routines (PPR) effect the horse and rider relationship, flow states, and performance outcomes in eventing.

Requirements of Participants

You will be asked to: use an electroencephalogram at the beginning and end of the study; wear a non-invasive FitBit Inspire HR to track your heart rate; use a non-invasive Equisense Motion S on your horse, which will track your horse's heart rate and locomotion patterns. You will be asked to complete: multiple questionnaires regarding your current psychological and physiological states associated with performance, assessments regarding your horse, and take part in 60 minute semi-structured interviews regarding your understanding and use of PPR, your current relationship with your horse, and have the opportunity to develop PPR that can support your performance.

Risks

There are no anticipated risks associated with the research.

Confidentiality

Your confidentiality will be maintained and your identification will be coded (Sheperis, et al., 2017). Data will be kept locked in filing cabinets and pass-coded on electronic databases.

Voluntary Participation/Right to Withdraw

It is completely voluntary to participate in this research study and you have the right to withdraw at any time.

Eligibility Requirements

13-21 years of age; currently competing in eventing.

Researcher Contact Details

Please contact me if you have any questions: Name, Phone number, and email.

Appendix: 2

Consent Form for Participation in Research (O'Callaghan, 2015)

I understand that the purpose of this study is to explore the effects of PPR on the horse and rider relationship, flow states, and performance outcomes.

Please check the box next to each statement to verify you have read it and understand your role in this study.

I understand that I will be asked to use: a non-invasive heart monitor on myself (FitBit Inspire HR) and my horse (Equisense Motion S) to track our heart rates in performance environments and an electroencephalogram to track my brain activity associated with flow states and my relationship with my horse.

I understand that I will be asked to complete seven e-surveys and questionnaires, regarding my psychological and physiological state in performance settings, my relationship with my horse, and flow states.

I understand that my confidentiality and my identity will be protected.

I understand that participation is completely voluntary and that I may withdraw at any time.

I understand that the results of this research will be published to contribute to the future sport of eventing, the sport and performance consulting profession, and tools to support athletes.

I am at least 18 years of age, or my parent/guardian will sign for me, and I hereby give my consent to participate in this study:

Signature: _____ Date: _____

Parent/Guardian Signature: _____ Date: _____

Appendix: 3

Demographic Questionnaire (O'Callaghan, 2015)

Please complete the following questionnaire which will ask questions about you and your equestrian activities.

1. Gender (circle one): Male Female

2. Age in years?

3. Number of years you have been riding for?

4. Number of years you have been competing for?

5. How often do you usually compete? (Circle the answer which best applies to you)

More than once a week; Once a week Twice per month

Once per month Less than once per month

6. How many days do you train/ride each week?

7. What State do you reside in the United States?

8. Are you a member of an equestrian organization, such as the United States Pony Club or Young Riders Program? If so, please state the equestrian organization and for how long.

Appendix: 4

Interview Guide for Semi-Structured Interview

Horse and Rider Relationship

How long have you been riding your current horse?

How would you describe your relationship with your horse?

How do you characterize your relationship with your horse?

Do you feel that your relationship effects your performance?

How does your relationship with your horse effect your performance?

PPR

Have you heard of PPR?

What do you know about PPR?

Have you used a PPR before?

If so, What PPR do you use? How does your PPR effect your performance?

Appendix: 5

Interview Guide for Flow

All questions will be followed up with asking, “What does that mean to you?” for more detail and elaboration.

Introduction

How long have you been competing in eventing? What is the highest level that you have competed?

Introducing Flow

Have you ever heard of flow? What does flow mean to you?

Can you tell me about a time that you have experienced flow?

Can you describe a flow experience?

Appendix: 6

Self-Reflection Form for PPR use and the effects on the Horse and Rider Relationship and Performance

How is my relationship with my horse? Describe in detail.

Does my relationship with my horse effect my performance in practice? If so, how? Describe in detail.

Does my relationship with my horse effect my performance in competition? If so, how? Describe in detail.

Does my PPR effect my relationship with my horse? If so, how? Describe in detail.

Does my PPR effect my performance in practice? If so, how? Describe in detail.

Does my PPR effect my performance in competition? If so, how? Describe in detail.

Appendix: 7**Horse Behavior Assessment**

How does my horse respond to the competition environment? Describe in detail.

Does my horse ever swish its tail during warm-up? If so, how often? Describe in detail.

Does my horse spook? If so, how so and how often? Describe in detail.

Does my horse relax into the warm-up? If so, how so? Describe in detail.

Does my horse tend to get more energized as the ride goes on? If so, how so? Describe in detail.

Does my horse respond quickly and correctly to my aids? If so, how so? Describe in detail.

Does my horse respond quickly and incorrectly to my aids sometimes? If so, how so? Describe in detail.

Does my horse respond slowly and seem non-responsive to my aids? If so, how so? Describe in detail.

Is my horse easy to control in warm-up and competition? If so, how so? Describe in detail.

Is my horse sometimes challenging to control in warm-up and competition? If so, how so?

Describe in detail.

Criteria and Points Possible (Part I/Part II/Part III)	Student Evaluation (Points)	Instructor Evaluation (Points)	Comments
Structure, Grammar, and APA Style (5/15/5) <ul style="list-style-type: none"> • Includes running head, title page, headings, page numbers, citations when appropriate, and references • Coherent flow of thoughts • Sentence structure is complete and active • Writing is precise, concise, and descriptive • Includes proper spelling, grammar, spacing, and paraphrasing. 			
Introduction (20) <ul style="list-style-type: none"> • Includes a few sentences overviewing the topic • Includes Problem Statement, Background, and Significance of topic • States the gap clearly • Prepares the reader for content of the paper 	20 Points- Meets all Requirements		
Literature Review (85) <ul style="list-style-type: none"> • Content is logically organized • Used peer-reviewed articles or seminal texts on topic • Summarizes literature accurately • Clearly identifies the gap in the research 	85 Points- Meets all Requirements		
Methodology (120) <ul style="list-style-type: none"> • Includes key components noted in both texts • Uses correct language and definitions of methodology and statistical analysis • Includes operational definitions 	120 Points- Meets all Requirements		
Final Submission (75) <ul style="list-style-type: none"> • Includes edits and corrections as advised • Includes re-written content connecting one section to the next, logically 	75 Points- Meets all Requirements		

<ul style="list-style-type: none">• Has a golden thread of the topic running throughout• Submitted as one document with cover page and reference page(s)• Included at least eight (8) peer-reviewed journal articles less than six years old			
Total	325/325	/325	