The influence of social and psychological factors on practices and performance of Fédération Equestre Internationale (FEI) endurance rider-owner-trainers in Aotearoa/New Zealand

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Abstract

Since 1998, governance of endurance horse riding in Aotearoa/New Zealand was aligned with the Fédération Equestre Internationale (FEI) to enable regular participation in world championships. These aspirations were facilitated by a high-performance programme. Despite this support, New Zealand riders performed poorly in FEI-level competitions within New Zealand and at world championships. This research aimed to understand factors that influenced the practices and performance of endurance riders in FEI-level competition within New Zealand. A qualitative methodology was chosen for the ability to understand meaning from participants' perspectives, to understand context, and to identify unanticipated influences in this under-researched subject. Twenty-three purposively selected participants contributed data to four studies during the 2016–17 endurance riding season in New Zealand. A survey and an observational study collected participants' self-reported descriptions of practices. Pre- and post-season interviews explored participants' motivations, competitive orientations, experiences, and perspectives. The complementary results from all studies showed that the performances of rider-owner-trainer participants were logistically, psychologically, and socially constrained. Amateur status limited time, money, and number of horses so participants rode slowly to avoid harming their horse and not achieving their goals. Performances were constrained by autonomous forms of motivation that drove risk averse practices and a task-focused competitive orientation that emphasised horsemanship over winning. Finally, through modelling, compliance, and comparison, the small, closely connected endurance riding community reinforced a conservative ethos that stigmatised harming horses. Based on the understanding of performance constructed in this research, adaptive performance strategies, autonomy-supportive coaching and greater use of sport science tools were recommended to enable riders to be comfortable with risk and riding at speed. Inadequate training could not be dismissed as a reason for poor performances, therefore further work was suggested to explore variation and periodisation in training programmes. The results suggest the qualitative methodology could provide contextual understandings of practices and performance in other countries where horse welfare suffers from competitiveness. The results also bring into question the relevance of the FEI for New Zealand riders because, although

competitive, participants' style of endurance riding emphasised intrinsic enjoyment, their own and their horses' wellbeing, and persistence in their sport of choice.

Dedication

This thesis is dedicated to three key characters in my life during the time that it took to complete this PhD.

Firstly, this thesis is dedicated to my father, Tony Webb, who took a special horse to the other side of the World, and from whom I learnt how to pursue crazy dreams.

Then there was my study-buddy, the slow-deaf Holly Cat who had no interest in crazy dreams. The last weeks were really, really, tough without you there.

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Thesis-related research outcomes

At the time of submission for examination, two refereed papers were produced from this thesis as follows:

Webb, H.J., Weston, J.F., Norman, E.J., Cogger, N.D., & Rogers, C.W. (2019). Experience, riding practices and training methods of Fédération Equestre Internationale (FEI:80 - 160 km) level endurance horse rider-owner-trainers in New Zealand. *Comparative Exercise Physiology 15*(2), 137–145. https://doi.org/10.3920/CEP180059

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Chapter 1 – Introduction to the research

1.1. The research problem

1.1.1. Performance of New Zealand endurance riders in FEI-level endurance

The national governance of endurance riding within New Zealand has been closely aligned for about 20 years with the Fédération Equestre Internationale (FEI), the governing body for international level equestrian competition. This alignment enables riders and horses to qualify in competitions held within New Zealand for participation in world championships. In 1998, a team of horses and riders flew from Aotearoa/New Zealand to Dubai, where they won the team gold in the World Endurance Championships (WEC). The four riders crossed the finish line in 22nd, 23rd, 24th and 25th place, at a mean speed of 14.5 km/hr.[1] Teams from the United States of America won silver, and Australia bronze, because, although their riders were faster (17.7 km/hr for the winning combination), they did not meet the team criterion that at least three team members must complete the course and their horses must pass veterinary inspections.

Since then, New Zealand endurance riders have been unable to repeat this level of achievement in international level competition (Appendix 1). This is despite investment in high-performance pathways that have facilitated participation in nine subsequent world championship events. In 2012, a team of New Zealand riders placed sixth in the Junior WEC (120 km) with a mean speed of 17 km/hr. However, the rest of the world now rides much faster, with countries aiming to be competitive at world championships preparing all team members to complete 160 km at 20 km/hr, and faster (Robert et al., 2011). By comparison, the performance of New Zealand endurance riders has remained conservative rather than evolving as other countries have. This stagnation raises the practical research problem of understanding what factors might influence the performance of New Zealand endurance riders engaged in FEI-level endurance riding.

[1] http://endurance.net/browse (accessed 15 November 2020)

1.1.2. Background to the research focus

From the early 2000s, endurance riding grew rapidly to become a global elite level equestrian sport (Coombs & Fisher, 2012). At the same time, as with most other sports, endurance riding became more global and commercialised. A faster and more competitive form of the sport emerged, with greater risks for horse welfare. These risks for horses are evident in FEI-level endurance in some countries and contexts as catastrophic injuries, exhaustion and death during competitions, doping, cheating, and high proportions of horses eliminated in veterinary inspections (Cuckson, 2018; FEI, 2019; Hogg, 2015; Kyriacou, 2018). As quickly as new rules and regulations were developed by the FEI to address specific issues, some riders, owners, and trainers found novel ways to circumvent those rules because rules and regulations constrain competitiveness. The FEI responded to these acts of circumvention with serial rule changes and consultation, strategic working groups and calls for more research. These events suggest that there is value in research that has the potential to illuminate the drivers of performance, including competitiveness, in FEI-level endurance riding.

1.1.3. Rationale for the research

A better understanding of performance can support riders and coaches to optimise performance. Participation at international level for any sport requires substantial investment and equestrian sports are no exception. The mean cost of keeping one sport horse in New Zealand has been estimated at $12,500 per year (Matheson & Akoorie, 2012), without the additional costs of qualifying and participating in international events. Endurance riders in New Zealand are largely self-funded, with a limited amount of public funding. Both individual riders and those who subsidise them deserve a return on their investment in the form of optimal performance, but in 2016 there was little research that might contribute to improved performances. In terms of more effective governance of FEI-level endurance riding, an understanding of factors that influence performance, such as competitiveness, has the potential to improve horse welfare.

1.2. How the thesis has addressed the problem

1.2.1. Aims of the research

The research presented in this thesis sought to describe and understand the riding, training and competition practices of endurance riders engaged in FEI-level endurance riding within New Zealand. Practices contribute to performance, hence the need to elucidate psychological, social, and cultural factors that influenced practices and what this meant for performances.

1.2.2. Research questions

The research questions lie at the heart of the research design, serving to focus and guide the research process (Maxwell, 2008). Put simply, the research questions were designed to understand the "how", and "why" of performance in FEI-level endurance riding in New Zealand. The research questions were developed to achieve a holistic description of participants' practices ("how" they rode, trained, and competed), complemented by an understanding of factors that influenced these practices, and how these factors and practices related to performance ("why" they rode, trained, and competed as they did). Therefore, this research was guided by the following four questions:

- What were the characteristics of selected participants engaged in FEI-level endurance riding in New Zealand?
- What were the selected participants' riding, training, and competition practices during a season of competition?
- What were participants' motivations, competitive orientations, perspectives, and experiences of a season of training and competition?
- How were the participants' practices and performances influenced by their characteristics, motivation, competitive orientations, perspectives, and experiences?

The first question and second questions were answered in Chapters 5 and 7. In Chapter 5, I aimed to provide a simple statistical description of the characteristics and riding practices of a selected cohort of FEI-level endurance riders, and a preliminary account of self-reported training methods. With Chapter 7, I aimed to capture detailed metrics of training and competition practices for a complete season. The research questions underpinning these two studies were designed to construct a descriptive account of riding, training, and competition practices.

The third and fourth questions were answered in Chapters 6 and 8. In Chapter 6, my aim was to understand the motivations and competitive orientations of riders as they commenced a season of training and competition. For Chapter 8, my aim was to explore the experiences and perspectives of riders as they reflected on that same season. Together, the research questions underpinning these two qualitative studies contributed to a holistic understanding of influences on practices and performances.

This thesis drew on a qualitative methodology, making use of different methods and types of data as were required to interpret and make sense of performance in endurance riding (Denzin & Lincoln, 1994). Using multiple forms of data meant that the results of all four studies complemented each other to provide a complete, cohesive, and holistic understanding of the drivers of and influences on performance in FEI-level endurance riders in New Zealand.

1.2.3. Thesis overview

This thesis is organised into nine chapters. This first, Chapter 1 outlines the reasons for this research and provides a broad overview of the research process with a road map of the thesis. In Chapters 2 and 3, I review the development of contemporary endurance riding, and the research literature that preceded and informed this research. Chapter 4 discusses the qualitative interpretive approach that framed the research design and outlines the methods employed to generate and analyse data. Chapters 5–8 present the four studies that make up this thesis as a mix of published and two unpublished studies. In Chapters 5 and 7, I present two published studies that meet the requirements of

thesis with publication. In Chapters 6 and 8, I present two studies that were unpublished at the time the thesis was examined. The final chapter, Chapter 9, begins by reflecting on the contribution of the thesis. Then, the complementary results from all four studies are synthesised with reference to the literature, thus placing this research within the overall body of literature. I discuss the implications of the understanding of performance that was constructed in this thesis, and what this might mean for FEI-level endurance riding in New Zealand. I also consider the limitations of the research, and how these were addressed, and I recommend areas for future research.

1.3. Summary of the chapter

Since 1998, endurance riders from Aotearoa/New Zealand have aspired to represent their country at FEI endurance world championships. A better understanding of performance can support this aspiration through enabling riders, coaches, and administrators to optimise the performances of New Zealand endurance riders in FEI-level competition. Currently, there is little research that contributes to our understanding of performance in FEI-level endurance riding in New Zealand. This thesis seeks to address this gap with recommendations to improve performance.

Chapter 2 – FEI-level endurance riding

2.1. Introduction to this chapter

This chapter describes the growth and development of endurance as an elite international equestrian sport under the governance of the Fédération Equestre Internationale (FEI). In New Zealand, administrators engaged with the FEI framework to facilitate regular participation at world championships. FEI-level competitions (or "rides") held within New Zealand enabled riders and horses to qualify towards FEI world championships.

2.2. The development of FEI-level endurance riding to 2016

2.2.1. The evolution of a modern global sport

For as long as horses have been used for transporting people, there have been long distance horseback races across the landscape (Gladitz, 1997). However, the modern form of distance riding with veterinary supervision to protect horses likely began in the mid-twentieth century with the 100-mile (160 km) Tevis Cup (Magafas, 1999). This iconic endurance ride was first held in 1955 and continues to follow the gold rush trails from Nevada to California in the United States (US) every year. Another iconic ride, the Tom Quilty Gold Cup (also 160 km) began in 1966 and is held each year in a different part of Australia. The first national endurance riding federation was established in the US in 1972. Ten years later, endurance riding was included among the elite-level equestrian sport disciplines administered by the FEI (Jeffcott, 2000), and the first international endurance ride, a European Championship event, was held at Florac in France in 1984. The first World Endurance Championship (WEC) was held in Italy in 1986 (Magafas, 1999), followed by Dubai in 1988 (Misheff, 2003), and the first World Equestrian Games Endurance (WEG) Championship in 1990 in Stockholm. These two forms of championships, WEC and WEG, are currently held every four years on a cycle that means there are two years between alternate world championship events.

The FEI administers nine elite equestrian sports via a framework of nine regional groupings of 134 countries, each represented by their national federations (Table 2-1).

From the early 2000s, endurance riding grew rapidly to become the second largest FEI discipline by number of riders after show jumping (Coombs & Fisher, 2012; Nagy et al., 2014a). Between 2006 and 2016, rider registrations increased from 4,000 to over 6,000 and horse registrations more than doubled.[2] This growth was largely due to increased participation by the United Arab Emirates (UAE), which had the greatest number of FEI registered riders, and held the most rides with the largest number of starters (Nagy et al., 2010). From starting in FEI-level endurance riding, both horses and riders must qualify through a series of distance-based grades. The shortest distance that was offered for rides under FEI rules in 2016 was 80 km, and the longest was 160 km. Rides are broken into sections (or "loops") of less than 40 km (FEI, 2016). Each loop is considered to have been successfully completed only when the horse has passed a mandatory veterinary inspection. Horses must also pass veterinary inspections before starting a ride, and within 30 minutes of completing the course. Passing a veterinary inspection means that the horse is fit to continue, but lame or fatigued horses are eliminated to prevent them from continuing. For 160 km rides, horses may be inspected as many as eight times during the ride.

Table 2-1

Regional Groups of National Federations Affiliated to the Fédération Equestre Internationale (FEI)

Group	Location
I	Central and Southern (or continental) Europe
II	Scandinavia, United Kingdom, and Iceland
III	Russia and the Baltic
IV	North America
V	Central America
VI	South America
VII	Middle East and Northern Africa
VIII	Asia and Australasia (or Oceania)
IX	Southern Africa

Note. New Zealand is governed in Group VIII (FEI, 2016).

[2] https://inside.fei.org/fei/about-fei/sportsforum/2017 (accessed 6th November 2017).

Despite the homogeneous framework and competition format provided by the FEI, differences in performance were apparent between countries and FEI regions by the 2000s (Nagy et al., 2010; Nagy et al., 2014a). These differences coalesced around two contrasting forms of endurance riding. The more competitive form originated in the "desert racing" characteristic of the Middle East (Marlin, 2015). Racing on uniform, flat surfaces in the desert environment of the Middle East facilitated faster speeds, with winning speeds of 26–30 km/hr recorded in the Qatar International Marathon between 1994 and 1997 (Burger & Dollinger, 1998). World record times for 160 km were repeatedly set and broken in the UAE during 2008, 2009 and 2010, with final loops ridden at over 30 km/hr (Misheff et al., 2010). Successive world records were set and broken in the UAE during February and March 2010, culminating in a winning speed of 29.5 km/hr for a 120 km ride (Nagy et al., 2010). Performances in world championships also became more competitive. Winning speeds of 160 km world championships increased from about 13 kph in the first WEC event held in Italy in 1986 to 23.6 km/hr in Slovakia in 2016. While speeds were increasing, more horses were being eliminated in veterinary inspections. Only 35% of starting combinations finished at the 2016 WEC in Slovakia. This combination of faster speeds and high elimination rates has also been described for Groups II, VI, VII and for the countries of UAE, Uruguay, and the United Kingdom (UK) (Nagy et al., 2010; 2014a)

The contrasting form of endurance riding is characterised by slower speeds and courses over variable and sloping terrain (Loving, 2011). These courses are termed "technical" because of the higher physical and cognitive demands on riders as they change position and balance with variations in pace and direction, monitor the effect of the terrain on their horse, and make decisions about pacing strategies (Williams et al., 2021). This form of endurance riding is characteristic of New Zealand where median speeds of 13.6–14.6 km/hr have been reported for 100–160 km rides (Legg et al., 2019). Similar speeds, combined with lower rates of elimination, have been documented for FEI rides in the US and Australia (Nagy et al., 2010; 2014a). However, the association between conservative performance and country may not necessarily have a solely geographic basis. Kerr prefaced his 1985 doctoral study of the physiological effects of endurance exercise on horses with an observation that the term "race" was rarely used in the context of

distance riding events in the UK. Since then, speeds in FEI rides in the UK have increased, with mean winning speeds of 18.6 km/hr reported for 100 –120 km rides, and 16.6 km/hr for rides ≥ 120 km (Nagy et al., 2010). Completion rates reported by Nagy et al. (2010) for the UK were second lowest of nine countries, second only to the UAE. This suggests there may also be a temporal element to these differences between countries, and that the performance of riders in a specific country can evolve over time from a conservative approach to a more competitive approach that embraces higher speeds, with a greater risk of elimination.

2.2.2. Horse welfare and ethics in FEI-level endurance riding

Higher speeds bring risks for horses due to the higher metabolic and biomechanical demands of racing over long distances and durations (Nagy et al., 2012). These risks can include horse deaths, first documented in research by Burger and Dollinger (1998). Furthermore, higher speeds in competition imply higher training loads required to prepare horses to compete at speed (Marlin, 2015; Misheff, 2003). High levels of wastage of endurance horses in training due to musculoskeletal injuries have been reported (Coombs & Fisher, 2012), as have fractures of a type and rate of occurrence like those which occur in Thoroughbred racing (Misheff et al., 2010). Recently, catastrophic injuries of horses during rides have been displayed on social media, increasing awareness and concern of the risks of harm to horses from "extreme behaviours … in some races in a few countries … horses galloping 25 km/hr for more than 100 km, leading to exhaustion and even death on the track" (Younes et al., 2016, p. 162). Reflecting on the moral and ethical concerns around elite-level equestrian competition, Hogg (2015, p. 60) described "stress fractures, doping practices, multiple horse deaths, and sporting scandals relating to cheating, corruption, and conflicts of interest" in FEI-level endurance riding prior to the 2014 World Championships. The FEI has reacted to protect horse welfare with serial rule changes and consultative groups to address the issue. In March 2015 and December 2020, due to systemic rule violations, the UAE national federation was banned from participation in any FEI competitions for several months. Since then, horses have continued to die in FEI-level competitions,

pointing to a failure by both the FEI and individual riders, owners, and trainers to protect horse welfare.

2.2.3. The vet gate

The most obvious regulatory mechanism to protect horse welfare in endurance riding is the veterinary inspection, termed the "vet gate" because it stops compromised horses from continuing. So, while endurance riding has the competition format of a race, the outcome is conditional on the horse passing a series of mandatory veterinary inspections that detect and eliminate horses that are not coping with the demands of competition (Barnes et al., 2010). Events held under FEI rules are characterised by a system termed "vet gate into hold" in which the time for each loop does not stop until the horse has entered the area where the veterinary inspection is conducted. As the horse finishes each loop, saddlery ("tack", or "gear") is removed, and the horse is cooled with water ("strapping") before proceeding to the vet gate. Large volumes of water are repeatedly applied to the neck, withers and girth area, and sometimes to the large subcutaneous vessels between the hind legs to rapidly reduce core body temperature (Foreman, 1996; Williamson et al., 1995). The horse is also offered water to drink. The heart rate is checked continually with an electronic heart rate monitor, stethoscope or by hand, and when the heart rate falls below the 64 beats per minute (bpm) required in 2016 (or higher and the crew is confident that it will fall quickly) the horse is led to the vet gate, and the handler calls "time" as the horse enters.

The time between crossing the finish line and entering the vet gate (usually minutes) is termed the "lag time" and is regarded by competitors as a tactical opportunity to achieve a break on the field, or if this takes longer than expected, as an indication that a horse is starting to tire or has been ridden too fast (Younes et al., 2015). For vet gates during the ride, the horse may be presented a second time if the heart rate is above 64 bpm but there is only one opportunity to meet the heart rate criteria for the final vet gate at the end of the ride (FEI, 2016). In addition to the heart rate, metabolic status is assessed by examination of mucous membranes, capillary refill time, and the skin recoil time (Barnes et al., 2010). Muscle tone, gastro-intestinal tract motility, heart rate and

character, and respiration rate are also assessed as indicators of metabolic status. Horses are trotted up “in-hand” for 30 metres and scored for regularity of gait and impulsion on a four-point scale. The saddle and girth area, legs, hooves, and mouth are inspected for injury. Also included in the examination is a short exercise test for fatigue called the Cardiac Recovery Index (CRI) that consists of the heart rate taken as the horse entered the vet gate, followed by another heart rate taken one minute after the horse commences the trot up (Barnes et al., 2010).

If the horse fails the vet gate, it is eliminated (also known as “vetted out” or “failed to qualify”), most commonly for metabolic status and/or irregular gait. Nagy et al. (2014a) reported 30% of horses were eliminated from 100–160 km rides for lameness, and a further 8.7% for metabolic conditions. Bennet and Parkin (2019) noted that, while the primary reasons for elimination are clear, simple categories, they include a range of conditions that have different consequences for horse welfare. For instance, elimination for metabolic conditions may be due to a high heart rate because the horse is separated from a companion horse or is unfamiliar with the vet gate environment - or the horse may have been dehydrated to the point where it required invasive treatment. Lameness and metabolic fatigue can be interrelated, for instance horses experiencing a bilateral lameness may be eliminated for metabolic conditions based on a high heart rate from pain and muscle condition of the back and hindquarters (Nagy et al., 2012). Conversely, horses may be eliminated for lameness because a metabolic condition has caused muscle cramping and irregular gait (Robert et al., 2002). Previously, metabolic condition was regarded as a greater risk for mortality, but this has changed with increased incidence of catastrophic fractures (Nagy et al., 2012). Other reasons for elimination may include voluntary withdrawal or rider injury or sickness (retirement, 7.3%), elimination for other horse health problems such as sore backs and mouths (2.8%), and rule violations (0.4%) (Nagy et al., 2014a).

If the horse passes the vet gate, it proceeds to a pre-defined area for a specified period (the “hold’) of about 40–50 minutes, during which time the horse is fed, watered, rested, and cared for, before being tacked up and commencing the next loop. During the hold period, the temperature of the horse is continually monitored, and more cooling applied

if required, or rugs are added if it is cold. The head and saddle area are washed to remove sweat, muscles checked and massaged, the hooves and shoes checked, and tack are cleaned, checked, and changed if necessary. For the longer rides, competitors are usually supported by a crew ("strappers") like those in multi-sport and adventure racing (Gurney, 2010). This social network provides tangible support in the form of strapping, trotting the horse up in the vet check, and feeding horse and rider during the hold. Crew also provide emotional support that is useful for addressing mental fatigue and irritability, and informational support to riders (Rees & Hardy, 2000), such as when they are due into the vet ring and to start the next loop, how far ahead other competitors are, their lag times and how their horses looked in the vet gate.

A further veterinary inspection called the "re-present" is an additional veterinary inspection where all horses must present to the vet gate prior to departing on the next loop. Despite having been assessed as fit to continue about 30 minutes earlier, a further 10% of horses may be removed from rides (Robert et al., 2002). A re-present is usually only required during the longer rides of 120–160 km, when officials have concerns for horse welfare such as after a particularly taxing loop, or if the weather is hot or humid. Veterinarians can also request that individual horses be re-presented after any loop if there are concerns. The vet gate is only a snapshot in time of the horse's condition, so horse welfare is dependent on riders, trainers and support crews effectively managing the horse during the ride (Bergero et al., 2005; Frazier, 2000).

2.3. FEI-level endurance riding in New Zealand

2.3.1. The development of endurance riding in New Zealand

New Zealand shares a common tradition with many other countries of riding horses for long distances, initially for transport and for work on farms, but increasingly for sport (Elgaker, 2012). The earliest account of an endurance race in New Zealand described a race across country that was organised by the colonial forces occupying Taranaki in the late 1860s. The race covered nearly 100 km from Patea to Waingongoro and back again, and while the time taken was not reported, the outcome was. The leading horse died a

few miles from the finish line, “slaughtered by the ignorance and neglect of its rider” (Belich, 1989, p. 36). The rider probably failed in two ways; firstly, by riding so fast that he had time to stop at a tavern, and secondly by administering a bottle of stout to his horse at said tavern. This instance serves to highlight the contribution of skilled knowledgeable horse management to performance and horse welfare outcomes in long distance races. In a later military context, horses were used to transport soldiers rapidly over long distances during the Boer and in the Middle East during World War I (Kinloch, 2016), however professional equestrianism as it occurs in the military has had less influence in New Zealand than in Europe or the US (Blokhuis & Andersson, 2019).

Within five years of the first Tom Quilty ride in Australia, the first 80 km endurance ride was held in New Zealand in 1971, followed in 1981 by the formation of the national organisation, the New Zealand Endurance and Trail Rides Association (NZETRA) (Hyland, 1988). Administrators were conscious of public image and sought to avoid distressed and dying horses because of riders who might “extend unfit mounts at crazy speeds” (Kelly, 1977, p. 393), so they introduced veterinary checks and standards for horse management to ensure that horses could start and complete rides (Kelly, 1977). Competitive trail rides (CTR, described in Table 2-2) were the preferred format as they are scored for lowest heart rates at the finish plus compliance with a pre-defined time. This format encouraged conservative tactics with less risk of adverse outcomes for horses. Four CTR events were documented in the Manawatū in the mid-1970s, over 80 km of rough hilly terrain. The maximum time allowed was 5 ¾ hours including a compulsory break of 45 minutes, which required horses and riders to travel at a minimum mean speed of 16 km/hr (Kelly, 1977). Subsequently, endurance riding and CTR evolved as different disciplines with different aspirations. Trail riding became localised with a high proportion of recreational riders and rules that differed from both endurance riding and CTR in other countries such as the USA (Hyland, 1988)

By contrast, endurance riding supported national and international aspirations with riders taking horses to compete in the Tom Quilty in Australia during the 1980s. The national federation, now Equestrian Sports New Zealand (ESNZ), subsequently affiliated

Table 2-2

Types of Distance Riding Competitions Including the FEI Qualification Framework that were Available to Riders in New Zealand in 2016-17

Level of performance	Type of class	Distance	Comments
Recreational and pre-FEI level	CTR	<70 km in one day	Competitive trail riding with speed limited format, classes offered by ESNZ affiliated clubs and two unaffiliated clubs
	CEN Endurance	≤80 km	Riders and horses were speed and distance limited until they had qualified in 2 x 40 km and 2 x 80 km classes
Non-FEI endurance classes	CEN	<160 km	In 2016-17 one 100 km CEN class was held by an ESNZ affiliated club. Minimum mandatory weights did not apply to these classes. Children <21 ride as juniors, adults ≥21 years of age are seniors
FEI classes held within New Zealand	CEI 1*	80–119 km	To start riders and horses must have completed 2 x 40 km and 2 x 80 km CEN rides. Mandatory minimum rider weight of 70 kg
	CEI 2*	120 km	To start riders and horses must have completed 1 x CEI 1*. Minimum weight 70 kg
	CEI 3*	160 km	To start riders and horses must have completed 1 x CEI 2*. Minimum weigh 75 kg
Biennial world championships outside New Zealand	CEI 4*	160 km	Riders and horses must have met qualifying standards set by FEI and ESNZ High Performance. In 2016-17 the FEI requirement was 1 x 160 km at 14 km/hr. Additionally, ESNZ HP required 2 x 160 completions at 16 km/hr for selection to represent New Zealand
International	Elite status	120–160 km	This class was created to facilitate riders leasing horses based in other countries to compete in world championship events. Adults must have completed 10 x 160 km, with 10 x 120 km for JY
Youth	JY	80–160 km	Children may not enter FEI classes until the year they turn 14. JY was from 14–21 years of age, exempt from mandatory minimum weights

Note. Concours Equestre Internationale (CEI) classes are those held under Fédération Equestre Internationale (FEI) rules, while Concours Equestre National (CEN) classes are held under the rules of the national federation, Equestrian Sports New Zealand (ESNZ).

with the FEI in 1997 and the team won the gold medal at the 1998 WEC in Dubai. Since then, New Zealand has maintained representation by teams and individuals at world championships. This was New Zealand despite being a minor country in global endurance riding, with only 2.5–4% of global FEI registrations in 2008–2011 (Nagy et al., 2014a). Representation at world championships was facilitated through closely aligned FEI and ESNZ rules that enabled horses and riders to qualify in competitions within New Zealand for representation in world championships (ESNZ, 2017; FEI, 2016). Under this dual governance, about one third of the 450 endurance horses registered with ESNZ in 2016 were also registered with the FEI. The dual governance meant that horses and riders could be based in New Zealand, rather than having to move offshore to compete at elite level.

Because of the dual ESNZ and FEI governance system, two classes of rides ≥80 km offered to riders in 2016: CEI (international level endurance), and CEN (domestic level endurance). About 20% of endurance rides were held by ESNZ under FEI rules, termed Concours de Raid d'Endurance Internationale (CEI) events, and they ranged from 80 km to 160 km in one day (Legg et al., 2019). The remaining 80% of endurance rides were termed Concours de Raid d'Endurance Nationale (CEN) (Legg et al., 2019). These classes of rides are also termed "club rides" because they are run by local clubs, under ESNZ rules. Club rides ranged from 25k km to 160 km in distance and are the equivalent of domestic level rides described in other countries that are held under national rules. Longer rides often start between midnight and daylight to avoid the hot parts of the day and have one or two loops in the dark, for which most riders wear head lamps.

2.3.2. FEI framework supports elite-level aspirations

Due to the FEI requirement for horses and riders to qualify through a series of distance-based grades, and the paucity of FEI-level rides held in New Zealand compared to other countries, most FEI-level riders in New Zealand will have been riding for years. However, definitions of elite level based on experience and time spent training are less valid because more years of experience, or hours spent training, do not automatically correlate with improved or elite-level performance (Ericsson & Charness, 1994). Instead,

a useful definition of elite was constructed by Swann et al. (2015), based on the following five criteria: international, national, and regional representation, involvement in talent development pathways, and sport specific measures. FEI-level endurance riding is consistent with this definition of elite because it meets all five criteria. Firstly, the sport is governed in an international framework, and participation in FEI-level endurance riding facilitates international representation through participation in world championships. In New Zealand, aspirations to compete in FEI World Endurance Championships are framed and supported by talent development programs. Furthermore, dual governance meant that regional and national level competitions in 2016–17 were held under FEI rules, fulfilling the criteria for national and regional representation through participation in these rides. In terms of sport-specific measures, Nagy et al. (2010) distinguished FEI rides longer than 100 km (i.e., ≥CEI 2*) as elite, and 80–100 km as below elite. The FEI rules are more specific, with an elite rider defined as one that has completed ten, 160 km rides for adults (FEI, 2016). Young adults (JY) must complete ten, 120 km rides to achieve elite status (FEI, 2016). These sport-specific measures corroborate the definition of participants in FEI 100–160 km endurance riding as elite-level riders. Therefore, with reference to Swann et al.'s (2015) typology based on performance, FEI-level riders in New Zealand would be defined as semi-elite to competitive-elite athletes, i.e., those whose highest level of participation is below the top standard possible in their sport, through to those who engage in regular competition at the highest level in their sport.

2.3.3. Comparisons of performance: New Zealand and the World

Absolute or objective measures enable performance to be analysed and improved (Ericsson & Charness, 1994). There are two objective measures that define performance in endurance: speed and passing or failing the vet gate inspections. If we consider speed first, it was difficult to compare research that documented speeds in New Zealand FEI-level 100–160 km rides with speeds documented for other countries because different descriptive statistical methods such as medians or means were used depending on the aim of each study. Also, 100 –160 km rides in New Zealand may have included a mix of CEI and CEI competitors due to the dual governance. Other differences in reporting were

the use of winning speeds only, instead of all successful competitors, or speeds only for loops that were successfully completed, instead of the whole ride. These variations in reporting speed are shown in Table 2-3, where the mean and median speed of riders in FEI rides within New Zealand is compared with that of riders in other countries.

Median and mean speeds for entire fields suggest that New Zealand riders are much slower than the rest of the world. However, FEI fields can include riders and horses at varying stages of their development, with correspondingly variable goals. It may be more useful to focus the comparison on higher performing riders with competitive goals, as indicated by winning speeds. Mean winning speeds in FEI rides (Nagy et al., 2010; 2014a) have been reported to range from 10.2 km/hr (160 km, US in 2008) to 29.5 km/hr (CEI 120 km, UAE in 2010). Maximum winning speeds ranged from 16 km/hr (>120 km, Italy) to 26.2 km/hr (100–120 km, UAE) (Nagy et al., 2010). A search of the FEI results database[3] for FEI 100–160 km rides held within New Zealand in the period 1/1/2008–31/05/2011 showed winning speeds for individuals that ranged from 12.1–19.8 km/hr. This comparison places New Zealand riders at the lower end to middle of the global range for speed.

In terms of elimination for lameness from FEI-level 100–160 km rides, the performance of New Zealand riders was like that of other countries. Elimination rates ranged from 21–38% in New Zealand between 2010–2016 (de Lannoy, 2015; Legg et al., 2019). This is close to elimination rates of 23–38% reported for contemporary FEI-level rides in other countries (Battista et al., 2019; Bennet & Parkin, 2018b; Marlin & Williams, 2018; Muñoz et al., 2016; Nagy et al., 2013; Nagy et al., 2010; Nagy et al., 2014a, 2014b; Younes et al., 2015). Looking at elimination for metabolic conditions, horses were removed from FEI-level rides in New Zealand between 2010–2016 at rates of 2–9% (Legg et al., 2019; Penders, 2015). This range was slightly lower than studies of FEI rides that report rates ranging from 4–12% (Bennet & Parkin, 2018b; Marlin & Williams, 2018; Muñoz et al., 2016; Nagy et al., 2013; Nagy et al., 2010).

[3] https://data.fei.org/Calendar/Search.aspx

Table 2-3

Summary of Studies Reporting Details of Speeds in 100 – 160 km Endurance Rides, Comparing the Performance of Riders from New Zealand with Other Countries

Authors, date, and country	Ride distance and type	Years included	Speed (km/hr)	Notes on data presentation
New Zealand				
Legg et al. (2019) New Zealand	100 may include CEN	2010–16	13.7 [IQR, 12.3–15.3]	median
Legg et al. (2019) New Zealand	160 may include CEN	2010–16	14.6 [IQR, 13.2–15.9]	median
Penders (2015) New Zealand	100 may include CEN	2010–2013	13.9	mean speeds were calculated from mean time per ride distance
Penders (2015) New Zealand	120 may include CEN	2010–2013	13.5	
Penders (2015) New Zealand	160 may include CEN	2010–2013	14.24	
Other countries engaged in FEI-level endurance				
Muñoz et al. (2016) Chile	CEI 120	2007–14	18.2 (+/- 2.7)	mean
Muñoz et al. (2016) Chile	CEI 160	2007–14	15.7 (+/- 1.4)	mean
Battista et al., 2019 Italy	CEI 80–160	2004–2015	15–19	interpreted from graphically displayed mean with 95% confidence interval
Younes et al. (2016) Spain, Portugal, France, and the UAE	CEI 80–119	2007–2011	16.8 (successful) 17.04 (eliminated)	comparison of mean speeds of successful and eliminated horses
Younes et al. (2016) Spain, Portugal, France, and the UAE	CEI 120–139	2007–2011	17.5 (successful) 17.8 (eliminated)	
Younes et al. (2016) Spain, Portugal, France, and the UAE	CEI 140–160	2007–2011	15.7 (successful) 15.6 (eliminated)	
Bennet and Parkin (2018a) global	CEI 120	2012–15	18.6 (s.d. 14.8–22.4) first loop 12.9 (s.d. 6.4–19.5) final 6th loop	mean speeds for selected loops only, not complete ride
Bennet and Parkin (2018a) global	CEI 160	2012–15	17.7 (s.d. 14.3–21.1) first loop 17.9 (s.d. 14.7–21.1) second loop 16.2 (s.d. 11.7–20.8) final 6th loop	mean speeds for selected loops only, not complete ride

Other than Trans-Tasman events, and occasional invitation rides in Europe and the US, participation in FEI rides outside New Zealand has been restricted to world championships. Of the 39 combinations that have represented New Zealand in ten World Championship events, eight (21%) finished in a top 30 placing but 24 (61%) did not finish the ride. The best performing New Zealand team in recent times placed sixth at the Junior WEC 2012 in the UAE with a mean speed of 17 km/hr[4]. In summary, these comparisons with global studies show that performance in FEI-level endurance riding within New Zealand was characterised by slower median and mean speeds, slower winning speeds, comparable rates of elimination for lameness, and slightly lower rates of elimination for metabolic conditions. The performances of riders with competitive aims suggest that aspirations of competing at world championships could benefit from improved performance.

2.3.4. Possible reasons for the difference in performance

Reflecting on elimination from FEI rides globally, Nagy et al. (2014a) suggested that differences between countries might be due to physical factors such as terrain, climate, and ground conditions (or "going"). Terrain was hypothesised as a reason for the slow speeds of New Zealand riders (Penders, 2015), however anecdotal accounts report occasional 40 km rides being ridden in 2 hours, and 80 km in 3 hours during the 1970–80s[5]. Furthermore, Kelly (1977) reported set riding speeds of 16 km/hr for CTR rides during the 1970s on steep terrain with ascents and descents totalling 1900 metres. It was unlikely that slow speeds since that time are due to courses becoming steeper since then, given the imperative to meet selection requirements for world championships has resulted in flatter, faster courses for FEI rides. Little is known of training FEI-level endurance horses, and given the influence of training on performance, this is a factor that warrants further exploration.

Rider factors influencing performance may be relevant, such as competitiveness, rider skill and ability to manage their horse (Nagy et al., 2014a). In New Zealand, human

[4] http://www.endurance.net/international/UAE/2011WECYRJ/Team_Results.PDF
[5] Struan Duncan, personal communication, December 2016.

factors have been proposed as explanations for performance. These include ownership of only one horse, riders' desire to avoid harm to their horses, and prioritising horse welfare over winning (de Lannoy, 2015) or the "laid-back and easy going" approach to life of New Zealand riders who were deemed less likely to ride competitively (Penders, 2015, p. 17). Other reasons for slower speeds and fewer eliminations that have been proposed include conservative strategies with young horses, and the requirement to open and close gates when crossing farmland, or the use of rides for training (Legg et al., 2019). To date, there has been no research into rider factors that might influence or affect performance in endurance riding.

2.4. Summary of the chapter

Endurance riding has developed since its inception in the 1950s to become a global elite-level competitive sport. Despite early engagement and success in FEI-level endurance, the performance of New Zealand riders has stagnated while the performances of riders in other countries have evolved to become more competitive since the late 1990s–early 2000s. Compared with FEI rides in other countries, New Zealand was characterised by slower median, mean and winning speeds. This poor performance is problematic for aspirations of New Zealand riders to compete at FEI world championships. There appeared to be no research that could explain why the performance of New Zealand riders was different. A better understanding of factors that affect practices and performance can support riders, coaches, and administrators to optimise the performance of New Zealand endurance riders. The next chapter reviews what was known from the literature on factors that contribute to performance in endurance riding.

Chapter 3 – Factors that contribute to performance in endurance riding

3.1. Overview of the chapter

Analysing performance in equestrian sports - even for high-stakes Thoroughbred racing - has traditionally been a largely tacit, subjective art based on practical and experiential knowledge, rather than underpinned by science (Richardson et al., 2019). However, performance analysis methods are now being applied to equestrian sports (McKenzie, 2017) with the potential to identify and understand factors that enhance or limit performance in competitions (Williams, 2013). Identifying and understanding facets of performance, even if these cannot be quantified, enables practices to be manipulated and modified to achieve better performances.

This chapter outlines what is known from the research literature of factors that contribute to performance in endurance riding. Firstly, I review factors that influence the performance of the horse, followed by those that may influence rider performance. It should be noted that this review is not exhaustive, and that factors such as horse genetics, feeding, management of horses, veterinary care in training, and horse behaviour have been excluded from this review. This exclusion enabled a focus on the research aims of understanding how riding, training, and competition practices may influence performance.

3.2. Performance of horses

3.2.1. Equine athletic ability for long distance exercise

Most breeds of horses can complete endurance rides of up to 80 km (Fielding et al., 2011), but at longer distances the sport is dominated by Arabian or part-bred Arabian horses (Bolwell et al., 2015; Nagy et al., 2013; Nagy et al., 2014b) with a small, light, ectomorphic body type that facilitates economic movement and effective heat loss (Muñoz et al., 2017; Robert et al., 2012). Furthermore, Arabians have a high aerobic capacity and an inherent muscle type suited to prolonged aerobic exercise (Bergero et al., 2005; Castejon et al., 1994; Rivero et al., 1995). Horses with heart rates that drop quickly on cessation of movement (RHH, recovery heart rates) are valued (Younes et al.,

2015) because this reduces lag times. Like muscle type, heart rate has a genetic component but can be improved with training. Mental toughness is also valued, and it has been suggested that this may be an inherited trait via genetic control of neuronal function that influences detection of fatigue (Ricard et al., 2017).

If "eventing is the triathlon of equestrian sports" (Bridgeman, 2009, p. 2), then endurance riding is the cross-country running or ultramarathon equivalent. The physiological responses of horses in 100 – 160 km rides are well understood as substrate depletion, musculoskeletal strain, and dehydration with electrolyte derangement from sweating (Robert et al., 2010; Robert et al., 2011; Rose et al., 1983; Schott et al., 2006; Stopyra et al., 2012; Viu et al., 2010). These effects on horses will depend on the course (terrain, distance and going), ambient weather conditions (temperature, humidity, wind, rain), the horses' health and preparation (training, travel, and acclimation prior to the event), in addition to management of the horse and riding speed on the day (Bergero et al., 2005; Muñoz et al., 2017; Nagy et al., 2013; Nagy et al., 2014b). As with human distance runners, endurance riders aim to travel at a consistent speed that is "barely anaerobic" (Lydiard & Gilmour, 1978), making tactical use of their anaerobic capacity (Clayton, 1991). Typically, the aerobic threshold is reached at 18 km/hr to 36 km/hr in endurance rides (Smith & Wagner, 1985), with low intensity exercise defined as below 60% of an individual horse's anaerobic threshold (Pagan et al., 2002; Pinna et al., 2004). Marlin et al. (2002) showed that horses completing a 140 km ride in England at 13.9–19.7 km/hr, with minimal variation in altitude in cool to warm conditions, were working well within their aerobic capacity at an estimated 30–40% $VO2_{MAX.}$

The greatest metabolic challenge for horses during endurance rides is thermoregulation with the associated loss of water and electrolytes in sweat (Butudom et al., 2003). Horses may lose up to 15% of their bodyweight (i.e., 60 litres for a 400 kg horse) of sweat during a ride (Flaminio & Rush, 1998), with dehydration regarded as routine by the mid-point of longer rides (Muñoz et al., 2010; Robert et al., 2010; Schott, 2006). To compensate for sweat losses, a highly regulated and co-ordinated system shifts electrolytes and fluid between extra-cellular and intracellular spaces (Viu et al., 2010). This system works extremely well in conditioned horses, operating within their

capabilities, and enables horses to maintain their core body temperature (Smith et al., 2006). High ambient temperature combined with high humidity inhibits evaporation of sweat, contributing to hyperthermia. When combined with speed, hilly terrain or heavy going, and dehydration, hyperthermia promotes glycogen depletion, which contributes to fatigue and exhaustion (Foreman, 1998; Nagy et al., 2014b).

A range of studies have confirmed horse-level risk factors for elimination from rides: breed, age, height and weight, previous experience, and time since last ride, and if the horse was a stallion (Bennet & Parkin, 2018b; Fielding et al., 2011; Garlinghouse & Burrill, 1999; Nagy et al., 2014b). However, Bennet and Parkin (2018b) observed that horse risk factors may be influenced by underlying causes that could be addressed by modifying the behaviours of riders and trainers. This makes sense because horse- and rider-level risk factors are related through the dyadic partnership that is inherent to all ridden equestrian sports. Horse- and trainer-level risk factors are connected by the relationship between training and performance in competition (Marlin & Nankervis, 2002). Furthermore, it seems possible that horse-level factors may have been confounded by study designs that tried to isolate these from the context of the horse-rider partnership. For instance, older horses (i.e., >6 years) were found to be twice as likely to be eliminated for metabolic conditions than young horses (Fielding et al., 2011; Langlois & Robert, 2008), which Fielding et al. attributed not to age *per se*, but to more aggressive strategies by competitive riders of experienced conditioned horses. This suggests there is a place for studies that explore horse-level performance within the social context of the riding, training, management, and competition practices applied to those horses.

3.2.2. Training practices

There is considerable lay literature on training endurance horses (Clayton, 1991; Liesens, 2011; Loving, 1997; Wilde, 1996), however these descriptions of training programs are generalised and normative, rather than reporting actual training practices. Research that has reported details of endurance training programs is shown in Table 3-1, of which only five studies (Bolwell et al., 2015; Goachet & Julliand, 2011; Goachet et al., 2010;

Table 3-1

Summary of Veterinary Studies Reporting Details of Endurance Horse Training

Authors and date	Study aim	Number of horses	Study design	Country	Competition goal for horse	Duration of training
Rose and Hodgson (1982)	To describe haematological and plasma biochemical changes with fitness	11	Prospective	Australia	Not stated	First 3 months of training
(Kerr, 1985)	To study electrolyte homeostasis, fuel utilisation, enzyme changes and muscular injury with endurance training	4	Prospective	UK	None	2 months
Hodgson and Rose (1987)	To examine adaptions in skeletal muscle with endurance training	7	Prospective	Australia	One horse 100 km, others not stated	9 months
Poggenpoel (1988)	To document heart rate changes with training	1	Case study	South Africa	Not stated	6 months
Lawrence et al. (1992)	To document changes in body condition during a 240 km ride	60	Survey	US	240 km	Not stated
Gomide et al. (2006)	To understand musculoskeletal injuries that arise from training	12	Prospective (track trained)	Brazil	None	90 days
Spooner et al. (2008)	To document changes in bone density from endurance training	11	Prospective (treadmill)	US	None	5 months
Goachet et al. (2010)	To assess influence of endurance training on digestion	8, 7*	Prospective	France	60- 120 km	2 seasons
Robert et al. (2010)	To determine the effects of endurance training and competition on hydration and electrolyte balance	8**	Prospective	France	119–132 km	6 months
Votion et al. (2010)	To determine the effects of training and competition on muscle oxidative phosphorylation and electron transport systems	8**	Prospective	France	119–132 km	5½ months
Goachet and Julliand (2011)	To report feeding and training at an experimental research farm for endurance horses	23*	Case study	France	40–160 km	8 months x 8 seasons

Robert et al. (2011)	To document management and training of horses preparing for European and world championships	33**	Prospective	France	160 km	8 months x 2 seasons
Bolwell et al. (2015)	To describe management and training practices applied to endurance horses	53*	Survey	New Zealand	Up to 160 km	First 8 weeks of training
Nagy et al. (2017)	To describe veterinary problems in endurance horses	190*	Survey	England & Wales	Up to >130 km	Not stated
Cappelli et al. (2018)	To assess the serum profile of ci-miRNAs in response to endurance training	4	Prospective	Italy	90 km	Not stated
Rajao (2019)	To compare bone thickness for trained and untrained endurance horses	14	Prospective	Brazil	120–160 km	Not stated
Redaelli et al. (2019)	To assess the infrared thermography as an indicator of the effects of training	8*	Prospective	Italy	90 km	4 months

Note: Studies that included FEI-level horses in the sample are marked with an asterisk (*) and samples of only FEI-level horses with two asterisks (**).
Note: Unless stated otherwise, prospective studies documented normal training in natural conditions.

Nagy et al., 2017; Redaelli et al., 2019) included FEI-level horses in the sample, and only three studies sampled solely horses that were training for FEI-level rides (Robert et al., 2010; Robert et al., 2011; Votion et al., 2010).

Training aims to prepare horses for the physical and mental demands of competition without harm, while also maintaining the horse's willingness to work (Bergero et al., 2005). To achieve this aim, training programs are underpinned by four principles: overload, specificity, variation, and reversibility (DeWeese et al., 2015). Overload occurs when a training stimulus takes cells and tissues beyond the current normal levels of performance. If allowed time to recover and repair, the tissues adapt, resulting in an increase in "fitness" over successive training sessions. Successive episodes of overload contribute to an overall increase in training load. Use of competitions for training would comply with the principles of overload and specificity and has been reported at 8–12 weeks from start of training (Bolwell et al., 2015; Robert et al., 2010; Rose et al., 1980; Votion et al., 2010) and after 4 months for horses preparing for 160 km rides (Robert et al., 2011).

The second principle of training is specificity, which is the discipline-specific match between the metabolic and mechanical stresses of competition and training (Bayly, 1985; Rivero, 2007). The third principle, variation, is achieved with different intensity, speed, distance, duration, recovery, and types of training (Haff, 2013). The fourth principle, reversibility is the loss of fitness that will occur when insufficient stimulus is applied to achieve adaptation, or when training ceases altogether such as when horses are spelled.

To comply with these four principles, training programs should manipulate the intensity, duration, and frequency of the training stimulus, in addition to the overall duration of the training programme (Rivero, 2007). Training for endurance horses is mostly low intensity, long duration stimulus that aims to increase aerobic power and capacity, mainly using Type I (slow twitch) muscle fibres. The recommended base of most equine endurance training was aerobic work within 66–90% of maximal working heart rate (HR_{MAX}) (Clayton, 1991). Increased training intensity can increase aerobic capacity,

increasing maximal oxygen uptake ($VO2_{MAX}$) and enabling horses to work at a higher intensity for short periods using Type II muscle fibres (Clayton, 1991). Intensity can be increased with resistance training, where the body or a limb works against a weight or force such as gravity, such as hills and heavy going, snow and water. Speed is another means of increasing the intensity of training stimulus, using interval and fartlek training or the use of time trial type training episodes. Fartlek or "speed play" is an unstructured mix of continuous work with varying speed (Bayly, 1985). This format is consistent with riding across natural, variable terrain, with gradual acceleration and deceleration, faster speed over easy terrain and uphill, slowing for descents and stopping for gates and road crossings.

Fast overload episodes are documented in accounts of endurance training in several countries. From South Africa, Poggenpoel (1988) reported regular 20 km time trial type sessions in training at 1–4-week intervals that increased from 16 to 23 km/hr after 22 weeks of training. Others used speed trials only towards the end of training. In France, Goachet and Julliand (2011) reported faster (18–20 km/hr) canter sessions on a racetrack at 2–4 weeks prior to 130–160 km rides. Similarly, in Italy Redaelli et al. (2019) reported 16–20 km/hr trials on a mechanical walker at 1–3 weeks prior to a 90 km ride. French horses preparing for 160 km at world championships concluded their training with three successive time trials at 6, 7 and 7.5 months of their 8-month programs (Robert et al., 2011). These trials were structured to finish at higher speeds, i.e., a 30 km trial at 6 months consisted of 27 km at 20 km/hr, 1.5 km at 25 km/hr and the final 1.5 km at 27 km/hr. Yet others used complementary episodes of distance and speed for periodised overload; for instance, Goachet et al. (2010) reported a slow (10 km/hr) 90 km session at 4 weeks prior to a 120 km ride, followed by a faster (18 km/hr) 36 km session at 2 weeks prior to the goal ride. For a similar level of performance goal, Robert et al. (2010) and Votion et al. (2010) reported the opposite with the faster (18 km/hr) 36 km after 8–10 weeks in work, 3 weeks prior to a 117–119 km ride at 14–17.6 km/hr at about mid-season (11/22 weeks). These accounts contrast with my practical knowledge of endurance training in New Zealand, where trainers avoid any form of speed work other than an occasional "gallop" finish in rides.

3.2.2.1. Managing training stimulus to avoid harm

While use of speed in endurance training would seem counter to the principle of specificity, there is a point at which no further adaption is achieved by linearly increasing accumulated distance and the risk of over-training or injury increases (Rivero, 2007). For instance, Gomide et al. (2006) documented 13 weeks of training to investigate the effects of training on musculoskeletal structures. However, the programme was not designed to prepare horses for a specific competition, horses were always trained on a racetrack, with no variation in terrain, surface or distance worked each session, and there was only one incremental increase in distance and speed (from 13 to 15 km/hr) mid-way through the programme. Such a monotonous programme risked creating over-use injuries without achieving adaptation. Use of faster time trial type sessions that are short relative to the goal distance for each horse may be a means of improving aerobic capacity and complying with the principles of overload and variation.

Varying the intensity, duration, and frequency of the training stimulus is an effective means of increasing adaptation while avoiding injury and preserving the horse's willingness to work. Periodisation, taper, recovery, and spelling are four techniques that are commonly used to achieve this optimal training outcome. Periodisation is the structured variation of training stimulus to take advantage of two physiological processes, super-compensation, and differential adaptation (Bompa & Haff, 2009; Haff, 2013). Super-compensation is the residual and delayed training effects that occur after a block of training, and these can be either enhanced or injurious depending on subsequent training. Differential adaptation is when different physiological systems, and their components, adapt to training at different rates (DeWeese et al., 2015). For instance, in horses, bone responds rapidly compared to cartilage or tendons and ligaments, and appropriate loading for bone may not be appropriate for soft tissues (Rogers et al., 2007). Even the changes within the working muscles of horses do not occur simultaneously (Rivero, 2007; Serrano et al., 2000). The key skill in successful periodisation is to vary workload, or type of work, in such a way as to enable the residual training effects to be summated, allowing super-compensation and differential adaptation to occur (Bompa & Haff, 2009).

Recovery, where work is ceased or considerably reduced after overload episodes, competitions, or demanding periods of training, is an important element of human endurance training because it allows adaptation to occur and for accumulated microtrauma to heal (Bompa & Haff, 2009). Most (90%) of the New Zealand riders surveyed by Bolwell et al. (2015) spelled their horses after a ride. About half used a formula of 1 day of spelling for every 10 km completed in competition. This formula was recommended in books on training endurance horses (Clayton, 1991; Loving, 1997; Wilde, 1996) where it was generally given as 1 day per 10 miles (16 km) of competition, but there was no explanation of the physiological basis for the recommendation.

The benefits for horses of recovery have been recognised in the FEI rules since 2009 as compulsory stand downs after rides during which a horse may not compete. These stand down periods vary from 5–90 days depending on the distance completed, with additional time if a horse was eliminated for sequential elimination for lameness or required mandatory treatment (FEI, 2016). These recovery periods were initially termed mandatory rest periods (MRP), but this was changed after 2016 to mandatory out of competition periods (MCOOP) to reflect that the FEI could not regulate training stimulus. Initially, Nagy et al. (2014b) identified that >90 days since a horse's last FEI start (i.e., the maximum MRP at that time) was associated with reduced elimination for lameness. The authors could not say if horses had or had not started in non-FEI rides during the 90 days. Bennet and Parkin (2019) compared the MRP rules in place during 2014–16 with hypothetical regimes and showed that the greatest protection could be achieved from an additional 14 days of MRP for all horses, plus a further 7 days for horses that were ridden faster than 22 km/hr in completed loops. These recommendations for extended recovery were adopted in 2019.

3.2.2.2. Quantifying training load

Ideally, quantitative measurement of training load enables the training stimulus to be assessed against adaptation, and to design a training programme that is delivering optimal adaptation without injury or overtraining (Foster et al., 2001; Rogers et al., 2007). Training load can be measured in terms of the duration (or distance), intensity,

and the frequency of training sessions. The simplest metric of training load, commonly used by runners and cyclists, is duration or distance of each training episode which is summed to give weekly totals (Foster et al., 2001; Krouse et al., 2011). For endurance horses, an optimal training load of 60 km per week to prepare a horse for 40 km rides was proposed by Bayly (1985), although he did acknowledge this was contingent on the individual horse. In Australia, Rose and Hodgson (1982) reported mean training loads increasing from 35 km (range 18–56 km) in the first week of training to 66 km in week 7 (range 18–101 km). From week 8, the first competitive rides were included in the weekly total for 10/11 horses, so the mean distances increased from 68 km/week to 99 km/week over the following four weeks. For the first 8 weeks of training in New Zealand, Bolwell et al. (2015) reported estimated median distances of 10 –20 km for twice to thrice weekly training episodes, but total training volume was not reported. Retrospective examination of the training of horses competing in a two-day 240 km event in the US (The 1990 Race of Champions) reported horses that were not regarded as competitive or were eliminated for metabolic conditions were completing about 50 km (in an approximate total time of 6 hours) training each week prior to the event. By contrast, the top seven finishers had trained over 70 km/week (about 9.3 hours), and the remainder of the finishers trained 54 km/week in 6.7 hours (Lawrence et al., 1992).

Total training load for an entire season, as total accumulated distance (TAD), was able to be approximated from three French studies that reported aggregated data for horses training for FEI-level rides. One cohort of eight horses preparing for CEI 119–132 km goals appeared to complete a mean of 830 km in training plus 250 km in competitions, to give a mean 6-month season TAD of 1080 km (Robert et al., 2010). A similar cohort reported means of 400 km + 250 km for a 5½ month season to give a mean TAD of 650 km (Votion et al., 2010). Over an 8-month season, another cohort of 23 horses were reported to accumulate a mean 1110 km in preparation for 90 km, and 1080–1600 km for 130–160 km rides (Goachet & Julliand, 2011). Anecdotally, individual horses in New Zealand in the mid-1980s were reported as training 19 km/day, 96–320 km in a week, and 2720 km in a season, of which 480 km was accumulated in competitions (Hyland, 1988). Also, in New Zealand but more recently, Bolwell et al. (2015) reported that survey

respondents' horses had successfully completed a median total of 300 km [IQR, 150–490] in competitions in the previous season.

Training load by distance or duration alone has little meaning without some measurement of intensity, the rate of energy expenditure during an exercise session. Intensity is largely determined by speed, but also by factors such as ground conditions, load, temperature, humidity, and terrain (Hall et al., 1981; Rose et al., 1983). In racing Standardbreds, workload intensity zones were defined as intensity relative to race pace as slow work (40–75%), fast work (76–91%) and sprint work at 92–101% of race pace and presented as graphs of volume against weeks in work to give visual measurement of training stimulus (Hamlin et al., 2002). Thoroughbred racehorse trainers traditionally have used time or duration in association with subjective assessment of gait or training activity as a measure of intensity (Rogers & Firth, 2004). These subjective measures have limited the ability to accurately quantify training load. Recently, on-board global positioning systems (GPS) with heart rate monitors (HRM) attached to tack have been used to gather Thoroughbred training data that includes objective measures of intensity (Fonseca et al., 2010; Kingston et al., 2006). This technology has potential as a measurement tool for endurance riding. However, although Bolwell et al. (2015) reported that a high proportion of their respondents used GPS and HRM and recorded data during training, no research has yet reported data captured during training for endurance horses.

3.2.2.3. Measures of fitness

Physiological measures of endurance horses' responses to training are well understood (Kerr, 1985), however Rose and Hodgson (1982, p. 144) concluded that routine blood and biochemical screening had "no useful role in assessing the fitness of horses" during training. Instead, the most used objective measure of the response to training in endurance horses is recovery heart rate (RHR) (Rose et al., 1983). In practice, recovery heart rate is routinely assessed after training by checking the heart rate within 5–15 minutes of ceasing exercise, by manual palpation or stethoscope and a watch, or with an electronic HRM which can be either hand-held or attached by a belly strap. An RHR

within the range of 60–80 bpm is regarded as an appropriate response to a training session. Below 60 bpm means the horse was not being worked sufficiently to achieve adaptation, and above 80 bpm means the horse was being worked too hard (Clayton, 1991). Poggenpoel (1988) described the heart rates of a single experienced horse during training. After a 20 km time trial that was faster each week, heart rates were measured with a stethoscope immediately on cessation of movement, and again after 15 minutes. Heart rates increased, while the recovery heart rate dropped.

Fitness test protocols have been developed that link heart rate to speed and lactate levels for use in practical field exercise tests (Evans, 2007). Fraipont et al. (2012) were able to distinguish between endurance horses training and racing over 60–90 km from those racing over 120 km. The better performing horses, with more years and distance accumulated in competition, reached mean speeds of 42.8 km/hr at 200 bpm, compared with 34.7 km/hr for less conditioned horses. Similar but less objective field exercise tests may be used to check fitness, where riders cover a known distance or hill climb at repeated intervals during a training programme and compare changes in performance over time by measuring parameters such as heart rate, respiration rate and speed (Poggenpoel, 1988). In New Zealand, most riders use milestones to guide changes in training based on heart rates, recovery respiration rates and sweating. The overall well-being of the horse in response to training is also important, as indicated by qualitative descriptors such as willingness to work, attitude, and recovery from work (Bolwell et al., 2015).

3.2.2.4. Training endurance horses in New Zealand

The endurance riding season in New Zealand starts, for most horses, after a winter spell of about 10–16 weeks, with rides in August or September, and ends in March to April each year (Penders, 2015). About eight weeks of initial preparation work culminated in the first ride for the season (Bolwell et al., 2015). After this first competition, half of the endurance riders surveyed increased the weekly volume of work by increasing the distance and speed, rather than the frequency, of training episodes (Bolwell et al., 2015).

In practice, this would be achieved by using rides as training opportunities (Nagy et al., 2013) and the New Zealand ride calendar was designed around this (de Lannoy, 2015).

3.3. Rider skills and practices

3.3.1. Riding practices

Books on endurance riding advocate the use of dressage schooling to improve the position and effectiveness of the rider, the suppleness and obedience of the horse, and the communication between the two (Clayton, 1991; Liesens, 2011; Loving, 1997; Wilde, 1996). However, this riding practice was not reported in accounts of endurance training until Bolwell et al. (2015) found that one quarter of New Zealand riders used schooling as part of early season training. Effective riding enables riders to control horses to conserve energy and avoid accidents on course. Riding skill is required to make tired horses repeatedly leave ride base, up to six or seven times in a 160 km ride, without coercion because endurance riders are banned by the rules from using whips, spurs, or split reins.

The forces acting on the horse's back may be mitigated by the position (Martin et al., 2016; Peham et al., 2010), gait and expertise (Licka et al., 2004) and fitness of the rider (Viry et al., 2015). The highest levels of synchronisation between horse and rider occur at the canter (Wolframm et al., 2013), which endurance riders use in either a sitting or a two-point position (Viry et al., 2015). Experienced endurance riders also showed a unique variation of the rising trot in which they modified their vertical oscillation to achieve a closer co-ordination with the horse's gait (Viry et al., 2015). The saddle is a critical point of interface between endurance horse and rider and a correctly fitting saddle can enhance communication between horse and rider, allowing full use of the horse's back and shoulders and avoiding horses becoming sore (Clayton & Hobbs, 2017; Nagy et al., 2012). Despite the contribution of riding ability and skill, saddle fit and rider fitness to outcomes in rides, this remains an under-researched area, restricting our understanding of how these aspects influence performance in endurance riding.

3.3.2. Pacing strategies

The essential skill linking the horse's athletic ability to successful performance is the rider's ability to select and monitor a pacing strategy (known in New Zealand as a "ride plan") to match the capacity of their mount. Successful combinations had lower speeds in the early loops and then maintained or increased their speed in the later loops, whereas eliminated horses were ridden with the opposite strategy (Bennet & Parkin, 2018a; Marlin & Williams, 2018; Viry et al., 2015; Younes et al., 2016). An optimal pacing strategy is achieved by controlling the horse's pace in the early loops, although this may not be easy because horses are fit and fresh at this point of the ride. Furthermore, mass starts may trigger horses' herd instincts to run with other horses, rather than being constrained to a sensible pace by their rider. This could be one reason why horses in rides with ≥100 starters, where it would be difficult to maintain an optimal pacing strategy, were more likely to be eliminated for lameness and metabolic conditions (Bennet & Parkin, 2018b; Nagy et al., 2010; Nagy et al., 2014a). Other reasons posited for large fields being associated with elimination were competitive riding, or injuries incurred by proximity or collisions (Bennet & Parkin, 2018b). Riders with prior eliminations were more likely to be eliminated again for the same reason, which Bennet and Parkin (2018b) interpreted as unskilled riders continuing to make the same mistakes.

Successful pacing strategies over natural terrain courses depend on the rider's ability to assess weather and ground conditions in variable conditions (Muñoz et al., 2017). Heavy going has been shown to be associated with increased elimination for metabolic conditions (Nagy et al., 2014b). A survey of the goals and judgement of European FEI riders found those with the goal of "training" rather than racing to win were more likely to complete a ride and to be more realistic in their assessment of the difficulty of a course (Nagy et al., 2013). Riders who underestimated difficulty were less likely to complete. Most (78%) riders said the difficulty met their expectations and were consistent in their pre-ride and post-ride assessment of the terrain, but that going was harder to predict (Nagy et al., 2013). This is because the ground may have been changed by weather and/or the hooves of large numbers of horses. Judgement is also required

when selecting an appropriate pace for the conditions and fitness of the horse. While most riders pre-planned the speed, they would complete the ride at, almost half did not judge this accurately, with nearly 25% of riders underestimating the speed of a ride (i.e., they took longer), and almost 10% overestimating their speed (Nagy et al., 2013).

3.3.3. Interpreting the condition of their mount

A related skill to pacing strategies is the ability of a rider to interpret or "read" their horse, detecting pain and fatigue, over the course of a ride. This is challenging because the horse's attitude and personality can complicate interpretation of signs and behaviours that have been associated with fatigue and pain, such as lethargy and abnormal or irregular gait (Hall et al., 2013; Ijichi et al., 2014). Fatigue, "hitting the wall" or "bonking" are standard experiences for most human distance athletes (Clemente-Suarez, 2015; Stevinson & Biddle, 1998) and it seems reasonable to assume that endurance horses may have a similar experience of fatigue and pain. Detecting pain and fatigue is a learned skill that riders must develop through experience (Williams & Tabor, 2017). Horses cannot verbalise, so affect, or attitude, is used as an indication of welfare state (Fraser, 2009). Attitude was documented in vet gates in an Australian study in which horses assessed as being more "alert/curious/excited" in the pre-ride vet gate completed a 160 km ride faster than those assessed as being "tired/lazy/sleepy," although (as could be expected) all horses became more "tired/lazy/sleepy" as the ride progressed (Fleming et al., 2013).

The subjective skill of "reading" their horse may improve with familiarity in longer-term partnerships, given the long durations that endurance riders spend with their horses, however there is no research that could confirm or refute this assumption. In a UK survey that included FEI-level and less competitive riders, 80% of horses were ridden by one rider only, and 97% of horses had been partnered with their current rider for >1 year (Nagy et al., 2017). This contrasts with only 46% of all starts in FEI-level endurance riding between 2012–15 being repeat combinations of horse + rider (Bennet & Parkin, 2018b). These statistics point to potential for contrasting practices in riding, training and competition, based on quite different relationships between horse and rider; one a

durable long-term partnership, and the other a "catch-ride" system like that in Thoroughbred racing. Hogg and Hodgins (2021) reported that endurance riders without a bond to the horse they were riding felt less constrained, and therefore could ride more competitively. Achieving an optimal ride strategy with an unknown horse in a complex competition environment requires a combination of skills and experience to ensure that horses complete rides within their physical capabilities (Muñoz et al., 2017). The responsibility for riders to judge the capacity of their horse, and to match this with an appropriate pacing strategy, is reflected in penalties applied to riders that incur elimination, with greater penalties for repeated eliminations (FEI, 2016).

3.4. Psychological influences on rider performance

3.4.1. Motivation

3.4.1.1. Intrinsic and extrinsic motivation in sports

Motivation in sport and exercise is driven by forces "that produce the initiation, direction, intensity and persistence of behaviour" towards achievement of goals (Keegan et al., 2014, p. 97). Intrinsic motivation occurs when internal forces such as pleasure, satisfaction, learning, achievement, and self-development drive participation in an activity. Self-development is the internal proactive drive to seek out challenges and new possibilities for cognitive and social development. Intrinsically motivated behaviour is internally driven, internally controlled, and represents the most self-determined and internalised form of behaviour that is enacted with a full sense of autonomy (Deci & Ryan, 2000). In contrast, extrinsically motivated behaviour is regulated by external forces such as rewards, punishments, and contingencies, and remains a means to an end rather than being the end in and of itself. Extrinsic motivation has been grouped into four categories that vary with the extent to which external regulation and control of behaviour has been adopted by individuals. Externally regulated extrinsic motivation is the most controlled, least internalised and least autonomous form of motivation. In this form of motivation, regulation is perceived to be imposed, with an external locus of control so behaviour is driven by rules, regulations and rewards such as money or prizes

(Deci & Ryan, 2000). Introjected regulation occurs when individuals impose regulations and consequences on themselves, such as shame or guilt, with the perception they have little autonomy or control. Identified regulation occurs when individuals begin to accept a regulation, value, or purpose as their own, so they have some degree of autonomy and a somewhat internal locus of control. Finally, the most autonomous, strongest, and most internalised form of extrinsic motivation, integrated regulation, occurs when individuals fully integrate regulation into their lifestyle, personality, and practice so that it is consistent and coherent with other aspects of their values and identity.

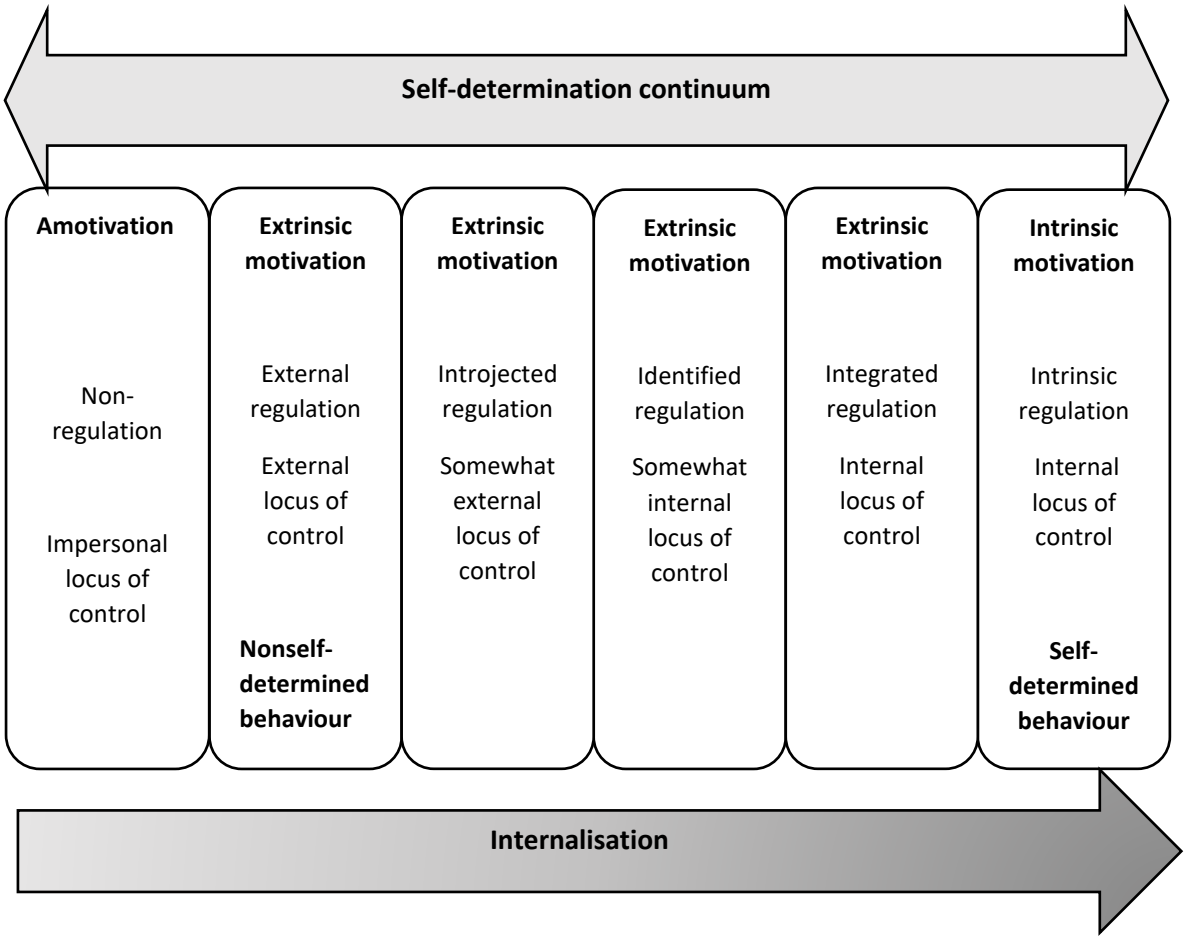
A survey study of leisure riders in the UK reported they were intrinsically motivated to learn about horses and riding for the feeling of accomplishment and to relax and enjoy freedom by doing fun, exciting, and thrilling things (Wu et al., 2015). This is consistent with Vallerand's (2007) conceptualisation of intrinsic motivation as the drive to know and learn, and to accomplish and to experience. The study also reported extrinsic motivations from social rewards, such as being with like-minded people and participating in an activity with family and friends (Wu et al., 2015). A survey of leisure riders in the US found that intrinsic motives varied by gender and whether riding was for work or for competition compared with recreation (Mitchell, 2013). A qualitative study exploring the development of elite UK dressage, eventing and show jumping riders found that motivation changed as riders progressed from early career riders to elite-level riders. Early career motives included fun, excitement, and opportunities to be successful, whereas elite-level riders were motivated by the challenge, ongoing learning, and relationships with horses (Lamperd et al., 2016). While riders at both stages were driven by a mix of internal and extrinsic motivations, elite-level riders had incorporated rewards like winning and peer evaluation into their practice, thus creating the freedom for them to control and direct their own careers (Lamperd et al., 2016). These riders had changed competitive success from an external reward to a more internal driver in the form of the entrepreneurial means to persist in their sport.

3.4.1.2. Internalisation of extrinsic motivations

Internalisation is the process whereby individual athletes actively transform knowledge, norms and values that regulate and influence behaviour, so these become consistent with their personal values (Standage & Ryan, 2012). This process where external motives and regulation become integrated and self-regulated is conceptualised in the theory of self-determination (Figure 3-1). Self-determination is driven by individual's need for their activities to be congruent with their inner sense of self, and with their surrounding social world (Deci & Ryan, 2000).

Figure 3-1

The Self-determination Continuum from Amotivation to Intrinsic Motivation via four Stages of Extrinsic Motivation



It should be noted that internalisation is not a development continuum in which individuals automatically progress from external to internal regulation of their actions. Rather, individuals bring a range of social and psychological influences to activities such as endurance riding, and this affects how internalisation works for them. For instance,

a cohort of endurance riders participating in the multi-day 200 km Fauresmith ride in South Africa were categorised as pursuers, challengers, and achievers based on their stage of development. Pursuers were intrinsically motivated early career riders, challengers were more experienced riders seeking opportunities for further development, and achievers were experienced participants driven by a mix of intrinsic and internalised extrinsic motives to achieve wins or placings (Kruger et al., 2020).

3.4.1.3. Competency, autonomy, and relatedness

One of the central principles of self-determination theory is that self-determined motivation, and therefore behaviour, affect and cognition, are affected by the extent to which the fundamental and innate human needs of autonomy, competence and relatedness are fulfilled (Treasure et al., 2007). Table 3-2 summarises this relationship. Ryan and Deci (2000, p. 13) called these human needs, "nutriments essential to growth, integrity and well-being."

Autonomy is the deep desire to organise experience and behaviour so that activities are "concordant with one's integrated sense of self" and is related to the experience of both integration and freedom (Deci & Ryan, 2000, p. 231).

In the context of endurance riding practices, autonomy may describe participants' need to perceive their behaviours as arising from their own choice, and that they can control their actions and the outcomes they desire (Amorose & Anderson-Butcher, 2007). Competence acts as a source of energy that drives action towards controlling the environment and attaining "valued outcomes" (Deci & Ryan, 2000, p. 231). In terms of practice, competence might reflect participants' needs to be proactive, to feel that they have adequate ability, and to perceive that their behaviour is effective (Amorose & Anderson-Butcher, 2007). Relatedness "refers to the desire to feel connected to others—to love and care, and to be loved and cared for" (Deci & Ryan, 2000, p. 231). It also refers to being understood and connected in a meaningful way to a broader social group (Kleiber et al., 2019). This could translate into practice that reflects participants' need for security, connection and belonging to a social group (Amorose & Anderson-Butcher, 2007). Relatedness may also include their relationship with their horse.

Table 3-2

Types of Motivation, Regulation and Control of Behaviours, and Nutriments Present for each of the Types of Motivation

Type of motivation	**Intrinsic motivation**			**Extrinsic motivation**			**Amotivation**
	Autonomous forms of motivation			Controlled motivation			
Behaviour	Self-determined			Non-self-determined			
Type of regulation	Intrinsic regulation	Integrated regulation	Identified regulation	Introjected regulation	External regulation		Non-regulation
Locus of control	Internal	Internal	Somewhat internal	Somewhat external	External		Impersonal
Nutriments present	Competence, autonomy, and relatedness			Competency and relatedness	Competency only		None present

Self-determined behaviour is facilitated when individuals can exercise autonomy and competence and it is reduced when individuals are not able to fulfil these needs. If all three needs are met, as with intrinsic motivation and the internally regulated forms of extrinsic motivation, individuals act autonomously and with volition. If all three needs are not met, individuals feel controlled. Therefore, if competency and relatedness are met, without autonomy, introjected regulation is the likely outcome (Mitchell, 2013). If only competency is met, then only external regulations drive individuals (Mitchell, 2013). Amotivation, where individuals are characterised by a lack of intention and personal drive (Treasure et al., 2007), occurs when all three nutriments are absent. Relatedness with people has been shown to have a less direct, more supportive,

influence on internalisation and self-determination. However, nothing is known of how horse-human relationships influence self-determination.

3.4.2. Competitiveness

3.4.2.1. Competitive orientation

Competitive sports such as endurance riding comprise of the activities of striving towards a goal of winning or - if not winning - a sense of achievement. While striving in sport is driven and directed by competitiveness, a strong desire to be as good, better, or more successful than others, this may not always involve the simple desire to win. Other motives may drive behaviours. Achievement goal theorists have defined sports motivation in terms of how an athlete perceives success in competitive sport (Ryska, 2003). Task-focused athletes define success in terms of internal sources, such as task mastery, improved skills, and effort expended towards goals. By contrast, an ego focus is concerned with external sources, often social, such as comparison with opponents and being externally evaluated as superior (Ryska, 2003). These differences in competitive orientation have also been described as outcome (with a goal to win or place), and performance (where the goal is performing well) orientations (Gill et al., 1996).

The two foci are not regarded as exclusive, and athletes may draw on a range of sources for motivation, which may change with experience. For instance, novice marathon runners were motivated by self-image and desire to get healthy, whereas experienced marathon runners were shown to be very competitive, highly goal oriented, with a social identity based on their sport, but scored low on win motivation (Masters & Ogles, 1995; Ogles & Masters, 2000, 2003). Female ultra-runners were found to be task oriented towards improving their health and coping skills and motivated to accomplish personal goals that were related to the specific context of the race and course, such as finishing particularly tough courses or within specified times (Krouse et al., 2011). Similarly, self-esteem and personal growth and challenges motivated female mountain bikers (Levy, 2002). Most participants in adventure recreational races were also characterised by a

relative lack of competitive goals, drawn instead to the freedom and opportunities for mastery, stimulation, and accomplishment (Lynch & Dibben, 2016).

3.4.2.2. Mastery and efficacy

Endurance riding is like other outdoor adventure sports for to the variable nature of the challenge, e.g., the terrain of the course and weather on the day (Christian et al., 2019). There is risk in these environments, so mastery involves effectively assessing and managing risk (Jones et al., 2017). In these sports, participants tend to exhibit a task orientation, finding reward in accomplishment, mastery and the accumulation of skills and depth of knowledge, the challenge of assessing and addressing risk, in addition to enjoying the unique places they traverse. As with other endurance sports, endurance riding requires mental toughness and the ability to cope with challenges such as heat, cold, wind and rain, dehydration and hunger, pain, fatigue and, for longer rides, lack of sleep (Addison et al., 1998; Stevinson & Biddle, 1998). Added to these environmental stressors are problems such as broken gear, accidents, and for endurance riders, possibly the state of their horse. Endurance riders were included with canoeists, kayakers, mountaineers, mountain bikers, adventure racers, and distance swimmers, road cyclists and ultra-runners in a mixed methods study of psychological coping during endurance sports (O'Neil & Steyn, 2007). These sports entail a high level of perseverance in preparing for and during events. In exploring this perseverance, the authors found respondents had a positive attitude towards problems and difficulties, seeing these as constructive opportunities for learning and development. Respondents had high self-efficacy, confidence in their abilities and strategies to cope, and they believed they could persist in the face of challenges and overcome problems. This coping ability required regular testing in the stressful environment of competition, where success provided positive feedback and increased self-efficacy. Greater self-efficacy has been related to perseverance, motivation, and performance (Moritz et al., 2000).

3.4.3. Commitment and persistence

3.4.3.1. Psychological commitment

Participants in endurance riding, and equestrian sports in general, invest considerable time and money, often over many years. This draw on resources can be a source of tension with other aspects of life such as work, family, or relationships (Dashper, 2012; Dashper et al., 2020). In addition to the costs and conflicts, riders risk disappointment and setbacks such as the loss of their horse for competition. A high proportion of season- and career-ending injuries occurred for eventing horses during training (Singer et al., 2008). Lameness was the most common reason for failure to train and achieve goals for dressage (Murray et al., 2010), show jumping (Engevall et al., 2013) and eventing horses (Munsters et al., 2013). And yet, despite these obstacles, riders have careers that span decades, with some continuing to ride into their 70s (Davis et al., 2014).

Persistence in sport is the product of multiple drivers including psychological commitment, which is the desire and resolve to continue participating in a sport, despite adversity (Scanlan et al., 1993). Psychological commitment, in turn, translates to behavioural commitment, which is the actions that contribute to persistence, such as catching and saddling a horse with the intention to go for a training ride. A survey of recreational riders found their behavioural intentions were influenced mostly by their locus of control, the extent to which riders perceived they could control their behaviours, with less influence from subjective norms followed by motivation, and involvement (Wu et al., 2014). Adherence to a program of training and competition was explored in amateur participants in competitive equestrian sports; where work, life, and horses interacted to have positive and/or negative effects depending on work-life balance and the extent of respondents' commitment to their different roles (Craies, 2015). One instance of a positive effect was that improved feelings and moods, new knowledge and coping skills from riding enriched the work-life balance of riders, buffering stress and increasing satisfaction in both spheres. When participation is a sport is driven by personal rewards such as enjoyment, self-esteem from improved fitness and appearance, mastery and competence, participants are more likely to persist in a sport (Bond & Batey, 2005).

Persistence, by definition, implies longer timeframes so studies that have investigated the development of riders through time can provide useful insights. One such qualitative study that explored the experiences of young eventing riders who transitioned to adult competition noted the extent of their commitment, and that the transition was facilitated by social support from parents and peers (Pummell et al., 2008). This was corroborated by a qualitative exploration of the experiences of young elite dressage, show jumping and eventing riders whose horses suffered career-ending injury, that found that social systems, particularly their horsey peers, facilitated persistence. Unexpectedly, and despite the emotional trauma of losing their horse for competition, this adversity increased riders' motivation and contributed to personal growth and self-determination (Davies et al., 2018). Using a similar methodology, Lamperd et al. (2016) found that being able to cope with adversity was an intrinsic motive, and that setbacks were an important aspect of the development of elite riders. Exploring the experiences of late-career female endurance riders, Davis et al. (2014) described how they drew on strategies and social connections, including their relationship with their horses, to counter the effects of aging to persist in a demanding sport. These studies suggest that, in specific contexts, adversity and constraints may have a positive effect on persistence in equestrian sports. However, there was no direct evidence of how negotiating constraints and adversity may have influenced riders' performance.

3.4.3.2. Endurance riding as a form of serious leisure

Persistence in a serious leisure sporting pastime can be understood in terms of both an individuals' motivation and choice, and from a wider consideration of collective and interactive social factors outside the individual (Donnelly, 2000; Iso-Ahola, 1980). Participation in FEI-level endurance riding in New Zealand has the characteristics of serious leisure as this concept was defined by Stebbins (2007, p. 5) - namely "the systematic pursuit of an amateur, hobbyist or volunteer" activity that is sufficiently engaging and fulfilling to the point where it becomes a second career for those in paid work. This career can have the form of a journey, with stages and junctions, disruptions, and accommodations.

Serious leisure has five distinctive characteristics: effort, perseverance, durable benefits, a unique ethos, and strong identification with their chosen pursuit. From beginning in endurance riding, perhaps mentored into the sport by friends or family members, riders expend considerable personal effort, time, money and emotional energy towards accumulating specialist skills, experience, and knowledge. To persevere at FEI-level, riders must persist to overcome difficulties, with possible delays in achieving success. This persistence has been shown to be a constant and ongoing aspect of serious leisure (McQuarrie & Jackson, 1996). Durable benefits that accrue from participation in serious leisure as listed by Stebbins (2007) include self-actualisation and enrichment, self-expression, regeneration or renewal of oneself, feelings of accomplishment, enhanced self-image, social interaction, and a sense of belonging. These less tangible, psychological benefits contribute to well-being and fulfilment of personal needs. Stebbins (2007) also listed a durable tangible product of the leisure activity, for instance a painting, piece of music or a publication, or - for endurance riders - a horse they have developed through to FEI-level.

Horse people of all forms engage with the unique ethos and social world around their leisure activity and their sport is a large part of their identity (Dashper & St John, 2015). This also holds true for endurance riders (Davis et al., 2014). In a similar manner to that described for distance runners (Elkington & Stebbins, 2014; Unreh, 1980), endurance riding becomes a considerable part of riders' identities. However, despite these social aspects, serious leisure as it was conceptualised by Stebbins in 1992 emphasised individual pursuit of leisure aspirations. Stebbins' early conceptualisation was also criticised for an anthropocentric perspective, overlooking sports that involve partnerships with animals (Dashper, 2019; Schuurman & Franklin, 2016). Subsequent studies have addressed this gap, including multispecies ethnographies of participants' lived experiences in dog sports (Baldwin & Norris, 1999; Gillespie et al., 2002), cat shows (Stone, 2019) and equestrian sports including endurance riding (Maurstad et al., 2016).

3.4.3.3. Negotiating constraints to serious leisure

Research since Stebbins' (1997) descriptive conceptualisation of serious leisure has focused on constraints to serious leisure in sports such as ice skating (McQuarrie & Jackson, 1996) and amateur triathlon (Lamont et al., 2014; Lamont et al., 2017). Initially constraints were conceptualised as static, exceptional factors that inhibited or even deterred participation, but this has shifted to an understanding of constraints as dynamic, complex, and interacting phenomena, conditions or priorities that modify individuals' ability to participate (McQuarrie & Jackson, 1996).

Lamont et al. (2012) grouped constraints into seven broad areas: family relationships, responsibilities at home, social lives, finances, well-being, work and education, and leisure activity. Rather than deter participation in serious leisure, constraints result in modified participation, or accommodation, as individuals find a balance between their motives and constraints, adapting and modifying their participation through individual effort and initiative (Jackson et al., 1993; Lamont et al., 2014; Samdahl et al., 1999). Negotiation may be achieved through implementing either behavioural (proactive responses such as time management or acquiring skills) or cognitive (acceptance, adaption, or resignation) strategies (Jackson & Rucks, 1995). This contemporary understanding of constraint negotiation as dynamic, ongoing, and integral to the development of participants is consistent with the conceptualisation of serious leisure as a career in the form of a journey with disruptions and accommodations (Pescosolido, 2015). Furthermore, conceptualising constraint negotiation as a potentially positive and constructive aspect of career development is consistent with the finding that adversity was a contributing factor in the development of riders (Davies et al., 2018; Lamperd et al., 2016; Pummell et al., 2008).

3.4.4. Psychological factors and performance

To date, research into psychological factors affecting performance in equestrian sports has been restricted to dressage, show jumping and eventing, and has focused on mood, anxiety, and arousal states of riders (Louw & Duff-Riddell, 2011; Wolframm &

Micklewright, 2008, 2010a; Wolframm et al., 2010a, 2010b) and strategies to address these (Bloom & Stevens, 2002; Jason, 2015; Wolframm & Micklewright, 2011). While the contribution of psychological factors to performance in show jumping, dressage and eventing are beginning to be appreciated (Iungano et al., 2019; Jason, 2015; McGinn et al., 2018; Wolframm & Micklewright, 2010a, 2010b; Wolframm & Micklewright, 2011), there is little research that describes psychological aspects of performance during endurance rides. A review of performance in endurance riding suggests that psychological aspects of performance are likely to be related to effective decision-making, coping, mental fatigue, sustaining motivation, and use of associative strategies to inform pacing strategies (Williams et al., 2021).

Nagy et al. (2010) and (2014a) speculated that different forms of competitiveness may have contributed to differences in performance and outcomes in endurance rides. A survey of FEI-level Belgian, Italian and UK endurance riders found those with the goal of "training," as opposed to riding competitively, were less likely to be eliminated (Nagy et al., 2013). These authors suggested that—for some riders—endurance riding may be like marathon running in that finishing a race and achieving completion was a more important goal than winning for most participants. In another study of FEI-level riders, the same authors concluded that competitions were used as training for experienced horses, so those horses were ridden less competitively with a reduced risk of elimination (Nagy et al., 2014b). Fielding et al. (2011) drew a similar conclusion to explain lower rates of elimination for younger horses in American domestic-level competition. These conclusions and the difference in practice between countries suggest that, despite the competition format of a race, FEI-level endurance riders in some contexts may be motivated by rewards in addition to, or other than, winning and that these motivations may influence their riding, training, and competition practices.

3.5. Social factors

While motivation and perseverance can be understood in terms of personal choice, these choices are influenced by social factors such as family or peer pressure (Rojek, 2005). Research into adventure sports also suggests that participant characteristics and

socio-demographic variables, such as gender and amateur status, may be important mediators of motivation (Gill et al., 1996). This section reviews the literature to understand what is known of the influence that social factors such as gender and professional or amateur status may have on practices and performance in endurance riding.

3.5.1. Socio-demographic characteristics of FEI-level endurance riders

It is useful to start with a description of the characteristics of FEI-level riders, which has varied with the context of each study. For instance, a survey of European FEI riders found 79% were female with a median age of 39 years (Nagy et al., 2013), which contrasts with a global study using FEI data that reported 75% of cases were male with a median age of 27 years (Bennet & Parkin, 2018b). Other studies have included FEI-level competitors in a broader sample of all levels of performance; a survey of UK endurance riders had 91% female respondents and a median age of 49 years (Nagy et al., 2017). In New Zealand for similarly broad samples, 77% of riders were reported as female (Legg et al., 2019; Penders, 2015), and most were in the age category of 41–50 years (Bolwell et al., 2015). These figures are consistent with the trend of feminisation seen in other equestrian disciplines (Adelman & Knijnik, 2013), but they contrast with males comprising 74% of all FEI-registered endurance riders worldwide in 2016. A check of FEI registrations by country showed this was due to large numbers of male riders registered in UAE, Bahrain, and Qatar.[6]

Regarding gender influence on performance, Nagy et al. (2013) found that male European riders were more likely to be competing in 160 km rides (64%), whereas females were more likely to be competing in 80–100 km rides (63%) (Nagy et al., 2010). Male riders were 84% more likely than females to be eliminated for the metabolic condition of their horse, and the authors suggested that further work is required to understand the influence of rider factors such as gender on competitiveness (Bennet & Parkin, 2018b). This limited evidence of gender differences for performance in

[6] http://www.fei.org (accessed July 22nd, 2016)

endurance, lends support to the notion that practices, and performances may vary with contextual factors.

3.5.2. Professional and amateur status in elite equestrian sports

Social and economic context such as professional and amateur status can influence cultural attitudes in sport (Coakley, 1998) and this appears to be the case for FEI-level endurance riding. Greater professionalism in endurance riding has been cited as an influence driving changes in performance (Marlin, 2015). The changes in endurance riding over the previous two decades have occurred within the broader social context of increased commercialisation and globalisation of sport, so it is useful to describe how this has played out in equestrian sports in general. Professionalism, in which athletes are paid or compensated for their participation in sport, is characterised by an emphasis on performance to obtain rewards. In contrast, amateurs engage in sport more for the pleasure of participation than for winning (Ryan, 2007).

Research that has explored performance in elite-level equestrian disciplines describes professionalism as the norm, with a distinctive culture. Lamperd et al. (2016) explored the development of elite-level eventing, dressage and show jumping riders in the UK to define key elements that might be replicated by aspiring riders. While the authors didn't specify the socio-economic status of the participants, references to selling horses and developing the financial and physical infrastructure of running "their business" suggest that most, if not all, of the sample were professional athletes (Lamperd et al., 2016, p. 116). In a similar context, (Dashper, 2014, p. 366) described elite equestrian sport as "a professional commercialised milieu" in which practices were driven by financial imperatives and pressure for excellent performance. Both studies described how riders created a "way of life" that was focused on continued participation at a high level of performance (Dashper, 2014; Lamperd et al., 2016). External rewards such as winning were internalised to become part of their "brand," a key element of their business model that could increase the likelihood of securing better horses and financial support. High quality "horsepower" was important, which often meant riding horses owned by other people that may have low equestrian knowledge and a preoccupation with

performance. Sometimes this led to conflict with riders' beliefs about practices, such as starting horses frequently or when there was a risk of injury from ground conditions. Some riders dealt with this loss of autonomy by desensitising themselves to the risk for horse welfare by choosing to focus on goals or regarding horses as a means to the end of sustained high performance. Other riders refused to compromise their autonomy to manage horses, electing not to ride for owners at all (Dashper, 2014).

Williams and Tabor (2017) distinguished professional from elite in their taxonomy of rider status, defining professionals as those for whom horses provided their main income, and elite as those riders that had competed at national or international level. By this definition, elite level was compatible with the amateur status of riders for whom equestrianism was not their primary income. The influence of amateur status on the practices and performance of elite riders is worthy of exploration because to date, elite equestrianism has been conflated with professionalism, and amateur equestrianism has largely been equated with recreational or leisure levels of performance. Consequently, the practices of elite amateur equestrians remain unexplored. The different cultures of professional and amateur have different influences on practices, with implications for performance and horse welfare in endurance riding that are described in the next section. Furthermore, it is possible that, in contexts where elite riders are amateurs, there may be cultural norms and responses to increased commercialisation of equestrian sports that are different from those in professional contexts.

3.5.3. The implications of professional and amateur status for practices

Understanding the influence of professional and amateur status on riding, training and competition practices is important because an emphasis on winning, as opposed to an emphasis on participation, has the potential for poor horse welfare outcomes. For FEI-level endurance riding, these outcomes include higher rates of musculoskeletal injury, morbidity and mortality in training and competition, and the use of banned substances or drugs with the aim of improving performance ("doping").

Ideally, effective rules and regulations should avert harm to horses, therefore regulation would benefit from an understanding of how cultural and social influences drive practices. In a pertinent example, professionalism and amateurism have different implications for drug monitoring regimes that arise from their contrasting ideologies (Cameron & Kerr, 2007). In professional sport, athletes' bodies are commodities, so they respond by using all available science, technical and medical tools to maintain or improve their value, whereas doping is antithetical to an amateur sport culture that emphasises moral virtues (Loland, 2001, 2006). Professional and amateur participants will have different needs for - and will respond differently to - doping regulation, so understanding this may contribute to more effective regulation that is endorsed by participants as relevant and necessary. And yet, despite the importance of understanding the influence of socio-economic status on practices in endurance riding, a gap exists in our knowledge. This may be because epidemiological studies to date have focused on mining FEI databases (Parkin, 2015), and valid socio-economic data was sensitive and difficult to obtain, or not required for FEI registration of trainers and riders.

Increased professionalism is associated with commercialisation and commodification of both the sport and athletes, so horses, riders and trainers are key commodities in a professional endurance riding system. Since the early to mid-1990s the UAE has exerted a financial influence in the sport as the largest global purchaser of horses. Horses are developed in countries throughout the world then exported to the Middle East for short, high-speed careers (Liesens, 2011). Burger and Dollinger (1998) documented the careers of 69 European horses before and after the annual Qatar marathon in 1994–97 and found reduced performance in most horses that didn't die in the event or weren't subsequently retired. After the UAE, France was the second largest participant in endurance riding (Nagy et al., 2010). While this increase has been due in part to the rise of a burgeoning French equestrian economy over the past two to three decades (Grefe & Pickel-Chevalier, 2015), the proximity and influence of the UAE has also contributed to the increased participation in endurance riding, with bigger fields and higher speeds. France has built on the traditional French National Stud to create a modern endurance horse production system that develops and showcases young horses for UAE buyers.

Young horses compete in age-group races up to 120 km, with speeds that reflect a market for horses that will race at higher speeds in the Middle East (Liesens, 2011).

Endurance riding in the UK has also been influenced by the professionalism with UAE owners and trainers domiciled there, notably at a FEI competition venue called Euston Park. At the 2014 World Championships held in France, riders from Europe and the UK represented their countries riding horses that were registered with the country where the horses were domiciled, despite being owned and trained by UAE owners such as those based at Euston Park. This arrangement epitomises commodification but contradicted the amateur ideal of a durable horse-rider partnership to represent one's country. This matter and concerns with alleged training methods, doping and rule violations in FEI-level endurance riding linked to the UAE prompted two high level administrators from Belgium and the Netherlands to challenge the FEI prior to the 2014 World Championships (Hogg, 2015). This incident added to the concerns of many UK riders, trainers and administrators, bringing them into conflict with their governing bodies' drive for high performance.[7]

The consequences of professional and amateur status for practices have been described in this section as varied responses to regulation that create problems and conflicts in FEI-level endurance riding, and the commodification of horses and riders with the development of localised industries to supply athletes to the Middle East. However, commercialisation is not necessarily a negative force and can have positive outcomes. For instance, a different response to commercialisation of endurance riding has developed in South Africa, one that takes the form of adventure tourism. Participants pay to lease a conditioned horse and support crew to participate in high-level rides such as the iconic three-day 200 km Fauresmith Challenge (Ingle, 2008). Similar experiences can be had in Namibia, Australia, the US, and Mongolia (Gordon et al., 2013). Riders that participate in such events are likely to be motivated by the novelty and unique experiences and the opportunity for self-development, and to emphasise successfully completing the course rather than riding to win (Kruger et al., 2020). The implications

[7] http://www.horseandhound.co.uk/news/crisis-in-british-endurance-409780 9th December 2016

for this form of professionalism are likely to be that owners value their horses for soundness and longevity as these contribute to a long-term income stream rather than a win or one-off sale.

These rides that offer an adventure tourism experience are not run under FEI rules, which raises the consideration of whether the different forms of the sport, one highly competitive and the other emphasising participation, are compatible and sustainable (Loland, 2001). In a wider context, Barker et al. (2014) reflected on the ethics and sustainability of high-performance sport, in which the drive for maximal performance has potential to compromise the welfare of the equine athlete. This is worthy of consideration in the context of endurance riding because greater scrutiny of equestrian sports through social media brings a greater risk of losing social license, if the public and political actors perceive a sport to be harmful to horses (Jonsson, 2012). The implications of this, for endurance riding in New Zealand, might include loss of the limited sponsorship that is available, and reduced access to areas for training and competitions. There are also wider implications that are relevant to the future of FEI-level endurance riding. Horse welfare issues in endurance riding threaten the FEI's standing with the International Olympic Committee (IOC) and may add to the case to exclude equestrian sports from the Olympics. If the issues and conflicts are not resolved, it has been speculated that the FEI may drop endurance riding to protect its Olympic disciplines.

In summary, it important to understand how professional and amateur status influence practices in competitive elite-level endurance riding because professionalism has consequences for practices, performance, and horse welfare (Noble, 2018). The issue for FEI-level endurance riding is not professionalism *per se*, but the expression of professional and amateur approaches in riding, training and competition practice that have implications for the long-term sustainability of the sport. Since sport is a social construct, created by participants to fit their own interests (Collins, 2007), it follows that individual countries, groups and individuals have choice in how they respond to the increased pressure to perform (Westerbeek & Hahn, 2013). This appears to be the case, with different countries developing different forms of endurance riding in response to

increased commercialisation and professionalisation. With this in mind, I turn to endurance riding in New Zealand.

3.5.4. The amateur nature of endurance riding in New Zealand

3.5.4.1. Amateur culture

Historic social and economic forces are likely to have contributed to endurance riding remaining largely amateur, despite sport becoming a major economic activity in New Zealand from the 1990s, with the professionalisation of rugby, basketball and netball, and involvement in the yachting Americas Cup. Ryan (2007) attributes the differentiation between amateur and professional to the moral and social values that settlers brought to New Zealand during colonisation, and the persistent influence these values had on sport. Despite egalitarian ideals, the legacy of the British social class system contributed to subtle differences in how sports were perceived, governed and engaged with. The amateur ethos emphasised the "spirit and style" of taking part, and striving rather than winning, as preparation for the "greater struggle of life" (Ryan, 2007, p. 100). Working class professional athletes threatened this ideal, so sports like rowing and equestrian sports such as hunting to hounds become increasingly codified and exclusive to restrict participation to "true" amateurs (Ryan, 2007). Latterly, changes in working conditions and the expansion of the middle class have opened equestrian sports to a wider range of urban-based participants. This created opportunities for increased professionalism, for instance as coaches and trainers in the more popular sports like showjumping, but endurance riding remained a minority sport with limited opportunities for specialised professionals. Sponsorship is limited mostly to covering costs of running the national championships, and there is no television coverage of endurance riding in New Zealand. Ribbons, certificates, and sometimes sponsored goods are awarded as prizes and there have been few events with a cash prize held in New Zealand.

National identity is likely to have influenced participation in FEI-level endurance riding, given the rationale for engagement in FEI-level endurance riding is to represent New

Zealand in world championships. Sport and sporting achievement are closely tied to national identity in New Zealand, and eventing has contributed to this with Olympic team and individual medals. The emblematic silver fern displayed by representatives is reified, and participants in pinnacle events such the Olympics are perceived to be ambassadors for the country (Thomson & Sim, 2007). Aspirations of representing one's country are endorsed and supported and moreover, it is reasonable for New Zealanders to assume they could represent their country through the colonial values of hard work, perseverance, striving, and a belief in self-advancement (Mincham, 2008). Sport funding and organisation in New Zealand promotes the connection between achievement and national prestige, with High Performance Sport New Zealand (HPSNZ) funding allocations based on expectations of achievements in the Olympics and world championships. A national preoccupation with the Olympics may have reinforced the amateur ethos in equestrian sport, because until recently showjumping, dressage and eventing riders had to be amateurs if they wished to participate in the Olympics.

At the time that modern endurance riding began in New Zealand in the 1970s, horses had been replaced as a form of transport in most places except on steep hill-country farms (Mincham, 2008), and so endurance riding was largely the preserve of farmers who used their working stock horses for sports such as polocrosse and endurance riding (Hyland, 1988). Coakley (1998, p. 5) defined culture as the "ways of life that people create in a particular group or society." Culture can vary between groups, such as rural and urban, constructed by people as they interact with each other within their particular social, political, and economic context. For instance, Bolwell et al. (2015) found that most respondents to their survey in New Zealand were employed in the agricultural sector. This is relevant for endurance practices because rural people and those who work in agriculture, especially livestock farming, hold different attitudes and perceptions about animal welfare from those without an agricultural background (de Mello, 2012; Luna et al., 2017; Mincham, 2008; Voight et al., 2016). These attitudes and perceptions intertwine with the other historic and contemporary political, social, and economic factors that have been described in this section to inform and influence the way individuals participate in endurance riding.

3.5.4.2. Amateur governance

In terms of governance, FEI-level endurance riding in New Zealand is best described as amateur with commercial elements. This amateur governance structure is common in New Zealand, enabled by government-funded political agendas that regarded sport as a mechanism for achieving social outcomes like increased physical activity and well-being for individuals and communities (Ferkins et al., 2013). Endurance riding is administered at grassroots as a network of legally constituted local clubs that are governed and administered by volunteers. These clubs are affiliated to ESNZ, a non-profit organisation administered in a business model with a small professional administration team that is accountable to member stakeholders. ESNZ receives income mainly from membership of riders and horses, start fees, and sponsorships and grants that include occasional government funding by Sport New Zealand via its subsidiary HPSNZ for world championship and Olympic campaigns. The four disciplines of eventing, endurance riding, dressage, jumping, in addition to high performance, are run as independent but subsidiary financial entities that contribute to their administrative costs and can borrow or leverage funding from ESNZ. While endurance riding had grown globally, in 2016 it was the minority discipline of ESNZ with endurance horses comprising only 6% of all registered sport horses.

While participants in FEI-level endurance riding in New Zealand are mostly amateur, the sport is not entirely free from the global influence of commercialisation. In 2016 there were two professional endurance riding stables in New Zealand, although both supplemented selling endurance horses with other equestrian business streams. More numerous were semi-professionals who sold horses regularly if not yearly to Australian, Malaysian or Middle East stables, but also worked in paid employment or ran pastoral farming businesses. However, most FEI-level riders are amateurs for whom endurance riding is their sport that they fitted in around work or running businesses. Equestrian sports are expensive, even in New Zealand, so it is reasonable to assume that amateur riders may occasionally sell horses to cover costs and to avoid the costs of keeping horses that will not enable them to achieve their goals. For those amateurs that aspired to represent New Zealand, attending world championships is often contingent on selling

their horse to pay the costs. To summarise, endurance riding in New Zealand is amateur by culture, governance and because riders are mostly amateurs to semi-professionals who fit their sport around earning a living.

3.6. Methodological approaches

Veterinary research since Carlson and Mansmann (1974) has enabled a thorough understanding of the physiology of horses in competitions, and the risks for horse welfare in this demanding sport. Furthermore, epidemiological approaches have been valuable to identify a wide range of event- and horse- level risk factors for elimination from competition. However, research on training horses for FEI-level competition has been restricted to a small number of studies, with small samples. An improved understanding of training practices and their consequences for performance is important because the literature shows that New Zealand endurance riders appear to train differently to what has been reported for elsewhere in the World. These differences include schooling, lower training volumes, with a higher proportion of total training volume from competitions, and a lack of speed. These training practices may contribute to the differences in performance between New Zealand riders and those in other countries.

Epidemiological approaches have been limited in their ability to advance our understanding of how riders, owners and trainers might influence practices and performance. This was partly a methodological limitation in that epidemiological studies have relied on existing FEI datasets to meet sampling requirements, and the FEI collects minimal demographic data from athlete, owner, and trainer registrations. These sampling constraints suggest there might be practical value in a qualitative methodology that requires smaller samples. A qualitative methodology is also useful for understanding context in under-researched areas. The literature reviewed in this chapter suggests that performance in endurance riding could be influenced by subjective and contextual factors, such as amateur sporting culture, the relationship that riders have with their horse, and their reasons for engaging and persisting in their

sport. While quantitative research methods have been used to understand motivation and commitment in sport and leisure (Ewert et al., 2013; Langan et al., 2016; Ogles & Masters, 2003), these tools often require context to be calibrated or adjusted for specific sports and demographics. This is possible for sports that are well understood, but at this time, endurance riders and endurance riding is an under-researched area. These methods also have requirements for sampling size, and the population of FEI-level endurance riders in New Zealand is not large. These methodological problems with epidemiological and quantitative data sets support the use of a qualitative methodology to achieve the exploratory and descriptive aims of this thesis.

The limited body of research into endurance riding meant that it was appropriate to refer to the broader literatures of sport psychology and social psychology of leisure for evidence of human factors that may influence performance. Relevant theoretical frameworks from this literature were reviewed in this chapter, including self-determination theory, achievement goal theory, and constraint negotiation in serious leisure. These theories were useful to inform theoretical thematic analysis in the pre- and post-interview studies, a process that is described in the next chapter. The wider literature exploring cultural contexts such as professionalism in other equestrian disciplines were also referred to because these have been shown to influence practices and performance. While the specific competition context of FEI-level endurance is quite different to other FEI disciplines such as show-jumping and dressage, research has shown that understanding and addressing psychological factors can improve performance in these disciplines. Therefore, these literatures from psychology and sociology supported the focus of this thesis on understanding factors that influenced riding, training, and competition practices and what this meant for performance in FEI-level endurance riding within New Zealand.

This broad review of multiple subject areas from both natural and social science disciplines required consideration of what various research methodologies have or might potentially contribute to an understanding of FEI-level endurance riding. This review of the literature suggests a methodological gap whereby research from a post/positivist research paradigm have been less effective, thus far, for illuminating the

human and contextual aspects of endurance riding. Therefore, a complementary research approach was chosen to achieve the aims of the thesis. This research approach is laid out in the next chapter.

3.7. Summary of the chapter

Performance in FEI-level endurance riding requires a balance between speed and avoiding elimination in vet gates. Behind these simple performance parameters are a complex mix of contributing factors that are not well understood. To date, research has focussed on the equine rather than human contribution to performance in endurance riding. Moreover, research has been restricted to examinations of FEI-level competitions, with little known of training, and even less of riding and riders, owners, and trainers.

Chapter 4 – Research design

4.1. Introduction to this chapter

This research aimed to describe the riding, training, and competition practices of individuals engaged in FEI-level endurance riding within New Zealand and to understand factors that influenced these practices, and what this meant for performances. The literature reviewed in Chapter 3 suggested that contextual human factors may influence practices, therefore a methodology from the social sciences was appropriate to achieve the research aims.

A qualitative interpretive research approach was chosen to achieve these exploratory aims of description and understanding. Inherent in these aims was the need to understand the specific context of riding, training, and competition practices in New Zealand, because what had been documented of riding, training, and competition practices in Chapter 2 showed these were different in New Zealand from those of some other countries.

This chapter begins with an examination of the assumptions about knowledge production that underpinned the interpretivist paradigm and connected the qualitative research methodology with the research questions at the heart of the research process. Then follows a description of how the methodology was implemented through the design, methods, and ethical aspects of the four studies that comprise the thesis research project. This chapter concludes with a reflection on aspects of the research that had the potential to influence the quality of the results.

4.2. The qualitative interpretivist research approach

4.2.1. The relationship between methods, methodology and paradigm

Research methods are the techniques, tools, and processes used to generate and interpret data (Braun & Clarke, 2013). Methodology is the conceptual and philosophical framework that guides and informs methods (Howes, 2017). Methodology is concerned

with the best way to gain knowledge and how this can be achieved through the research design. While methodology is a fundamental aspect of any research project, it can be implicit and/or presented as a paradigmatic or impartial (Mason, 2018). However, methodological choices are influenced and shaped by the academic discipline in which the research is conducted. Each discipline will have a specific paradigm (also termed theoretical perspective, or paradigmatic perspective) that lays out the epistemological and ontological assumptions that underpin knowledge production in a research project, along with the research values and ethics (Denzin, 2010; Denzin & Lincoln, 2000; Shannon-Baker, 2015). Making the paradigm explicit is important in research where methods are mixed, or in emergent and evolving applied disciplines such as leisure studies (Snelgrove, 2017). A clear understanding of the methodology and paradigm also enables the readers and users of the research to have confidence in assessing the trustworthiness of the results. In this section, I explain how the interpretivist paradigm and qualitative methodology were aligned with the methods thus ensuring that the overall research design and process made sense (Mason, 2018).

4.2.2. Rationale for choosing a qualitative methodology

This research was exploratory, seeking to address the gap in the research around our understanding of endurance riding, training and competition practices and the implications of these for performance. Maxwell (2008) summarises the value of a qualitative methodology for exploration, thus: 1) it is effective for understanding meaning from the perspective of participants, 2) it is useful for identifying unanticipated influences, 3) it is effective for understanding context and the influence this may have on participants, and 4) qualitative research is useful for understanding processes.

Understanding meaning (i.e., what is relevant) from the perspective of individuals engaged in FEI-level endurance is warranted because meaning guides behaviours such as riding, training, and competition practices. Furthermore, by prioritising participants' perspectives in the way that qualitative research can, the research was not limited or predetermined by the researcher with all that I know - and don't know - about performance in FEI-level endurance riding. A lack of research into human factors

influencing practices and performance in endurance riding means there were likely to be influences that have not been proposed in the research literature or anticipated from practical knowledge of endurance riding. A qualitative approach was able to overcome this potential limitation and achieve the research aim.

Qualitative research also emphasises and includes the context in which individuals act, experience, and construct meanings, thus increasing the breadth and depth of an inquiry, and contributing to greater exploratory power (Braun & Clarke, 2013). Since Nagy et al. (2014a) had posited that social or cultural processes might influence the competition practices of FEI-level riders, the capability to include context and understand processes was useful to meet the aims of this research. For these reasons, a qualitative methodology was effective for understanding the influences and processes that contribute to performance in endurance rides.

4.2.3. The interpretivist paradigm

Qualitative research is a broad church, encompassing a range of philosophical approaches to knowledge and knowing. Increasingly, qualitative methods are being used to explore management of horses and, despite using common methods, the paradigm that informs knowledge production can differ between studies. Studies have demonstrated a range of paradigms, from positivist approaches that seek to uncover absolute truths (Buckley et al., 2004) to interpretivist approaches that aim to construct relative insights (Litva et al., 2010). These differences in paradigm arise from the standpoint or worldview of the researcher and their academic discipline (Hesse-Biber, 2010). A paradigm, then, is a philosophical discussion in which a researcher conceptualises and lays out the epistemological, ontological, ethical, and methodological assumptions underpinning a research project (Denzin, 2010). This section lays out the interpretivist paradigm that informed knowledge production in this thesis research project.

Epistemology is concerned with defining what counts as valid knowledge and therefore, how valid knowledge is produced (Braun & Clarke, 2013). An interpretivist paradigm is

underpinned by a social constructivist epistemology (Creswell & Poth, 2018). Constructivism is concerned with the production of meaning by individual people. Social constructivism extends this to include the influences of interactions between people and social processes in producing meaning (Braun & Clarke, 2013). As the name suggests, interpretivism is concerned with interpreting how individuals interact with and continually construct their social worlds and the meanings that people make of their experiences (Hesse-Biber & Leavy, 2011). Understanding meaning from the perspective of participants was an effective research strategy for an under-researched subject. Therefore, interpretivism was appropriate to achieve the research aim through interpreting participants' lived experiences and documented self-reported practices during a competition season, and the interaction of these within a comprehensive account of performance.

4.2.4. Characteristics of the qualitative interpretive approach

4.2.4.1. Multiple constructed contextual versions of reality

When everyone has their own construction of reality, it follows then, that these multiple realities are best understood as complex, contextual, and ultimately subjective (Lincoln & Guba, 1985). Participants in qualitative research are conceptualised as acting within a subjective world that is constructed through their own and the researcher's interpretations. It is the understanding of how that world is organised that presents a version of "truths" in context that are both multiple and situated (Lincoln & Guba, 1985) rather than a single objective truth that is grounded in an external reality. In rejecting a universal truth, I acknowledge that the results of this research will be contingent, provisional, and uncertain.

An interpretivist paradigm was more appropriate for this thesis than a positivist or critical realist paradigm, because it was consistent with my experience that knowledge is socially constructed by individuals as they make meaning of their worlds. I am sceptical of the concept of a single, static, universal objective truth that represents reality. Not because I think we are limited in our ability to truly perceive something as real, but

because I prefer to think that everyone's truth is valid for them and should be respected by me as a researcher trying to understand their version/s of reality. Participants may very well be constructing a story to justify their behaviours, attitudes, and achievements (or lack thereof), and interpreting these constructions is key to understanding their actions and them as individuals. Furthermore, it is my observation that "the truth" for each of us evolves as ongoing experiences inform our subsequent interpretations of meaning. It is also my cultural experience that "truth" and "reality" are contextually and culturally bound (Moon & Blackman, 2014). Since a becoming, relativist ontology was more appropriate for me than a static, being ontology (Gray, 2013), interpretivism was a better fit for me as a researcher than other paradigms such as critical realism, positivism, or post-positivism.

4.2.4.2. Qualitative approaches to data

A qualitative methodology may use different forms of data as needed to complement or corroborate each other to achieve a reasonable interpretation of practices (Mason, 2018). Qualitative data in the form of words and images is often contrasted with quantitative data in the form of numbers. However, a more useful distinction between qualitative and quantitative methodologies is to consider the way the data is generated and analysed. For instance, qualitative studies generate detailed and complex data from small numbers of participants, rather than broad and shallow data from many participants. This data is then analysed to understand broad patterns and processes, rather than reducing diversity to a consensus around a mean value.

This thesis made use of both quantitative and qualitative data. In the survey and training studies, simple descriptive statistics were applied to quantitative data to achieve a contextual description of the cohort's practices. This technique enabled a contextual description of the range of practices, rather than using inferential statistical techniques to generalise the results to the broader global population. Qualitative data generated in longitudinal in-depth interviews contributed an understanding of these practices. In this way, quantitative and qualitative data complemented each other to produce a

comprehensive, contextual interpretation of practices with an understanding of how these contributed to performance.

4.2.4.3. Naturalistic setting

Data generation is the wider process and relationships that enabled data collection. Because context is so important in qualitative research, methods of generating data try to resemble normal life rather than separating data from the context. Data generation was organised around opportunities that presented when participants engaged in the 2016–17 season of training and competition. Surveys and interviews were conducted in participants' homes or training bases, and training data was self-reported by them during their normal activities, with minimal disruption and without manipulation of the setting by the researcher.

4.2.4.4. The position of the researcher within the research process

Qualitative research holds that the researcher, with their beliefs, experiences, and worldviews, should not be separated from the research process. The inclusion of the researcher is regarded as a strength of qualitative research, enabling an understanding of context and agency that could not be achieved if the researcher were removed from the process. The inclusion of the researcher within the research process brings both subjectivity, and intersubjectivity. In this thesis, subjectivity is a philosophical position arising from a constructivist epistemology and a relativist ontology. The consequence of subjectivity for this research is research results in the form of a situated, provisional understanding rather than claiming a universal truth.

Intersubjectivity is the process in which my perspectives and thinking interacted with those of the participants during data collection and analysis. The consequence of intersubjectivity for this research was the need for reflexivity, a careful accounting of the researcher in the production of knowledge. As for many qualitative researchers exploring equestrianism (Brandt, 2004), my personal history, position within the research process, and relationship with the community of interest is a relevant starting

point for reflexivity. Prior to this research, I was an FEI-level endurance rider for over ten years, immersed in the relatively small and close community with relationships to most participants that pre-dated this thesis. Initially, this relationship with participants contributed a "sameness" of perspectives and thinking (Rose, 1997), but this changed with my development as a researcher. The financial and time constraints of a PhD meant that I had to stop competing. Furthermore, my thinking changed as I became more familiar with the literature and began analysing data. These changes contributed to an emerging "difference" in intersubjectivity where my perspectives and thinking had moved to become more like a researcher and less like an endurance rider. Further reflexivity was applied to potential influences I may have introduced to data collection and analysis, and this is described in section 4.4.3.

4.2.4.5. Reasoning in qualitative research

Qualitative research has been defined by the process of inductive reasoning - working from the specific to the general such as theories (Braun & Clarke, 2013). Inductive reasoning was evident in theoretical thematical analysis of interview data, where initial coding produced specific categories that were referenced against salient theories to produce explanations. However, in practice the qualitative research process is emergent and often recursive, working back and forth between the data and broader concepts to construct an explanation. My personal experience of thematic analysis, for instance, was that it felt like the movement of a dolphin; alternating between periods with a higher-level detached perspective above the data, and periods when I was submerged within the data. This suggests a mix of inductive and abductive reasoning (Mason, 2018). In this thesis, interpretations of experiences, meanings, accounts, actions, and events were synthesised to produce a general truth in the form of "explanations and understandings" (Mason, 2018, p. 226). This goal of a loose, situated understanding rather than seeking absolute certainty, is also characteristic of abductive logic (Willis et al., 2007). Overall, then, a mix of reasoning was applied in the research process, with inductive logic as the primary form.

4.3. Research methods

4.3.1. Overview of the research project

4.3.1.1. Research setting

At the time of data generation, ESNZ and FEI rules had been closely aligned for more than 20 years. The 2017 national championship 160 km title was only offered as a CEI class, restricted to riders and horses that had qualified through the FEI system of distance-based grades. While riders had the option of participating in CEN classes held alongside CEI classes, very few did, with almost all riders preferring to pay dual registration so they could start in FEI classes. These circumstances contributed to a sample of riders preparing horses almost exclusively for FEI-level competitions, with the opportunity to explore their riding, training, and competition practices and to understand how this might relate to performance in FEI-level endurance riding.

4.3.1.2. Research questions

The research questions align the aims and methodological framework of the research with the methods (Maxwell, 2008) thus ensuring trustworthiness of the results, a connection that is summarised in Table 4-1. The four questions guiding the research process are also shown in Table 4-1.

4.3.1.3. The research process

Participants were recruited during winter, prior to horses starting in training, and surveyed for demographic data and retrospective descriptions of practices. In-depth interviews were conducted at the same time when participants were planning their season of training. A longitudinal observational study of training collected participants' self-reported training and competition data during the nine-month season from August 2016 to April 2017, and a second set of in-depth interviews was conducted after the season during the winter of 2017.

Table 4-1

Summary of the Research Questions that Linked the Aims of the Research with the Research Methods

Aims of the research	Research questions	Type of data	Methods of data: collection	analysis	Chapter
To describe the riding, training, and competition practices of FEI-level endurance riders in New Zealand	What were participants riding, training, and competition practices during a season of competition?	quantitative	survey longitudinal observational study of training	descriptive statistics	5 7
To understand factors that influenced practices and performance	What were the characteristics of selected participants engaged in FEI-level endurance riding in New Zealand?	quantitative	survey	descriptive statistics	5
	What were participants' motivations, competitive orientations, perspectives, and experiences of a season of training and competition?	qualitative	longitudinal in-depth semi-structured interviews	thematic analysis	6
	How were their practices and performances influenced by their characteristics, motivation, competitive orientation, perspectives, and experiences?				8

The timeline and data generation procedures for the four studies are summarised in Table 4-2. The two quantitative studies are included in their published form, with details of data collection and analysis methods in Chapter 5 (for the survey study) and Chapter 7 (for the training study). Since publication constrained word limits, a fuller account of the methods is provided in the following sections (4.3.2.1. and 4.3.2.2.).

Neither of the two qualitative studies were published prior to completion of the thesis, enabling a generic description of data collection and analysis methods for both studies (4.3.2.3–4.3.2.5.). The two studies diverged slightly in the recruitment and the interview processes, so these specific details are provided in the methods sections of Chapters 6 and 8.

4.3.2. Methods used in the four studies

4.3.2.1. The survey study

The survey was intended to capture a preliminary snapshot of participants and their riding, training, and competition practices. The survey questionnaire was constructed during the autumn and winter (May – July) 2016 by myself and my supervisors, and pilot tested in July with three endurance riders. The survey had two parts. The first was designed to capture participants' demographic characteristics, riding background, sources of information, and the actions they took to improve their performance as an endurance rider. The sample size for this first part was 25 riders. To avoid idealised responses, participants were asked to report on specific things they did in the previous season. I believe that responses were likely to be reliable because participants had owned their horses for some time and were asked about routine practices. However, I acknowledge that information bias arising from memory decay is possible given that participants were self-reporting events and actions from the previous 12 months.

The second part of the survey was for horses being enrolled in the training study, therefore included horse, training and some management data for 36 horses.

Table 4-2

Timeline and Summary of Data Generation Procedures and Actions

Dates	Stage of season	Actions and procedures
May - July 2016	Winter break from training and competition	Survey questionnaire developed (see Appendix 8) Pre-season in-depth interview schedule developed (see Appendix 9) Sample frame identified from ESNZ and FEI registrations of horses and riders as at June 2016 Training data collection forms confirmed (see Appendix 11) Information letter and consent form developed (see Appendix 4,5) Low risk ethics approval obtained for survey, pre-season interview and training studies (MUHEC 4000016286, Appendix 2) ESNZ and FEI advised of research project via personal contacts
July - August 2016	Horses commence training towards first competition	Pilot testing survey questionnaire and pre-season interview schedule Pilot interviews transcribed and schedule peer reviewed Interview technique reviewed with one supervisor Potential participants invited by email, social media, or phone Participants recruited, surveyed, interviewed and horses enrolled in training study Information letter sent or given to participants prior to appointment (Appendix 4) Written consent obtained in person prior to interview (Appendix 5)
July 2016-May 2017	2016-17 endurance competition season	Pre-season in-depth interviews professionally transcribed and sent to participants that requested these Review of literature completed, and copies sent to participants Post-season interview schedule developed (Appendix 13), piloted Training and competition data collected Owners of horses that were withdrawn from the study were contacted by phone for a short exit interview (Appendix 12)
June–August 2017	Winter break	Full human ethics approval obtained for post-season interview study (MUHEC SOB 17/10, Appendix 3) Participants interviewed for post-season in-depth interviews Written consent obtained prior to interviews (see Appendix 7)
June–November 2017	Start of subsequent season	Post-season interviews professionally transcribed Transcripts checked and sent to all 20 participants with a request for permission to use data (Appendix 14)

Participants were asked to report on specific actions and intentions for the forthcoming season. Preliminary analyses of the horse management data showed that feeding and management of horses was consistent with descriptions in the literature for elite level endurance horses (Bolwell et al., 2015; Harris, 2009). To retain a focus on answering the research questions, this data was not written up for inclusion in the thesis.

4.3.2.2. The training study

This study aimed to prospectively collect, and report detailed individual training data for a full season of competition. Consistent with a qualitative interpretive approach, and to answer the research questions, this publication sought to provide a broad account of participants and their training and competition practices using descriptive statistics. To retain a focus on answering the research questions, several other analyses were not completed. For instance, preliminary analyses of periodisation and training load were prepared but not advanced because - while these results were intriguing - they were not central to answering the research questions. Another example was the analysis of intermittent training represented by the variable 'days not worked'. A simple sentence in the discussion section of Chapter 7 belies the effort expended in exploring the reasons for days that horses were not worked. Multiple (MCA) and principal component analyses (PCA) were conducted to ascertain whether individual rider-owner-trainers, individual horses, horse health problems, or competition starts were associated with days not worked. Horse and trainer effects each were responsible for less than 17% of the variation, so this analysis did not add to an understanding of training and competition practices. The value of trialling PCA and MCA was that I began to understand the power of the qualitative studies in terms of providing an understanding of practices such as intermittent training.

4.3.2.3. Pre- and post-season interview studies

These studies aimed to understand factors that influenced practices and performances. To achieve this aim, data was collected by in-depth semi-structured interviews and analysed for themes. This and the two following sections discuss aspects of methods

that were generic to both interview studies: the development of interview schedules, the process of theoretical thematic analysis, and the use of theoretical frameworks to inform analysis.

The semi-structured interview schedules (Appendices 9 and 13) were developed and piloted separately, about 12 months apart. Both began with broad opening questions that focused participants on their lived experiences of FEI-level endurance riding. Subsequent questions asked about specific events, actions, and experiences to avoid generalised, normative responses. For the pre-season interviews, questions sought to understand what motivated participants as they prepared for the coming season. For the post-season interviews, questions were designed to understand participants' experiences during the season. Both schedules were pre-tested with three endurance riders, and probes developed to ensure clarity and to elicit fluent responses. During interviews the order of questions and probes were determined by the flow of the conversation. The interview closed with a general reflective question, and a gentle withdrawal from the encounter. Interviews were recorded and journal notes were made during and within a short time after the interview that captured impressions and observations that were not able to be captured in recordings.

Twenty people were interviewed for the pre-season study, 21 for the post-season study and 19 for both studies. The criterion of saturation was not used as a measure of the quality or adequacy of data because the term refers to the absolute point when new data do not add to a concept, thus implying that a single "truth" has been discovered. This criterion is relevant to positivist and realist approaches where completeness and universal truth are sought (Varpio et al., 2017). The measure is not appropriate for research from an interpretive perspective where results are regarded as contingent, contextual, and partial. Furthermore, the criterion of saturation was developed to assess the technique of grounded theory, where interviews and analysis interact in an iterative cycle. There was little iteration between data generation and analysis in this thesis, due to the sustained effort required for all four studies, so the criterion of saturation was less relevant that other measures of quality.

4.3.2.4. Theoretical thematic analysis

Thematic analysis was informed by an interpretive approach that emphasised and sought to interpret the meaning that people make of their own lives and experiences (Mason, 2018). Themes were defined as organising ideas that captured meaningful patterns across the dataset (Braun & Clarke, 2013). These organising ideas were phrases or sentences that identified key ideas for categorising data (Saldaña, 2015). Both interview studies used a theoretical thematic analysis, in which analysis of data was guided by existing theories and concepts and influenced by my practical knowledge of endurance riding (Braun & Clarke, 2013).

The theoretical thematic analysis followed four broad steps shown in Table 4-3. The first step consisted of familiarisation with recordings and transcripts, contributing to a sensitisation to the data. In the second step of analysis, transcripts were uploaded to NVivo Pro version 12 where all text was systematically coded to categories and collated in overarching themes (Braun & Clarke, 2006). Where there was overlap between categories within a theme, the coding was assigned to a single category deemed to be the most relevant. At this point, coding was reviewed with my primary supervisor.

In the third step, each category and each theme were reviewed against the research questions, with reference to concepts in the literature (shown as coding trees in Appendices 10 and 16). In the fourth and final stage, each transcript was reviewed to check the interpretation and definitions of categories with attention to how evidence of conflict, and conflicting evidence was interpreted. Finally, results were written up for peer review by supervisors. A copy of the research report was sent to participants as a gesture of reciprocity. Since over three years had passed since the interviews, participants' feedback on the research was not sought.

Table 4-3

Details of Thematic Analysis of Semi-structured In-depth Interviews Conducted with FEI-level Endurance Riders in New Zealand Before and After a Season of Training and Competition

Aim of each stage	Steps in each phase of data analysis
Familiarisation with the data, sensitisation to content	1. Professional transcription of recordings in a denaturalised form, excluding non-speech utterances and sounds (Halcomb & Davidson, 2006; Oliver et al., 2005) 2. Repeated reading and annotation of each transcript 3. Reference to any journal notes made during or after each interview 4. Reference to recordings for emotions and emphasis on speech
Inductive categorisation (coding)	5. All transcripts were uploaded to NVivo and coded line-by-line to >80 categories labelled with participants' words or phrases 6. Categories were collated into over-arching themes and considered against the research questions 7. Categorisation at this point was discussed with the primary supervisor and the potential for coding to theory was discussed
Categorisation guided by theoretical frameworks	8. All text assigned to each category was reviewed, each category was reviewed, defined, and interrogated, and revised where this was appropriate 9. Categorisation was considered against the research questions and relevant theories and concepts 10. Results were presented for review with arguments and coding trees for each theme, supported by a code book that defined each theme and subordinate categories
Presenting the research for review	11. Each transcript was reviewed to check interpretation and definitions of coding 12. Findings were considered against the research questions and written up in a coherent narrative with supporting evidence in the form of coding trees, excerpts, and quotations 13. A draft copy of findings was shared with participants because this was promised

4.3.2.5. Use of theoretical and conceptual frameworks to guide analysis

In the third step of theoretical thematic analysis, categories from the first round of coding were reviewed against salient theories from sports psychology and the social psychology of leisure. This literature was appropriate because thematic analysis sought to understand what participants' accounts provided in terms of evidence for psychological and social factors that may have influenced their practices and performances. Sport psychology is concerned with motivation, commitment, and performance in competitive sports for both amateur and professional athletes. The discipline of social psychology of leisure is concerned with individuals in their non-work time (Iso-Ahola, 1980; Walker et al., 2019). Researchers working in this area observe individuals' free will and choices in everyday situations and consider how individual actions - and choice - are constrained by other people (Donnelly, 2000).

For the future-focused pre-season exploration of motivations and competitive orientation (Chapter 6), the themes of enjoyment, challenge and constraint produced by the first round of inductive coding were consistent with the concepts of intrinsic, internalised autonomous and controlled forms of motivation. Self-determination theory explains how these forms of motivation relate to behaviours and practices (Deci & Ryan, 2000). Achievement goal theory (Nicholls, 1989) explains how motivation to participate in sport can be manifest as different orientations, and how these relate to goals and competitive behaviours. Both theories provided a coherent framework for linking motivation to practices and thence to performance.

For the reflective post-season study (Chapter 8), the themes describing difficulties, persistence, and adaptation from the first round of inductive coding were consistent with the theory of constraint negotiation in serious leisure (McQuarrie & Jackson, 1996). Other theories relevant to elite sport psychology were considered, such as the sport commitment model of Scanlan et al. (1993). From sociology, Unreh's notion of social worlds, and Bourdieu's concept of habitus were also powerful frameworks capable of explaining how socialised norms guide behaviours. However, constraint negotiation provided a coherent explanation of how performance was affected when amateur

participants adapted their practices – and performances - to negotiate constraints, so they could persist towards goals.

It is possible that any of the chosen theoretical framework could have informed both pre- and post-season studies. For instance, the post-season interviews described changes in motivation that occurred over the season that could have been illuminated by self-determination theory. However, each study was analysed separately, which meant that the results of one study did not inform analysis of the other. In Chapter 9, the findings from all four studies are synthesised, with a discussion of the potential for the findings from both studies to relate to common theoretical frameworks.

4.4. Participants, the research relationship, and research ethics

4.4.1. Sampling

A key driver of participant selection was access to a sample with the potential for a productive research relationship (Maxwell, 2005). Access was facilitated by my prior involvement in endurance riding and Massey University's provision of veterinary expertise, staff, and resources to the sport. A prior study collecting data from endurance riders in New Zealand (Bolwell et al., 2015) also pointed to an accessible population. This access contrasted with previous attempts elsewhere to engage with elite riders that were frustrated by time constraints, regular international travel for competitions, and protection of commercially and competitively sensitive information (Hogg, 2015; Lonnell et al., 2014; Nagy et al., 2014b).

Generating different forms of data from the same participants contributed to a deep rapport with potential for a more complete understanding of practices. Sampling was directed by both purposive selection and convenience. Purposive sampling aimed to generate detailed information from a relatively small number of deliberately selected participants who could talk about their experiences of FEI-level endurance riding, training and competition practices (Malterud et al., 2016). These purposively selected participants were training endurance horses towards at least one 80–160 km ride during

the 2016/17 season. Dual registration with both ESNZ and FEI was a prerequisite for athletes to compete in rides at this level (ESNZ, 2017; FEI, 2016), enabling lists of 111 registered horses and 91 people to be compiled from these publicly available databases. The convenience aspect was a feasibility limitation of initially 6 hours, later extended to 10 hours driving time (or 700 km), from Palmerston North.

In contrast, quantitative studies normally require samples that are representative of the wider population from which the sample was drawn as this facilitates extrapolation of results to other contexts (Curtis & Curtis, 2011). The entire population of people engaged in FEI-level endurance riding in New Zealand was a small community at the time of recruitment so the final sample for the survey (n=21) and training studies (n=16) comprised 23% and 18% respectively of eligible people. Despite the logic of sampling differing between qualitative and quantitative research, the sampling strategy resulted in a diverse sample that satisfied the sampling requirements for both qualitative and quantitative phases (Curtis & Curtis, 2011).

4.4.2. Recruitment

A total of 40 eligible participants were contacted through social media, email, phone, or in person and invited to participate in all four studies. This process resulted in 21 participants and 36 horses being initially enrolled. Invitation was selective (Patton, 1990) based not only on engagement in FEI-level endurance riding during the 2016-17 season, but also for diversity in characteristics such as age, gender, experience, and number of horses. Care was taken to ensure a variety of geographic locations so recruitment avoided over-sampling from a few local endurance riding clubs in preference to as many as possible. A diverse range of socio-economic characteristics, such as amateur and semi-professional status, and lifestyles were sought. Deliberately sampling for heterogeneity ensured that a diverse range of experiences were likely to be captured in the qualitative data (Patton, 1990).

As participants withdrew, further participants were invited to participate, usually people that were involved with the same study horse(s), such as the partner, spouse, or parent

of the original participant. By the end of data generation, a total of 23 participants had contributed to at least one study, with a core of fifteen participants contributing data to all four studies. Sixteen participants contributed quantitative data, and eighteen contributed qualitative data. The contributions of participants to each phase and study are shown in Table 4-4.

4.4.3. The research relationship and ethics

This research leveraged existing relationships with the endurance riding community in New Zealand, due to my insider status as a former endurance rider. My research relationship with participants was both a privilege and an ongoing responsibility. This relationship and my view of what is important, and my values and beliefs about how people should be treated, informed my ethical conduct, which I describe in this section. While generating different forms of data from the same participants was a strength of the research design, sustained participation in serial studies was associated with practical and ethical concerns. My main concerns were the prolonged research relationship with repeated contributions and continued challenges to preserving participants' anonymity and data confidentiality. These were consistent with the principles of avoiding harm and voluntary consent (Mason, 2018).

The research relationship was essential to sustain data generation and was critical in the qualitative phase because of the deeper, more intimate nature of the intersubjective encounter that was required to collect "thick" rich data in which the context of the behaviour was described (Geertz, 1973). Participants had been my peers in the sport, some of whom I had known for decades. This familiarity facilitated access to rich data, but I had to take care to avoid exploiting this relationship through coercion during recruitment or data collection. A deep research relationship such as occurred for this research brings the responsibility to consider any conflict of interest that might exist, and the potential for harm. These aspects of the research relationship were considered during data generation, with participants retaining their right not to participate, to stop recordings, to cease submitting training data, or to withdraw at any time. Participants were also given contact details of a person, independent of the research and with a

thorough knowledge of research ethics, whom they could contact to discuss and address any concerns in a confidential manner.

Table 4-4

Contributions of Each Participant to Each of the Four Studies That Comprise the Research

Participant ID	Quantitative phase		Qualitative phase		All studies	
	Survey	Training study	Pre-season interview	Post-season interview	All studies	Total participants
P1	✓	✓	✓	✓	✓	✓
P2	✓	✓	✓	✓	✓	✓
P3	✓	✓	✓	✓	✓	✓
P5	✓	✓	✓	✓	✓	✓
P6	✓	✓	✓	✓	✓	✓
P7	✓	✓	✓	✓	✓	✓
P8	✓	✓	✓	✓	✓	✓
P9	✓	✓	✓	✓	✓	✓
P10	✓	✓	✓	✓	✓	✓
P13	✓	✓	✓	✓	✓	✓
P14	✓	✓	✓	✓	✓	✓
P15	✓	✓	✓	✓	✓	✓
P18	✓	✓	✓	✓	✓	✓
P19	✓	✓	✓	✓	✓	✓
P20	✓	✓	✓	✓	✓	✓
P21	✓	✓	-	✓	-	✓
P11	✓	-	✓	✓	-	✓
P12	✓	-	✓	✓	-	✓
P17	✓	-	✓	✓	-	✓
P4	✓	-	✓	-	-	✓
P16	✓	-	✓	-	-	✓
P22	-	-	-	✓	-	✓
P23	-	-	-	✓	-	✓
	21	**16**	**20**	**21**	**15**	**23**

Two important processes to avoid harm were those of obtaining informed consent, and the procedures that preserved anonymity and respected confidentiality (Gubrium et al., 2012). Informed consent for the survey, training and pre-season interview studies was achieved with a participant information sheet that explained the project and participants' rights (Appendix 4), complemented by a discussion prior to securing written consent (Appendix 5) to participate and to record the interview. Consent for the post-season interview was achieved separately with an information sheet and letter (Appendix 6) and written consent form (Appendix 7). Once they had consented to be involved, participants retained the freedom to stop recording, to withdraw their participation, and to withdraw their data.

Anonymity was a specific concern for participants, given the small community and the distinctiveness of individuals, performances and experiences that might be contained in data. Data was protected by anonymisation, password protection, and controlled access to stored and transmitted data. Raw data in all forms was identified by pseudonyms chosen by participants that were later changed to numbers P1–P23 because the pseudonyms themselves were distinctive. Raw data as recordings were not shared with anyone other than professional transcription services bound by a confidentiality agreement. In transcripts, all non-study people, horses, and places that could identify participants were anonymised. Raw numerical and statistical data was shared only with two supervisors with no connections to the sport of endurance riding or knowledge of the participants. Where I was uncertain of the implications of sharing raw data for anonymity, I sought advice from an independent person who provides advice on research ethics. Presentation of results was scrutinised to ensure that neither participants nor their horses could be identified, and care was taken to avoid any excerpts that might risk identification. This meant that research diaries and codebooks were not able to be provided as appendices in this thesis because these described distinctive people, horses, achievements, and events that could jeopardise anonymity. When making decisions around protecting anonymity in publishing, I was guided by participants' anxieties and perceptions of the risk rather than my (or my supervisors') assessments of actual risk of participants' being identified. This was consistent with the principle of avoiding harm because anxiety is a form of harm.

Reciprocity was an important part of the research relationship for me. Normal courtesies such as clarity around interview bookings, punctuality and gratitude for participants' time and contribution were observed. In New Zealand, for example, it is considered courteous to take food and to remove shoes when visiting people in their homes. It is possible that participants may have been drawn to Massey University's reputation in equine veterinary science with the potential to access information, so where participants requested specific information on training and management of endurance horses, I endeavoured to provide this. I sent copies of a preliminary review of the literature, and reports of all study results to participants.

4.4.4. Institutional ethics approval

The ethical concerns described in the previous section were formally considered in two applications to Massey University's Human Ethics Committee (MUHEC). The survey, training and pre-season interview studies were assessed by peer review and deemed to be of low risk to human participants. Consequently, MUHEC was notified of the studies and a low-risk approval was granted (4000016286, Appendix 1) valid to 30/6/20. The post-season interview study was characterised by a much deeper relationship between researcher and participants, so a full review by MUHEC was sought and granted (SOB 17/10, Appendix2) valid to 6/6/20.

Horse welfare was a consideration for the training study and a requirement for publication of the training study. However, as the aim of this observational study was to document normal training and management practices with no experimental manipulation, Massey University animal ethics committee approval was not required.

4.5. Threats to quality

This section considers the threats to the quality of the research. Because some studies were published as discrete units prior to completion of the research, it was necessary to

consider quality in the context of each study as well as the overall qualitative methodology. The term "validity," from quantitative research, translates to the equivalent term "trustworthiness" in qualitative research (Johnson & Christensen, 2014). The differences in terminology and conceptualisation arise from the different research perspectives and their underpinning concerns with what is true, and how knowledge is constructed or produced. Put simply, these two terms refer to the likelihood that the research results are reasonable, with a sound basis in appropriate methods, logic and careful work, and that readers and users of the research can have confidence in the analysis and interpretation of the data.

4.5.1. Validity

For the survey and training studies, validity of results was concerned with the precision and accuracy of measurement (reliability), the influence of research design on outcomes (internal validity), and the extent to which the results may be generalised to other contexts (external validity) (Sarantakios, 2013). Threats to validity for the survey and training studies included the potential for bias contributed by the non-random convenience sample, voluntary self-reported data, and missing data. The non-random sample resulted in non-parametrically distributed data, so medians and quartile ranges were reported in the descriptive statistics. The potential for self-reported data to be incorrect or estimated was acknowledged and discussed, enabling readers to judge the strengths of the inferences drawn and to make decisions about generalisability. Missing data were replaced with values calculated from known data, with all steps and assumptions stated. These threats, along with their implications for the results and the actions taken to address them, are discussed further in Chapters 5 and 7.

A small amount of qualitative data was collected as free-text responses by participants to open questions in the survey and comments in the weekly training dairies. This data was quantified using content analysis, a form of categorisation that required subjective interpretation by the researcher. This involved analysing free text for key ideas, which were then categorised using consistent words and terms, and then counted (Hsieh & Shannon, 2005). Participants' words and phrases were used to label categories

(grounding the categories in the data) and categories were peer reviewed with two supervisors with the aim of countering any potential bias that the researcher may have introduced to the process of categorisation.

4.5.2. Trustworthiness

4.5.2.1. Criteria for appraising risks to quality

Traditionally, qualitative interpretive research has been appraised with reference to the four criteria of credibility, dependability, confirmability, and transferability (Lincoln & Guba, 1985). These criteria refer to the confidence that readers and users can have in the veracity of my interpretations (credibility), the stability of the results (dependability), the coherent relationship between results, interpretations, and recommendations (confirmability), and finally the extent to which results can be applied to other settings (transferability). More recent conceptualisations of quality have used procedural checklists (Braun & Clarke, 2006; O'Brien et al., 2014). Since the interview studies were not published with peer review prior to submission of this thesis, checklists were useful to guide critical reflection (reflexivity) on the four criteria of trustworthiness of the research process and procedures. Peer review by supervisors was also valuable to guide reflexivity on the research process and the results.

The research relationship was an important aspect of the research process that brought the potential to influence credibility and dependability. The close connection between me as the researcher and the participants enabled the generation of rich, deep data, so attempts to counter bias introduced by subjectivity would have been paradoxical. Instead, subjectivity was accounted for through functional and personal reflexivity, thinking critically about how data generation methods and the researcher may have influenced the research process and the knowledge produced (Braun & Clarke, 2013).

4.5.2.2. Functional reflexivity

Functional reflexivity considers how the process of subjective interconnection between interviewer and participant in the interview was managed to produce good data. An essential part of the interview process was building on the pre-existing "insider" relationship with most participants to create a rapport. One-on-one interviews, mostly in participants' homes, were conducted after an hour or more spent with participants, enrolling their horses and exploring practices in a survey, and for some this included visiting and riding their horses. The rapport was even deeper for the post-season interviews conducted after 9–10 months of data collection, resulting in much longer interviews with participants to explore their understanding, perceptions and interpretations of their world (Adulv, 2013; Grinyer & Thomas, 2012). This was consistent with Geertz's (1973) definition of "thick" descriptions, subsequently described by Donnelly as "intensive, small scale, dense descriptions of social life from observation, through which broader cultural interpretations and generalisations can be made" (Donnelly, 2000, p. 83).

The interview schedules were structured to focus participants on their experiences, with a gradual increase in intimacy, using probing questions and seeking clarification of their meaning and closing with a structured withdrawal from the encounter. I brought previous training and workplace experience in advisory positions to interviewing that meant I was familiar with the processes of building personal but professional relationships with interviewees. Despite specific experience with interviewing for social work case studies, I required practice to balance active listening with thinking critically, and to recognise and draw out good data. As a result, the data from early interviews, particularly those with introverted participants, may not have been as rich and deep. This improved as I gained practice in using elaboration and confirmatory probes.

Functional reflexivity was also applied to subjective influences during analysis and interpretation. These influences were identified and accounted for by documenting analysis in an audit trail of codebooks, coding trees and reports of preliminary results. Due to the nature of doctoral research, codes and themes were constructed by one person, then peer reviewed by a panel of supervisors. This process ensured consistency in the coding methods but did not utilise multiple researcher perspectives for coding.

Adequate supporting evidence for the results included “thick” descriptions of accounts in the write-up that grounded the results in participants’ accounts.

The effort of generating data during the endurance riding season meant that the interview data was not analysed until well after data collection was completed. This is not good practice and may have limited my ability to progressively focus interviews, build on observations and working hunches, and to think about how to explore these (Maxwell, 2008). Furthermore, although participants were sent a summary of the research, the time that had elapsed meant that it was inappropriate to ask for member checking (Varpio et al., 2017). For some individuals, this may have risked harm through re-engagement with sensitive events and topics, and for most it would have prolonged their commitment past the 12-month period (Goldblatt et al., 2011).

4.5.2.3. Personal reflexivity

Personal reflexivity was useful to identify influences introduced by the inclusion of the researcher in the analysis process (Braun & Clarke, 2013). Significant effort was invested in reflecting on my researcher perspective, my assumptions about social reality and how knowledge was produced in this research. A research diary was a useful mechanism for laying out and critiquing my interpretations, usually as mind maps and diagrams, and documenting the development of concepts for critical reflection later in the research.

Familiarity with participants meant that I had to be conscious to put aside judgement and prejudices rooted in my previous relationships and maintain a neutrality that enabled me to be fully open to understanding how others construct their worlds. This cognitive switch took practice; being with people I knew, but “seeing” them as constructions, as data, was incorporated into the pre-interview routines. An insider knowledge of colloquial terms and events created trust and made the interview flow, but there were moments when I was made aware of potential negative effects of my insider position. One such moment was when I asked participants to describe or elaborate or clarify things that we both took for granted as common or shared implicit knowledge, and they replied to the effect that I should have known these things, or

worse—with a stunned silence. These moments reminded us both that I was there as a researcher, not a friend, and made me aware of the potential for data that I may have missed because of our shared implicit knowledge. There may have been moments when I was not so aware of implicit, tacit knowledge and it is possible that this may have contributed to missing data because it was taken for granted.

4.5.2.4. Confirmability

In terms of confirmability, the coherent relationship between results, interpretations, and recommendations, the four studies produced complementary results that contributed to a richer understanding of performance by New Zealand endurance riders. Consistent with a qualitative interpretive approach, the thesis was a multi-method rather than a truly mixed methods research project. The descriptions of riding, training, and competition practices were complemented by an understanding of the motivations, competitive orientations, experiences, and perspectives of participants, and how these influenced performance. The results from different studies were not triangulated because this criterion from positivist and realist paradigms implies that all four studies would have converged on a single truth (Denzin, 2010; Varpio et al., 2017). Because interpretive research emphasises that reality is socially constructed, and therefore, there are multiple and relative versions of reality, it makes no sense to exclude all but one version of reality (Willis et al., 2007)

4.5.2.5. Transferability

The reflections have thus far considered the criteria of credibility, dependability, and confirmability. The final criterion of transferability is concerned with the extent to which the results can be applied or extrapolated to other settings. A similar term from quantitative research is generalisation, and the term is often also applied to qualitative research conducted in realist or positivist paradigms. However, transferability in interpretive research is contested (Williams, 2000). On the one hand, the quintessentially contextual nature of the results and small sample sizes support the argument that transferability is not appropriate. On the other hand, inductive studies of

sport have been criticised for producing only contextual understandings that do not add transferable knowledge (Carlsson & Hedenborg, 2014). In practice, rarely can the findings of a study be applied in every context, and most studies have some application beyond their specific context. A sensible resolution, then, is to consider each study in terms of its contribution and how this advances our overall understanding of a phenomena (Pearce, 2012). One means of achieving a careful and considered transferability is to use theoretical frameworks to inform analysis (Polit & Beck, 2010), particularly for explorations of under-researched areas (Biddle et al., 2001). In this research, coding with reference to theoretical frameworks avoided subjective reading of the data to a "fictional, non-existent world constructed by the researcher" (Fereday & Muir-Cochrane, 2006, p. 81). Instead, results were linked to an understanding produced in similar sporting contexts (Kennelly et al., 2013; Lynch & Dibben, 2016), thus addressing the potential limitation on transferability.

4.6. Summary of the chapter

This thesis was informed by an interpretive paradigm, using a qualitative methodology to achieve the exploratory aims. Four key design features of this research were: 1) the central role of participants with multiple contributions, 2) the instrumental role of the researcher who was positioned within the research process, 3) generation of data in the natural research setting of a competition season, and 4) complementary qualitative and quantitative data in four separate studies. The deep sustained research relationship brought practical and ethical considerations that required reflection and careful management to avoid harm and generate good data. Publication of the survey and training studies forced consideration of limitations and threats to quality in the context of the paradigm espoused by the journals. However, the overall quality of the thesis was appraised with reference to the criteria for qualitative research of credibility, dependability, confirmability, and transferability. Subjective and intersubjective influences were valued traits of the research that were acknowledged and accounted for through functional and personal reflexivity.

Chapter 5 – Survey study

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H.J. Webb, J.F. Weston, E.J. Norman, N.D. Cogger, C.W. Rogers (2019). Experience, riding practices and training methods of Fédération Equestre Internationale (FEI:80 – 160km) level endurance horse rider-owner-trainers in New Zealand. *Comparative Exercise Physiology* 15 (2): 137 – 145.

5.1. Abstract

Riders and training have been implicated as contributing to poor performance and adverse horse welfare outcomes in endurance competitions ('rides'). This study described the experience, riding practices and training methods of a cohort of 21 Fédération Equestre Internationale (FEI: 80 – 160 km) level endurance rider-owner-trainers in New Zealand. Data were collected via face-to-face survey and descriptive statistics calculated. Respondents had a median 13 (interquartile range [IQR] 9–15) years' experience in domestic competition and 7 (IQR 4–10) years in FEI competition. Respondents were mostly amateur (67%), >40 years of age (87%), female (76%), riders (95%), owners (91%) and trainers (95%) with ≤2 FEI level horses (53%). Over half (62%, 13/21) intended to prepare horses for a 160 km competition over a 26 – 41-week season. Respondents reported using additional fitness training (86%, 18/21) and used athlete support services such as chiropractic (29%, 6/21), massage (29%, 6/21) or physiotherapy (19%, 4/21) so they could ride better. Most (86%, 18/21) respondents reported that they employed schooling using equitation techniques to develop riding skills and supple, sound, rideable horses. Ridden aerobic distance training was complemented with a median 6 [IQR, 5 – 8] other training methods for convenience, enabling amateur participants to schedule training around employment. Furthermore, respondents intended to use a series of 40 – 80 km rides for training purposes for most (94%, 34/36) horses instead of time-trial type training sessions reported in other countries. This cohort of experienced amateur semi-elite to competitive elite rider-owner-trainers in New Zealand appear to self-coach, taking responsibility for the development of their horses and working pro-actively to improve aspects of their riding practices and training that might improve performance. These results can inform further exploration of how rider characteristics inform and influence training and competition practice and outcomes.

5.2. Introduction

An endurance ride (a 'ride') is a competitive test of a rider's ability to manage their horse's stamina over a natural course of up to 160 km. International level endurance rides of 80 – 160 km are regulated by the Fédération Equestre Internationale (FEI). Rides >80 km present unique physiological and welfare challenges for horses, so courses are broken into sections ('loops'), each <40km and concluding with a compulsory veterinary inspection ('vet gate') that ensures horses are fit to continue to the next loop. Horses that are lame, wounded or exhibit signs of metabolic conditions associated with fatigue and dehydration are eliminated and cannot proceed further (Bennet & Parkin, 2018a, 2018b; Nagy et al., 2014a). Horse and rider must complete the course and pass all vet gates to be deemed to have successfully completed a competition (FEI, 2016). The first horse to finish all loops may fail the final veterinary inspection and be beaten by a later-finishing horse, ridden strategically to remain within the horse's capacity, and thus avoid elimination. Rider experience and riding ability, in addition to training regimes, have been implicated as risk factors for elimination (Adamu et al., 2014; Burger & Dollinger, 1998; Nagy et al., 2014b).

Endurance riders require specific skills and knowledge to be successful, the most obvious of which is the ability to ride a horse. Equitation, or the practice of horse riding, refers to a rider's position on a horse (Dyson, 2017) and their ability to ride effectively across natural terrain at speed (Viry et al., 2015). Riders must also constantly assess the effect of pace, terrain, surface and weather conditions on their mount, monitoring and interpreting fatigue and pain (Muñoz et al., 2017). To maximise their chances of qualifying, riders must select, and constantly review, appropriate goals (Nagy et al., 2013) and pacing strategies that match their horse and the conditions on the day (Marlin & Williams, 2018). Endurance riders also require a suite of psychological skills and strategies that enable them to cope with the rigors and stresses of competition (O'Neil & Steyn, 2007). Riders may also be trainers, and so must possess the skills to adequately prepare horses for optimal performance without harm (Bergero et al., 2005). These are all skills and knowledge gained through experience (Muñoz et al., 2017), usually as a rider progresses through a series of distance-based grades.

Competitive sports may require athletes to make trade-offs; to balance opposing situations or concerns (Barker et al., 2014). In the case of endurance, the rider must balance their competitive aspirations with the risk of elimination in the veterinary inspections, and with regard for their horse's welfare. A recent examination of FEI level rides by Bennet and Parkin (2018a) described this interplay. The authors were able to distinguish between outcomes in competition for three groups of horses from their speed in the second and third loops. The authors surmise that these three groups represented well-prepared horses ridden by skilled riders at an appropriate speed, contrasted with less well-prepared horses ridden by less skilled riders, and the latter group, again were horses skilfully ridden at a speed, albeit much slower but appropriate for their level of preparation. So, although speed was a contributing factor to elimination, it appeared to be influenced by the skill of the rider and preparation of the horse.

The relationship between performance in rides and ride strategies that match pace to the preparation of the horse has also been reported in a study of 120 km level horses (Marlin & Williams, 2018). Furthermore, riding style and ride strategy varied with rider expertise (Viry et al., 2015). These results suggest that understanding rider experience, riding practices and training would enable these to be manipulated to achieve improvements in performance (Williams, 2013) and horse welfare outcomes (Frazier, 2000). Understanding rider factors could support the FEI's stated goal of re-instating horse welfare and horsemanship as the core priorities for this level of competition[8] . However, there is little documentation within the scientific literature of the expertise and equitation of endurance riders, and how horses are trained (Nagy et al., 2014a). A useful starting point could be to describe riders and training in New Zealand, where riders have indicated willingness to engage with researchers (Bolwell et al., 2015). The aim of this study was to describe the characteristics, experience, and riding practices of

[8] Decision of the Fédération Equestre Internationale tribunal – Alleged horse abuse of the horse Castlebar Nato dated 26 June 2019 (19th December). Fédération Equestre Internationale. https://inside.fei.org/content/fei-tribunal-hands-down-record-sanction-horse-abuse-case (accessed 32st Decebmenr 2020).

a selected cohort of FEI 80–160 km level endurance riders in New Zealand, and to provide a preliminary description of self-reported training methods.

5.3. Materials and methods

Respondents were recruited for a season-long prospective study of training and competition of endurance horses in New Zealand, of which this survey was the preliminary stage. The eligible population were those people training endurance horses towards at least one 80 – 160 km ride during the 2016/17 season. Registration with Equestrian Sports New Zealand (ESNZ) is a prerequisite for athletes to compete in rides greater than 46 km (ESNZ, 2017), and with FEI for international level rides (FEI, 2016). Lists of registered horses and people were compiled from these publicly available databases, and potential respondents within 6 hours travelling time of the researcher were contacted through social media, email, phone, or in-person, and invited to participate. The study was conducted in accordance with the Code of Ethical Conduct for Research, Teaching and Evaluations Involving Human Respondents, Massey University. Formal consent by the Massey University Human Ethics Committee was not required for this type of study.

The survey consisted of three sections with a mix of 42 open, closed and multiple-choice questions and took respondents between 20 and 40 minutes to complete. The first section focused on horse and respondent demographics, the second section collected data related to training methods used in the previous season, and the final section asked about the intended management and training for each horse during the initial stage of the forthcoming 2016 – 17 season. The survey questions were pilot tested on three people who did not intend to compete at 80 – 160 km level and adjusted to ensure that questions were understood and collected the data that was required. Respondents completed surveys in July and August 2016 prior to their horses starting training for the 2016 – 17 endurance season. The survey was administered in a face-to-face interview situation for all but one respondent, who completed and submitted the survey electronically. To ensure privacy and confidentiality, surveys were conducted at a location of the respondent's choice. This was often their rural homes. The interviewer

had recent experience in interviewing for social casework and >10 years' experience in the sport of endurance. Terminology used in the survey was clarified with respondents to ensure a common and consistent understanding. Respondents were asked to provide an honest and personalised account of their experience and practice, and reassured that there were no ideal, correct or incorrect answers. Where possible, responses were checked against publicly available databases if respondents were uncertain or did not know the answer. This included the number of seasons a horse had competed, FEI registered roles riders had in the sport, or the total distance a rider-owner-trainer had successfully completed over their competition career. Data were entered into a Microsoft Excel® (Microsoft, Redmond, WA, USA) spreadsheet for analysis.

Most of the data collected were interpreted as categorical or binary variables. Some questions had multiple answers, resulting in categorical variables that were not mutually exclusive. Responses to open free-text questions, such as data recorded for likely commencement of training dates and estimates for when the next stage of training might commence, were converted to categorical data. When the free-text response was extensive, the content of the text was analysed for key ideas, which were then categorised (Hsieh & Shannon, 2005). This was done for descriptions of how horses would be started in training, reasons given for complementary conditioning and schooling methods used in the previous season. Categorical data were summarised as frequency counts and percentages. The denominator for each question varied, as some questions did not apply to all respondents, and respondents could choose not to answer some questions. Numerical data were summarised as medians with the interquartile range (IQR 25th–75th percentiles) of the distribution because they were slightly right skewed.

5.4. Results

Of the 42 people approached and invited to participate, 11 declined, and 10 did not respond, resulting in a sample of 21 respondents responsible for 36 horses. Respondents and enrolled horses comprised 23% (21/91) and 32% (36/111) respectively of all FEI registered endurance athletes in New Zealand at the time of the survey. The majority of

respondents owned the horses (91%, 19/21) which they trained (95%, 20/21) and rode in competition (95%, 20/21). Table 5-1 presents the demographic data for respondents and horses. Respondents prepared a median of 2 (IQR 1–2) horses, mostly geldings (58%, 21/36) with a median age of 11 (IQR 8–11) years. Horses were either purebred Arabian (75%, 27/36) or Arabian cross breeding.

Table 5-1

Descriptive Demographic Characteristics of Endurance Rider-owner-trainers who Participated in a Face-to-face Survey Prior to the 2016–17 Endurance Season in New Zealand

Respondent variables	**Number (%)**
Respondent age:	
<40 years	3 (14%)
41–50 years	6 (29%)
51–60 years	6 (29%)
> 61 years	6 (29%)
Respondent gender:	
Female	16 (76%)
Male	5 (24%)
Number of horses trained by each respondent during the season:	
1	10 (48%)
2	6 (29%)
≥3	5 (24%)
Respondents that have sold endurance horses in previous 24 months	7 (33%)

Note: Frequency counts rounded to whole numbers so will not sum to 100%.

Respondents had prior experience in a median of 3 (IQR 2–7) equestrian activities other than endurance (Table 5-2). All respondents had previous experience in some form of distance riding such as stock work or competitive trail riding whereas fewer (62%, 13/21) had experience in a ridden activity or discipline such as Pony Club, show jumping or dressage that required and/or conferred equitation skills. Respondents had a median 13 (IQR 9–15) years of experience in domestic rides, and 7 (IQR 4–10) years' experience of

FEI-level 80 – 160 km rides. More than one third of respondents (38%, 8/21) had experience of endurance outside New Zealand as either a competitor, support crew or official.

Respondents reported using a median of 5 (IQR 4–8) sources of information about training and management of endurance horses during the previous endurance season. These were: peers in New Zealand (95%, 20/21); written resources such as books and magazines (67%, 14/21); equine professionals such as veterinarians, body workers and company representatives (57%, 12/21); internet resources such as social media and websites (43% (9/21); peers outside New Zealand (33%, 7/21); and human endurance sport resources (24%, 5/21). All respondents reported their own personal experience as a source of information. Most (67%, 14/21) respondents reported they also used a range of coaches or mentors.

Over half (57%, 12/21) of respondents reported an injury or asymmetry of their body that may have caused them to be uneven while riding in training and/or competition during the previous season; of these, five took active steps to manage this. Actions included being aware of and managing their position through dressage lessons and riding in front of a mirror, adjusting stirrup length so that one was longer, pain relief medication, using a variety of gaits while riding, medical support, and dismounting occasionally during rides to walk or run beside their horse. In the season prior to the survey, respondents utilised a median of 2 (IQR 0-2) forms of athlete support, most commonly chiropractic or massage therapy (both 6/21) and physiotherapy (4/21).

In the season prior to the survey, the majority of respondents (86%, 18/21) were active in a sport, or fitness activity additional to endurance riding for reasons of fitness and strength, work, recreation, and to manage pain and improve mobility. Activities included gym training, Pilates and core strength/stretch training, walking, running and cycling, and outdoor sports such as fishing, hunting and hiking. Over half of those who exercised, did so every, or almost every day, and one third exercised three times per week. Nearly one third (29%, 6/21) of all respondents held a physically active job. Most (86%, 18/21) respondents did not report manipulating their bodyweight to increase or decrease their

total riding weight. Nearly one third (29%, 6/21) had carried additional weight ranging from 8-19 kg during rides on their body, or on their saddle, in order to comply with mandatory minimum weights for adult riders. Of these, 4 (19%) carried weight during training.

Table 5-2

Measures of Experience as Endurance Riders and Prior Experience in Equestrian Activities Other Than Endurance as Reported by Respondents in a Survey in New Zealand

Respondent variables	**Number (%)**
Rider FEI grading prior to 2016–17 season:	
Not registered as a rider	1 (5%)
80-100 km 1*equivalent	2 (10%)
120 km 2* equivalent	7 (33%)
160 km 3* equivalent	11 (52%)
Lifetime kilometres of riders:	
0 – 4,999	8 (38%)
5,000 – 9,999	7 (33%)
≥10,000	6 (29%)
Previous experience in distance riding activities (categories not mutually exclusive):	
Competitive trail riding	14 (67%)
Stock-work	14 (67%)
Other distance riding activities (hunting to hounds, trekking, Le Trec)	7 (33%)
Previous experience in equitation activities (categories not mutually exclusive):	
Pony Club	11 (52%)
Show-jumping	9 (43%)
Dressage	8 (38%)
Eventing	7 (33%)
Ridden showing	6 (29%)
Adult Riding Club	1 (5%)

Note: Frequency counts rounded to whole numbers so may not sum to 100%

Respondents identified a predetermined goal for almost all horses (94%, 34/36) for the 2016/17 season. For most horses, this was a class at the National Championship event at the end of the 2016-17 season, either 160 km (16/36, 44%), 120 km (10/36, 28%) or an unspecified distance (1/36, 3%). A few horses (8%, 3/36) had Regional Championship events (held mid-season) as their stated goal. Only 11% (4/36) of horses were set a goal to qualify at FEI 1* 80–100 km level. Respondents intended to use rides during the season as training opportunities for 94% (34/36) of horses. These rides were commonly predetermined prior to horses commencing training; the first 40 km for 81% (29/36) of horses, the first 80km for 83% (30/36) horses, and the last ride prior to the pre-determined goal event for 72% (26/36) of horses. The median planned period from the start of training to the first 40 km ride was 5 (IQR 3.25–6.75) weeks, and 9 (IQR 8–10.25) weeks to the first 80 km.

Most horses (88%, 32/36) had a winter training break, but four horses were in work over the winter, although this was not always endurance training. For these horses, the date of the survey was taken as the intended date for commencement of training. The total intended period of training ranged from 26 – 41 weeks (median 35, IQR 33 – 38 weeks). The type of work planned during this first stage was described most commonly as either walking (19%, 7/36) or a gradual increase in workload over variable terrain (47%, 17/36). Respondents described other variations on early training as roadwork, trotting and cantering, training for a dressage competition, and ‘legging up’ (the traditional term for the period when a horse begins training after a break from training). Respondents defined the end of the first stage of training with a competition start (usually the first 40 km of the season) for 53% (19/36) of horses, although for some horses a date (22%, 8/36) defined the end of a stage.

Intended training during stages subsequent to the first stage was reported to consist primarily of low intensity aerobic exercise as long slow distance work, complemented by a median of 6 (IQR 5 – 8) other conditioning methods shown in Table 5-3 with the reasons respondents gave for using these methods. Most (86%, 18/21) respondents reported that they used schooling in their training programs. Schooling was defined as

dressage training, not always in an arena, with the aim of improving the horse's movement and responsiveness to the rider.

Table 5-3

Equitation Techniques and Complementary Training Methods Reported to have been used During the Previous Endurance Season in a Survey of Endurance Rider-owner-trainers in New Zealand, with the Reasons for Using These Methods (n=21)

Training methods and equitation technique variables	Number (%)
Equitation techniques used in schooling:	
Change trot diagonals	18 (86%)
Change canter leads	18 (86%)
Lengthen or shorten frame	14 (67)
Half halt	13 (62)
Lateral movements	12 (57)
Flying changes of canter lead	7 (33)
Reasons stated for using schooling:	
Symmetry and suppleness of horse	13 (62)
To ensure variation in use of muscle groups and even use of horse's body	8 (38)
Rideability (ability to control and manoeuvre horse)	7 (33)
To improve performance	7 (33)
To improve quality and economy of movement	5 (24)
Complementary training methods:	
Fartlek-type work	14 (67)
Lunging	11 (52)
Leading off another horse	10 (48)
Galloping	10 (48)
Leading by person walking or running	9 (43)
Interval work	8 (38)
Leading from vehicle	6 (29)
Free range/loose during training	4 (19)
Other (recreational swimming, stock work, and Le Trek)	5 (24)
Schooling methods:	
Flatwork or dressage schooling	16 (76)
Gymnastic or exercises to improve suppleness	6 (29)
Jumping	6 (29)
Cavaletti or pole work	4 (19)
Other (using a Chambon, Market Harborough or Pessoa device, ground work, and in-hand trot up practise)	3 (14)
Reasons stated for using complementary conditioning and schooling methods:	
Convenience and fitness	10 (47)
Variety and stimulation to avoid boredom	7 (33)
To improve movement and symmetry	5 (24)
Mental wellbeing of the horse	5 (24)
To develop rider skills, rideability, control and responsiveness of the horse	5 (24)
Soundness	2 (9)

Note: Categories are not mutually exclusive and so may not sum to 100%.

5.5. Discussion

Purposive selection of respondents was intended to focus this study on riders competing at FEI: 80 – 160 km, who have developed expertise (skills and knowledge) in a structured manner by progression through the series of distance-based grades that define FEI performance (FEI, 2016). Below FEI 80 – 160 km level, the acquisition of skills and knowledge may occur in a variable *ad hoc* fashion (Ericsson & Charness, 1994) and riders may be differently motivated (Wu et al., 2015). At the time of the survey, national (governed by ESNZ) and international (FEI) level endurance in New Zealand had been closely aligned for over 20 years and the national 160 km championship was a FEI class. To enable riders and horses to qualify for the aspirational goal of a national championship class, four other FEI events were held in New Zealand during the 2016/17 season. This dual governance was responsible for a sample frame of riders engaged in the FEI qualification process through regular competition at FEI 80 – 160 km level, from which a representative sample was drawn. The study sample was similar to a sample of 70 respondents to an online survey conducted by ESNZ (Anonymous, 2019) for level of performance (≥80 km), age (≥40 years) and the high proportion of females. The sample was also similar for gender but slightly older than respondents to a survey of 52 endurance riders in New Zealand, although not all respondents in that study were competing >80 km (Bolwell et al., 2015).

Selection for FEI level performance resulted in a sample with considerable skill and knowledge from participation in their sport in a range of roles. This expertise may have enabled respondents to 'self-coach', relying on their own heuristic knowledge to replace some components of performance normally contributed by a coach (Sue-Chan & Latham, 2004; Wolframm, 2014). Self-coaching has been defined as the process whereby athletes assume responsibility for activities that contribute to improving performance and achieving goals (Bradbury, 2000). Because riders often train without a coach present at every training session, they must develop self-coaching skills in order to develop their horses. Respondents achieved this by actively working to improve their riding ability and the rideability of their horses with schooling. A rideable horse is easier to manoeuvre at speed over unfamiliar terrain, avoiding rough ground, holes, and

collisions with other horses or anything that may cause an accident or injury (Bennet & Parkin, 2018b). Furthermore, a rideable horse enables a controlled speed, conserving both the rider's energy and its own in the early stages of a ride, and a greater chance of an optimal ride strategy (Bennet & Parkin, 2018a; Marlin & Williams, 2018). Schooling can increase riders' awareness and detection of lameness, often manifest in behavioural cues that are more evident during schooling, such as differences in turning or circling, rhythm and freedom of movement, unwillingness to work on both trot diagonals evenly and to perform canter strike-offs on both leads (Dyson, 2017). Respondents took action to reduce the effects of asymmetry in their own bodies and regular off-horse fitness training ensured that they were better able to avert fatigue and maintain a balanced and effective position for the duration of long rides (Prentice, 2016). Previous research has shown that these actions all contribute to better riding, with a reduced likelihood of elimination from rides (Nagy et al., 2012).

From this preliminary description, training appears to be distinctive with the use of a series of slow 40 – 80km rides for training purposes. The speed of these rides is typically slow by international standards, at approximately 14 km/h (de Lannoy, 2015), but consistent with speeds on courses that cover rough steep terrain (Loving, 2011) and require riders to open and close gates. It is likely that study respondents used competition rides to achieve both specificity (adaptation to the specific demands of competition) and overload (gradual periodic increase in training stimulus) (Hodgson, 2014). Internationally, a form of fast time-trial has been reported to achieve overload. These sessions range from 36 km at 18 km/h usually after 8 weeks in training for 100 – 120 km level French horses, to 20 – 30 km at 30 km/h once or twice a week for fit elite Australian horses (Barnes, 2014; Robert et al., 2010). Regular competition rides may also provide a self-coaching mechanism to monitor, review and re-evaluate progress against the training plan, and as form of external validation that horses were adapting to the workload without injury. Frequent low-level competitions provide further self-coaching opportunities for repetition and error-correction and are useful for maintaining self-esteem and self-efficacy (both important moderators of performance in other equestrian disciplines) and motivation (Wolframm, 2014). Other reasons for respondents using rides for training may include a lower cost of travel and competing in

New Zealand than overseas and an amateur sport structure that enables a calendar of frequent, low-level rides.

The use of competition rides for training, with an emphasis on developing their horse, rather than racing to win, is consistent with the previous finding of Bolwell et al. (2015) that 92% of a sample of 40–160 km level New Zealand endurance riders had a season goal of development. At FEI level, riders with a development goal were more likely to complete a ride (Nagy et al., 2013), which may explain the lower elimination rates and low speeds that characterise competition in New Zealand (de Lannoy, 2015; Nagy et al., 2010; Nagy et al., 2014a; Penders, 2015). There are four possible explanations for this development-focused approach to competition, one of which may be the predominantly amateur ownership of horses by respondents. Riders with only one or two horses may be less inclined to risk injury or harm their horse (de Lannoy, 2015), or to incur longer mandatory periods of non-competition following elimination. It may also be that despite being committed and competitive at elite-level, amateur rider-owner-trainers have a relationship with the horses they own, ride and train (Dashper, 2014) that could affect their willingness to compromise horse welfare. Thirdly, participation in sport can be conceptualised on a spectrum from 'power and performance' where the emphasis is on domination through competitive success, to 'pleasure and participation' with empowerment, growth and development as the foci (Coakley, 1998). Endurance in New Zealand, similar to other outdoor niche sports such as adventure racing, probably tends towards the 'pleasure and participation' model (Collins, 2007), which may further contribute to a development-focused approach to competition. Finally, preparing endurance horses to race over 120 – 160 km takes may years, so riders with only one or two horses will spend a higher proportion of time in development mode, whereas riders with access to many conditioned horses will spend more time in competition mode.

The cohort also differed from international reports of training with a longer season duration and use of a variety of training methods. The duration of the season-long training program was 2 to 3 months longer than has been reported for horses in France, possibly because the temperate climate in New Zealand permitted training to begin in winter (Robert et al., 2010; Robert et al., 2011). The most common explanation given by

respondents for using a mix of ridden and unridden training methods was convenience and fitness, thus enabling amateur rider-owner-trainers to schedule training around other activities such as paid employment and managing businesses. Moreover, cross training, with a range of surfaces and variation in load cycles, has been associated with a reduction in lost training days in sport horses (Lonnell et al., 2014; Murray et al., 2010). Despite these advantages of mixed training methods, previous studies of training endurance horses elsewhere in the World do not report a variety of methods, relying almost solely on aerobic training with occasional time-trial type training sessions (Goachet & Julliand, 2011; Poggenpoel, 1988; Robert et al., 2010; Robert et al., 2011).

The results of this study demonstrate that, in New Zealand, elite status in competitive equestrian sport is compatible with amateur rider-trainer ownership and sports governance. The term 'elite' has required clarification in the context of equestrian sports, as a result of having been conflated at times with professional status (Lamperd et al., 2016; Williams & Tabor, 2017). In this study, most respondents could be defined as semi-elite to competitive elite level athletes by their sport-specific experience (Swann et al., 2015), participation in 100 – 160 km level FEI competition (Loving, 2011; Nagy et al., 2010), and a number were elite level riders as defined in the FEI rules. However, they were also predominantly amateur rider-owner-trainers, participating in a niche sport (Rosanowski et al., 2012) characterised by an amateur nature and governance structure with no financial rewards (Ferkins et al., 2013). This is despite increasing commercialisation and globalisation of endurance over the past two decades (Misheff, 2003), with increased pressure to perform (Westerbeek & Hahn, 2013), that has resulted in increased speeds, higher rates of elimination and adverse horse welfare outcomes (Coombs & Fisher, 2012). Sporting culture and governance foster localised variation in approaches to global elite level sport, ameliorating the homogenising pressures of commercialisation and globalisation (Houlihan, 2013). It is possible that an amateur sporting culture, complemented by amateur ownership of one or two horses, within an amateur sport governance structure may contribute to the low speeds and low elimination rates that characterise endurance in New Zealand.

5.6. Conclusions

This study has described a cohort of experienced amateur semi-elite to competitive elite endurance rider-owner-trainers in New Zealand that appear to self-coach, taking responsibility for the development of their horses, and working pro-actively to address aspects of their riding practices and training that had potential to improve performance. Respondents reported they used schooling with equitation techniques for symmetry, suppleness and rideability of horses, and a mix of training methods for convenience and fitness. Respondents also reported using a series of low-level competitions for training purposes. This descriptive study has identified a number of aspects of riding practice and training of endurance horses that warrant further investigation. This would include how rider characteristics influence and inform their training and competition practice.

5.7. Statements required for publication

5.7.1. Acknowledgements

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5.7.2. Supplementary material

Supplementary material is appendiced (Appendix 8) and can also be found online at https://doi.org/10.3920/CEP180059.

5.7.2. Authors' contributions to the study

H.J. Webb contributed to the conceptualisation and design of the study, recruited participants, collected and analysed data and contributed to the manuscript writing as part of a PhD programme. C.W. Rogers, J.F. Weston, C.B. Bolwell, E.K. Gee, E.J. Norman

and N.D. Cogger contributed as supervisors to the design, data collection and analysis and provided editorial support to manuscript writing. Overall, H.J. Webb contributed 90% to the publication.

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Chapter 6 – Pre-season interview study

6.1. Introduction to this study

The preceding survey study in Chapter 5 provided a preliminary description of the cohort of rider-owner-trainers and their riding practices and training methods for Fédération Equestre Interationale-level (FEI: 80–160 km) competition. However, the survey results raised further questions about the participants and their practices; for instance, when time was short, why did they spend it schooling horses instead of distance training? Was convenience really the reason for systematic use of club rides for training when these required effort and expense to attend? What was the effect of self-coaching on performance? The survey study also raised questions about the motivations and competitiveness of participants. Why were participants focused on developing horses, and their own riding ability, rather than racing to win? And, if so, which of the four reasons for a development focus that were proposed in the discussion section of the previous study might be valid?

To quote Donnelly (2000, p. 85), further work was required to hang "flesh on the skeletons of survey data." To achieve a more complete and contextual understanding of participants' riding, training, and competition practices, it was necessary to understand what participating in endurance riding meant to individuals. Understanding practices required understanding behaviours, which required understanding the meaning that participants constructed. Understanding meaning, from a qualitative interpretive approach, was the process of noticing and interpreting what participants thought was relevant or defining in their lived experiences of a season of training and competition (Saldaña, 2015).

A useful starting point for understanding the meaning that endurance riding held for participants was to explore their motives for engaging in their sport at a competitive level. Amateur FEI-level endurance riders invest significant time and effort to participate in their chosen sport, for which they need to be highly motivated, and yet little is known about their motives and how these might influence performance. A better understanding of motivation has the potential to inform efforts to improve performance through coaching and performance development pathways. Related to motivation is

competitive orientation, another driver of participation in sport. An understanding of the meaning that endurance riding held for participants could also provide insights into their competitive orientation. Pre-season interviews provided the opportunity to explore motivation and competitiveness at a time when riders were setting goals and making plans for a season of training and competition. Therefore, this study sought to understand:

What were participants' motivations and competitive orientations prior to a season of training and competition?

6.2. Methods

6.2.1. Recruitment of participants

Purposive recruitment for this study was described in Chapter 4, with the processes of obtaining informed consent and compliance with Massey University research ethics requirements. For this study, 20 of the 21 respondents to the survey were interviewed immediately after completing the survey. A face-to-face in-depth interview was not possible with one individual who completed an electronic version of the survey.

6.2.2. Generating data with semi-structured in-depth interviews

The preceding survey had collected data on participants' goals and plans for the forthcoming season, so these conversations contributed to building a rapport and focused participants on their plans and goals. The semi-structured interview schedule (Appendix 9) consisted of 10 open questions in three phases, although the order of questions was often determined by the flow of the conversation. The introductory phase comprised two questions that were designed to engage with the participant's passion for their sport and to place them mentally within their experiences of preparing for the forthcoming season. In the middle phase, seven questions asked about specific instances or experiences, then the interview closed with a question that required participants to reflect on the career of a specific horse, before asking if there was anything further they

wanted to talk about. Participants were mostly interviewed in their rural homes, for a median duration of 24 minutes.

6.2.3. Theoretical thematic analysis

The process of theoretical thematic analysis was described in detail in Chapter 4 and the four stages of the process were outlined in Table 4-3. As described in Section 4.3.4.5., categories produced in the first round of coding were consistent with self-determination theory (Deci & Ryan, 2000) and achievement goal theory (Gill et al., 1996; Nicholls, 1989), so these theoretical frameworks informed the review and reorganisation of codes in the third step of the analysis.

6.3. Results

Thematic analysis produced two overarching themes related to participants' motivation to engage in FEI-level endurance riding (for enjoyment and the challenge) and one theme that described constraints that tempered their competitiveness. Table 6-1 shows these three overarching themes and their primary categories. Coding trees for all three themes, with primary and secondary subordinate categories can be found in Appendix 10.

6.3.1. Description of participants from interviews

Participants ranged from retirees who were time-rich but often limited financially, to those who were working full time and fitted training, caring for horses, and competing in endurance riding into their "spare" time. In between were those raising families, including parents training horses for younger family members, and balancing employment or running businesses with endurance riding. Participants funded their involvement in endurance riding in a range of ways: income from full time employment or businesses that had nothing to do with horses, to semi-professionals who regularly sold horses to overseas buyers and complemented this income with casual employment. About two thirds of participants owned land, either as lifestyle block holders or pastoral

famers who could fit breeding and working horses around running their business. Many of the costs and assets required to participate in endurance riding may also have been borne by the farming business, such as grazing and feed, horses, equipment, and horse trucks.

Table 6-1

Themes Interpreted from In-depth Semi-structured Interviews With 20 Amateur FEI-level Endurance Rider-owner-trainers Prior to the 2016–17 Season of Training and Competition

Themes	Primary categories
The challenge	Achieving personal goals
	Competitions for regular training and practice
	Self-reliance and responsibility for outcomes
	Good horsemanship is part of the challenge
Enjoyment	Horses and riding
	Freedom and purpose
	Connectedness
	Reducing emotional discomfort
Constraints	Riding competitively has risks for horses
	Responses to imposed rules
	Self-imposed constraints to competitiveness
	Longevity of horse careers
	Stigma of elimination for metabolic condition

6.3.2. Theme 1: The challenge

6.3.2.1. Achieving personal goals

When asked why they did endurance riding, most participants first spoke about their goals: *"to be able to set personal goals and to go through and improve performance for myself and my horses and actually just that sense of achievement" (Participant [P1]).* Nearly half of participants used the word "challenge". For most this was a personal challenge tailored towards their individual goals. Others articulated their version of

challenge as one of process and improvement: *"You've got to have a challenge. Going out and riding 40 kms week after week after week after week, even it was in different places, you're not actually challenging your horse to get fitter and challenging yourself to get better" (P11).*

6.3.2.2. Competitions for regular training and practice

An integral part of the challenge for participants was organising activities towards goal achievement. One aspect of this was their intention to use regular domestic or "club" rides as over-reaching episodes to improve their horse's fitness: *"Home (*training*) tend to be maintenance and rides … tend to be stretch" (P14).* Club rides provided regular challenges to test fitness and organisation. Participants explained that club rides, were opportunities to make and correct errors, try equipment such as hydration packs and different saddles, vary routines, and discover what foods would tempt horses to eat during holds. In addition to the practical value for practice and fitness training, club rides provided feedback. Less experienced riders gained confidence from successful rides that their training had been adequate, which encouraged them to start at longer distances: *"I just feel that she's ready to step up. She's done four 120 kms and gone well" (P7).* Analysis and reflection on ride outcomes, particularly eliminations, enabled learning and triggered changes in practice: *"(*on the trip*) home in the truck … you talk about why it didn't quite go right … in your mind you need to know why it went wrong, so you don't make the same mistake again" (P18).*

6.3.2.3. Self-reliance and responsibility for outcomes

Another aspect of the challenge was the opportunity to be self-sufficient: *"I like the challenging myself … my ability to train a horse; my ability to do the best I can at something … where I don't have to rely on other people, only myself" (P12).* This meant that riders perceived they could, and should, take responsibility for outcomes in rides: *"I can only blame myself if things go wrong. But then I can pat myself on the back if it all goes right" (P12).* However, this responsibility was complicated by the multiple, dynamic, and variable factors that contributed to outcomes. These factors included

weather, terrain, health and fitness of horse and rider, technical skills, and equipment. Moreover, each performance was not easily standardised or compared to another: *"Every track you do is different … There are so many variables that you need to manage… it requires so much management and so much thought" (P17).*

In acknowledging this self-sufficient responsibility, participants discriminated between factors they could and should control: *"We haven't done our preparation, or our maintenance during the ride well*" *(P20)* and those they perceived to be beyond their control: *"Just bad luck that your horse has slipped, stood on a stone" (P20)*. There was a consensus that *"lameness is not always controllable" (P20)*, whereas elimination for a metabolic condition was perceived to be an outcome that riders could control. This meant that participants held themselves mostly responsible for metabolic conditions: *"(*It*) means you haven't ridden your horse properly… I haven't done what I should be doing. Failing to qualify is me not looking after my horse properly; maybe riding too hard" (P1).* Accordingly, participants held themselves to account for errors of judgement such as *"times where a rider has gone too fast on a downhill area in the dew, and the horse has slipped" (P20)*. This responsibility extended beyond competitions to all the components that contributed to performance in their goal ride: *"It's the whole process of working up to it. You can't muddle your way to a 160" (P11)*.

This accountability to themselves is best described by P6:
"The thing is, is that if you put in the training and you get your food right and the horse is eating well, and is happy - then, you're doing everything that you can to make that … a success. It's that management."

6.3.2.4. Good horsemanship is part of the challenge

This was one category that could have belonged under either of two themes: the challenge or enjoyment. Participants gained satisfaction from competent performances, sound decisions, and from being perceived as competent by their peers. However, participants also consistently defined the challenge in terms of things they had to do well to achieve their goal. Specifically, goal achievement was dependent on a competent

performance in competition - one where they rode competitively while exercising sound judgement and responding to their horse's ability to cope with the demands of competition. An external measure of a competent performance was *"completion…to come away feeling satisfied that you have made a good job of it. Ridden consistently, your horse has been fit and you haven't had to worry about your horse" (P11).* A successful completion, finishing the course and passing all the veterinary inspections, required *"getting all the boxes ticked in a row and then getting to the end…which…can be quite a big ask at times because it is a tough sport, and everything does need to be right" (P13).* Especially, riding for a win or place in 160 km rides, *"you're not going to succeed if you have nine out of ten things right - you have to have ten out of ten things right" (P3).* This effort meant that completion was an emotional experience for participants and their support crews: *"I always feel quite emotional when they finish their big rides. You know the work that you've put in, to achieve" (P13).*

P8 described how a successful ride was a cumulative process of monitoring, management, and decision-making:

"The boxes were ticked…as the loops went past…yes she's still travelling well, yes she's vetting in well, she's still bright, she's still eating, she's still drinking, she's still hydrated, her metabolics are good, I'm still good …. I am not after wins as such; I am after where I can position that horse."

Decision-making during rides was dependent on *"how the horse is on the day"* (P7). This included the option to withdraw horses that weren't coping: *"I have made an assessment on my horse and withdrawn it…(*or*) out on course I have been unhappy with my horse, so I have called for a* (rescue vehicle)*" (P10).* For some, the decision to withdraw was influenced by the relationship participants had with their horses, but for most, it was more about making a good decision: *"You can…be satisfied if you've made a decision that means that you're not going to achieve the dream, but you're satisfied with the decision" (P11)*.

Participants also defined success and enjoyment of a ride in terms of avoiding negative outcomes - avoiding elimination, falls, injury, or harm to their horse. Just as winning was

never a sure thing (*"You can go out there and think… 'I am going to…win this race'. But it doesn't always happen like that" P18)*, riders had to accept that elimination was a key part of the challenge. This was despite elimination being associated with strong negative emotions: *"always disappointing" (P9)* and *"gutting"* because *"you put so much work into your horse" (15)*, and it *"makes you feel terrible; just gutting and you think what could I have done?" (P13)*. Avoiding elimination or harm to their horse meant that, sometimes, a successful ride was one where they decided to prioritise their horse's welfare over racing for a win. P2 describes a ride they considered as successful, where they elected not to try to win: *"That would be one of the best rides I have done because I was using my brains all the way through … I could have won it, but …"*

6.3.3. Theme 2: Enjoyment

After much thought, the theme of "enjoyment" was placed second, after "the challenge". To place enjoyment as the first theme would have aligned the themes with the motivation spectrum: enjoyment was consistent with intrinsic motivation, the challenge was consistent with the two internalised forms of extrinsic motivation, and the theme of constraints was consistent with the two controlled forms of extrinsic forms of motivation. Enjoyment was mentioned later in interviews, and less frequently in the context of a motive. Therefore, I interpreted that it was more likely that these riders were driven primarily by the challenge of achieving personal goals and opportunities for developing themselves and their horses. Enjoyment was the delayed product of their efforts, rather than the primary motive.

6.3.3.1. Horses and riding

Participants enjoyed the opportunities that endurance riding provided for outdoor experiences and access to countryside: *"places that a big percentage of New Zealanders would never see and don't even know exists" (P5).* For others, it was the novel and exciting parts of endurance riding that were enjoyable: "*You get to meet new people...gallop finishes! Falling off and having a laugh about it...Early morning starts. Riding in the dark…with a headlight on your head. It is just fun really" (P20).* For older

riders, endurance riding was an opportunity to continue to ride and be physically active in a high-level sport in later life: *"It's a sport that I enjoy doing because I have always ridden horses…horses have been always a part of my life" (P8).* This transition to endurance riding was a deliberate choice, one that required investment in assets such as equipment and multiple horses to sustain participation at FEI-level.

Participants enjoyed riding and being with horses: *"I do enjoy the relationship with my horse. When I haven't been riding one for a while, I miss that and when I get back on a horse, I really enjoy that" (P14).* Half of participants specifically referred to love or affection for their horse. For some, their horse was their "mate," their "baby," their "friend," whereas others had a more utilitarian perspective: *"We love horses and like being competitive with them, plus we breed them, so we might as well have a use for them" (P15)*. Participants enjoyed developing horses, discovering their unique characteristics, and seeing them improve. Some found they had to learn new approaches and ways of working with individual horses: *"He loves his job. He has taught us a lot … And (*you*) never stop learning. Every horse develops differently" (P10).*

For most, their horse was a partner that was perceived to have agency, as P12 explains: *"It is all about me and the horse…Your horse has got to be your friend and your partner. It is no point having a horse that doesn't want to be around you, doesn't want to do the work and is being forced".*

6.3.3.2. Freedom and purpose

As riders and trainers of their own horses, engaging in their sport of choice, participants had considerable freedom: "*You're doing this sport because you love it … you don't want it to…be like going to work" (P6).* Endurance riding gave participants' *"riding a purpose...if you have got a purpose…then you…have a reason to go out and something to…work to; you've got a plan…(*and*) much more reason to actually train in a specific way" (P1).* This purpose provided structure for endeavours and justified the resources required to sustain participation at FEI-level.

6.3.3.3. Connectedness

Participants enjoyed the "*camaraderie … because everyone is more friendly* (than other equestrian disciplines) *… endurance we're always very welcoming so you get pulled into that side of it"* (P17). Endurance riding was a sport for families, where parents could ride with their children, and family members could support each other. Other examples of support included riders that had been eliminated earlier in the day volunteering to crew for their peers, and the tradition of a crowd gathering to celebrate the final horse and rider in a 160 km ride. P5 describes what this support meant for them:
"It was an absolute thrill to finish but the thing that got me the most was I came around the corner and over the top of the hill and to see all these people sitting there at 7.30 or something at night waiting … at the finish line. That to me, was a big thing."

Participants also enjoyed connecting with their peers through coaching and mentoring. Coaching was an informal arrangement with a friend or team member, rather than a professional coach with a financial stake in a competitive outcome. Participants were interviewed at a time when they were setting goals for the season, and for some, there was pressure from peers to exceed their current accomplishments. P7 was planning a first attempt at 160 km because *"people keep telling me I need to."* Similarly, experienced riders took confidence from other elite level riders: *"They're giving me the green light; and they're saying, 'Right, now it's time for you to go.' And probably giving me the confidence and helping me to realise that I can actually do it, instead of me just playing it safe" (P6)*. Sometimes a ride veterinarian provided an independent perspective on performance, also encouraging riders to be less conservative: "*It was actually one of the vets, said to me, 'I think you need to go further with this horse', as in a further distance" (P13).*

6.3.3.4. Reducing emotional discomfort

Curiously, one quarter of participants forgot or minimised occasions when they had been eliminated for a metabolic condition: *"I have never been vetted out on metabolics, never in twenty years … oh no, heart rate I have sorry …. That was just lack of knowledge*

that one" (P8). Technically, elimination for heart rates higher than specified in the rules is classed as a metabolic condition but elevated heart rates may also be due to a range of behavioural or environmental factors such as horses being separated from companions, or becoming hypothermic in cold, wet, and windy conditions. Participants were experienced riders, therefore their judgement that elimination for heart rate was forgettable may have reflected an understanding of these other factors on heart rates. However, some examples suggested that high heart rates weren't due to trivial factors:
"I have never had a metabolic vet out … No never … It's always been lameness. Hang on. I tell a lie … a 40 km ride … we galloped … nearly the whole way .. it was a really hot day and we couldn't get the heartrates down" (P15).
*"I have never had a horse metabolic. I have never had tie-up. I have never had colic. Apart from that serious turn that (*my horse*) had …" (P17).*

These examples suggest that participants may have minimised instances of elimination for metabolic conditions as a means of reducing discomfort or unease they may have held about the physical demands and risk of harm for their horse. Other conceptualisations or mental adjustments that may have reduced discomfort were the perception of agentive horses and minimising significant effort. Almost all participants described their horses as *"competitive"* (P14) and believed they *"loved to work"* (P18) and *"had plenty of go"* (P4). For some, their horses had agency, made decisions in rides, and had a stake in the outcome of rides: *"I hate my horse not qualifying. Not so much for me, as for the horse. To think that the horse has done all that work and there's nothing at the end" (P19)*. Most participants believed their horses were happier as performance horses: "*She's competitive and she never quits … I just think that she wants to be an endurance horse; she wouldn't be happy just being a hack …" (P5).* Participants also gave evidence of norms that minimised significant effort, such as *"only … 40" (P13)*, or anything less than an 80 km ride is a *"small one" (P2)*, or 100 km is a "*stepping-stone*" *(P3)* towards 120 or 160 km rides. Some participants perceived lameness as insignificant, or less significant than a metabolic condition; *"just a little bit of lameness" (P2)* or *"only a stone bruise" (P15)*.

I interpreted these conceptualisations and mental adaptations by participants as a means of reducing emotional discomfort they may have held about the demands on and risk to their horses. Discomfort had potential to reduce enjoyment, or even to deter participants from pursuing their goals if they felt they were harming their horses. Deploying mental adaptations freed participants up to pursue their goals, allowing them to enjoy their sport. Therefore, this category was coded to the theme of enjoyment.

6.3.4. Theme 3: Constraints

6.3.4.1. Responses to imposed rules

Participants generally perceived veterinary officials as supportive, and accepted elimination: *"A vet-out means the vets have decided that my horse is not fit to continue … That's why the vets are there. We may not always agree with their decision sometimes … but ultimately … their job is to assess our horses" (P10).* Most participants were able to accept and reframe elimination in a positive context, despite the disappointment. Some took the approach that elimination provided opportunities to learn: *"It is a good thing because you learn from it. No one gets anywhere in life by just winning, winning, winning … you need a few ups and downs; you need a bit of failure. I have learnt that since I started doing endurance*" (P17). Others looked at what they had been able to achieve, despite elimination: *"I am quite good … at finding the silver lining … So … even though I didn't get the certificate and the ribbon, the buckle, I had a success …" (P1).*

However, for some, the veterinary inspections and FEI rules were a source of conflict and frustration. These participants perceived decisions in the veterinary inspection to be inconsistent, subjective, or inaccurate reflections of the condition of the horse at that moment. Some felt that rules intended to protect horses in other countries did not apply to New Zealand, and furthermore that FEI rules conflicted with their beliefs about the appropriate way to develop horses: *"So now for us, actually all these rules that they're putting on to rescue these horses that are having a bad time, for us it's actually making it worse for the horses. Now we have suddenly got pressure on to get our first 40 km out of the way" (P3).*

6.3.4.2. Riding competitively has risks for horses

Another aspect of the challenge for participants was the skilful horsemanship that was required to balance any risks to their horse's welfare with riding competitively. However, this category was included under the theme of "constraints" rather than "the challenge" because it appeared to be a factor that constrained performances.

For the minority who defined a successful performance as winning, this was contingent on their horse finishing in good condition: "*Winning it and knowing your horse is really, really good at the end. I just love it when they are perky at the end" (P19).* This meant that racing for a win or place involved a tension for riders: *"That was a great ride but nerve-wracking if you know what I mean. Always right from the start we were going to go for it (*but*)…you're always thinking of your horse" (P15)*.

This tension between competitive goals and concern for their horse was exacerbated by the difficulty of appraising the condition of their horse during rides. To guide their pacing strategies and decisions such as withdrawal, riders relied on a mix of subjective and objective indicators. Long duration relationships contributed to a subjective sense of embodied, tacit communication, or 'feel': *"If you know your horse well enough, you can tell. You can read them enough to know that they are hitting a brick wall" (P12).* Participants felt it was important to know their horse well to be able to manage it properly in competitions. In addition to subjective indicators, objective measures such as heart rates and cardiac recovery index (CRI) provided reassurance in the face of behavioural aspects that made it difficult to determine a horse's true condition: *"The horse might be telling you he's tired…he's 60 and you run him (*out and*) back and he's 56 - then that horse ain't tired" (P15).*

In the context of riding competitively, when there was an increased risk of elimination and potential harm to their horse, riders articulated these moments as almost a crisis of confidence or a fear they might fail in their responsibility to manage their horse well. Experienced riders were aware of this lack of confidence: *"start self-doubting—because*

I'm good at that" (P3) and that it influenced their competitiveness: "*beating the odds (*is*) what I've been doing … but of course, to go to the next level … in some ways you actually have to ditch that philosophy, and … and actually be more of a risk taker" (P6)*.

Riders struggled particularly with assessing metabolically compromised horses as this was difficult to determine objectively while on course, had the potential for morbidity, and assessment was linked to a decision to adjust or abandon their goals to preserve their horse. P3 had experienced elimination for a metabolic condition while riding competitively for a win, and this was something they strove to avoid repeating: *"… when you get those situations, you want to learn from it and not do it again. I can crash my pony once, but I don't want to do it again because that would be dumb and it's upsetting to cook your … horse. I would hate it if I hurt (*them*)."*

P11 described this crisis and their fears about the consequences of getting the decision wrong:

"A lot of endurance is mental … I find it very difficult during the ride … trying to work out when something is wrong ... that's probably my biggest mental issue … is it in a flat patch mentally or is it in trouble? I always worry about that because I have been at rides where horses have died … I am absolutely terrified. I mean I don't think I would make the mistake that those riders have made but I am also scared of … misreading the horse"

6.3.4.3. Self-imposed constraints to competitiveness

Despite half of participants declaring that they did endurance riding because they were *"pretty competitive" (P4)*, riding competitively was qualified as being appropriate for the fitness and stage of development of their horse. This lack of competitiveness was most obvious in examples of riders negotiating wins or placings while approaching the finish line after riding together all day, despite the effort and expense that each rider had expended to be at the point where they might have won the ride. This emphasis on the quality of the experience rather than riding to win may have arisen from individuals' intrinsic enjoyment of their sport. However, it is possible that the strong personal constraint was reinforced by a broader ethos of avoiding harm to horses. P16 could be

interpreted as having internalised social mores about responsibility and avoiding harm to horses when - despite never having withdrawn their horse - they declared, *"I didn't used to … (*now*) If I am not happy with him, rather than him being vetted out, I think I would just withdraw him."*

6.3.4.4. Longevity of horse careers

Most participants had only one or two horses that they invested years of time in developing through to 160 km level. Participants believed that developing horses in a slow and gradual manner, not racing young horses, contributed to horses having long competition careers. This belief influenced their practices in tangible ways, as explained by P6:

"I look at it, that that's the right way to do it … like, I'm competitive but I'm patient.... I'm competitive but I'm not competitive to the point of being stupid about it … if you want to get somewhere in the sport … you've got to treat (your horse) *well at the beginning, otherwise you're not going to have that horse, as a 15-16-year-old."*

6.3.4.5. Stigma of elimination for metabolic condition

About one third of participants described feelings of tension and pressure from consequences imposed by participants on themselves or arising from external sources such as their peers. Participants perceived there to be shame in harming their horse, with a specific stigma accorded to elimination for a metabolic condition. P17 described their anxiety at the prospect of being eliminated for a metabolic condition, although this had never happened to them:

"The fact that it's all written down for people to see. If you treat your horse badly or something goes wrong everyone can see it. Not because you want to sell your horse and you're not going to get enough money for it anything like that, but I am very proud of my horses and would hate to be one of those people that people look at and go, "Well they don't treat their horses very nicely do they?"

6.3.5. Summary of results

Table 6-2 shows how the three themes related to the concepts of intrinsic and extrinsic motivation (Deci & Ryan, 2000). The theme of "enjoyment" was consistent with intrinsic motivation, the theme of "the challenge" was consistent with internally regulated forms of extrinsic motivation, and the third theme of "constraints" was consistent with externally regulated forms of extrinsic motivation.

Table 6-2

Motivations of FEI-Level Endurance Riders Identified by Thematic Analysis of Interviews Prior to a Competition Season in New Zealand

Type of motivation	**Intrinsic motivation**	**Extrinsic motivation**				**Amotivation**
		Internally regulated		**Externally regulated**		
Themes	Enjoyment	The challenge		Constraints		n/a
Proportion of participants whose transcript coded to each theme	**100%**	**85%**	**75%**	**40%**	**30%**	**0%**
Examples of behaviours from interviews	Emphasis on enjoyment, self-reliance, escape from normal life, freedom to work towards and accomplish personal goals, continual learning, and self-development	Internalisation of social & material rewards to sustain participation, i.e., mentors, performance development squads, identity as elite rider	Social and material benefits and rewards valued, i.e., camaraderie, physical activity, support networks, distinctive biothane tack	Shame of harming horse, especially metabolic condition	Rules create conflict with how participants wanted to develop horses. Perception that FEI rules do not apply in New Zealand	No evidence of amotivation as participants prepared for a season of training and competition

The themes of “enjoyment” and “the challenge” suggested that internally regulated forms of motivation, with an internal locus of control contributed to the high proportion of self-regulated and self-determined behaviours demonstrated by participants. Fewer participants gave evidence of externally regulated behaviours. This suggests that at this level of performance, riders were autonomously motivated with little external direction or control and had internalised many of the external rewards and regulations. Autonomous forms of motivation are more likely when the nutriments of autonomy, competency, and relatedness are fulfilled (Deci & Ryan, 2000). The high proportion of participants that demonstrated autonomous forms of motivation, where all three nutriments are being met, suggests that participants’ style of engagement in FEI-level endurance riding was largely directed to meet needs of autonomy, competence, and relatedness.

The theme of “constraints” described feelings of shame and conflict that were consistent with externally regulated forms of extrinsic motivation. This theme suggests that for some participants in some situations, external regulations had not been fully internalised. Hence the feelings of tension, shame and conflict arising from restrictions from an external locus of control that were not concordant with participants’ sense of themselves (Deci & Ryan, 2000). Fewer participants gave evidence that only their needs of competency and relatedness were being met through engagement in FEI-level endurance riding. This may reflect the high degree of autonomy that rider-owner-trainer participants had, compared with contexts where riders do not own or train their horses.

Competitiveness was constrained by an emphasis on the quality of the experience: producing competent performances and making good decisions in a complex competition environment, enjoyment, and connecting with their horses, friends, and family. This emphasis on progress and performance is consistent with a task- rather than ego-focused approach to competition (Nicholls, 1989). Competitiveness was constrained by participants’ desire to avoid harming their horse and ensuring that their horses had long careers. There was evidence of broader social mores around competent horsemanship and avoiding harm to their horses. As could be expected at the start of a season, there was no evidence of amotivation.

6.4. Discussion

The amateur endurance milieu was not without tensions and contradictions, mostly around horse welfare. The most distinctive tension was that between riders' desire to ride competitively and their reluctance to harm their horse. Accepting responsibility for outcomes such as metabolic conditions was complicated by the cognitive effort of constantly monitoring their horse's condition during rides (Williams et al., 2021). Participants described the difficulty and distress of knowing for certain whether their horses were coping with the demands of competition. For them, the risk of morbid or even fatal outcomes for horses were very real. Therefore, participants' self-determined response to the risk of harming their horse was to ride conservatively. The difficulty in assessing the condition of their horse may have been due to participants' reliance on their experience of horses and endurance riding, and mostly subjective rather than objective measures to guide their decisions in training and competing. Although a pilot study had showed high self-reported use of heart rate monitors, GPS technology and capture of training data by New Zealand endurance riders (Bolwell et al., 2015), this was not the case for participants in this research project. Greater use of objective sport science tools such as on-board HRM, analysis of captured training data, and blood tests for horses might have given participants greater confidence in assessing the risks of riding competitively and more certainty around the outcome of rides.

If riders accepted responsibility for the welfare of their horse, with that being under an internal locus of control, a metabolic condition was something they should have been able to control by their own actions, then perhaps elimination for metabolic conditions presented a contradiction for them to resolve. One means of doing this may have been a mental adaptation, whereby participants minimised their experiences of elimination for a metabolic condition. Similar adaptations have been described for other equestrian disciplines (Jones, 1983). This adaptation may have reduced emotional discomfort with past decisions and outcomes. Other adaptations to reduce cognitive tensions were the belief that their horses were willing and agentive co-participants, that lameness was a lesser horse welfare problem, and norms that minimised significant effort. These adaptations may have constituted a form of freedom that increased intrinsic motivation

thus enabling participants to pursue their aspirations without feeling conflicted about what they were doing. There was limited evidence of a further tension for amateurs between employment and the time and cost demands of sustained participation in FEI-level endurance.

By their very nature, competitive sports encourage a focus on extrinsic drivers that can have negative effects on the motivation and the well-being of athletes (Vallerand et al., 1987). In competitive equestrian sports, the well-being of horses may also suffer negative effects from external rewards and drivers (Dashper, 2014). However, the results of this study suggest that - despite the context of a competitive sport - participants' self-determined form of engagement in FEI-level endurance riding contributed to their own and their horses' well-being. A high proportion of participants gave evidence of autonomous forms of motivation that have been positively related to improved psychological wellbeing through sport (Reis et al., 2000; Vallerand et al., 1987). As shown in Table 6-2, autonomous forms of motivation were the most common and were associated with all three nutriments of autonomy, competency, and relatedness. This suggests that that participants' self-determined style of engaging in endurance riding was directed to fulfilling these deep human needs, thus contributing to their wellbeing, and strengthening motivation.

One example of self-determined engagement was the practice of using serial club rides for training and deliberate practice. Club rides enabled riders to demonstrate competence, to make autonomous decisions, and to have an enjoyable experience with their horse. Every successful club ride provided a positive feedback mechanism that reinforced participants' intrinsic motivation. A similar effect was shown for endurance athletes including riders who used regular competitions to test and hone their coping ability (O'Neil & Steyn, 2007). Success increased both athletes' belief that they could cope with competition stressors and their desire to compete again. Enhanced motivation has also been shown when elite track athletes had regular opportunities to demonstrate competence by accomplishing personal goals (Mallet & Hanrahan, 2004). It appears therefore, additional to the practical functions, that regular club rides were

an important psychological mechanism for wellbeing and enhancing intrinsic motivation.

A task-focused approach to using competitions for practice had implications for performance. Participants explained that in regular club rides, they could take time to make and correct errors, try equipment such as hydration packs and various saddles, vary strapping routines, and discover what foods would tempt horses to eat during holds. In this sense, serial club rides constituted a form of purposeful practice, defined by Ericsson (2019) as regular goal-directed practice without a coach. Purposeful, sport-specific practice has been shown to account for considerable variance in performance in triathletes, swimmers, and middle-distance runners (Ericsson, 2019). However, purposeful practice works best when performances can be objectively measured and compared. Without interactions between goals, performance, and monitoring, Ericsson (2019) predicted that performance would cease to improve. Without objective measures of performance or independent appraisal by a coach, it is possible that participants' performance (i.e., completion) may plateau or regress as a result of self-coaching.

Another self-determined aspect of participants' engagement in their sport was the emphasis on personal goals concerned with process and performance and continual learning, rather than aiming to win every ride. In this respect, participants were like human endurance, triathlon, and adventure race athletes. Like ultra-runners, participants were task oriented and motivated to accomplish personal goals that were related to the specific context of the race and course (Krouse et al., 2011). Similarly, self-esteem, personal growth and challenges motivated female mountain bikers (Levy, 2002). Setting and achieving progressive personal goals in competitions also provides opportunities to demonstrate competence. Like amateur triathletes, participants were encouraged to tackle greater challenges as they progressed through distance-based grades towards a goal of 160 km (Lamont & Kennelly, 2012). In this sense, FEI-level endurance riding was more like a lifestyle sport, with opportunities for athletes to be autonomous in their choice of goals, and in organising activities to achieve their goals,

with opportunities for mastery, stimulation, and accomplishment (Lynch & Dibben, 2016).

Autonomous forms of motivation have also been related to proactive efforts and progress towards personal goals, in a way that the externally controlled forms of motivation are not (Koestner et al., 2008). Responsibility for outcomes was the "challenge" that most participants spoke of - the opportunity to be self-determined in proactively organising and managing the multitude of factors that contributed to outcomes in endurance riding. When individuals are autonomous and self-determined in working towards their goals, they are more likely to persist in addressing novelty and challenge, and the quality of their behaviour and well-being improves (Langan et al., 2016; Lee & Ewert, 2019). Therefore, the autonomous motivation of the cohort would seem to explain the effort expended in the self-determined behaviours documented by the preceding survey study (Chapter 4); setting goals and milestones, making training plans, self-coaching, seeking out multiple sources of knowledge, and taking proactive steps to improve their riding and the rideability and controllability of their horses. In a similarly proactive manner to the elite riders interviewed by Lamperd et al. (2016), participants in this study had internalised social and material rewards such as involvement in high performance development pathways, selling horses, investment in equipment such as trucks, and relationships e.g., with support crews, as a means to the end of accomplishing their goals. In internalising these extrinsic drivers, participants were bringing them under an internal to somewhat internal locus of control.

When extrinsic motivations are internalised to the extent they were in this cohort, individuals have assimilated and transformed external regulations so they can be self-determined when enacting (and complying with) regulations such as rules that protect horse welfare. Furthermore, most individuals identified with the value and importance of regulations and incorporated them into their integrated sense of self and their practice. The slow process of developing horses, and a long-duration relationship with those horses, was an important means of accomplishment for these amateur riders. Participants invested considerable time, money, and effort in developing each horse, so their locus of control was extended to personal, implicit rules governing this process and

the welfare of horses. These rules included 1) the belief that slow development of young horses contributed to horses having a longer career in endurance riding and 2) that developing young horses quickly was harmful, 3) that riding competitively was contingent on their horse not being harmed, and 4) that riders should be ashamed of being eliminated for a metabolic condition because it could have been avoided by competent riding. This does suggest therefore, that in New Zealand, a high level of external regulation is not necessary to protect horse welfare because of participants' self-regulation.

This study has described self-reliant, self-determined individuals engaging in their chosen sport. Self-determination theory was a appropriate lens to guide interpretation of participants because it linked individuals' inherent urges for growth and well-being with the "affordances and demands of their social world" (Deci & Ryan, 2000, p. 262). Affordances are what the environment offers the individual in terms of possibilities for experiences (Walker et al., 2019). For participants in this study, endurance riding offered opportunities for freedom and enjoyment, to learn, to accomplish and to be competent, and to connect with their horse and people in the endurance community. This study has described less of the interaction between individuals and any demands of the social world of endurance riding. This may have been due to the future-focused context of the interviews, when participants were concerned primarily with their aspirations for the coming season. Interviews in a retrospective context, exploring specific incidents such as club rides, could increase our understanding of participants' beliefs and self-imposed restrictions and how these might influence practices and performance.

6.5. Conclusions

This interpretive study has described a range of intrinsic and extrinsic motives for engaging in FEI-level endurance for twenty amateur rider-owner-trainers in New Zealand. Participants were highly motivated to engage and perform competently in their sport, but not necessarily to win. Competitiveness was constrained by strong beliefs about the "proper" way to train and compete horses so as to avoid harming horses, and

by a task-focused approach to competition that emphasised the quality of the performance and decision-making.

In terms of performance, it is possible that greater use of sport science tools and technologies might provide participants with greater confidence in appraising risk and riding more competitively. Club rides provided both practical and psychological functions, so this potential influence on performance and practices warrants further exploration.

As all but one respondent in the survey study also participated in this study, the results of this study can be assumed to provide detail and context of the survey respondents' individual experiences and therefore to explain the practices documented in the survey. This interview study has complemented the preceding survey study, building on the measures of central tendencies by adding breadth, context, and nuance from participants' accounts. In this way, therefore, the qualitative methods were useful to flesh out the survey data (Donnelly, 2000).

Chapter 7 – Training study

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7.1. Abstract

Training measures, particularly those that examine the interactions between training volume, speed, and recovery, can improve understanding of training practices that contribute to success and avoid adverse horse welfare outcomes in endurance competitions. This study describes the training of Fédération Equestre Internationale (FEI) 100 – 160 km level horses in New Zealand. A convenience sample of 16 participants and 25 horses were surveyed prior to commencement of training. Participants then reported daily data for an entire nine-month season of training and competition. Participants began their season with predetermined goals and individual training plans for each horse. They intended to use competitions for training. Competitions contributed a median 44 % [IQR, 36 – 49 %] of total accumulated distance (in training and competition) for each horse for the season, despite being only 11% (207/1,933) of all days worked. Most starts (80%) were in domestic level (CEN) competition ≤80 km. Speed ranged from 2 – 18 km/hr on home training days to 6 – 18.5 km/hr in CEN competitions and 10.9 – 16.9 km/hr in FEI competitions. Horses were worked 34 % [IQR, 21 – 38] of days in training, ranging from 12 – 55 % for individual horses. The most common horse health problem was lameness, affecting 12 /25 horses, for a median 9 (range, 1 – 78) days. This study highlights the potential for CEN data as a resource to improve understanding of training and competition load, speed and recovery, and therefore reduce adverse horse welfare outcomes in FEI competitions.

7.2. Highlights

- This study reported a full season of training for a cohort of FEI 100 – 160 km level endurance horses in New Zealand.
- Participants strategically used domestic competitions for training, which contributed nearly half of total training volume (km).
- Domestic competition data may be useful to understand training load, speed and recovery contribution to training injury risk

- Training appeared to be tailored to individual horses so further exploration of periodisation is warranted

7.3. Introduction

Endurance horse riding, particularly at elite international level over distances of 100 – 160 km, is a demanding sport that requires specific training (Muñoz et al., 2017). To win, riders must complete the course faster than their competitors, balancing their aspirations with the fitness of their horse, or risk the horse being eliminated for fatigue or lameness in mandatory veterinary inspections (Barnes et al., 2010). When preparing horses for competitions, trainers must also negotiate a balance between applying sufficient stimulus to increase fitness for competitive performances, and the risk of negative training outcomes (Ringmark et al., 2016). The consequences of inappropriate training can range from metabolic conditions in undertrained horses being overwhelmed in competitions (Bennet & Parkin, 2018a; Nagy et al., 2012) to musculoskeletal injury including fractures from overtraining and high speeds in training (Coombs & Fisher, 2012; Misheff et al., 2010). Consequently, the governing body for international elite level endurance (the Fédération Equestre Internationale, FEI) has hypothesised that training may contribute to poor horse welfare outcomes during competitions[9] (Whitton, 2017), but noted that there is a lack of detailed training data to support or refute this conjecture.

Training programs consist of season-long macrocycles, usually constructed around a specific goal for the season such as a start in a national or international championship (Martin & Coe, 1997). Key variables of endurance training programs are the distance, duration and frequency of each training episode (de Almeida et al., 2019; McKenzie, 2017). These variables can be manipulated to achieve adaptive responses that vary with individual horses, depending on their previous training and inherent athletic ability

[9] Decision of the Fédération Equestre Internationale tribunal – Alleged horse abuse of the horse Castlebar Nato dated 26 June 2019 (19th December). Fédération Equestre Internationale. https://inside.fei.org/content/fei-tribunal-hands-down-record-sanction-horse-abuse-case (accessed 32st Decebmenr 2020).

(Rogers et al., 2007). To date, these variables have only been qualitatively and cursorily presented in the literature in descriptive accounts of training, or as background to investigation of physiological adaptations to training. These accounts have suffered from a number of limitations; aggregation and general estimation of training measures (Goachet & Julliand, 2011; Lawrence et al., 1992; Robert et al., 2010; Robert et al., 2011; Votion et al., 2010), small numbers of horses (Cappelli et al., 2018; Goachet et al., 2010; Poggenpoel, 1988; Redaelli et al., 2019), and measures for only a portion of a season (Bolwell et al., 2015; Rajao, 2019; Rose & Hodgson, 1982). Currently there are no detailed, individual measures of endurance horse training that might enable an understanding of the balance between training volume, speed and recovery, thereby enabling trainers to implement training practices that achieve optimal adaptation and avoid adverse horse welfare outcomes.

In Europe, owners' and trainers' concerns about confidentiality were cited as the reason for this lack of detailed training data (Nagy et al., 2014b), which frustrated researchers seeking to understand risk factors for elimination from competitions (Battista et al., 2019; Bennet et al., 2020; Bennet & Parkin, 2019; Bennet & Parkin, 2018b). Similar difficulties obtaining commercially sensitive training data were also reported for road cycling (Halson, 2014). Endurance riders in New Zealand have previously engaged with researchers in a cross-sectional survey and willingly provided an overview of their training and management practice (Bolwell et al., 2015). This study collected estimated training data for approximately 8 weeks to the first competitive ride of the season. The study reported widespread use of heart rate monitors and training diaries which indicated that collection of detailed individual data was possible. More recently a retrospective cross-sectional survey of a selected cohort of New Zealand FEI level endurance riders reported on riding and training practice, including the use of competitions within the training programme (Webb et al., 2019). Therefore, this study aimed to prospectively collect detailed individual training data, for an entire season of training and competition, for a cohort of FEI level endurance horses and participant rider-owner-trainers in New Zealand.

7.4. Materials and methods

7.4.1. Recruitment and enrolment

A prospective longitudinal cohort study was conducted over a complete endurance season from July 2016 to April 2017. All endurance horses registered with the FEI and/or the national federation (Equestrian Sports New Zealand, ESNZ) and intended to start in at least one 80 – 160 km FEI level competition during the 2016/17 season were eligible to participate. People responsible for the care of these horses and based within 700 km, or 10 hours driving time, of Palmerston North, were contacted via social media, email, phone, or in-person, and invited to participate. When the person responsible was a junior, a parent or guardian was approached. Informed owner consent was obtained prior to horse enrolment in the study. The study was registered as a low-risk project with the Massey University Human Ethics Committee and conducted in accordance with Massey University's Codes of Ethical Conduct for Research, Teaching and Evaluations Involving Human Participants, and for Use of Animals for Research, Testing and Teaching.

7.4.2. Data collection

Demographic data for participants and horses were captured in a face-to-face enrolment survey (Appendix 8) prior to horses starting in work. Participants were asked to state the intended goals for each horse for the season. For each day worked, participants recorded the date, distance, whether distance was measured, duration, gaits, terrain, training method and goals; however not all participants recorded every variable for every day worked. Multiple training sessions in one day and multiple loops in a competition were recorded as a single day worked. Every 1 – 2 weeks, participants sent electronic, or hard copies, of weekly training records (Appendix 11) to the lead author. Participants were visited by the lead author at least once during the season to check unusual records, collect missing data and sustain participation. Data for each

horse were entered into a spreadsheet[10]. All competition starts were validated against the ESNZ database[11] for distance, duration, and outcomes of either completion (where horse and rider completed the course and passed all veterinary checks) or elimination (where horse and rider did not complete the course and/or the horse did not pass all veterinary checks). Horses were excluded from the study if participants did not submit training data for two months. In these cases, a short exit survey was conducted with the rider by phone to clarify the reasons for leaving the study (Appendix 12).

7.4.3. Data analysis

Demographic and training characteristics were described as categorical or binary data and summarised as frequency counts and percentages. Nonparametric numerical data were summarised as medians with interquartile ranges (IQR, 25^{th} – 75^{th} percentiles) presented where the sample size was >10. Responses to open free-text questions, such as descriptions of surfaces, going and terrain, and horse health issues were categorised. Training programs for each horse were quantified using the following parameters: total days in work, proportion of days worked (% of total days in work), total accumulated distance (TAD, km) and days with horse health issues.

7.4.4. Calculation of distance variables

Distance in kilometres was selected as a practical measure of training volume for each training day, as is commonly recorded for endurance runners (Foster et al., 2001). Distance in competitions (n = 207) was assumed as correctly measured, usually by vehicle odometer and/or global positioning system (GPS) technologies. Distance of home training days was measured by odometer or GPS (n = 1,116), estimated (n = 347), or not reported (n = 263). For training days where distance was not reported, a value was calculated using the reported duration and proportion of time worked at each gait.

[10] Microsoft® Office Excel (2016), Microsoft Corporation, One Microsoft Way, Redmond WA 98052-7329, USA.

[11]See: Equestrian Sports New Zealand database of endurance competitions (accessed 3rd October 2019). https://www.nzequestrian.org.nz/disciplines/endurance-ctr/competition/results/

Gait speeds of study horses were assumed to be as reported in the literature for similar level Arabian endurance horses in training: 6 km/hr walk, 13 km/hr trot, and 18 km/hr canter (Robert et al., 2010). These speeds were consistent with speeds reported for study horses, and with the lead author's practical experience of endurance training in New Zealand. The records for 47/19,33 (2%) of all training days provided information about duration of training only. In these cases, it was assumed (again, from practical experience) that the training session consisted of 10 minutes walking at the start and end of the session, and trotting for the remainder of the time, as this was the most commonly reported gait. The records for 13/1,933 (<1%) of all training days provided only information about gaits or that the horse was trained (no distance or duration data). In these cases, data from the previous training day at home for that horse was carried forward. The recorded, calculated and imputed distance values for all days worked for each horse were then summed to give total accumulated distance (TAD) in home training and competition for the entire season of training.

7.5. Results

7.5.1. Horse and participants and exclusions

Initially, 36 horses in the care of 21 riders were enrolled, but 11 horses and five participants were subsequently excluded from the study for limited or no recorded training data. Eight horses were withdrawn due to respondent burden and three for lameness. The final sample of 25 horses in the care of 16 participants, comprised 23% (25/111) and 18% (16/91) of FEI level horses and riders in New Zealand at the time of enrolment. Table 7-1 shows participant and horse demographic details.

7.5.2. Season goals and reported horse health problems

Participants started training horses in the southern hemisphere late winter or spring; mostly (20/25, 80%) in July and August 2016 for a median season duration of 252 days [IQR, 203–266]. A goal was set for 22/25 horses prior to the season, and these are shown in Table 7-2.

Table 7-1

Demographic Details for a Cohort of FEI-level Horses and Participants Captured in a Face-to-face Enrolment Survey Prior to the 2016 - 17 Endurance Season in New Zealand

Participant variables (n=16):	**Participants**
Males	4 (25%)
Females	12 (75%)
Age ≤40 years	2 (13%)
Age >40 years	14 (87%)
Median years competing in endurance	14.5 [IQR[a], 9.8 – 18]
Self-identified as riders	15 (94%)
Self-identified as owners	14 (88%)
Self-identified as trainers	16 (100%)
Self-identified as holding volunteer roles	12 (75%)
Median number FEI level horses enrolled	1 [IQR, 1 – 2]
Sold FEI level horses in 24 months prior	5 (31%)
Had ≥3 FEI level horses in work	5 (31%)
Median hours/week caring for horses during 2016 – 17 season	7 [IQR, 7 – 14]
Median hours/week riding or personal fitness 2016 – 17 season	8 [IQR, 5.8 – 14.1]
Horse variables (n=25):	**Horses**
Geldings	14 (56%)
Mares	11 (44%)
Purebred	18 (72%)
Partbred or Anglo Arabian	7 (28%)
Median age (years)	12 [IQR, 10 – 13]
Median age started FEI qualification process	6 [IQR, 6 – 7]
Median number of seasons competing endurance	5 [IQR, 3 – 7]
Domiciled at a location with a rural postcode	25 (100%)

Note: [a] IQR, interquartile range is displayed as the 25th and 75th percentiles.

Table 7-2

Characteristics of Training Programs for 25 Endurance Horses Preparing for FEI 100 – 160 km Level Competition in New Zealand

Horse identifier	Intended goal* for season (km)	Longest competition completed (km)	Days worked as % total days in training	Days with a horse health problem (excl. competitions)	Total number of days in training
13b**	Lifetime km	80	16	0	196
16c	120	80	36	12	252
15c	120	80	35	26	238
15b	100	100	44	14	259
5	120	100	38	1	280
11a	120	100	54	14	182
1	160	100	37	1	182
14c	Not predetermined	100	12	78	259
12a	Not predetermined	100	21	0	273
3	Not predetermined	100	56	0	196
11b	120	120	55	0	231
12b	160	120	19	33	280
6	160	120	25	22	266
16b	160	120	34	0	238
8	160	120	34	26	266
7	160	120	38	27	203
10	100	160	37	0	273
16a	120	160	33	0	238
4	160	160	17	24	231
14b	160	160	19	8	273
14a	160	160	21	3	273
13a	160	160	25	0	203
9	160	160	34	31	217
2	160	160	37	1	259
15a	160	160	45	0	259

Note: *Where >1 goal was stated, the longest distance goal is shown here.
**Horse 13b had a predetermined goal of accumulating kilometres towards a lifetime award by successfully completing competitions during the season.

For the 21 horses set a goal that was a competition start, nine started in the predetermined distance, two started in a longer and ten in a shorter distance. Most horses with a set goal (18/21, 86%) were successful in their goal start, whether this was altered or not. There were 36 occurrences of horse health problems in training (i.e., excluding eliminations from competitions) reported from 15/25 horses. The most common horse health problem in training was lameness; 12 horses had 24 occurrences of lameness lasting from 1 – 78 (median 9) days. Seven horses reported as lame in training were also eliminated once each from competition for lameness. Lameness occurrences in training and competition are summarised in Table 7-3.

7.5.3. Methods of training

Overall, horses were worked on 1,933 days, of which 1,726 (89%) were training at home and 207 were competitions. Long slow distance work was the most common form of training (1,499/1,933, 78%), followed by unridden work (130 days, 7%) and schooling (97 days, 5%). There was substantial variation in days worked between individual horses (Figure 7-1). The proportion of days worked ranged for individual horses from 12 – 55% (median 34; IQR, 21 – 38). Some horses had more training than rest days whereas others were only worked about a mean of one day per week.

7.5.4. Distance

Distance was reported for 1,670, of all 1,933 (86%) training days. Distance was not reported when duration was the only practical measure of workload for training methods such as lunging, mustering and hand-walking. Distance was also not reported by three participants (responsible for four horses) who routinely recorded duration rather than distance. In these cases (263/1,933 days), values were calculated from the duration of the session and proportion of gaits (n= 203 cases) or duration only (n= 47 cases) or imputed (n=13) by carrying forward data from the previous home training day. The range for these calculated and imputed distance values was 1 – 60 km [median 7; IQR, 5 – 13], compared with 2.4 – 49 km [median 10; IQR, 6 – 14] for training days

reported as measured (n= 1,116), and 1.5 – 40 km [median 11; IQR, 7 – 16] on days when participants estimated rather than measured distance (n=347).

Table 7-3

Numbers and Timing of Lameness Occurrences in Training and Competition During a Competition Season for a Cohort of 25 Endurance Horses Preparing for FEI 100 – 160 km Level Competition in New Zealand

Days from commencement of training	Month of training	Horses withdrawn from study for lameness	All other occurrences of lameness reported by participants	Occurrences of elimination from competition for lameness
0 – 27	1	1	1	
28 – 55	2		2	
56 – 83	3	1	1	
84 – 111*	4	1	2	1 (80km)
112 – 139	5		4	2 (80 km)
140 – 167**	6		2	
168 – 195	7		3	4 (100 – 120 km)
196 – 223	8		3	1 (80 km)
224 – 251	9		2	
252 – 279	10		3	(160 km)
>280 day	>10		1	
Totals		**3 horses**	**24 occurrences, 12 horses**	**9 occurrences, 9 horses**

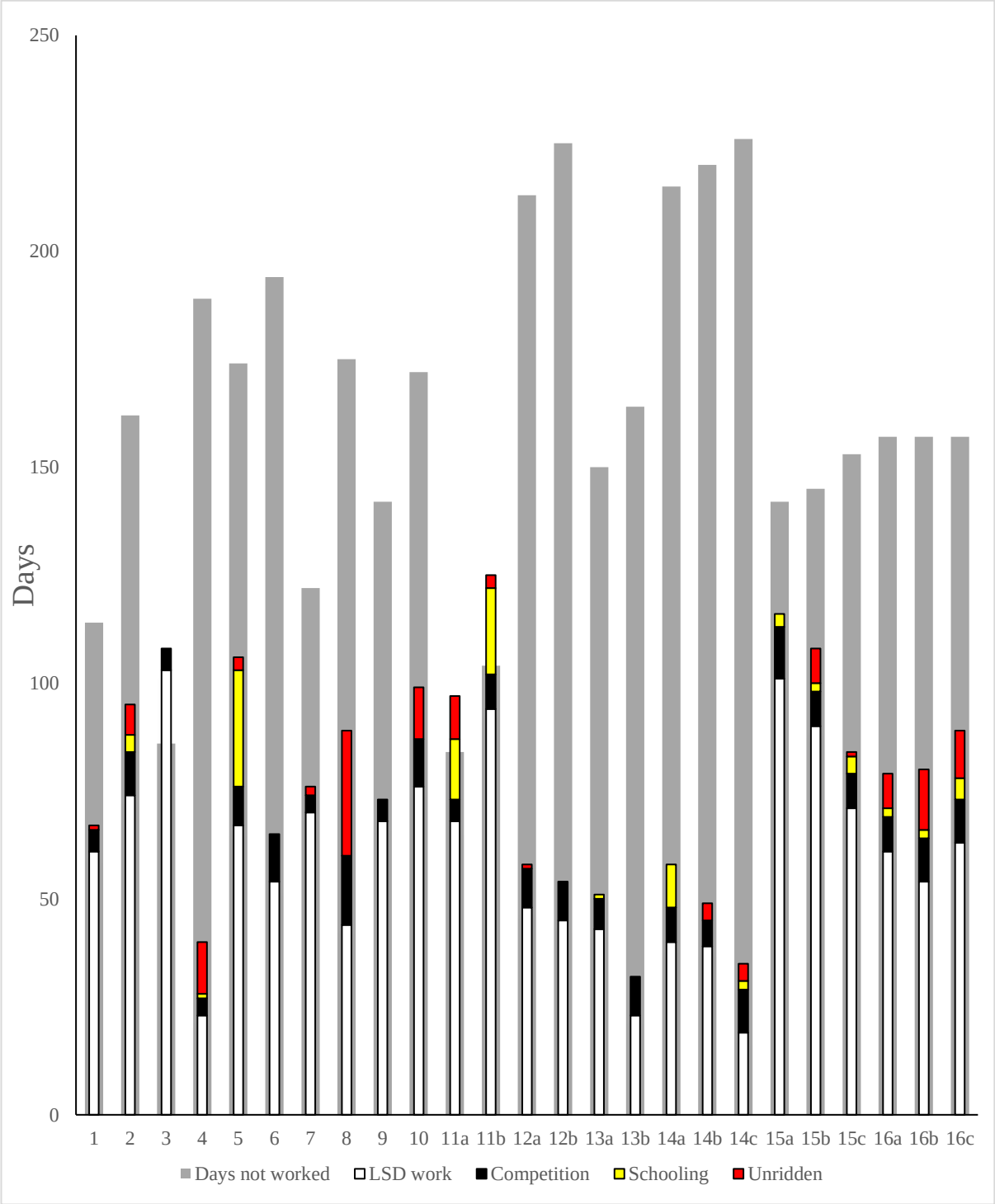
Note: Horses that were withdrawn from the study for lameness had their data excluded from analysis. Substantial diversity of training variables for individual horses made specific phases of training difficult to classify but competition starts have been provided as a general indication of workload. The distance/s of competition starts in which horses were eliminated for lameness are shown in parentheses

*Horses that were lame in training and/or competition started in 100 km competitions from 4 months (>84 days) of commencing training.

**Horses that were lame in training and/or competition started in 100 – 160 km competitions from 6 months (>140 days) of commencing training.

Figure 7-1

Number of Training Days for Each Training Method and Days not Worked During a Season of Training for FEI 100 – 160 km Level Endurance Horses in New Zealand



Note: Individual horses are identified by a number representing the rider-owner-trainer participant responsible for their care, with a suffix where participants were responsible for > 1 horse. LSD means long, slow distance training.

7.5.5. Speed and gaits

Speed for training days at home was able to be calculated for 1,410 days from duration and distance: ranging from 2 – 18 km/hr with a median 8 km/hr [IQR, 6.6 – 10]. Gaits were reported for 1,595/1,933 days including competitions; trot was most common (1,303), then walk (1,139) and canter (854). All three gaits were used in 514/1,595 training days, followed by walk+trot (407) then trot+canter (312) and walk only (263). Horses were worked on terrain with slope 963 days and/or no slope 956 days, on formed surfaces 599 days and/or unformed surfaces 468 days. These categories were not mutually exclusive as horses may have been exercised on more than one type, terrain, surface, and at differing gaits within a single training day.

7.5.6 Total accumulated distance (TAD) in training and competitions

Overall, horses completed a median TAD 1,409 km [IQR, 1,149 – 1,602] during the season. This total was composed of a median 850 km [IQR, 620 – 940] in training and a median 600 km [IQR, 420 – 720] in competition, however there was substantial variation between individual horses (Figure 7-2).

7.5.7. Use of CEN competitions as training opportunities

Despite comprising only 11% (207/1,933) of training days, the 207 competition starts contributed a median 44% (IQR, 36–49%) of the TAD for the season. Pre-season, participants stated their intention to use competitions as training for 96% (24/25) horses. Figure 7-3 compares the longest distance completed by horses and riders prior to the study with longest distance start during the study. Horses had a median of 8 starts [IQR, 6 – 10] with a median 4.3 weeks between starts (range 2.4 – 8.3) during the season. Most (165/207, 80%) starts were in CEN-level ≤80 km competitions (i.e., national competitions held under ESNZ rules) (Table 7-4). Most horses (23/25) had at least one start in FEI 100 – 160 km competition. Of these, eight horses had one start, 11 horses had two starts and four horses had three FEI level 100 – 160 km starts. Horses successfully completed 92% (190/207) of all starts; 10 horses completed all starts, 14

horses were eliminated in one start, and one horse was eliminated in three starts. Lameness was the most common reason for elimination (9/17, 53%) followed by withdrawal (3/17), metabolic conditions (2/17), rider injury (2/17) and over time (1/17).

Table 7-4

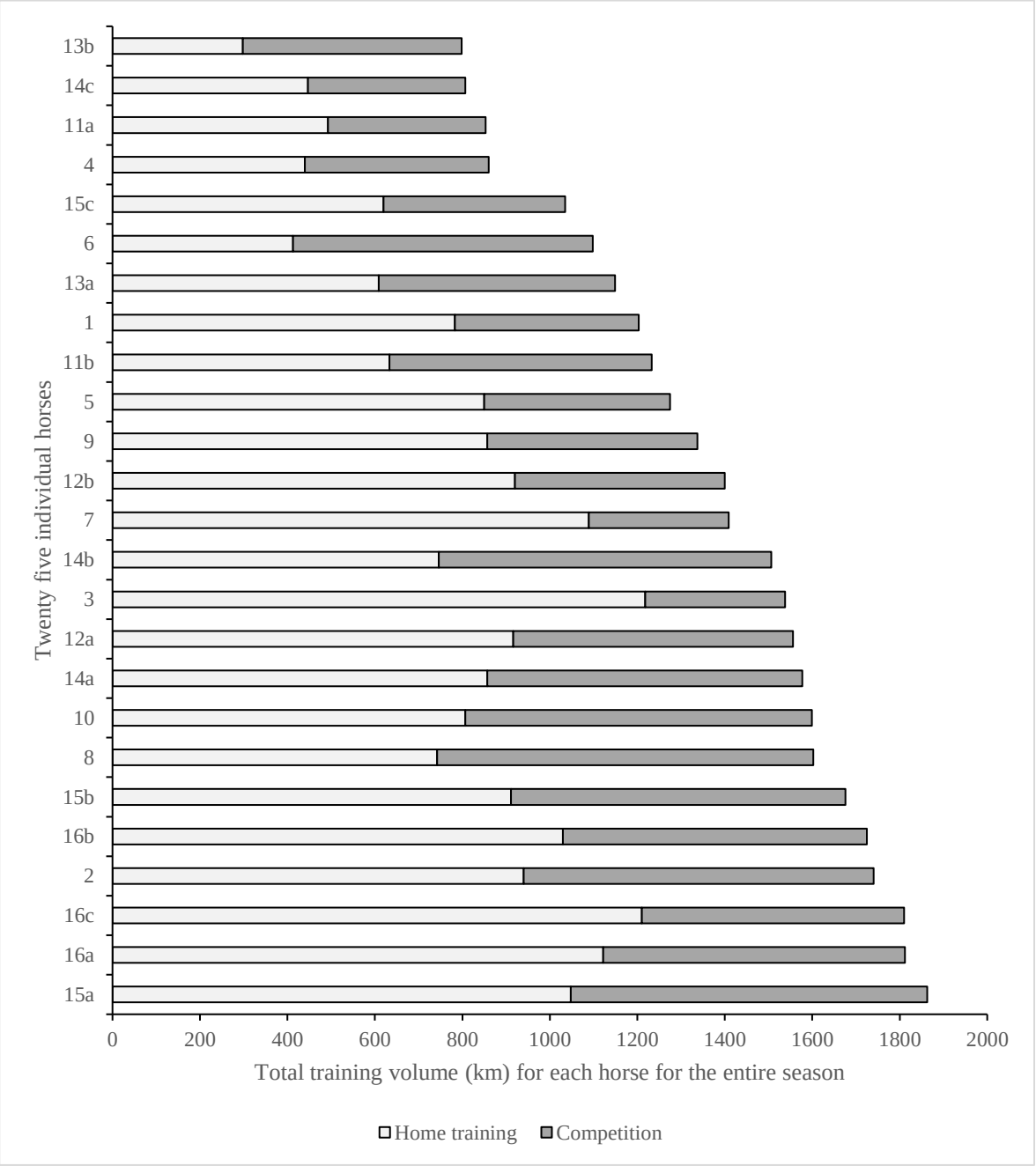
Characteristics of 207 Starts in National Level (CEN ≤ 80 km) and International Level (FEI Level 100 – 160 km) Endurance Competitions for 25 FEI Level Endurance Horses in New Zealand During the 2016 – 17 Season

	Domestic level CEN ≤ 80km (n=165)	**International level FEI 100 – 160 km (n=42)**
Completions:		
Percentage	95% (156/165)	81% (34/42)
Range of speeds (km/hr)	6 – 18.5	10.9 – 16.9
Median speeds (km/hr)	12.8	14.24
Eliminations:		
Percentage	5% (9/165)	19% (8/42)
Range of speeds (km/hr)	9.16 – 17.1	12.1 – 16.6*
Median speeds (km/hr)	15	14*

Note: *Speed data was not available for two eliminations as horses were retired on course partway through a loop.

Figure 7-2

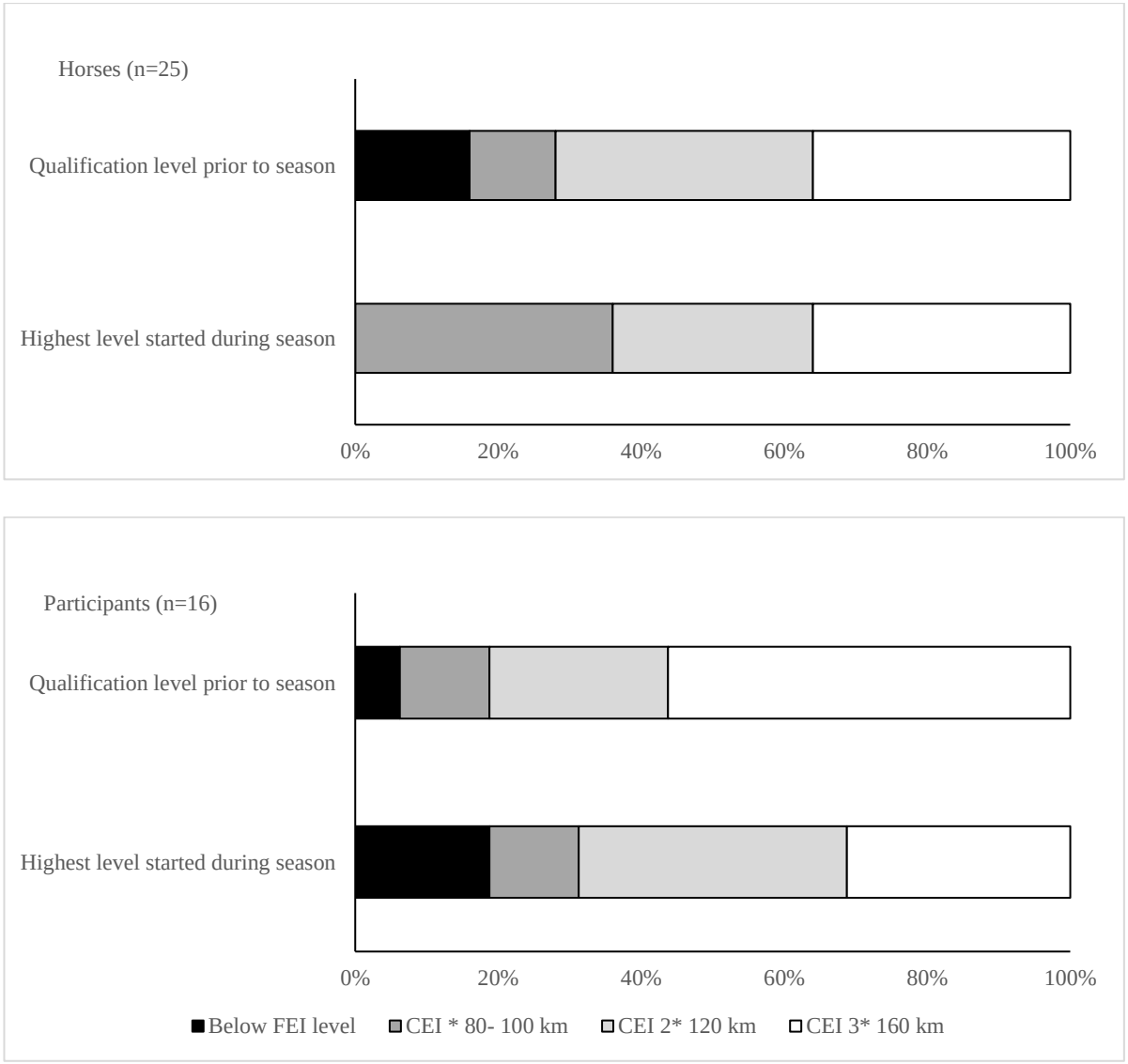
Total Accumulated Distance (TAD, km) in Training at Home and in Competitions Including Goal Starts During a Complete Season for 25 FEI 100 – 160 km Level Endurance Horses in New Zealand



Note: Each horse is identified by a number representing their participant rider-owner-trainer. Alphabetic suffixes indicate participants that were responsible for >1 horse.

Figure 7-3

The Longest Distance Completed and Qualified in Fédération Equestre (FEI) Level Competition by Horses and Participants Prior to the 2016–17 Endurance Season in New Zealand Compared with the Longest Distance Competition Started in During the Season



Note: FEI competitions are termed Concours Equestre Internationale (CEI). Distance-based grades of competition held in New Zealand begin with CEI * (usually 80 – 100 km) through CEI 2* (always 120 km or thereabouts) to CEI 3* (always 160 km). The longest distance start for participants may not have been on a horse enrolled in the study.

7.6. Discussion

This study describes a complete season-long training macrocycle preparing horses for FEI 100 – 160 km competition in New Zealand and found that training consisted mainly of high volume, low speed work, using CEN competitions as training opportunities. We can only speculate why experienced participants deliberately used competitions as training, despite presumed access to extensive rural landscapes for home training. It may be that amateur participants, with limited time to train, preferred the convenience of using competitions as overreaching episodes that mimicked the specific physiological demands of goal competitions (Rose & Hodgson, 1982). During the study, the longest distance start for most riders was less than or equal to the longest distance they had previously completed, whereas most study horses started at a longer distance than previously completed. This suggests that experienced riders were developing inexperienced horses by challenging them with longer distances to progress them through the FEI distance-based qualification system. This is consistent with the finding of Bolwell et al (2015) that 93% of respondents had a goal of developing horses, rather than racing to win. In this context, CEN competitions presented opportunities to habituate inexperienced horses to the experiences and situations unique to endurance competitions and to condition horses for successful starts in longer distance classes.

Consistent with the principle of individualised athletic training (Borreson & Lambert, 2009), there was considerable variation between horses for most training variables, as shown by the data ranges and graphs. For example, median TAD was consistent with aggregated volumes reported previously for similar level horses in New Zealand (Hyland, 1988) and France (Goachet & Julliand, 2011; Robert et al., 2010; Votion et al., 2010), but TAD for individual study horses ranged from 800 to >1800 km. Similarly, some horses had more training than rest days whereas others had more rest days than training days. This variation suggested that rider-owner-trainers tailored training for each horse to account for factors such as competitions, recovery and horse health, but further work is required to explore individual variation and periodisation of training load. Participants may have had to schedule training around employment or running businesses. Days worked may also have been influenced by each horse's age, lifetime conditioning,

inherent athleticism and response to training. While days not worked was clearly an important component of training, we were unable to ascertain if these were voluntary or involuntary (Perkins et al., 2005), associated with horse health problems (Robert et al., 2011), or individual trainers (Adamu et al., 2014; Morrice-West et al., 2019).

Speeds were lower than reported for the Middle East and Europe where horses are being prepared to compete at speeds usually >18 km/hr (Goachet et al., 2010; Redaelli et al., 2019; Robert et al., 2011). Lower speeds reported in this study may be due to variable going and sloping terrain (Loving, 2011; Nagy et al., 2014b). A limitation of this study is that training intensity was not quantified by heart rate data as participants did not routinely train with on-board heart rate monitors. However, speeds of 6 – 18.5 km/hr suggest that study horses may have been working at 33 – 51% of their aerobic threshold (Cottin et al., 2010; Marlin et al., 2002), thus achieving fitness without training at high speeds. This is consistent with studies that show training load for elite human endurance runners consists mostly of long, slow, low intensity work (Kenneally et al., 2018; Seiler & Kjerland, 2006; Seiler, 2010). Lower speed implies lower strain with a reduced risk of musculoskeletal injury (Martig et al., 2014; Rogers & Dittmer, 2019) but further investigation is required to explore whether low training speed may be protective against lameness (Whitton, 2017).

Lameness was the most common reason for elimination from competitions in this study, which is consistent with reports from other populations (Legg et al., 2019; Nagy et al., 2010; Nagy et al., 2014a; Robert et al., 2010; Robert et al., 2011; Younes et al., 2016). Our results concur with studies reporting lameness as the most common horse health problem during training for endurance horses (Fraipont et al., 2011; Nagy et al., 2017). Horse health was not explicitly requested from participants and so may have been under-reported. Also, recruitment for performance at FEI 100 – 160 km level and possible exclusion of unsound horses in this study may have resulted in selection bias towards sound, higher performing horses, with fewer horse health problems to report.

Finally, it is possible that distances of home training may have been inaccurately estimated by participants or overstated due to assumptions in calculating missing

distance variables although a conservative approach was taken to these calculations. However, the possibility that home training distance was over-stated serves to emphasise that the contribution of competitions to TAD may have been even greater than reported.

7.7. Conclusions

Training horses for FEI 100 – 160 km competition in New Zealand consisted mainly of high volume, low speed work, with CEN competitions deliberately used as training opportunities. Despite substantial variation between individual horses for distance, duration and frequency of training episodes, CEN competitions provided a large proportion of total accumulated distance during the season for all horses. Thus, accumulated CEN data for the season was representative of training load and may be useful when assessing training risk in other populations. This study points to the potential for CEN data to contribute to further understanding of the balance between training volume, speed and recovery, and the implications of these for predisposing to injury and elimination in FEI competitions.

7.8. Statements required for publication

7.8.1. Acknowledgements

The authors thank the participants for contributing an entire season of training data, and Erica Gee for her contribution to the study concept, funding, and design.

7.8.2. Horse welfare statement

This study complied with the Code of Ethical Conduct for Use of Animals for Research, Testing and Teaching, Massey University. The observational aim did not require experimental manipulation of horses. Responsibility for horse care and welfare remained with participant rider-owner-trainers. All twenty-five horses retained for the full duration of the study were subject to mandatory documented veterinary checks in competitions.

7.8.3. Competing interests

None of the authors of this paper has a financial or personal relationship with other people or organisations that could inappropriately influence or bias the content of this paper. J.F.W. holds governance roles in the sport in New Zealand and is an accredited FEI veterinarian.

7.8.4. Funding sources

This work was funded in part by a Massey University Doctoral Scholarship and the New Zealand Equine Trust (ET 5/2016). Neither funder had an involvement in the research process.

7.8.5. Authors' contributions to the study

H.J. Webb contributed to the conceptualisation and design of the study, recruited participants, collected and analysed data and contributed to the manuscript writing as part of a PhD programme. C.W. Rogers, J.F. Weston, C.B. Bolwell, E.K. Gee, E.J. Norman and N.D. Cogger contributed as supervisors to the design, data collection and analysis and provided editorial support to manuscript writing. Overall, H.J. Webb contributed 90% to the publication.

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We, the candidate and the candidate's Primary Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of candidate:	Hilary J Webb
Name/title of Primary Supervisor:	Chris W Rogers
In which chapter is the manuscript /published work:	Chapter 6

Please select one of the following three options:

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H.J. Webb contributed to the conceptualisation and design of the study, recruited participants, collected and analysed data and contributed to the manuscript writing.

( ) It is intended that the manuscript will be published, but it has not yet been submitted to a journal

Candidate's Signature:	Hilary J Webb
Date:	18-Nov-2020
Primary Supervisor's Signature:	A/Prof Chris Rogers
Date:	18-Nov-2020

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Chapter 8 – Post-season interview study

8.1. Introducing this final study

At this point, after three studies, our understanding of influences on participants' practices and performance is more developed. However, questions remain to be answered. For instance, why was there such variation between individual participants and horses for training practices and parameters? How did slow speeds in training and club rides prepare horses for faster performances in goal rides? What constraints or obstacles to accomplishing their goals did participants face during the 2016–17 season? How did they negotiate these, and how did this influence performance? What more can we learn about the influence of social factors on practices and performances that was alluded to in the pre-season interview study? A further, final study was required to answer these questions and to achieve a more holistic understanding of the performance of the cohort. Therefore, this final interview study aimed to capture and explore participants' reflections on their experiences of FEI level endurance riding during the 2016–17 season, and thereby to understand factors that influenced riding, training, and competition practices and how these contributed to performance.

8.2. Methods

8.2.1. Participants and recruitment

General recruitment including research ethics and procedures for obtaining informed consent to participate in this study were described in Chapter 4. For this study, the sample of 21 participants included three new female recruits that were associated with study horses, replacing one male and one female that withdrew after the pre-season interviews. This study included all 16 contributors to the training study of Chapter 7.

8.2.2. Data generation with semi-structured in-depth interviews

There were some differences between these interviews and those conducted pre-season. These differences included the stage of the season, consent to use data, and procedures during the interview process. Participants were interviewed 2–4 months

after the New Zealand National Championships held in April 2017, the ultimate event of the season for most participants. Interviews were conducted at a location of each participant's choice, usually their rural homes, and lasted a median 45 minutes. Each horse's performance record for the 2016–17 season was downloaded from the ESNZ database and presented to participants at the start of the interview. Participants also brought each horse's performance logbook to the interview that contained specific details of every ESNZ, and FEI-level competition start during the season. A short survey confirmed participants' roles and their highest graded start as a rider during the season, and their estimates of time spent training and caring for their horses. This routine contributed to rapport and focused participants' reflections on the season.

The semi-structured interview began with a broad opening question asking participants how they felt the season had gone, followed by probes and further questions as required to elicit free talk. The interview schedule (Appendix 13) was informed by journal notes during data collection for the preceding three studies, and pre-tested with three endurance riders. Questions covered included the high and low lights of the season, training programs, differences between club and goal rides, what being an endurance rider meant to participants, balancing endurance riding with other parts of participants' lives, support, and their relationship with their horse and how participants perceived their horse's engagement in endurance riding. Questions, probes, and order of questions were determined by the flow of the conversation. The interview closed by asking if there was anything further that participants wanted to say that would enable me to understand how they trained and competed. Interviews were recorded and journal notes were made during and within a short time after the interview that captured impressions and observations that were not able to be captured in recordings.

8.2.3. Thematic analysis of data

Thematic analysis followed the same process outlined in Table 4-3 in which inductive categories were first generated from the data, then reviewed against relevant concepts and frameworks in the literature. As described in Section 4.3.4.5., categories produced in the first round of coding were consistent with the serious leisure perspective

(Stebbins, 2007) and constraints negotiation (McQuarrie & Jackson, 1996), so these theoretical frameworks informed the review and reorganisation of codes in the third step of the analysis.

8.3. Results

Thematic analysis produced five overarching themes related to participants' experiences of the 2016–17 season of training and competing in FEI-level endurance riding. Further detail of these themes and their categories is presented in this section, beginning with a summary in Table 8-1 of the overarching themes and the primary categories for each theme. Coding trees for all five themes, with primary and secondary categories can be found in Appendix 15.

During the 2016–17 season, participants reported spending a median of 7 [IQR, 7–14] hours each week caring for their horses, and a further 8 [IQR, 6–14] hours each week training. This figure did not include competition rides used at 2–4 weekly intervals for training.

8.3.1. Theme 1 – Striving towards personal goals

This theme describes participants' commitment to the processes of setting, working towards and achieving goals that had personal relevance for them.

8.3.1.1. Setting and accomplishing goals

Participants felt their sport was characterised by the effort required to achieve their goals ("*the challenge,*" P12). These were personalised goals that provided motivation, structure and focus for participants, and had been predetermined at the start of the season. Goals ranged from qualifying at a longer distance than either horse or rider had previously completed, possibly their first 160 km, to accumulating "buckles" for completing 160 km, or qualifications towards lifetime distance awards for veteran horses. P1 reflected, *"What I love about endurance is that you set your own goals ...*

personal goals … participation goals." For some, these goals were achievable in a way that may not have been possible in other equestrian disciplines, where *"if you're wanting to be serious at elite level you are going to have to have serious horse-power and serious money or really good sponsorship."* P21 observed, *"You can have one horse that's your pet, but you can go right through the grades to the top. Okay, you're not going to represent New Zealand … but you can have your own goals that are just as meaningful as winning."*

Table 8-1

Themes Interpreted from Reflective In-depth Semi-structured Interviews with 21 Amateur FEI-level Endurance Rider-owner-trainers After the 2016–17 Season of Training and Competition

Themes	Primary categories
Striving towards personal goals	Setting and accomplishing goals Dedication Acknowledging the challenge
Reducing risk	Avoiding harm to horses Avoiding risk in club rides Goal rides are different
Problems, disruptions, and disasters	Continually negotiating resources Problems that disrupted or risked goal achievement A sound horse is essential
Positive strategies to persist	Drawing on support Flexible goals and plans Long time frames Ways of coping
Success was ...	Achievements Experiences Learning and progression Well-being

Other participants did aspire to represent New Zealand, and during 2016–17 those riders aiming to represent New Zealand at the 2018 World Endurance Championships were working with ESNZ coaches to meet qualifying criteria. P6 described how they reconciled this with their personal goals for themself and their horse: *"The first time I rode (*my horse*) …. I just knew (*it*) was a good horse … so I want to get (*it*) and myself as high as we can possibly go … I want to do the best we can … I mean, yes (*WEC selection criteria are*) in the back of my mind but at the end of the day, I'm doing my own thing as well. I'm ambitious … to do as good as I can in the sport … and I'm a goal setter."* Participants recognised that their horse was essential for achieving goals and they were part of a bigger commitment to a journey or partnership with their horse:

*"I am achieving something worthwhile. I'm part of something bigger … part of a team (*with my horse*). It means that I have a long-term goal that I am trying to achieve, and I am working towards it. It's a journey rather than a destination. I'm talking about the journey of training to completion. I can't do it without (*my horse*) … it's that journey from being a non-ridden horse to being a 160 km horse. That's huge … that sense of accomplishment"* (P1).

8.3.1.2. Dedication

This ongoing process of working towards goals required *"hard slog"* (P17) and "*striving*" (P23). Participants believed that achievement could not be purchased, but that it had to be earned through effort. For these amateur participants, the effort of the daily care and training of their horses was an inherent part of achieving goals. Having to *"get up every day and feed your horses"* (P3) provided structure and direction to efforts. Consequently, this compulsion to provide a high level of care for their horses meant that endurance riding was both a *"lifestyle"* (P17) and an "*obsessive hobby"* (P1) because it was something they loved and chose to do. This imperative was contrasted with recreational riders, who participants believed could voluntarily reduce their level of care and participation. A similar distinction was made between endurance riders and endurance sports that used machines such as bikes that were not dependent on humans for care in the way that horses were. Participants also distinguished themselves from recreational riders by their commitment to their goals and the effort required to achieve

goals. This made training with anyone other than fellow endurance riders problematic; *"'Can I come hacking with you?' And it's like, 'But I'm not hacking … at this point in the season I'm training ... and you can't keep up'"* (P21).

8.3.1.3. Acknowledging the challenge

Not only was endurance riding hard work, but participants also accepted that the disappointment of unattained goals was an inherent part of their sport. This was due to a mix of controllable and uncontrollable factors, which P14 described as "*the lottery-ness of it all*" and noted that riding competitively for a win or place in a goal ride was like "*playing Russian roulette.*" Continuing to reflect, P14 spoke for most participants when they accepted that *"it's endurance. So, what that means is it's not going to be easy. It shouldn't be easy. There should be a bit of a challenge in there … If it is too easy, it's not endurance."* Accordingly, participants had respect for peers who won 160 km rides, "*because we all know what it takes to win … and how hard it is to … get your horse up to that level and win*" (P15).

8.3.2. Theme 2 – Reducing risk

This theme describes the normal routines and practices that participants used to achieve their goals, and the beliefs that underpinned these practices. Recipes were the practices and processes that had been developed through participants' own experience or adopted and adapted from sources such as their peers, mentors, interaction with riders from other countries, or resources such as internet forums, social media, and books. These recipes were largely conservative prescriptions to ensure that participants had a sound horse with which to achieve their goals. The aim of these recipes was to reduce risk, so the effect on performance was that participants trained and competed conservatively in club rides but had a contrasting attitude towards risk in goal rides.

8.3.2.1. Avoiding harm to horses

It was important to participants that they avoid harm to horses and many of their training and competition practices reflected this. Participants expressed concern and took deliberate care to avoid excessive mechanical loading and overtraining, and prioritised time for recovery. Hill work was valued because it provided "*cardio without too much pounding*" (P13) or *"walk and wheeze"* (P11)—in other words, aerobic conditioning without unnecessary mechanical loading. This concern with avoiding harm influenced the longer-term development of horses, with participants demonstrating strong beliefs about how early training influenced horses' longevity. Participants took pride in slowly and gradually developing their horses, so they were "*never thrashed … going hard out fast*" (P6), in the conviction that *"speed kills. Speed is what will do all your damage"* to young horses (P8). The investment of time and effort to produce an FEI-level horse was significant so it was important to participants that they protect this: *"Keeping your horse sound and having that longevity ... we don't have the money to keep changing our horses and wrecking them. So, we … appreciate that … to get anywhere in our sport you have to look after them … It's taken* (my horse and I*) years to get to the point where we are now … it's not a five-minute sport …. It's years"* (P6).

Some participants contrasted competition practice in other countries with that of New Zealand: *"I was just looking at the Euston Park results, and they had shocking statistics. Like, I think of seven starters in the 160, only one qualified. And we don't all line up thinking that, do we? Like, of course your main priority is always completion"* (P9). For P21, their endurance horse was safer in New Zealand than the Middle East: *"Thank goodness … he probably wouldn't be alive now if he'd been a hand taller, I don't … think he would have been a good racing desert prospect*." P18 contrasted French age group races with their own practice that emphasised longevity:

"*You look at the number of seven-year-olds that do the 120 (*class*) and less than half of them were still running two years later. So, you know these guys are really putting the speed in. They've got one goal and that's all they're worried about. And- and if they achieve that that's fine and if they don't do another race that's just fine. We're not like that. We want to keep them going."*

8.3.2.2. Avoiding risk in club rides

For all participants, their training programme was framed by the calendar of club rides, and their lives and practice were organised around the use of club rides for training. Club rides were unanimously perceived as preparation for goal rides, as opportunities for conditioning and teaching horses, for riders to learn and develop judgement, to try equipment, to develop teamwork, to practise routines such as strapping, and to learn how best to manage their horse during the hold time. Club rides were characterised by a more conservative strategy than goal rides, with successful completion prioritised over wins, placings, or predetermined speeds. Despite P20 declaring there was *"no prestige in winning a club ride,"* this was a more nuanced position to do with managing risk than the declared worth of club titles or lack of competitiveness. Some clubs held <80 km rides in a CTR format that rewarded low heart rates and riding at specified speeds, and riders relished these opportunities to be competitive while developing fitness, skills, and judgement for endurance rides without having to ride fast to win. Furthermore, in club rides, where speed was not regulated, riders regarded second place as good as a win if it had involved a competent performance against credible opposition and their horse finished in good condition. For some, wins and placings represented capable management of the risks of riding competitively and clever tactics. These examples were evidence of a tension between the desire to be competitive and a restrictive force that participants imposed on themselves.

Participants felt that it was important not to compromise their longer-term goal for the season by taking unnecessary risks in club rides. This was critical for riders with only one horse: "*I think that part of the difference is when you're one horse, one rider … I think you ride with a different philosophy perhaps to folk that have a team … everybody has different goals and, hey, yeah, I mean, I will take a win if it came along - but I'm not going to risk my season for it"* (P21). Courses at club rides were perceived as tougher, often hillier than goal rides, but riders had the choice to slow down if their horse wasn't coping or if the terrain or weather were worse than had been anticipated. As P10 explained, "*We read the horse on the day. If on the day the horse felt like it could go out and run at the front without it being detrimental to the rest of our plan for the season, then that's*

where we let it run." Participants were critical of peers who they perceived as demonstrating poor judgement in winning club rides on tough courses, then not having a sound horse for goal rides: *"It's really important to look after your horse … what's the point if you are going to … blat around … club rides … (*then*) you don't see them at the big rides because they've done something crazy … you invest so much time and … money … why would you?"* (P19).

8.3.2.3. Goal rides are different

Participants regarded goal rides as different to club rides and this was reflected in the term "*big rides*" (P19). Goal rides were what participants had been preparing for all season and were accorded more resources and effort than club rides, for instance travelling a few days earlier to the venue and purchasing new equipment or special food, electrolytes, and drinks for riders. Participants took active steps to minimise risk, such as bringing hay and water from home and avoiding changes to their horse's diet. Horses were clipped, washed, shod and hooves padded. This was in part due to the longer distances of goal rides, but also because there was perceived to be a greater risk of elimination and pressure to *"get it right"* (P5). During the ride, strategies and tactics depended on whether participants were planning to ride competitively or to achieve qualification. For those participants with a season goal of successful completion in their goal ride (i.e., completing first 120 or 160 km, qualifying a horse at a higher level), strategy was not that different to club rides: *"I know the saying is, 'To qualify is to win', but to me to qualify is to get what you're after"* (P2). For these riders, wins or placings were a "*bonus*" (P2) outcome of a conservative strategy that was rewarded when competitors ahead of them were eliminated.

Other participants embraced the higher level of risk that goal rides presented: *"We use a product … (*for*) tie up … because they normally tie up in the first 10k if they're going to … you go fast and normally at a club ride you'll just build up into it, whereas in a race we're starting in a canter and we're staying in it" (P20).* However, while they may have started the ride with a goal of riding to win or place, these goals were modified if this was required to achieve their modified goal of completion: *"It's thinking, just back off*

and just get round to get your buckle. It's what we are all striving for, isn't it…? That 160" (P23).

Participants valued successful completion because of the investment in time and effort to get to and through goal rides: "*It's just that amazing feeling of achievement … because so much goes into the build-up and the training and the feeding and just the welfare of the horse … (*sighs*) oh, it's sort of a relief but it's exciting as well and that's pleasing … in those big events … I think it's quite emotional. Just because it's blood, sweat and tears … the whole thing … like it's a lot of ducks to (get in) a row to actually get to that end of those rides and everything work*" (P13).

8.3.3. Theme 3 – Problems, disruptions, and disasters

This theme refers to participants' efforts in addressing factors and events that may have constrained their ability to do their sport and to achieve their goals. These efforts included negotiating resources such as time, money, and support, and overcoming challenges, obstacles, and barriers to goal achievement during the 2016–17 season.

Theses constraints to achieving their goals, and how they overcame them, were front of mind for many participants when asked to reflect on their season. Most participants described the 2016–17 season as unique or different in terms of constraints they had to negotiate to achieve their goals; even experienced competitors used words such as "*disaster*" (P11) or "*the most up and down season*" they'd ever had (P5, P21). Constraints have been classified in two forms in this theme: resources necessary for participation that had to be routinely negotiated, and unique obstacles in 2016–17.

8.3.3.1. Continually negotiating resources

This category describes negotiating resources required to achieve goals. Negotiating resources for goal achievement was central to the experience of all participants; some perceived this as a constant negotiation of every aspect of their lives *("horse-life balance")* for the entire season. As P18 reflected, *"It just empties the bucket … all the*

time … I'm talking about money and energy." Paid employment was the most mentioned - negotiating leave to attend rides, or the effort required to train horses in the evenings after work and weekends. P23 described how this was for them: *"I'm tired but once you get out on your horse, your mindset changes and you're good to go. It's just getting home from work stuffed, but no matter what I'll still ride my horse. Even if we have tea at ten o'clock."* One woman noted that *"it's just lucky that I've got a husband who cooks"* (P12). Another reflected that being *"selfish"* was necessary to do *"the job properly … if you're only going out there to do half a job of training … because you feel pressured to come in and cook tea ... no point … unless you're going to do it properly, don't do it at all"* (P19). For others, constraints from farming, family, home, or social lives had to be manipulated or accommodated in order to achieve goals. Some struggled with the physical capacity required for a demanding sport because of their age, injuries, or illness. Others struggled with the expense and effort, particularly of attending goal rides. Volunteer roles meant that some participants trained less than they would have liked or did not ride in club competitions in order to set and mark courses or fulfil administrative or official roles. Participants planned, saved, negotiated, and made sacrifices and choices in order to participate, such as having limited time or money for non-endurance riding activities like holidays. This constant negotiation was considered to be part of the "challenge" that drew participants to endurance riding, and P11 spoke for most when they said, *"if you're going to do the job properly, then that's got to be your attitude."*

8.3.3.2. Problems that disrupted or risked goal achievement

Club rides provided confidence that training had been adequate to prepare horses for longer goal rides, which provide reassurance for riders attempting a longer goal ride than previously completed. Not being able to use club rides for training was mentioned as a problem for goal achievement for one-third of participants. For some, this was due to a major earthquake that disrupted travel in parts of the country for the season. For others, rides were cancelled, or their horse was lame and unable to compete at a club ride that was a significant steps towards goals. The effect of missing club rides was that participants had to train more at home than they normally would have, with reduced confidence that their horse was adequately prepared for the goal ride. P22 explains this

concern for them: *"She was going from an 80 up to a 120 … and that's a 40 km difference so I thought that 100 would have been nice for her to understand what it was all about."*

Accidents during the early dark loops in goal rides were cited as the most dramatic factor affecting goal achievement; dark loops are risky because horses are fresh, wanting to go fast and reacting to shadows from head lamps while travelling in groups at speed over unfamiliar terrain. The effect of accidents was either that riders were injured and eliminated, or they waited with injured riders until help arrived, thereby losing valuable time. Unwritten etiquette is that everyone who was with or behind the injured rider at the time of accident will wait, so accidents have the potential to negate any advantage that leading riders may have gained. Normally officials reach a consensus on the time that riders were delayed, and this is deducted from total riding time for all riders who stayed, although three participants that had experienced this contended that this was not done fairly.

The pace of early loops of longer (i.e., 120 and 160 km) rides was also difficult for riders trying to achieve optimal pacing. Riding at a sensible pace in the early loops to avoid accidents and conserving energy for later in the ride often conflicted with the attitudes of experienced, fit, keen distance horses. As P18 explained the situation:

*"It's really hard in a … night loop to slow down. You (*have to*) stick with the bunch or your horse won't accept that. You (*have to*) keep the peace out there. It's no use fighting it … for a whole (*40 km*) loop when the front's only 500 metres in front doing the same speed. So, you just go with the flow … It's just you end up in a group and you're going, 'I don't really want to be here,' but you know that if you try and slow down it won't really happen … And I was talking to someone else at the end of the ride and they're going, 'Yeah, was a bit quick that first loop.' So, that was the case. I wasn't the only one (*thinking*) … we're really going a bit quick here."*

Weather - either heat or heavy going due to rain - was another factor that had the potential to affect achievement in goal rides because it increased the physical and

metabolic demands on horses. This meant that goal achievement depended on making the right judgements throughout the ride:

*"Because it's Taupō … you don't know … how much it's going to take out because the ground is still pretty good condition. But … it (*was*) a little bit slippery and … there were a few bits that were a bit heavy and … so, you know, until you try you don't know. So … halfway through the fifth loop I gave up on doing the time because it wasn't going (*to*) work because it had been so muddy. (*My horse*) was tired"* (P3).

P18 described this process of reading their horses as *"empathy for what you're doing … you've got to understand what you're sitting on, or it doesn't really work."* Judgements were based on constant appraisal of the condition of their horse and making decisions to preserve the option of achieving their goals: *"If the day begins to get really hot, well you think, well you've got to back off. That day did. It was overcast, then it come out stinking hot and if there's no way you can keep up with the front runners … just back off"* (P23). P6 affirmed that it was important to have a partnership with, and to understand, the horse they were riding: *"We've got to be … switched on to our horses, we've got to be in tune with our horses so much more because the distance will kill them if we don't do it right"* (P6). Participants felt that the higher physical demands, the training required, and the need to pass veterinary inspections meant that horse welfare and horsemanship was a stronger consideration or constraint for endurance than for other equestrian disciplines.

8.3.3.3. A sound horse is essential

An injured or sick horse represented a major obstacle to goal achievement. A sound, suitably qualified and conditioned horse was as important for amateur participants that had constructed goals around one "*special"* horse (P6) as it was for those who sold horses and needed to provide evidence of successful performances in the form of "*clean logbooks"* (P10) to prospective purchasers. This meant that elimination was also a problem for goal achievement; *"You haven't won until you've crossed that vet line. No matter whether you cross the line or someone else crosses the line first, you still don't win until that … vet has the final say"* (P22).

While participants generally endorsed rules that prescribed the development of horses, over one third of participants felt that some rules and veterinary supervision were problematic for goal achievement. A few participants resented the imposition of elimination, particularly in the final veterinary inspection where they felt that a horse that was only *"a little bit marginally lame … you should still win … right at the end of a 160" (P15).* Some felt that veterinary decisions were wrong: "O*ften I don't always agree with a vet's judgement"* (P18). Others felt that specific veterinarians were inconsistent or discriminated against specific riders; *"I mean, I've been vetted out on a lot less. Not mentioning names" (P22).*

For some, the high level of regulation had changed the sport: *"Socially it's changed because you've got… officials running around … going … this, "This is the line and don't cross it"* (P8). The emphasis on passing veterinary inspections was perceived to have undermined riders' knowledge and horsemanship; *"All these rules and regulations haven't made it any better, I don't think … because now people are so reliant on what the vet has to say, because that's how they've dictated it is that you've lost a lot of horsemanship … people are completely riding different … (*They have lost the ability*) to read their horse on a course…"* (P8).

The consequences of elimination were sometimes compounded by increased mandatory stand downs applied to horses eliminated from club rides, and for some this had the potential to jeopardise their entire season: *"You had to watch what rides you were allowed to do; your stand down rides and what rides you could go to because if you vetted out, this could occur and things like that" (*P22). Other concerns were the imposition of having to remain in specified and supervised areas during the hold time between loops, the cost of compliance with FEI drug regulations, and worry about the risk of traditional or herbal remedies contravening drug regulations.

A few participants pointed to alternative competition formats that would enable their practices to be consistent with their beliefs about how horses should be managed. These included elevator rides, where combinations can elect to withdraw after successfully

passing a veterinary inspection and be credited with the distance they had achieved (e.g., 120 km of a 160 km ride). By contrast in the ride formats that were available to participants in 2016–17, withdrawal was classed as elimination, so the combination was credited with no kilometres regardless of the distance they had completed. P3 explained that elevator rides were better for horse welfare because riders could elect to finish at a point where the horse was tired but not exhausted, rather than having to choose between elimination or continuing to push their horse to complete a long distance. A new distance riding organisation was formed at the end of the 2016–17 season, offering alternative formats where:

*"every single multi loop ride will be an elevator. So, there is never pressure like that (*to complete*) … You know, where my horse has had enough and, you know, if I nurse him round another loop then I'll get a qualification and the kilometres count and it's not a failure. But if I could stop now and say I'll claim the hundred and whatever it is I'm up to because, you know, he's had enough then that's better for the horses"* (P3).

8.3.4. Theme 4 – Positive strategies to persist

This theme describes the broader and more positive practices that enabled participants to achieve their goals, and the beliefs that underpinned these. These strategies were less prescriptive and more enabling than the prescriptive rules described in Theme 2. These strategies enabled participants to overcome constraints to goal achievement and persist in their sport. Overall, participants drew on four broad strategies to persist towards achieving their goals: support for both goal rides and throughout the season, flexible goals and strategies, long timeframes, and philosophical adaptation. These four strategies were also conceptualised as behavioural and cognitive strategies for negotiating through constraints to goal achievement (Table 8-2). Behavioural strategies were the most common and included proactive responses such as time management and meticulous planning, negotiating leave from work or work arrangements to be able to attend rides, delegating household tasks, engaging professional equine practitioners, and budgeting to enable attending goal rides. Cognitive strategies were less common, and included responses such as acceptance, adaptation, or resignation.

Table 8-2

Behavioural and Cognitive Strategies for Negotiating Constraints Encountered During the 2016–17 Season of Endurance Riding Training and Competition in New Zealand

Proactive behavioural strategies
Goal setting, meticulous planning, backwards from goal ride with options for milestones, knowing key priorities
Flexibility at 5 levels of scale: rider career, horse career, season, training blocks, ride day
Club rides for training (continuous aerobic work, specific terrain, habituation, practise routines, teamwork, equipment)
Conservative strategies in club rides, adjust pace to conditions on the day
Prioritising other parts of life when training disrupted (work, farm tasks, family life, self-employment)
Prioritise other horses when one goes lame
Re-homing horses that are not sound for endurance
Using time after club rides or disruptions to allow adequate recovery for horse and/or rider
Using time after club rides to restore balance to other aspects of life (family, housework, farming)
Adapting training to accommodate weather (not riding in wet, slippery conditions, change training route or goal)
Dressage training to improve rideability and control, avoid accidents and control pace
Techniques and opportunities to develop horse's proprioception and economy of movement
Hill-training rather than speed to reduce cumulative musculoskeletal loading
Slow or dismount for descents
Travel for specific terrain or conditioning goals (i.e., canter work prior to goal rides)
Engage professionals for horse health issues in training (saddle fit, osteopath, body worker, blood tests, hoof x-rays and lameness workups)
Gym or physical work or training to improve endurance and stability to avoid fatigue (poor decisions) or being thrown from horse
Working locally and/or part-time, changing work arrangements, leave without pay, pre-planning leave and/or time away from work
Family, friends, or paid help to feed and/or train horses
Delegating household tasks
Finding another person/s to ride in competitions (if >1 horse in training, or if injured or unwell, or to take advantage of limited CEI events to qualify horses)
Sacrificing holidays or family functions
Using horse/s for farming tasks such as monitoring stock, mustering
Adjusting timing of, or working around, farming tasks
Budgeting and saving for goal rides
Structure finances and assets to prioritise endurance
Selling horses to fund participation in sport/WEC and WEG
Organising extra resources and support crew for goal rides
Leaving home days to week before a competition to allow travel breaks or recovery from travel
Buy specific supplements and electrolytes to pre-empt tie-up or dehydration, pad and shoe with specialised shoes or techniques
Take hay, feed, and water from home
Controlling pace in dark/early loops to conserve horse's stamina, avoiding bunches, ride alone or with a buddy to avoid accidents
Adaptive, reactive cognitive strategies
Viewing completion as successful, outcome of competent preparation and riding on the day
Derive confidence and motivation from successful completions in club rides

Taking it ride by ride, don't have or get fixated with pre-determined goals
"Partnership" with their horse was valued and important
Criticism of reckless riding in club rides
Feeling that if the horse was 'just a little bit lame' in the final inspection, that it should not be eliminated
Disagreement with veterinarian/s' decision of elimination
Perception that some veterinarians are subjective or wrong
Contention that time allowed for someone else having an accident was insufficient
Perception that endurance has changed, for the worse (more expensive, elitist, expensive, loss of horsemanship)
Perception that vet ring has changed the sport, rider/s' knowledge and autonomy undermined
Acceptance of rider's physical limitations
Acceptance of risk of rider injury as part of the sport
Acceptance of risk of not achieving goals – 'that's horses for you', 'these things happen'
Viewing disruption as an opportunity, switching to other priorities in life (family, farming, work)
Trusting advice from others when not confident that the horse was adequately prepared for goal ride
Finding positive outcomes from elimination, what was done well, tasks and routines mastered
View elimination as an opportunity to learn
View cancelled or missed club rides as positive; saved money, horse was fresher, wasn't over trained, tried a new approach, learned new ways of training, training rides with friends and family were fun, 'it all turned out ok'
Focus on future goals; next season, next horse, new challenges

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8.3.4.1. Drawing on support

At home, participants drew on support from friends and family to continue to train and compete their horse when they couldn't ride. Others trained with friends when club rides were cancelled. Participants also engaged the support of professionals such as saddle fitters, equine body workers, farriers, and veterinarians to address saddle fit, shoeing problems and lameness that may have prevented goal achievement. Support from trusted others was an important source of confidence when participants' plans were disrupted. P7 describes how a friend supported her decision to enter her first 160 km, although the season had not gone to plan: *"At the time I thought (*my horse hurting themself*) might have buggered up the 160 … having such a big jump from a 100 to a 160 … because I always wanted to do a 120 then a 160 in the same season … I was sitting at a computer deciding which one for ages, like I'll just tick the 160. And my friend wouldn't let me back out of it"* (P7).

During goal rides, riders were usually supported by a strapping crew of friends, family and fellow riders. This team provided physical and logistical support in organising

resources and gear, strapping, trotting horses up for the veterinary inspection, cleaning, feeding and caring for horses during the hold. Those participants that did not report this were amateur, female, rider-owner-trainers with a single horse, who found the sport, particularly big rides, difficult without support: *"And they admit that they struggle. It's a real battle for them and I really admire them. I really do. I really do, because to train and to travel and to go to rides and do the whole thing on your own … and work"* (P18). If a rider appeared to have no crew, it was considered normal to help them with strapping. Participants felt that this willingness to help—even fellow competitors—distinguished endurance riding from other equestrian disciplines. Participants also valued help with caring for horses after rides, especially if they rode different horses on subsequent days: taking horses out for hand walking and grazing, feeding, and changing rugs, hosing, and poulticing legs, and preparing horses for Best Conditioned judging. Supporters ensured that riders were also fed and watered and massaged if this was required, and provided emotional support when riders were tired. Crew also provided tactical support, observing competitors' horses, and noting how far ahead or behind they were. And sometimes crews reminded riders to ride within their horse's limits: *"And when I (*came*) across the finish line, my strappers were growling at me because my horse's heart rate was a little bit higher than it should be. Generally, when he comes in his heart rates are like … mid-seventies and it was up in the eighties. And they had to work just that little bit harder to bring it back down and they were growling me"* (P12).

8.3.4.2. Flexible goals and plans

Training programs were meticulously planned, but highly individualised: "*There'd be very few of us that trained the same … because we all have different horses … the goals might have been the same … but everyone has different ideas of how to get there"* (P5). Flexible goals, strategies and priorities enabled participants to persist towards achieving goals. Some adapted their goals for the season, such as a shorter goal ride, or how they trained towards those goals. For instance, when participants were unable to attend club rides for training, they increased the volume of home training. Weather was mentioned as a problem for many, so their response was to change when or how they trained, or their goal for that training session. Flexible strategies were used in both club and goal

rides in response to weather, conditions, and terrain. Others used disruption to restore balance and prioritise other parts of their lives; for instance, when club rides were cancelled, they went on training outings with other endurance riding friends or family members:

*"So, we'd go out to the bush … we'd be out for most of the day. (*It was good for the horse*) because … psychologically, she gets bored. And the other thing is that it means that (*my partner*) and I can spend time together. We take the motorbike; we take the dog. We take a bit of a picnic and all the rest of it*" (P6).

8.3.4.3. Longer time frames

Most participants worked within a longer timeframe to goal achievement, with a consensus that it takes many years of slow conditioning to prepare both horse and rider for 160 km. P2 explains it thus: "*I ride my horses to be able to ride the same horse in ten years' time. That means more to me … I still expect to be riding (*my horses*) … in … ten years."* When describing a disruption in the 2016–17 season, participants often emphasised their plans and goals for the next season, or even their next horse, rather than the disruption: *"it means that I've got something to accomplish for next year. Something to accomplish for next season. Um; and my goal for this next … season is fairly hefty actually"* (P1). This next horse was a second, less developed horse that was intended to succeed their primary horse, enabling sustained achievement at an advanced level without having to revert to starting over: "*This coming … season we'll probably concentrate more on (*riding competitively*)."* **HJW** - Let's talk about 2016/17**.** ***"****No - this next one ... these horses are ready to … step up now ... these two*" (P15).

8.3.4.4. Ways of coping

The disappointment of elimination was reframed in terms of what had been achieved, so for some elimination at the final inspection was irrelevant: *"I don't care if she vets out, as long as it's at the finish" (P7)*. For them, their horse had completed the distance, and so they had achieved a form of their goal regardless of elimination. Others focused not on the elimination, but on what they had been able to achieve in terms of how their

horse went, or how they managed problems during the ride. Participants were generally philosophical about disruptions, accepting what they couldn't control ("*You're always going to get that somewhere with horses,*" P14) and contrasted themselves with other equestrian disciplines by the commitment and physical and mental toughness required to persist towards achieving goals: "*Committed … I want to say tougher but I'm not sure if that's … maybe more resilient"* (P9). One participant observed that, in other endurance sports, athletes have only themselves to consider and can choose to push their own bodies to or beyond physiological limits, whereas endurance riders must always consider their horse and the risk of elimination from overexertion: "*People … might come into the sport and have the grit and be able to run marathons and all those things … but … it's just a different sort of grit isn't it?"* (P18).

8.3.5. Theme 5 – Success was ….

This theme describes how participants defined success in the 2016–17 endurance season.

8.3.5.1. Achievements

Season highlights were defined by participants in terms of achievements, experiences, learning and progression and the well-being that endurance riding brought them. For some, the highlights were spontaneously offered at the opening of the interview. For other participants that felt their season had not gone well, this was offered after reflecting on the obstacles or in response to probing during the interview, or even at the conclusion of the interview.

Achievement was described both in terms of internal personal satisfaction, "*just getting through and knowing that you've done it*" (P23), and external validation such as qualification certificates, 160 km buckles, FEI rankings and recognition by their peers. Achieving qualification was regarded as proof that participants had mastered the process of beating the odds and avoided elimination; "*Finishing is winning"* (P22). However, even when horses or riders were eliminated in the final veterinary inspection, participants took this as success, proof that their horse could complete the distance; "*I*

don't care if she vets out just as long as it's at the finish" (P7). This was particularly important for first attempts at longer distances or attempts to ride faster than previously.

For some, achievement was defined as consistently capable performances during the season—qualifying in 100% of all rides or at least very few eliminations in a season, completing two 160 km rides in the season, and adding to their horse's portfolio of performances. Distance and club awards for distances accumulated in successful qualifications were taken as validation of repeatable and consistently capable performance. Best Condition Awards were evidence that training, and management of the horse was optimal, and that training prepared the horse well for the demands of competition. Some participants derived satisfaction from supporting others to achieve—either on horses they owned that were loaned to others or supporting family members. A small number considered it an achievement to finish the season with saleable horses or that they had sold horses between the end of the season and being interviewed, based on their performance during the season.

8.3.5.2. Experiences

Some participants described the enjoyment they derived from doing endurance riding as a season highlight—training, travelling, camping, and socialising with other members of the endurance riding community. For P5, *"it was not about winning … and what my horse is worth, it was about socialising."* For some, training provided a chance to do something enjoyable with their children: *"We took two of the young (*horses*) down to (*a friend's*) … And the (*children*) rode their horses, so … It was outing for the young horses and it was a training ride and it was a family day and it was (*a chance to*) have a look over some new country and … it was a good day. It was just relaxed. Everybody enjoyed themselves"* (P8). A few riders derived enjoyment from their relationship and achievements with a special horse, usually one they had started themselves and competed with for many years. Participants also described achieving goals as hugely enjoyable, sometimes to the point of tears of joy.

8.3.5.3. Learning and progression

Participants also described season highlights in terms of opportunities for learning and progressing in their chosen sport. For participants, endurance riding was a process of working towards progressive goals such as longer rides or bringing on new horses. Participants valued opportunities for continual learning and ongoing refinement of practices: *"You never totally master it, do you? Because the moment you think you have, you're in for a rough season"* (P18). These riders emphasised positive aspects of performance and what they had been able to achieve, or what they had learned and improved in their systems, equipment (such as saddles, bridles or hoof boots) and horse management. For example, those riders who had been unable to use club rides as training but still achieved their goals, or those who felt that, despite the constraints, they were on track towards a longer-term goal. Others took pride in their horses maintaining body condition due to revised feeding regimes and/or successfully managing gastric ulcers or other health conditions in a horse.

8.3.5.4. Wellbeing

Finally, endurance riding was a source of well-being for most participants, despite—or perhaps because of—the difficult times: *"One of the things I've noticed was that I feel better on a horse than anywhere else and so, you know, it's times when things like that happen you notice stuff like that" (P3).*

8.3.6. Overall summary of results

Participants expended considerable effort in achieving their personal goals, with the risk that these goals might not be achieved. This effort included continual negotiation of both routine and novel constraints to achieving goals, which they considered as a part of the "challenge." Since a sound horse was essential for goal achievement, participants had developed conservative practices and processes that were oriented towards avoiding risks of harm and elimination This contrasted with an acceptance of greater risk in goal rides. Participants deployed both proactive behavioural and adaptive cognitive

strategies in four strategies to persist in their chosen sport: drawing on support, flexibility, long timeframes, and adopting a philosophical attitude. Participants described the highlights of the season in terms of achievement, experiences, opportunities for learning and progression, and their own and their horse's well-being.

8.4. Discussion of the results

This cohort was distinctive for their freedom and dedication to pursuing their personal goals, - yet - a common experience for participants during the 2016–17 season was dealing with issues and obstacles that threatened to thwart accomplishment. Leisure can be understood in terms of how participants negotiate constraints to free engagement in sport and leisure (Jackson et al., 1993). This negotiation of constraints in amateur sport has also been described for triathlon (Kennelly et al., 2013) and surfing (Fendt & Wilson, 2012) where individuals modified their participation to persist in their sport. The results of this research suggest that participants modified their training and competition practices to persist towards some form of goal accomplishment. A key constraint for participants was having only one or a few horses. In this respect, participants' modified practices were flexibly "horse-centred" to ensure they had a sound horse for goal rides. This contributed to a contrast between risk averse, conservative approaches in training and club rides for training, and greater acceptance of risk in goal rides. These different approaches were evident in Chapter 7 (Table 7-4) as higher speeds and higher rates of elimination in goal rides. Therefore, the constraint negotiation strategy of riding slowly in club rides ironically appeared to limit performances in goal rides because slow club rides may not have provided sufficient conditioning for fast performances in goal rides.

Another important constraint for participants was the vet gate, which had a similar effect of tempering the participants' competitiveness and influencing their performance to be more conservative. Participants' acceptance of the vet gate, and the decisions of veterinarians was not universal, however in entering rides, endurance riders choose to be constrained by the requirement to consider the stamina of their horse (Adelman, 2015), or risk elimination in mandatory veterinary inspections (FEI, 2016). One

veterinarian noted the influence of the vet gate on rider tactics, observing that “the concept of ‘fit to continue’ is in direct contrast to human athletics, where the … objective is to finish exactly at the limit of one’s capabilities” (Kerr, 1985, p. 11). Unlike marathon, ultra-running, triathlon, or adventure racing where contestants can push their own bodies to, and often past, their limits, endurance riders must consider the welfare of their equine partner and the risk of elimination in the vet gate. Elimination has consequences beyond the outcome of a specific ride, incurring additional compulsory time during which horses may not compete and rider penalty points (Bennet & Parkin, 2019). These consequences can prevent the use of club rides as training, and possibly even participation in goal rides. From this perspective, elimination is a considerable constraint to goal achievement, therefore a conservative ride strategy could be interpreted as a sensible and logical constraint negotiation strategy.

The results of this research show that context was important—that other members of the small, closely connected community of amateur rider-owner-trainers were a key influence on practices and performances. Participants drew on “rules of thumb” to guide their training and competition practice, using club rides as training and spelling their horses afterwards at a rate of one day per 10 km. Other rules were less explicit, more implicit. These included the belief that it was important to avoid harming horses in training and competition, and that horses could have long careers if they were developed with care. Participants also gave evidence of cognitive strategies, stories they told themselves, that justified their choices: criticism of peers they perceived as risking goal achievement or harm to their horse through reckless riding. Participants were also critical of the speed and harm incurred in FEI-level endurance riding in some other countries, perceiving this to be poor horse management, and that their own practice was superior. As they interacted with each other through support and mentoring, participants reinforced these beliefs to produce cultural norms that endorsed conservative riding - "how we do it” in New Zealand. These norms were validated and reinforced with valued Best Condition and distance awards that rewarded successful completions with their horse in good condition, rather than a horse that required invasive treatment for metabolic fatigue. In turn, participants became constrained by these norms; memorable performances were those in which participants took pride in

riding competently, tactically, and competitively, but within the constraints of their horse's stamina and the veterinary inspection.

Further to the psychological restrictions on performance described in Chapter 6, this study has demonstrated social restrictions on performance. Participants' interactions with other members of the small endurance riding community reinforced the psychological restrictions as an ethos that valued conservative riding and stigmatised harm to horses. This reinforcement was mediated by three social processes that influenced participants' practices and performances: modelling, conformity and comparison (Walker et al., 2019). Modelling, or imitating the behaviours of those around us, is a key influence for development (Bandura, 1986, 1997). Knowledge transmission by modelling is especially powerful when models are perceived to have greater status associated with a level of competence that the imitator aspires to (Aronsen, 2012). Participants were recruited into the sport through family members, friends, or endurance riders with extra horses. Once engaged, they were largely self-coached, with support, coaching and mentoring from other riders, club members and crew. Participants were intrinsically motivated to learn, listing multiple information sources in the survey study. However, the subjective, situated, tacit judgements required to monitor the condition of their horse during rides were best learned through experience, hence the high degree of knowledge transmission by peer-to-peer learning in the cohort. At the higher levels of the sport, some riders were supported in performance development pathways by riders who had experience of taking horses overseas to compete in world championships. These relationships provided opportunities to imitate riding, training, and competition practices through riding together in training and competitions, through crewing for each other, and in volunteer roles. Although some participants had prior opportunities to ride in other countries, and subsequently maintained relationships with individuals or stables that informed their practices, most modelling was based within the New Zealand endurance riding community, thereby further homogenising practices and performance.

Homogenisation of practices and performances was reinforced through implicit pressures to conform with prevailing practices and norms. Conformity occurs when

individuals feel liked, that they are validated, and that they belong to a community (Fiske, 2004). Participants were part of a social community that they drew on for support at home and during rides, and in turn they reciprocated as volunteers, mentors, and support for other riders. Rides, club membership and moments during the sport strengthened this sense of belonging. As athletes become socialised into their sport, they adopt many of the implicit norms that contribute to the unique ethos of that social world (Shipway et al., 2012). Shared norms, values and behaviours have been described for the broader "horsey" community (Dashper, 2017; Dashper & St John, 2015). Endurance riding shares some of these norms, such as that of guilt or shame when horses are harmed or injured (Davies et al., 2018). Further pressure to conform was implicit in codes of conduct that endorsed conservative riding, avoiding harm to horses, and developing young horses slowly. Implicit rules also upheld the importance of fair play as exemplified in instances such as stopping to assist other riders on course, waiting for severely injured riders or horses to be triaged, and riders ceding a significant win to their riding buddy as they crossed the finish line after riding together all day. Consistent with self-determination, these codes of conduct emphasised the quality of participation rather than the value of winning (Deci & Ryan, 2000).

Club rides for training were a key point of conformity in terms of compliance with common practice and validating conservative practices. Less confident individuals feel a stronger need to conform (Aronsen, 2012), and following the example of others was a key part of learning endurance riding. Participants "stepping up" to longer distances for the first time, where they were uncertain of the outcome, was motivated by the pressure of "other people tell me I need to." Pressure to conform was also evident where participants had been unable to use club rides for training as they normally would have. Participants struggled with their decision to enter goal rides; they felt that missing club rides meant their training was inadequate. They missed the reassurance of rides they normally used as indicators of training progress, or as steppingstones to 160 km rides. In Chapter 6, I attributed this lack of confidence to the difficulty of appraising the risk of harming their horses, for which I prescribed greater use of sport science. However, this "crisis of confidence" also afflicted experienced, competitive riders riding to win, using onboard HRM and GPS. It was only in the synthesis of the results of all four

studies that I appreciated the influence of conformity on performance and understood that participants were articulating a conflict between their desire to ride competitively and the pressure to conform. Therefore, I interpreted conservative riding in club rides, avoiding elimination for metabolic conditions, as conforming to the prevailing norm. In this context, social norms were a powerful constraint to riding competitively, thus limiting performance.

Sport is inherently comparative, and despite a task-focused rather than external orientation, participants were not exempt from criticising their peers and making judgments about riders in other disciplines and contexts. Comparisons and criticisms of those who rode recklessly in club rides, potentially jeopardising their season goal, served to strengthen the social mores and conservative practices. Participants' perceived sense of purpose and commitment distinguished them from recreational riders, and their specific skills, the physical demands of training and competition, and the risks to horse welfare set them apart from other equestrian disciplines. This comparison had the effect of strengthening their beliefs that proactive effort and preserving their horse was important. Participants were also critical of endurance riders in countries where competition practices contrasted with theirs, condemning high speeds, high elimination rates, "racing" young horses and the regular mortality incurred in FEI-level rides. These comparisons served to distinguish participants as endurance riders and bind them to their unique social world and its ethos (Robinson et al., 2014; Veal, 2016).

8.5. Conclusions

The ability to access and interpret participants' reflexive constructions was a strength of the research approach. At a superficial level, participants' perception that 2016–17 was an exceptionally challenging season could be interpreted as a way for them to explain away a failure to achieve goals they had declared to me at the start of the season. However, interpreting these accounts provided an understanding of how the loss of their horse for goal rides and the vet gate were constraints that participants responded to by modifying their practices and performances. By their own free will, and in interacting with other endurance riders, participants appear to have reinforced these

constraint negotiation strategies as cultural norms and contributed to the unique ethos that underpins the conservative competition practice of most endurance riders in New Zealand.

Chapter 9 - Discussion and conclusions

9.1 The contribution of this thesis

This thesis contributes an understanding of why performance in FEI level endurance riding in New Zealand tends towards “riding” rather than “racing”, with slower speeds and fewer horses eliminated for metabolic condition when compared with most other countries. The main contribution of this research was an understanding of psychological and social constraints to performance. An understanding of these constraints can inform efforts at improving performances in the future. Therefore, the results of this thesis have practical implications for those who will continue to aspire to represent New Zealand in FEI world championships.

An emergent issue that became apparent after data collection was a decline in ESNZ and FEI registered riders since 2016. While it was not an aim of this research, I have provided insights that are relevant to this trend. The decline can be understood as a difference between a lifestyle sport emphasising participation for enjoyment and personal wellbeing, and a competitive sport with a focus on competitive success (Coakley, 1998; Collins, 2007). This understanding has practical implications for administrators of endurance riding in New Zealand, both in terms of offering competition experiences that match what riders’ value, and for continued affiliation with the FEI.

Some further contributions are offered. This research has described amateur, elite-level equestrians, thereby addressing the imbalance in research that has not differentiated between elite level and professionalism in equestrian sports. Furthermore, this research contributes an understanding of how of amateur status mitigated competitiveness at elite level in a demanding sport where there are risks for poor horse welfare outcomes. I hope that these insights may be of use to makers of policy and regulations in endurance riding.

9.2. Summary and synthesis of the results

Four research questions served to focus and guide the research process. The first two questions were addressed with the survey and training studies: documenting the "how" of participants' practices and performances. The third and fourth questions were answered with the pre- and post-season interviews; explaining the underlying "why" of these practices and performances.

9.2.1. Summary of the answers to the research questions

RQ1: What were the characteristics of selected participants engaged in FEI-level endurance riding in New Zealand?

With the survey study, I captured a snapshot of the cohort as mostly female, amateur rider-owner-trainers, who had been engaged in endurance riding for many years. Participants had one or two horses that they had started and developed themselves. Participants were self-coached, relying primarily on their own experience with horses and endurance riding and that of their peers, in addition to a range of other sources of information. The cohort included a range of FEI performance levels because participants and/or their horses were at varying stages within the FEI qualification framework. About one third of participants had been or were currently engaged in ESNZ endurance riding performance development pathways with the aim of representing New Zealand in regional events such as Trans-Tasman competitions or international events such as world championships.

RQ2: What were participants' riding, training, and competition practices during a season of competition?

I constructed a description of participants' practices, building on the preliminary description of riding, training, and competition practices from the survey with the full season of training and competition documented by the training study. Participants set goals with milestones and made training plans that utilised primarily slow aerobic work,

with additional training methods for convenience. Participants were proactive in their efforts to improve their riding and used schooling with equitation techniques to make their horses more rideable. Almost half of total training volume was from club rides used for training at approximately monthly intervals. Goals and training were flexible with considerable variation between horses for most training variables. Only one-third of horses completed the goal that was pre-determined for them, with lameness the most common reason for disrupted training and goal achievement.

RQ3: What were participants' motivations, competitive orientation, perspectives, and experiences of a season of training and competition?

Prior to the season, participants were intrinsically motivated to accomplish personal goals, but also by the affordances that endurance riding offered for enjoyment, experiences, and opportunities for learning and development. All participants gave evidence of autonomous forms of motivation and had internalised social and material rewards to become means of accomplishing their goals. Participants valued self-reliance and believed they should take responsibility for outcomes in rides and avoid harm to their horses. For these riders with a mostly task-focused competitive orientation, success was defined in terms of sound decisions and competent performances, validated by successful completion, rather than winning. An internal locus of control was extended to personal implicit rules around harm to horses. For them, elimination for metabolic conditions was shameful because they could have avoided this outcome with careful riding. I interpreted that participants were meeting their needs for autonomy, competency, and relatedness through participation in endurance riding, and that this – in turn - strengthened their intrinsic motivation.

Interviews after the season showed that that participant had worked hard to accomplish their goals, which included negotiating constraints, and that they perceived this effort to be part of the "challenge". Hard work and the risk of disappointment only served to increase the value of accomplishment. Participants deployed a mix of proactive behavioral and adaptive cognitive strategies to negotiate constraints and to persevere in accomplishing their goals: organising and drawing on support, flexibility, long time

frames and a philosophical attitude. A risk averse approach in club rides was explained as a deliberate strategy to preserve their horse for goal rides. There was evidence of conflict for some riders between outcome goals imposed by high performance coaches, and participants' beliefs about what was right for their horse. In summary, participants were highly motivated to perform well and persist in their sport, with an emphasis on the quality of the experience. For participants, winning was a bonus rather than the only motivation.

RQ4: How were participants' practices and performances influenced by their characteristics, motivations, competitive orientations, perspectives, and experiences?

I begin by reviewing the five distinctive practices that were described in this thesis, and the influences that underpinned these practices. Then I summarise how these practices influenced performance in FEI level endurance riding.

1) The survey study described participants' proactive efforts to take responsibility for all or most aspects of their riding performance. This explains the use of schooling by New Zealand riders, when this practice has not been documented in research of training endurance horses elsewhere in the World. This proactiveness was explained in the pre-season interview study as a task-focused approach to competition, fuelled by internally controlled forms of motivation, and participants' needs for autonomy, competency, and autonomy.

2) Self-coaching, described in the survey study, is consistent with an amateur model of sporting participation with low costs and a 'do-it-yourself' ethos. Self-coaching and peer-to-peer learning strengthened the social influences that limited performance, contributing to homogenised practices. Self-coaching creating a tension when riders were required to ride faster by high performance coaches.

3) The practice of developing horses from starting in endurance, with an emphasis on slow careful training and competition in the early stages of a horse's career. This practice was explained by a task-focused competitive orientation, and in terms of constraint

negotiation. Only one third of horses in the training study achieved the goal that was set for them. Long timeframes and care to avoid harm in training and club rides were behavioural responses that enabled participants to achieve their goals. Developing their own horses mean that participants formed long duration relationships and a close, emotional connection with their horses.

4) The use of regular club rides for training was a convenient way for amateur participants to achieve the training stimulus required for their goal rides. This practice was explained in the pre-season interview study as participants meeting their needs for autonomy, competency, and relatedness through participation in endurance riding, and that this - in turn - strengthened their intrinsic motivation. Frequent use of club rides was also consistent with a task-focused competitive orientation, where participants were focused on performance and process goals, and developing horses, rather than riding to win.

5) Flexible, adaptive, and convenient training plans enabled participants to negotiate the many constraints to achieving their goals that they experienced in a season (part of the "challenge"). In addition to constraints that have been described for other endurance sports such as running and triathlon, participants risked elimination and/or the loss of their main, or only horse for goal rides. Their self-determined response to these constraints was a deliberative strategy of riding conservatively.

Conservative performances by FEI level endurance riders in New Zealand were the result of psychological, social, and logistical influences. Primarily, an internal locus of control was extended to personal implicit rules around responsibility for avoiding harm to horses. This was reinforced by social interactions within the small, close connected world that served to homogenise practices by imitation, compliance, and comparison. These interactions contributed to an ethos that stigmatised harm to horses, specifically elimination for metabolic conditions.

Through club rides, participants were well rehearsed at riding sensibly, making good decisions, and looking after their horses. This approach to club rides contrasted with a

greater acceptance of risk in goal rides. Coaching influences that limited performance were self-coaching, peer-to-peer learning, a lack of sport science tools, and a poor awareness by high performance coaching of the psychological aspects of performance.

Amateur status constrained performance in several ways. Riders with only one or two horses they have developed themselves from starting in work will spend more time in development mode, compared with riders that have access to many horses that are already experienced and conditioned for competitive riding. Riders with only one or two horses were less inclined to take risks that may be incurred in riding competitively.

9.2.2. Connecting complementary results from multiple studies

A strength of the research design was the generation of different but complementary forms of data from the same participants which contributed breadth and depth to the understanding produced by the research (Mason, 2018). In this section, I discuss the insights that arose from the complementary results of multiple studies.

As they prepared for the season, participants set goals for themselves and their horses. In the survey study, these goals were defined mostly as outcome goals, e.g., 160 km CEI 3* or specified times for WEG qualification. These goals contrasted with other surveys of endurance riders' goals (Bolwell et al., 2015; Nagy et al., 2013) that reported low proportions of outcome goals. This may have been because participants in this research were surveyed at a time when they were thinking about goals in terms of the outcome for the season, or it may have been that the question format of a closed tick box precluded the detail implicit in process or performance goals. All three subsequent studies showed that participants' goals were more nuanced than the simple outcome goal reported in the survey. Some participants prioritised completion, qualifying in a longer distance or winning distance awards, which are performance goals. Many participants defined accomplishment as the process of getting to their season goal with a sound, well-prepared horse. Capable performances in club rides for training was also an implicit process goal for most participants. The training study showed that goals were flexible, and that training plans were horse-centred - again, more process rather than

outcome goals. Therefore, the results from all four studies suggest that participants' training programs linked process and performance goals throughout the season to much longer-term outcome goals such as the end of the season pinnacle ride or developing their horse from starting in endurance to world championship level.

There were important differences for motivation between the pre- and post-season interviews that contributed insights not possible from a single study. Despite the high degree of autonomous motivation demonstrated by participants, a complete understanding of how motivation influences practices and performances requires consideration of amotivation (Deci & Ryan, 2000). Amotivation has been refined to four forms: 1) where an individual believes they don't have the ability or 2) the capacity to achieve their goals, or 3) they believe that their efforts are ineffective, or 4) that their current strategy is ineffective (Pelletier et al., 2006). A poignant example of the latter two forms of amotivation were evident post-season in participants who had elected to meet external standards specified by ESNZ endurance riding performance development coaches. These riders described how the effort of compliance detracted from their enjoyment of that ride, especially where they had felt pressured to push their horse when it was tired. Consequently, they felt their decisions and ride strategies had been ineffective. The contrast between motivations in the pre- and post-season interviews endorsed the value of a longitudinal qualitative design (Audulv, 2013) because these insights demonstrate the extent of the restrictions that participants imposed on themselves. Despite the opportunity of achieving a high-stakes goal that participants likely had worked towards for years, these riders remained steadfast in their reluctance to take any risks that would compromise the well-being of their horse. These horses did not die or even require mandatory treatment, and yet their riders felt that their chosen strategy had been ineffective and that they made poor decisions that affected their horse's welfare.

The pre-season interview study provided preliminary evidence of two potential constraints, which the post-season interviews were able to explore in greater depth. These constraints were resources such as time and money for amateur riders, and the social influence of the small, closely connected community of amateur rider-owner-

trainers. Through exploring participants' lived experiences of a season of training and competing, the post-season study showed that the practices documented in the training study, such as using multiple methods of training and horse-centred flexible plans, were a means of negotiating constraints to participation. In terms of social constraints, the post-season interview also showed that participants' interactions with other members of the small and closely connected endurance riding community reinforced an ethos that valued conservative riding and stigmatised harm to horses. This reinforcement was mediated by three social processes that influenced participants' practices and performances: modelling, conformity, and comparison (Walker et al., 2019). Moreover, these social forces reinforced the psychological restrictions that participants placed on themselves, thereby contributing to conservative practices and performance.

9.3. Implications of the research for performance

The results of this research suggest that the unique context of FEI-level endurance riding in New Zealand has contributed to constrained performances that are conservative in comparison with performances documented in other countries. This is problematic for aspirations of competing in world championships against riders from around the globe.

This section examines the implications of the research results for performances of New Zealand riders in FEI level endurance riding. Two contrasting performance scenarios are discussed—one based on a form of endurance riding endemic to New Zealand, the other based on remaining engaged with the global framework of the FEI. For the latter scenario, the understanding of constrained performance that was constructed in this research (and outlined in Section 9.2.3.) is applied in recommendations for improving performance.

9.3.1. De-affiliation from FEI-level competition

The first interpretation of the research results is that it is unlikely that New Zealand will ever win another gold medal, as the rest of the world has learned to ride faster, with an acceptance of the risks that accompany high speeds and long distances. The

psychological and social restrictions described by this research would suggest that, for New Zealanders, endurance will always be a ride, and not a race, and therefore continued engagement in FEI-level endurance riding is futile.

If we accept this interpretation, endurance riders within New Zealand would relinquish all hope of participating in world championships and ESNZ would disengage from FEI-level endurance competition. It would still be possible for individuals to participate in FEI-level endurance riding, but they would have to be based in other countries, as New Zealand's elite-level eventing riders are. The sport would be governed under a national body, similar to those of Australia and the US, and performance would be similar to that described by Fielding et al. (2011) for domestic-level endurance riding in the US. In this scenario, engagement in endurance riding within New Zealand would emphasise the characteristics of lifestyle sports such as surfing, climbing, windsurfing or parkour. These sports are characterised by grassroots participation, commitment to a lifestyle and social identity, a participatory ideology, and individualistic pursuit of self-actualisation and intrinsic rewards in an outdoor context (Wheaton, 2004). This form of endurance riding would be like ultra-running or adventure racing for the emphasis on personal rather than competitive goals (Krouse et al., 2011; Lynch & Dibben, 2016).

The process of disengaging with FEI competition may have already begun, with decreasing numbers of medium to high level (i.e., open graded and >100km) riders, more intermediate and novice graded riders, and decreasing overall starting numbers documented between 2010 and 2016 (Legg et al., 2019). These changes were followed by declining ESNZ and FEI registrations of endurance horses and riders. By 2020, ESNZ endurance riding registrations were half that of 2016, and FEI-registered riders were reduced to one quarter of the numbers in 2016. In contrast, new organisations have formed and appear to have increasing memberships. The Rangitīkei Area Distance Riders Club (RADRS) formed in 2015 and by 2020 had almost 50% more members than ESNZ. This was despite RADRS having a clear geographical base that restricted membership, compared with the national membership of ESNZ. The formation in 2017 of Distance Riding New Zealand (DRNZ), an endurance riders' organisation unaffiliated to either ESNZ or FEI, provided another alternative for riders. By 2020, DRNZ and ESNZ had similar

numbers of registered riders. Riders may hold membership with more than one organisation, but these changes in registration suggest a shift away from ESNZ and FEI to a different form of membership. This trend became apparent largely after data had been collected, although there were limited references to the changing governance documented in the post-season interview study. Further exploration is required to ascertain if the shift is because the alternative organisations offer a form of participation that is consistent with a lifestyle sport rather than a competitive sport with aspirations of international representation (Thorpe & Wheaton, 2019).

9.3.2. Improve performance to be competitive in future WEC events

In the second interpretation, New Zealand riders continue to qualify and compete under both ESNZ and FEI governance and make systematic attempts to improve performance. Consistent with this interpretation, the following section discusses the practical application of the understanding of the restrictions on performance that this research has produced, and how this understanding could inform future attempts to improve performance.

Recent world endurance championships are a useful and relevant starting point for defining the scope of the improvement in performance that would be required for New Zealand to compete successfully against other countries in FEI-level endurance riding. Despite disruption by extreme weather and COVID-19; the 2016 World Endurance Championships at Šamorín in Slovakia and the 2019 European Championships at Euston Park in the UK provide useful performance parameters[12]. A world championship is a team rather than individual event, requiring three team members to successfully complete. The Euston Park event excluded teams from outside Europe, but Šamorín included teams from all over the world, including Region VII where high-speed racing is common (Bennet & Parkin, 2018a; Nagy et al., 2014a). Both events were held over technical courses, in temperate climates like that of New Zealand. Both events were won

[12] https://www.fei.org/endurance/events/

by Spanish teams, with France second, at mean speeds for all three team members of more than 21 km/hr. The Netherlands placed third at Šamorín in 2016 with an average speed of about 20 km/hr and Australia placed fourth with a mean speed for all three riders of 19.5 km/hr. Germany placed third at Euston Park in 2019 with an average speed of 17 km/hr. These performances suggest that a team of riders, aiming to complete 160 km at 17–19.5 km/hr could be successful in achieving a podium finish at a world championship.

Certainly, the performance in FEI rides within New Zealand that was documented in this research was conservative. However, it should be noted that the cohort included a range of horses and riders at different stages with varying goals. Participants ranged from both early-career and experienced riders starting novice horses through to experienced riders preparing experienced horses for international competition. The highest performing combinations had to meet minimum speeds of 16 km/hr for 160 km during 2016 –17 to be selected for world championships. An increase of 6–7% in speed on the qualifying standard would achieve 17 km/hr, and a 20% increase would result in 19.5 km/hr. These speeds are within the range of winning speeds reported in FEI 100–160 km rides held within New Zealand[13] for the period 1/1/2008–31/05/2011, thus suggesting that individual horses and riders have been capable of performances that are comparable with elsewhere in the World. An Italian study of FEI rides showed a similar increase in speeds, while elimination for metabolic conditions decreased over the 12-year period to 2015 (Battista et al., 2019). This does support the argument that riders can learn to prepare and ride horses safely at faster speeds in FEI-level endurance riding, therefore there is potential for the performance of New Zealand riders in FEI-level competition to improve. Accordingly, the following recommendations are made, based on the understanding of performance constructed in this research.

9.3.2.1. Adaptive performance strategies

[13] https://data.fei.org/Calendar/Search.aspx

Goals are a powerful motivational tool that provide a focus, align activities and practices, encourage persistence and greater effort, and promote adaptive performance strategies (Roberts & Kristiansen, 2012). This research has shown that participants possess the attributes and motivation that foster adaptive strategies: self-reliance, knowledge and experience, a task-focused orientation, and autonomy (Pulakos et al., 2000). Furthermore, adaptive performance strategies were evident in participants' flexible ride plans and responsive horse-centred training plans. The following additional adaptive strategies are suggested to enable riders to become comfortable with riding at faster speeds, based on the understanding of participants' motivations from this research: learning to "play" with speed in a safe and autonomous manner, time trials for selection, and greater use of sport science technology and sport psychology in squad training.

This research has explained that slow speed is informed by New Zealand riders' desire to avoid the loss of their horse for competition, reinforced by social norms that criticised fast riding and stigmatised elimination for metabolic harm, which is a greater risk with faster speeds. If riders in New Zealand were encouraged to "play" with speed, in a low-stakes competition format that supports their autonomy and competency, and where they retain control of decisions, then their competition practice may become less conservative. One such format mentioned by participants was the elevator ride, where they could elect to withdraw their horse after completing any number of loops and passing the veterinary inspection (FEI, 2016). Elevator rides could allow riders to practice optimal pacing strategies (Bennet & Parkin, 2018a), with the option to withdraw at a point they deemed best for their horse and be credited with the distance they had successfully completed.

The use of time trials is documented for squads in other countries as appraisal and preparation for world championships (Robert et al., 2011). In contrast, New Zealand horses and riders must meet selection criteria only through successive high stakes 160 km classes, which requires considerable effort and can be disrupted by any number of factors, from travel to undetected subclinical musculoskeletal damage and respiratory infections. Shorter, faster tests have a useful role in assessing fitness (Robert et al., 2010; Robert, Leclerc, et al., 2011) with less risk of disruption and therefore may be an

alternative for selectors for assessing preparedness. Their usefulness could be increased by veterinary checks, data collection with HRM and GPS technology, and blood testing as used in the exercise tests described by Fraipont et al. (2012; 2011). Greater use of sport science tools and technologies, such as on-board HRM to complement participants' subjective monitoring, could enable participants to ride faster with more confidence in appraising the risk of harm to their horses. These testing sessions could also serve as opportunities to practice team riding strategies and for team members and their support crews to learn to work together. Such sessions also have potential to improve rider and support crews' understanding and use of psychological tools and strategies that can contribute to improved performance.

9.3.2.3. Autonomy-supportive coaching

This research builds on prior descriptions of autonomous self-coaching by elite-level New Zealand athletes (Bradbury, 2000), to provide an understanding of how this process worked in the study cohort. Although self-coaching was influenced by social norms and interactions within the New Zealand FEI-level endurance riding community, rider-owner-trainer participants were also strongly autonomous. This meant that performance development coaching was difficult. There were two parts to this problem; the resistance of participants to being directed, and a lack of skill in performance development coaches to overcome this resistance.

Understanding and supporting athletes' motivations can guide coaches that aim to improve performance in complex competitive environments (Christian et al., 2019). Autonomy-supportive coaching aims to create an environment where athletes feel that their behaviour arises from their true self rather than in response to external pressures or demands (Conroy & Coatsworth, 2007). When coaching subjects feel that they have a choice in their actions and are competent and connected, they will flourish (Deci & Ryan, 2000; Healy et al., 2016; Reeve et al., 2008). This research showed that external regulations, compliance with individual performance plans, and targets and evaluations as they were implemented by high performance coaches in 2016–17 had the effect of a perceived reduction in autonomy with reduced motivation and for some,

disenfranchisement from FEI-level endurance riding. This was especially strong if participants perceived they had demonstrated reduced competency in their attempts to meet targets. Better awareness by endurance development coaches of psychology and an understanding of autonomy-coaching processes (Amorose & Anderson-Butcher, 2007) could avert losses of conditioned horses and experienced riders from development pathway programs and make optimal use of a small but dedicated pool of talent.

9.4. Limitations of the research

The research presented in this thesis had four key design features: the central role of participants, the instrumental role of the researcher with a close research relationship, generation of data in the natural research setting of a competition season and use of complementary qualitative and quantitative data. These aspects are consistent with a qualitative research methodology (Braun & Clarke, 2013), and each brings both strengths and limitations that had to be accounted for. In this section I consider the influences of the unique cohort, of subjectivity, and how different forms of data were incorporated in the process of producing knowledge.

9.4.1. The influence of the cohort on the research results

Since the multiple contributions of participants to successive studies was an important design feature of the research, this discussion of the limitations begins with a consideration of who did—and did not—contribute and how this may have influenced the results.

The cohort included one in four FEI-level riders in New Zealand in the 2016-17 season. A similar number declined to engage in the research for unspecified reasons. Nagy et al. (2013) described the response biases of FEI 100–160 km riders for a two-part survey where male, experienced, higher graded and professional riders were less likely to engage with researchers, despite personal contact at rides. Similar difficulty engaging with high performing and professional riders has been described for equestrian sports

(Lonnell et al., 2014) including FEI-level endurance riding (Nagy et al., 2014b). For professionals, semi-professionals, and very competitive riders, contributing data that described their practices could be perceived as forfeiting a competitive advantage, which may explain their reluctance to engage with researchers. Although demographic data was not collected for abstentions, it is possible that those who did not participate in this thesis project may have been highly competitive and/or semi-professional with concerns about confidentiality. In terms of understanding the potential effect of excluding semi- or professional riders, the research is limited and mixed. A survey of US recreational riders that included individuals that rode for work or that rode to compete found both were intrinsically motivated to accomplish (Mitchell, 2013). This result suggests that abstentions may not have been so differently motivated from the cohort. However, professional riders may have had a different relationship with their horse (Dashper, 2014) and therefore their practices and performance may have been influenced by different restrictions than were described for amateur riders in this research.

The overall sample had a high proportion of females that was consistent with the broader population of endurance riders in New Zealand (Anonymous, 2019; Bolwell et al., 2015) and with trends towards feminisation of equestrianism in general (Adelman & Knijnik, 2013). However, the sample contrasts with global FEI registrations for endurance riding that were predominantly (74%) male in 2016 due to high numbers of male riders registered in the Group VII countries of UAE, Bahrain, and Qatar. The differences between performance and gender profiles for New Zealand and Group VII are so distinctive that gender should not be excluded as an influence on performance. Male FEI-level endurance riders have been shown to be more likely than females to be eliminated for the metabolic condition of their horse (Bennet & Parkin, 2018b), implying a contrasting competitive orientation. In other equestrian disciplines, a global study found no differences between the performance of male and female riders in FEI-level show jumping, although the authors noted a prior study that found gender differences for psychological responses to competition (Meyers et al., 1999). This research is consistent with findings that female ultra-runners and mountain bikers have different attitudes towards competition than men (Krouse et al., 2011; Levy, 2002) and different

experiences of competition (Bond & Batey, 2005), and to differ from males in their competition practices in triathlon (Dolan et al., 2011). A US study of recreational riders found that males were intrinsically motivated to accomplish, whereas females were motivated to have experiences (Mitchell, 2013). The same study found that female riders had higher levels of introjected extrinsic motivation than males, meaning they were more likely to suffer emotions such as guilt or shame (Mitchell, 2013). This literature suggests that a sample with a higher proportion of males, such as that of FEI globally or in the Middle East, may have yielded different insights into the influence of social and psychological factors on practices and performance in endurance riding.

A short phone survey documenting attrition from the training study showed respondent fatigue (8/11) as the most common reason, followed by lame horses (3/11). However, for brevity, the survey used closed tick box menus, with limited ability to fully explore participants' reasons for withdrawing. A comparison of the 36 horses in the survey study with the 25 horses retained for the season-long training study showed that older, higher performing horses were retained, whereas younger, ungraded or CEI 1* horses were withdrawn. The fate of these withdrawn horses was monitored; only two horses completed a full season, and the remainder trained and competed intermittently, or not at all. None of the 11 horses that were withdrawn achieved the pre-determined goals stated in the survey. This does suggest that higher performing horses and their riders were retained in the training study, and therefore participants' experiences of a season of training and competing may have differed from those who withdrew their horses from the study. Some participants that withdrew from the training study re-engaged for the post-season interviews, where their challenges were documented and interpreted. A few made direct reference to the difficulty of maintaining records, but it is possible that others that withdrew from the training and post-season interviews may have done so from shame because their actual performances did not match their aspirations that were declared pre-season.

The sampling strategy was purposive rather than random, so representativeness was not deliberately sought. However, the sample comprised one quarter of all FEI registered endurance riders in New Zealand in 2016. Furthermore, participants' results

in the 2017 ESNZ Endurance National Championships were proportional to the wider population of all endurance riders in New Zealand competing at distances of ≥80 km. The cohort was also consistent for gender, age, and performance levels to two larger contemporary samples of endurance riders in New Zealand (Anonymous, 2019; Bolwell et al., 2015). Referencing against the national population and with other samples allowed me the reasonable assumption that the cohort, and therefore the results of this research, were representative of the broader sample frame of New Zealand FEI-level endurance riders in general.

To summarise, the results of this research reflect the unique cohort that was mostly amateur, mostly female, and successfully engaged in FEI-level 100–160 km endurance riding in New Zealand. The characteristics and influence of those who abstained from participating in this research will never be known, but the literature suggests that the characteristics of the cohort may have contributed to a distinctive competitive profile, and that samples with contrasting characteristics might produce different results. Consequently, it should be borne in mind that the results of this study reflect the unique context of the study setting, i.e., amateur endurance riding in New Zealand, rather than representativeness of FEI-level endurance riders in other countries and contexts. I drew on salient theoretical frameworks during my analysis and interpretation to counter this limitation of highly contextualised results. Theoretical thematic analysis in the interview studies was guided by the theoretical frameworks of self-determination theory (Deci & Ryan, 2000), achievement goal theory (Nicholls, 1989), the serious leisure perspective (Stebbins, 2007) and constraints negotiation in serious leisure (McQuarrie & Jackson, 1996). This method avoided the trap of solipsism and instead linked the results to an understanding produced in similar sporting contexts such as outdoor adventure racing or amateur triathlon (Kennelly et al., 2013; Lynch & Dibben, 2016). Instead of being a property of this research, the ability for inference lies with the readers and users of this research. Accordingly, sufficient detail of the participants, the methods used, and the context of the results has been provided to support analytic generalisation to contexts that are proximally and theoretically similar (Biddle et al., 2001; Polit & Beck, 2010).

9.4.2. The influences of subjectivity and intersubjectivity

Qualitative methodologies rely on evidence of careful, systematic, and methodical work, and reflexive praxis to ensure that the influences of subjectivity and intersubjectivity are accounted for. These steps are outlined in Chapter 4, with key influences on the results described here.

The research results were my interpretation of the data, with limited corroboration during analysis due to the nature of doctoral research. Interpretation began with my choice of transcription method (Halcombe & Davidson, 2006; Oliver et al, 2005), through to my construction of themes and subordinate categories, to my choices in writing up. Feedback from my supervisors and examiners was useful in addressing a tendency of "forcing" the data to fit theoretical frameworks.

My "insider" connection to the community of interest and to individuals was a strength but required ongoing reflection on my relationship and how this influenced data collection and analysis. My knowledge of endurance riding in New Zealand was useful for data generation: knowing when horses were likely to start in work, when and how to contact participants, assessing the credibility of raw data, and what reasonable assumptions I could make when imputing missing data. However, this intimate knowledge occasionally led to missing data, i.e., what was not said because I shared a common knowledge and perspective with interviewee.

9.4.3. Multi-methods within a qualitative methodology

The thesis was initially conceived as a sequential mixed methods research design, but practical considerations forced a change in the actual design to use multiple methods within an overall qualitative methodology. This design change was due to the effort of data collection during the 2016–17 season, which meant that analysis did not commence until after all data was collected. A sequential design would have allowed the preliminary findings of the survey and pre-season interview studies to inform data collection and analysis in the training study and to shape the interview schedule for the

post-season interviews. Furthermore, a mixed methods thesis would have included greater integration of the quantitative and qualitative findings, with perhaps stronger evidence of cause and effect.

The other, methodological difference between mixed and multiple methods designs is that, in using both quantitative and qualitative paradigms, a mixed method study incorporates different ontological and epistemological assumptions. However, this multi-method thesis drew solely on a qualitative interpretive paradigm underpinned by a relativist ontology and a social constructivist epistemology. This paradigm informed the methods used to produce knowledge in this thesis. The research approach of seeking to understand meaning from the perspective of participants provided exploratory power from a small sample. The approach was also effective for an under-researched subject; identifying unanticipated influences on performance, understanding social context and the influence this had on participants' practices and performances (Maxwell, 2008). The other consequence of a qualitative interpretive paradigm was that the knowledge produced in this thesis takes the form of a situated, subjective, and provisional understanding rather than claiming to be a single objective truth grounded in an external reality.

9.5. Areas for future research

9.5.1. Further exploration of training practices

The training study aimed to achieve a simple statistical description of training and competition practices. Bolwell et al. (2015) reported high use of heart rate monitors and training diaries by endurance riders in New Zealand, therefore it was assumed that participants in this thesis research would be able to capture this data. However, this was not the case, therefore limiting the data that was captured. With hindsight, respondents in the Bolwell study probably did not distinguish between handheld monitors used only for recovery heart rate, and onboard HRM that captured continuous real-time data during training. Low use of onboard heart rate monitors with GPS (HRM+GPS) capability therefore limited the understanding of training that was achieved and requires further

consideration here. The lack of heart rate data meant that the intensity of training stimuli was not able to be ascertained, and the lack of GPS capacity contributed to uncertainty and error in calculations of training volume. This limitation meant I was unable to ascertain if training was adequately matched to performance targets. A simple explanation for the slow speeds in rides may have been that subjective measures of adaptation to training produced horses that were simply not fit enough to go faster, particularly on the sloping terrain that occurs in New Zealand. This hypothesis informs my recommendation of greater use of sport science technologies. Therefore, I recommend further research to explore adaptation to training by capturing real time training data with onboard HRM+GPS to ascertain if a lack of fitness is a performance limiting factor for endurance riders in New Zealand.

A further limitation arising from the training study was the inability to confirm whether days not worked was due to competitions, recovery, and horse health – or other factors. Despite additional analyses that included PCA and MCA, I was unable to ascertain if days not worked were voluntary or involuntary (Bolwell et al., 2013), associated with horse health problems (Robert et al., 2011), or individual trainers (Adamu et al., 2014; Morrice-West et al., 2019). It was possible that days not worked may have been due to participants negotiating other aspects of their lives such as work or family responsibilities, and therefore that amateur status was less conducive for adequate training to achieve faster performances. Ineffective training may have contributed to conservative speeds in competition as riders adjusted their ride strategies to the fitness (or lack thereof) of their horses. Therefore, I recommend further work exploring variation, recovery, and periodisation of training load in endurance horses and whether this was related to constraint negotiation by amateur riders.

9.5.2. Social psychology of equestrian sports

A greater understanding of human factors is necessary to ensure that horse welfare is not compromised in competitive equestrian sport (Waite, 2016). This research has contributed a broad exploration of psychological and social factors that influenced practices and performance in the demanding discipline of FEI-level endurance riding.

Theoretical frameworks from the discipline of social psychology of leisure were useful as lenses through which to understand how the individual riders were influenced by the interactions within their social worlds. This broader approach was warranted for an exploratory study because, although leisure is about expressing values of freedom and choice, these are influenced by wide-ranging social factors such as peer group pressure, family, tradition and even globalisation (Jackson et al., 2007; Rojek, 2005). The results of this research suggest that self-determination theory and the serious leisure perspective have value for future research exploring social and psychological factors in a broader range of equestrian sports.

Constraint negotiation in serious leisure was a useful conceptual framework for interpreting the lived experiences of elite level amateur endurance riding, which suggests that there may be merit in applying the framework in further explorations of a broader range of equestrian disciplines and contexts. Horse riding is a sport that people may pursue later in life (Davis et al., 2014). An understanding of how individuals negotiate, and balance sustained participation with other parts of their lives, including aging, may be useful for policy makers concerned with active living and aging (Dionigi, 2006). Understanding how riders modify their participation, practices, and performance to negotiate constraints such as the loss of their horse may also be useful for coaches and performance programs supporting the career development of riders (Lamperd et al., 2016).

Studies such as the multispecies ethnography of Maurstad et al. (2013) show the potential for the serious leisure concept to further our understanding of the horse-rider partnership in equestrian sports. Self-determination theory (Deci & Ryan, 2000) was also insightful in terms of understanding how endurance riding fulfilled participants' needs of autonomy and competency, and relatedness with people. This thesis suggests that endurance riding afforded participants opportunities for close relationships with their horses. However, a gap remains in our understanding of how the horse-rider partnership contributed to meeting the human need for relatedness. Future studies informed by theories from sociology and psychology of leisure can address this gap.

And finally, epidemiological research to date has emphasised physical aspects of endurance riding such as event- and horse-level risk factors. Social and psychological factors have been excluded from large scale epidemiological studies; however, this thesis has shown that these are important drivers of practices and performance that have consequences for horse welfare. Social factors such as gender and professional status can be quantified, and the risks defined by epidemiological studies. Psychological aspects of motivation and competitiveness can also be quantified (Healy et al., 2016; Madigan et al., 2017; Mitchell, 2013; Pensgaard & Roberts, 2003; Stoeber et al., 2009) and therefore could be applied in future studies seeking to ascertain risk in performance and horse welfare outcomes.

9.5.3. Applying the qualitative methodology in other contexts

This research has provided context and explanation for contemporary studies that documented conservative performances in New Zealand (de Lannoy, 2015; Legg et al., 2019; Penders, 2015). Therefore, the results of this research point to the potential for the qualitative methodology to illuminate practices and performances documented in other countries. This is particularly relevant where social and psychological factors were suspected drivers of the endurance racing style of competition in FEI endurance rides (Nagy et al., 2014a). While it would be inappropriate to directly transfer the results of this study to another setting, the methodology could guide comparative studies in any of the 134 countries engaged in FEI-level endurance riding. It could be useful to compare similar size communities, such as the six other countries like New Zealand that had less than 5% of all horse starts in FEI-level 100–160 km rides in 2008–11: Bahrain, Italy, South Africa, UK, US and Uruguay (Nagy et al., 2014a). These countries represent a range of FEI governance regions, geographies, climates, and cultures, with the opportunity to explore these potential influences on performance. Another approach could be to select contexts for contrast, such as countries with many registered riders and horse starts, or high proportions of male or professional riders and trainers. Within New Zealand, further exploration is warranted of the schism between endurance riders who remained engaged in ESNZ and FEI-affiliated competition after the 2016–17 season, and those who left to join alternative organisations. Understanding motives for participation in the

different forms of endurance riding can inform governance and administration of the sport, and policy and planning decisions (Lynch & Dibben, 2014).

9.6. Concluding thoughts

> *"The FEI requires all those involved in international equestrian sport to adhere to the FEI Code of Conduct and to acknowledge and accept that at all times the welfare of the Horse must be paramount. The welfare of the Horse must never be subordinated to competitive or commercial or other interests."*
> Federation Equestre International Code of Conduct for the Welfare of the Horse (2021)

> *"We need to test the stamina and fitness of the horse without compromising welfare, which will require good horsemanship, more strategic riding and more emphasis on recovery. Make no mistake about it, endurance is a competition against the clock, but winning requires completion and without any emphasis on completion you are not going to win."*
> Sarah Coombs, Chair FEI Endurance Temporary Committee, 19th April 2019

Coakley (1998, p. 5) as defined sport as socially constructed, "by people as they interact with each other and live their lives" connected to social, political, and economic processes. This research suggests that FEI-level endurance riding in Aotearoa/New Zealand is the unique product of contextual psychological and social forces that have contributed to practices and performance that were distinctive from other countries. For participants in this study and for most endurance riders in New Zealand, their sport was endurance riding, and not endurance racing. This has implications for performance that can be addressed through improved coaching that is mindful of the constraints described in this thesis.

These were amateur rider-owner-trainers, participating for no financial rewards in a niche sport that was characterised by an amateur culture and governance structure. This amateur context contrasted with increasing professionalism in global endurance riding.

However, sporting cultures have been shown to foster localised variation in approaches to global elite level sport (Houlihan, 2013). Therefore, the practices and performance described in this research could be interpreted as a localised response to global commercialisation of endurance riding, in which participants' style of engaging in FEI-level endurance riding contributed to their own and their horse's wellbeing.

In conclusion, I observe that, in New Zealand at least, a high level of external regulation is not necessary to protect horse welfare because of participants' self-regulation, and an ethos that emphasises competent horsemanship and decisions driven by horses' welfare. This self-regulation troubles the relevance of the FEI and its effectiveness in addressing horse welfare in endurance riding.

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Appendices

Appendix 1- Performance history of New Zealand endurance riders in FEI world championships

Year	Event and venue	Outcome
1998	WEC Dubai	4 combinations finished 22,23,24,25th place for a team gold medal. Two combinations were eliminated (DNF).
2000	WEC Compiegne, France	One combination finished 44th. Two combinations did not finish (DNF)
2002	WEG Jerez, Spain	Two combinations finished 34, 40th place. Two combinations DNF
2005	WEC Dubai	Two combinations finished 21,41st place. Four combinations DNF
2006	WEG Aachen, Germany	One combination finished 23rd. Four combinations DNF.
2008	WEC Terengganu, Malaysia	One combination finished 31st
2010	WEG Kentucky, USA	One combination finished 26th. Two combinations DNF
2011	Junior WEC, Abu Dhabi	Three combinations finished 28, 36, 42nd place for a team result of 6th place. One combination did not start
2012	WEC Euston Park, UK	No representation
2014	WEG Normandy, France	Five combinations DNF
2016	WEC Samorin, Slovakia	No representation
2018	WEG Tryon, USA	Two combinations DNF

Appendix 2 - Massey University Human Ethics Committee low risk approval 4000016286

Date: 10 June 2016

Dear Hilary Webb

Re: Ethics Notification - 4000016286 - The training and management of FEI level endurance horses in New Zealand – A mixed-methods cross-sectional study.

Thank you for your notification which you have assessed as Low Risk. Your project has been recorded in our system which is reported in the Annual Report of the Massey University Human Ethics Committee.

The low risk notification for this project is valid for a maximum of three years.

If situations subsequently occur which cause you to reconsider your ethical analysis, please go to http://rims.massey.ac.nz and register the changes in order that they be assessed as safe to proceed.

Please note that travel undertaken by students must be approved by the supervisor and the relevant Pro Vice-Chancellor and be in accordance with the Policy and Procedures for Course-Related Student Travel Overseas. In addition, the supervisor must advise the University's Insurance Officer.

A reminder to include the following statement on all public documents:

"This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named in this document are responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you want to raise with someone other than the researcher(s), please contact Dr Brian Finch, Director - Ethics, telephone 06 3569099 ext 86015, email humanethics@massey.ac.nz. "

Please note, if a sponsoring organisation, funding authority or a journal in which you wish to publish requires evidence of committee approval (with an approval number), you will have to complete the application form again, answering "yes" to the publication question to provide more information for one of the University's Human Ethics Committees. You should also note that such an approval can only be provided prior to the commencement of the research.

Yours sincerely

Dr Brian Finch

Chair, Human Ethics Chairs' Committee and Director (Research Ethics)

Research Ethics Office, Research and Enterprise

Massey University, Private Bag 11 222, Palmerston North, 4442, New Zealand T 06 350 5573; 06 350 5575 F 06 355 7973
E humanethics@massey.ac.nz W http://humanethics.massey.ac.nz

Appendix 3 - Massey University Human Ethics Committee full approval SOB 17/10

Date: 06 June 2017

Dear Hilary Webb

Re: Ethics Notification - SOB 17/10 - Rider reflection on a season of training and management of endurance horses

Thank you for the above application that was considered by the Massey University Human Ethics Committee: Human Ethics Southern B Committee at their meeting held on Tuesday, 6 June 2017.

Approval is for three years. If this project has not been completed within three years from the date of this letter, reapproval must be requested.

If the nature, content, location, procedures or personnel of your approved application change, please advise the Secretary of the Committee.

Yours sincerely

Dr Brian Finch

Chair, Human Ethics Chairs' Committee and Director (Research Ethics)

Appendix 4 - Participant information sheet and letter of invitation to be involved in the first three studies

IVABS

Massey University

Private Bag 11-222

PALMERSTON NORTH 4442

29th June 2016

Dear XXXX

PhD project: the training and management of FEI level endurance horses in New Zealand

Thank you for your expression of interest in my study. This letter will tell you more about my study so that you should have all the information you need for your decision to participate. Please keep this letter in a safe place in case you need to refer to it during the study.

1. Introduction to the researcher

I am probably known to most of you as an endurance rider, but I have also managed to fit some study into my life. My undergraduate study was mostly biological sciences which has led to, and qualified me for, this project.

I am supported by Dr Chris Rogers (Main supervisor), Dr Jenny Weston and Dr Charlotte Bolwell. A number of other researchers will contribute to the project where their support is needed – Dr Erica Gee, Dr Naomi Cogger and Dr Liz Norman. You can search the Massey website for profiles of these staff.

2. Project description

There are a number of studies that make up the overall project. The main study is a cohort study following a group of horses, and this letter is a formal invitation to you, as the owner or trainer of those horses, to participate in the main study.

3. Participants

I will be studying horses competing at FEI level during the 2016-17 season, so I have selected horses registered with FEI that are based within a maximum of 6 hours from Massey University Turitea Campus. I have estimated that 30-35 horses are a statistically sound number, but not too many to work with.

As part of this study, I will interview the owner or trainer when I enrol each horse, which means that I will also be working with about 15-20 people.

I will have contacted you initially by emails, and if I did not already have your email address, I will have obtained it either from the ESNZ website, or by asking you directly.

4. Project procedures

4.1. The cohort study will start with a four-part enrolment interview (hopefully) before horses start in work. The first three sections collect background information, and then ask about equitation, and decision-making in training and competition. The final section of this interview asks for the horse details and training and management. I estimate this will take 1-2 hours of your time.

4.2. I will collect training data over the season, probably each week or fortnight. I will be collecting data such as the frequency, duration, distance and speed of training sessions. There are a number of ways that I can collect this data and I am happy to work with you to find the method that suits you best. I hope this would take about 5-10 minutes per horse each day, which I estimate would sum to 1-1 ½ hours per week.

4.3. It is planned to finish the study with an exit interview that could take 1-2 hours.

5. Data management

5.1. The responses from each interview will be identified by a number and date. Your name will be recorded against the number in a separate journal in case I need to contact you during the study. Other than this, the data from the interviews will not be linked to an individual person or horse. I will record the interviews and need your written permission to do this. The data will be transcribed into a written form for analysis which will then be sent to you for checking and alteration if you wish. I will also need your authority to publish this data in the form of the final results.

5.2. The training data will also be identified by a unique number for each horse, and the name will be recorded separately only for the purpose of contacting you if you require this. There will be a lot of data, and I will be working with statistical results rather than individual data.

5.3. Data will be stored securely on the Massey University hard drives and any back-up files will be securely stored. The data will be deleted after 7 years.

5.4. The study results will be available in a paper. This may take some years, so I will send you a summary of the results once I have these – most likely within one year of the end of the study.

6. Your rights

While I am extremely grateful for your participation, please understand that you are under no obligation to accept this invitation. If you decide to participate, you have the right to decline to answer any particular question. During the interview, you have the right to ask for the recorder to be turned off at any time during the interview.

You also have the right to withdraw from the study before the enrolment interview. You have the right to ask any questions about the study any time during participation.

You have the right to provide information on the understanding that your name will not be used unless you give permission. You will be given access to a summary of the study findings when it is concluded.

7. Project contacts

If you have any questions about this study or the overall project, please do not hesitate to contact any of the following people:

Hilary Webb: H.Webb@massey.ac.nz; phone 06)356 9099 ext. 85797

Chris Rogers: C.W.Rogers@massey.ac.nz, phone 06)356 9099 ext. 85162

Charlotte Bolwell: C.Bolwell@massey.ac.nz phone (06)356 9099 ext. 85131

Jenny Weston: J.F.Weston@massey.ac.nz phone (06)356 9099 ext. 85135

This study has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researchers named above are responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you wish to discuss with someone other than the researchers, please contact:

Dr Brian Finch, Director Research Ethics, humanethics@massey.ac.nz,

phone (06)356 9099 ext. 86015

8. Permission forms

During the interview, I will ask you to sign a permission form which confirms that you understand the study and your rights while participating in the study.

Please do not hesitate to contact me if you require clarification of this invitation or have any concerns or queries regarding the study.

Kind regards,

Hilary Webb

Appendix 5 - Written consent to participate in the first three studies and to record interviews

The training and management of FEI level endurance horses

PARTICIPANT CONSENT FORM

I have read the Information Sheet and have had the details of the study explained to me.

My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree/do not agree to the interview being sound recorded.

I wish/do not wish to have my recordings returned to me.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: ..... **Date:** .....

Full Name .....

Appendix 6 - Participant information sheet for the final study

Rider reflection on a season of training and managing endurance horses
PARTICIPANT INFORMATION SHEET

Researcher introduction

For those who do not know me, my name is Hilary Webb, and I am studying towards a PhD in Animal Science at the Institute for Veterinary, Animal and Biomedical Sciences (IVABS) at Massey University. My research project is about how endurance horses in New Zealand are trained and managed. I am known to most of you as an endurance rider, but I have also managed to fit some study into my life which has qualified me for this project. You can find out more about me in this role, and this project, with this link: https://www.massey.ac.nz/massey/research/higher-research-degrees/phd-student-profiles/doctoral-my-story.cfm?studid=Fucrb1ndwd0%3D

I am supported by Chris Rogers (main supervisor), Jenny Weston, Naomi Cogger and Liz Norman. The profiles of these staff may also be found on the Massey website.

Project description

In this final study, I would like to interview riders about their 2016/17 endurance season to understand why horses were trained as they were this season. An understanding of training practice could contribute to improved training protocols that may enable endurance riders to train horses for maximal performance with minimal injury. Such an understanding could also contribute to effective rules for the sport, better knowledge transfer to riders, and ultimately could contribute to the ethical and sustainable use of horses in endurance.

Why you?

I would like to invite you to participate in my final study. This is the end-of-season interview that I talked about when I enrolled you in the training study in July or August 2016. I would like to interview you because of your involvement in the previous studies and this final study may explain the findings of those studies. I would like to talk about the training of your horse/s that you intended to compete at 80-160km level this season. It doesn't matter if they didn't compete at Nationals, or if your horse/s didn't complete a full season in work, or that you did not compete in FEI events; only that it was your intention to compete at 80-160km level during the 2016-17 endurance season.

Project procedures

This interview could take about 1 -2 hours and can be carried out at a time and place that is convenient for you. Before we start the interview I will ask you to sign a consent form which confirms that you understand the study and your rights while participating in the study and gives your permission to record the interview. Later, I will also need your authority to use the transcribed data for my research.

If you decide to participate in this final study, could you please let me know by email or Facebook message and I will contact you to organise the interview.

Data Management

The interview will be recorded and then professionally transcribed for analysis. You will be given a chance to read, amend and approve the transcript before analysis. The transcription will then be anonymized, and the identity of participants will be known only to me. The transcriber will be required to sign a confidentiality agreement before being given any recordings. The anonymised audio recording, research analysis and findings will be kept on password protected computers and servers. The key linking you to anonymised files will be also be stored on password protected computers and servers and will not be available to anyone other than myself. The signed form indicating your consent to participate will be stored in a locked filing cabinet in the office of my supervisor, Dr Chris Rogers. All reporting on findings will protect your identity and that of your horse/s.

Participants' Rights

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- decline to answer any particular question;
- ask for the recorder to be turned off at any time during the interview;
- read, amend and approve the interview transcript before analysis;
- withdraw from the study before or during your interview, or after reading the transcripts and before 1 September 2017;
- ask any questions about the study at any time during participation;
- provide information on the understanding that your name will not be used unless you give permission to the researcher;
- be given access to a summary of the project findings when it is concluded.

Project Contacts

Hilary Webb: H.Webb@massey.ac.nz; phone (06)356 9099 ext. 85797

Chris Rogers: C.W.Rogers@massey.ac.nz, phone 06)9518 5162

Jenny Weston: J.F.Weston@massey.ac.nz phone (06)951 85135

Liz Norman: E.J.Norman@massey.ac.nz phone (06)951 8115

Compulsory Statement

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 17/10. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone06 356 9099 extension 83657, email humanethicsouthb@massey.ac.nz.

Appendix 7 - Consent to participate in the final study and to record interviews

MASSEY UNIVERSITY
COLLEGE OF SCIENCES
TE WĀHANGA PŪTAIAO

The training and management of FEI level endurance horses

PARTICIPANT CONSENT FORM FOR END OF SEASON INTERVIEW

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree/do not agree to the interview being sound recorded.

I wish/do not wish to have my recordings returned to me.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: ..... **Date** .....

Full Name - printed

.....

This study has been evaluated by peer review and subjected to approval by one of the University's Human Ethics Committees. If you have any concerns about the conduct of this research that you wish to discuss with someone other than the researchers, please contact:

Dr Brian Finch, Director Research Ethics, humanethics@massey.ac.nz, phone (06)356 9099 ext. 86015.

MUHEC ethics approval number: SOB 17/10

Appendix 8 - Survey study questionnaire and horse enrolment

New Zealand FEI Endurance Survey Section A – Demographic and riding practices

This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named above are responsible for the ethical conduct of this research. If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher(s), please contact Dr Brian Finch, Director, Research Ethics, telephone 06 356 9099 x 86015, email humanethics@massey.ac.nz".

Age: ☐ ≤ 22 years ☐ 22-30 years ☐ 31-40 years ☐ 41-50 years

☐ 51-60 years ☐ 61-70 years ☐ > 70 years

Gender: ☐ Male ☐ Female

In the sport of endurance, are you FEI registered as: (tick all that apply).

☐ Rider ☐ Trainer ☐ Owner ☐ Official ☐ Not currently registered

What grade do you hold as a rider?

☐ Not graded ☐ Novice CEN ☐ Intermediate CEN ☐ Open CEN

☐ CEI 1* ☐ CEI 2* ☐ CEI 3* ☐ Elite

How many years have you been riding endurance?.....

How many years have you ridden FEI level endurance? .....

What are your lifetime kilometres (approximately) (i.e. ESNZ record)? .....

Have you been involved in any other activities that use horses? (tick all that apply)

☐ Eventing ☐ Show jumping ☐ Dressage ☐ Showing in-hand ☐ Showing ridden

☐ Polo-crosse ☐ Western ☐ Hunting ☐ Pony club ☐ Competitive Trail Riding

☐ Thoroughbred racing ☐ Standardbred racing ☐ Farm work and mustering ☐ Polo

☐ Other please specify .....

What address do you keep your horse(s) at? .....

..... Postcode.....

Number of endurance horses on your property TODAY: .....

How many of the horses on your property TODAY do you intend to compete at FEI level this season?.....

In past 24 months have you sold horses as competitive endurance mounts? ☐ Yes ☐ No

Where do you get your information about the training and management of endurance horses? (tick all that apply)

☐ Personal experience ☐ Other NZ riders/trainers ☐ Overseas endurance riders/trainers

☐ Development squad ☐ Junior training camp ☐ Non-endurance horse coaches

☐ Websites ☐ Endurance coaches ☐ Human endurance sports ☐ Veterinarian

☐ Magazines ☐ Social media ☐ Nutritionists ☐ Company representatives

☐ Books ☐ Other please specify ……

Last season, did you include any of the following in your endurance training programme for your horse(s)? (tick all that apply)

☐ Flat work or dressage schooling ☐ Cavaletti or pole work ☐ Hand walking or running

☐ Gymnastic or exercises to improve suppleness ☐ Free range/loose during training

☐ Ponying off another horse ☐ Swimming ☐ Leading horses from vehicle or quad bike

☐ Jumping ☐ Lunging ☐ Mechanical walker ☐ Static stretching ☐ Body wrap techniques

☐ Ground/liberty work ☐ Training using Chambon, Market Harborough or Pessoa

☐ Galloping ☐ Interval work ☐ Fartlek work

☐ Work other than distance training (please specify) ……..……..…

Why did you use these techniques? ……..……..…

Last season, did you use the following during training and/or competition? (tick all that apply)

☐ Change of diagonal ☐ Change of canter leads ☐ Half halt ☐ Lateral movements

☐ Flying changes ☐ Lengthen and shorten frame/extension

☐ Other ……...

Why did you use these techniques? ……..…

Last season, did you carry weight during competition? ☐ Yes ☐ No

Did you carry weight during training? ☐ Yes ☐ No

If so, how did you carry weight?.....

Last season, as a rider did you deliberately increase or decrease weight for competition?

☐ Yes ☐ No

If so, how did you achieve this?.....

Last season, did you have any injuries or asymmetry of your body that may have caused you to be uneven while riding in training or competing?

☐ Yes ☐ No ☐ Don't know

If yes, did the asymmetry affect your horse?

☐ Yes ☐ No ☐ Don't know

If yes, how did you manage for this? ……

Last season, did you do participate in other sport or fitness training personally? ☐ Yes ☐ No

If yes, please describe: ……..

And for what purpose?.....

What stages of the season? .....

How often? .....

As a rider do you use any of the following to assist your development as an athlete (tick all that apply)

☐ Massage therapist ☐ Physiotherapist ☐ Personal trainer ☐ Sports psychologist

☐ Nutrition advisor ☐ Chiropractor ☐ Coach ☐ Mentor

☐ Other ……..

That is all for the rider questions - thank you ☺

New Zealand FEI Endurance Survey Section B – Horse enrolment

This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named above are responsible for the ethical conduct of this research. If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher(s), please contact Dr Brian Finch, Director, Research Ethics, telephone 06 356 9099 x 86015, email humanethics@massey.ac.nz".

ESNZ and FEI registered name of horse ……

Stable name ☺ ? ……

Age as of 01/08/16: …… Number of seasons competed: ……

Permission to copy parts of the logbook at the end of the season. ☐ Yes ☐ No

Preferred format for data collection: ……

Preferred interval for data collection: ……

Other issues/notes: ……

Likely start in work date:
……

☐ GPS used? ☐ every training ride ☐ occasionally ☐ for a specific purpose

Make and model:……

☐ HRM used? ☐ every training ride ☐ occasionally ☐ for a specific purpose

Make and model:……

Do you use competitions as training opportunities? ☐ Yes ☐ No

For this horse in this 2016/17 season:

What is the planned pinnacle event this season? ……

What/when is the first 40km ride planned for this horse?……

What/when is the first 80km ride planned for this horse?……

What/when will the last competition prior to the pinnacle event be?.....

How will you start this horse in work? ……..

(If already started – complete data capture form for weeks done).

During early training, where will this horse live? (tick all that apply, with approximate number of hours per day)

☐ Stable or covered yard ☐ Yard ☐ Small paddock <1ha no pasture ☐ Small < 1ha pasture paddock

☐ Medium 1-2ha pasture paddock ☐ Large >2ha pasture paddock ☐ Alone ☐ With other horses

☐ Other (please specify) ……

During early training, how will this horse be shod: (tick all that apply)

☐ Unshod ☐ Conventional ☐ Booted ☐ Sole protection

☐ Variations on conventional (please specify) ……

☐ Other (please specify) ……

What treatments are planned during early season training? (please tick all that apply)

☐ Drench ☐ Dentist ☐ Veterinarian ☐ Farrier ☐ Saddle fitting ☐ Physiotherapist

☐ Equine body worker ☐ Chiropractor

☐ Other (please specify) ……

Do you take blood from this horse for testing? ☐ Yes ☐ No

When? ……

What is tested? ……

During early training, what will this horse be fed: ……

Is feed measured or weighed? ☐ Yes ☐ No ☐ Other

During early training, what supplements will this horse receive: (please state product name and amount fed)

……

When will you start the next phase or stage of training? ……

Thank you so much for your time.

Appendix 9 - Preseason interview schedule for semi-structured interviews

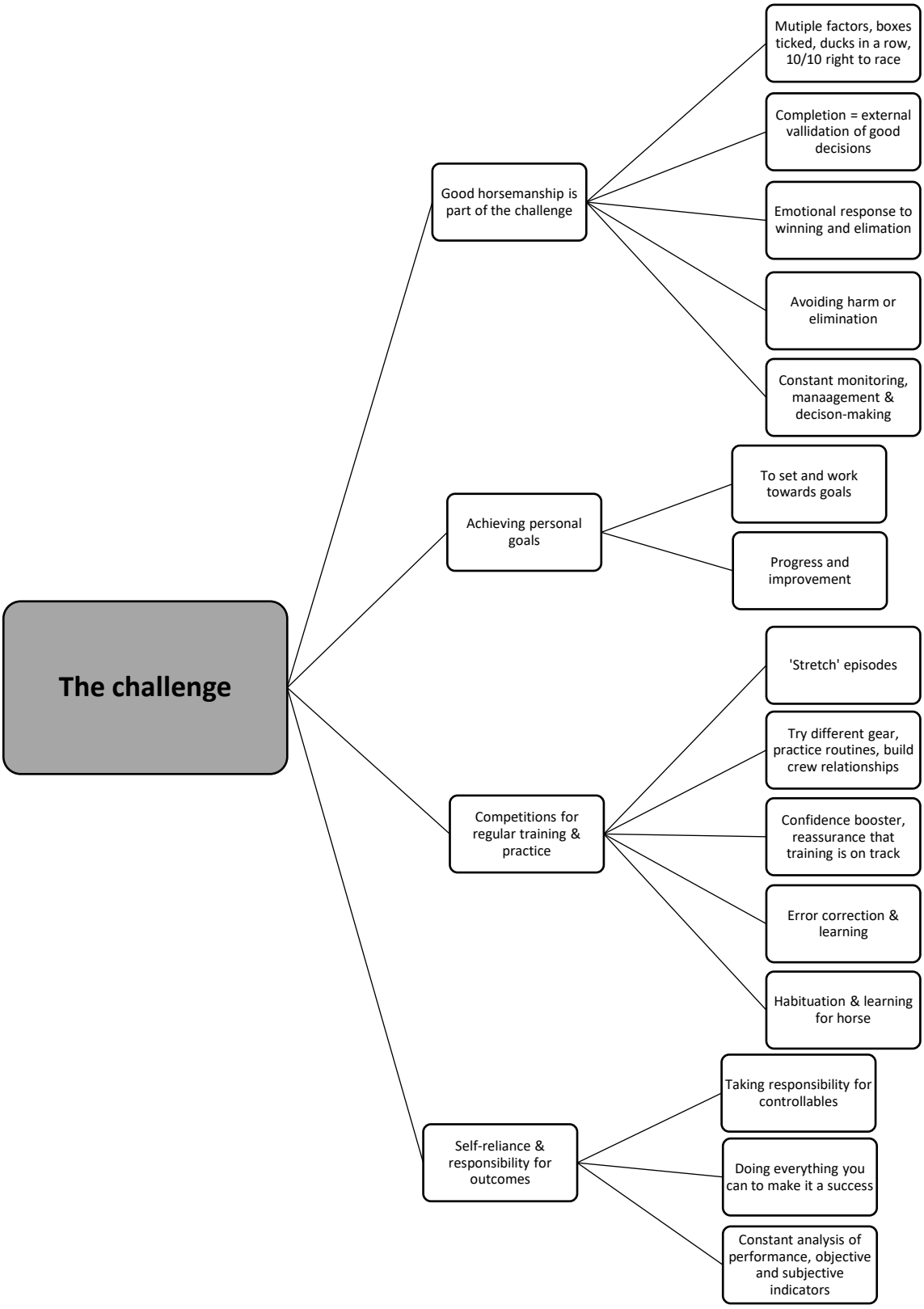
Semi-structured schedule of questions and typical prompts for in-depth interviews conducted with FEI level endurance riders in New Zealand prior to a season of training and competition

Aim of each stage	**Schedule of questions and prompts for pre-season interviews.** Prompts varied with the specific context of the interview and are listed here in the most typical form from transcripts
Build rapport and focus on personal experiences	Survey, horse enrolment and procedures to obtain written consent 1. So, tell me, why do you do endurance? 2. Tell me about your best horse. What makes him/her a good endurance horse? We can talk about the one you have now …
Deep rapport and immersion in experiences	3. Talk me through how you set your goals for this season? So, we've just talked (in the survey) about your goals for this coming season, what was your thinking around that? How did you decide what you're going to do? How do you know that is the right goal for your horse? 4. In your training program for your horse (that we talked about in the survey), how do you decide when and what to change? What are the triggers for changes to that plan that you made for the season? Like, we talked about the differences between the first and second phase of training, what drives those changes? 5. Other than training, what are all the things that you do to prepare for a competition? So, once your training is all done, in that last week before a ride, what are the things you do to get away to a ride? What are the things that you do to prepare for a competition – mentally and getting yourself packed? What do you do to get ready for a ride? 6. If you have a ride plan, do you stick to it? So, do you have a ride plan? Why/in what situations would you not stick to your plan? What would make you not stick to your plan? 7. Describe a successful completion for me. Like (a specific example known to the interviewer) for instance? So, one that has gone really well? 8. In competitions, how do you know when your horse is tired? What are the signs that you see when they're tired? What are you 'feeling' (from your horse)? 9. Tell me about FTQ (failure to qualify). What does it mean? What does it mean to you? What do you do about it?

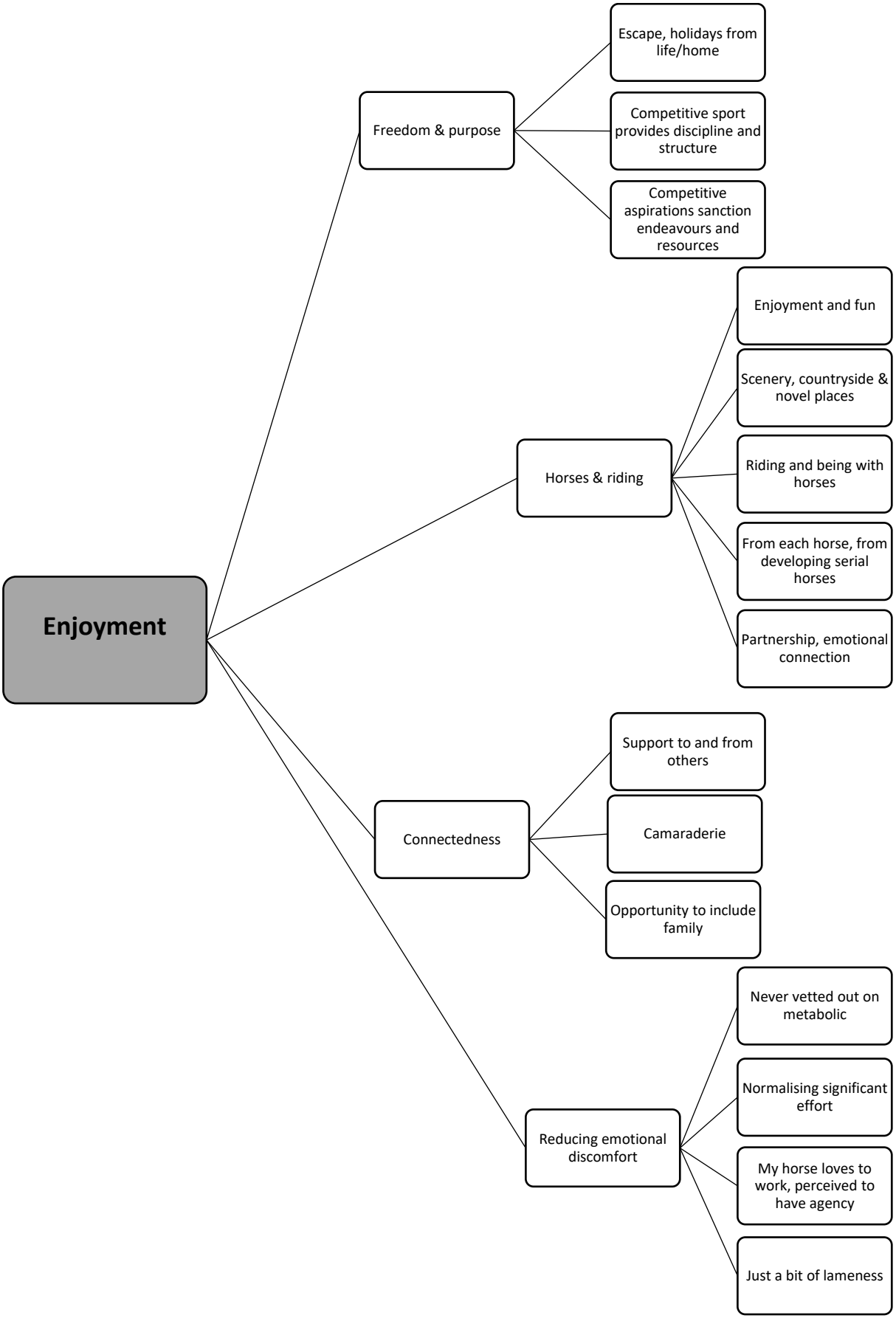
Broaden focus, reflection and gentle withdrawal from rapport, closure	10. Talk me through the career stages of an endurance horse. So, you've started/developed a number of horses, tell me about that? So, you get a saddle on them …? How long/many years to 160 km? What are the things that you consider when you decide to retire a horse from endurance? 11. Is there anything else you want to tell me that could help me understand how you train and compete? Is there anything else that you would like to talk about?

Appendix 10 - Pre-season study coding trees

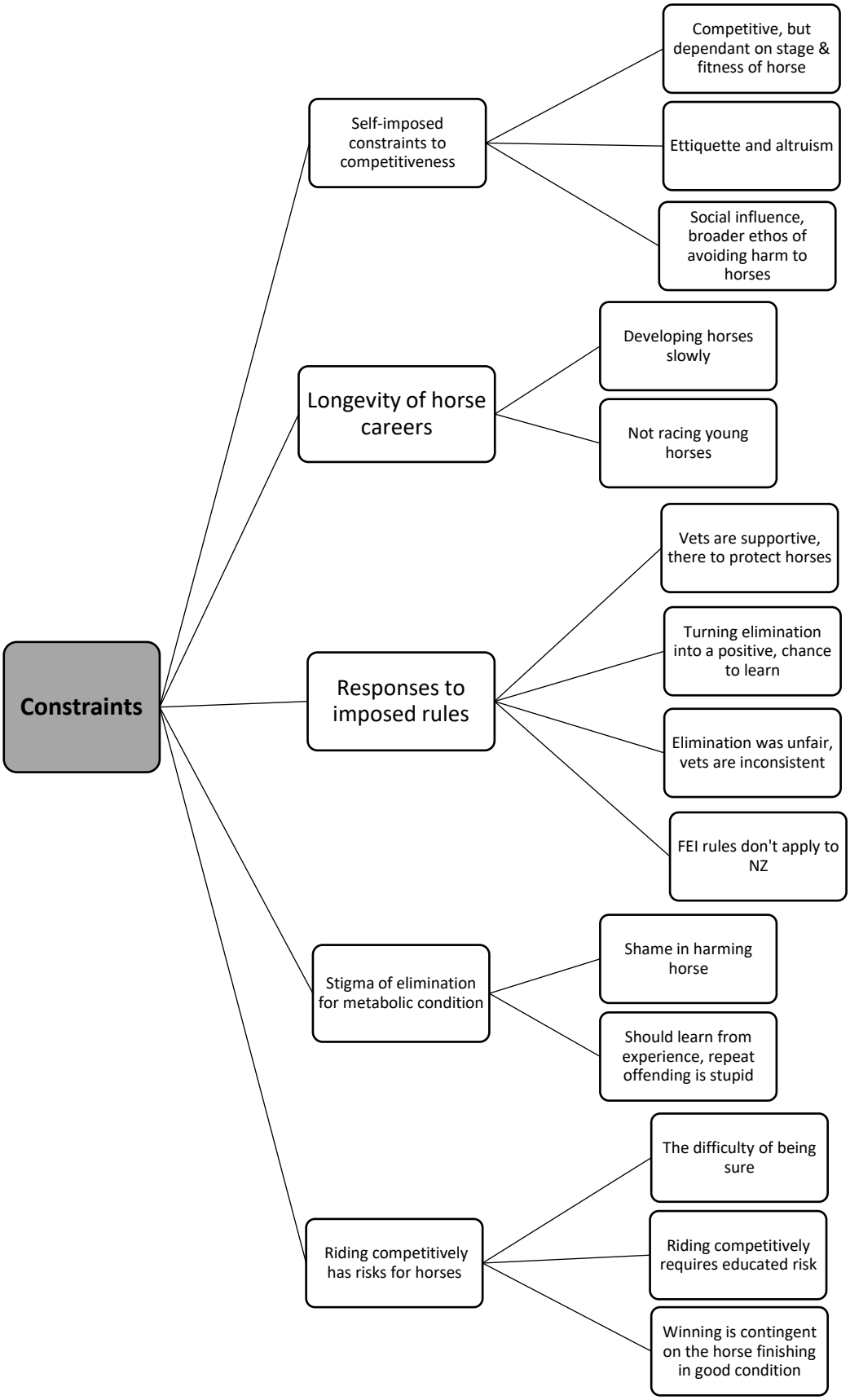
Theme 1: The challenge



Theme 2: Enjoyment



Theme 3: Constraints



Appendix 11 - Training study data capture form

ID ..... WEEK STARTING ...../...../.....

	Time worked:	Distance worked:	Measured Yes/No?	Speed or gaits % time still, walk, trot, canter or gallop	Terrain	Specific conditioning goals for this training episode or week
MONDAY						
TUESDAY						
WEDNESDAY						
THURSDAY						
FRIDAY						
SATURDAY						
SUNDAY						

* Any changes in feed this week?	
* Any changes in supplements this week?	
* Any changes in turn out this week?	
* Any treatments this week?	

Appendix 12 - Training study phone exit survey

Reason for leaving the study – please tick any that apply:

☐ The paperwork became too much

☐ A horse health problem prevented this horse from continuing to train

☐ The horse was sold, leased or loaned

☐ Personal reasons meant that rider/owner/trainer was unable to continue to train and compete this horse in endurance this season

If there was a horse health problem, what was the nature of the problem:

☐ Lameness ☐ Respiratory problem ☐ Tie up ☐ Injury

If lame, please specify which limb, or the back: ……

If lame, what was the nature of the lameness: ……..

☐ Other (please specify) ……

Was a veterinarian involved in the diagnosis and/or treatment of the problem?

☐ Yes ☐ No

Would you still be available for an end of season interview in May 2017?

☐ Yes ☐ No

This would take about 1 hour at a time and place that suits you.

Thank you

Horse ESNZ number:
Last week for which training data captured:
Date exit confirmed:
Means of confirmation:
ESNZ performance record attached:

Appendix 13 - Postseason interview schedule for semi-structured in-depth interviews

Preliminary questions

ID ……

For the season just finished:
Were you: ☐ Owner ☐ Trainer ☐ Rider ☐ Official or volunteer

If you rode this year, what was the highest level of competition that you **entered and started in**?

☐ CEI or CEN 160km ☐ CEI or CEN 120km ☐ CEI or CEN 100km
☐ CEI or CEN 90km ☐ CEI or CEN 80km ☐ Less than 80km
☐ Did not compete in endurance

What was your first 120km **completion/qualification**? (Event or year) ……

This season just finished, approximately how many hours **training for endurance** (riding and personal fitness work) did you do each week?

Range …… Average ……

This season just finished, approximately how many hours **caring for your endurance horse/s** (other than exercise) did you do each week?

Range ……Average ……

Semi-structured schedule of questions and typical prompts for in-depth interviews conducted with FEI level endurance rider-owner-trainers in New Zealand after a season of training and competition.

Aim of each stage	**Schedule of questions and prompts for post-season interviews.** Prompts varied with the specific context of each interview and are listed here in the most typical form recorded in transcripts
To build rapport and focus on personal experience of the season	Procedures to obtain written consent to record interviews Presentation of the performance records for each horse for the 2016-17 season
To obtain thick rich descriptions of experiences during the season of interest	1. Tell me about your 2016-17 endurance season? How did you feel it went? What were the highlights? What were the lowlights? What did that mean for your training plan/goals? You mentioned …, tell me more about that … what do you mean? How did that affect your training? What did you do next? How did that affect what you did next? How did that affect your season? 2. Thinking about your training program during this season just gone, what were your general principles or general 'rules of thumb'? Did you have any guidelines for workload? Travel? Speed? What were those based on? What lead you to that guide? Why did you adapt that guide/rule? Where did that rules come from? If you had to explain your training to a beginner … a complete novice to endurance, someone who had never done endurance before … Anything else like that, based on your experience or things that have happened in the past? Why is that important? 3. Did you approach club rides this season differently to Nationals or Regional Championships? For you, is there a difference between club rides and championships? What makes them different? Why is that do you think? What are the different risks and trade-offs that you consider?

	4. Can you tell me about a time this season when you had to balance endurance with other parts of your life? How did you do this? Why was that, do you think? You mentioned….., how did you deal with this? You mentioned ….., what do you mean? You mentioned …....., tell me more about that …. How did you feel about that? How did that affect what you did next? 5. Tell me, what do you think your horse gets out of doing endurance? How can you tell? What makes you think this? When your horse is … what are they doing? When your horse is performing well, what is he/she doing? When your horse is performing poorly, what is he/she doing? 6. You are an endurance rider – what does this mean to you? Are you different or the same as riders in other disciplines? Why is endurance different, do you think? Why do you feel/think that? Is endurance a lifestyle or a hobby for you? 7. Do you have people who support you? How do they do this? Why do they support you? What do they get out of supporting you? Why do you support …?
Closure and withdrawal from the encounter	8. Is there anything else that you would like to talk about? Is there anything else you want to tell me that could help me understand how you train and compete?

Appendix 14 - Transcript release authority letter to participants for final interviews

IVABS

Massey University

Private Bag 11-222

PALMERSTON NORTH 4442

1st August 2017

Dear …….

Your permission to use transcripts

Thank you for participating in the end of season interview. I hope that the data from the interview will provide some understanding of how Kiwi endurance riders train and manage their horses. You will be given access to a summary of the study findings when the study is finished, although this could take some time.

There is one final action that I need you to take. I have attached the transcript of the interview. Could you please check this, and sign the Transcript Release Authority, and return it to me in the envelope.

This step will enable me to use the edited transcript and extracts from it in reports and publications. I am conscious that the endurance community in New Zealand is small, so care and consideration will be used to ensure that you and your horse/s will not be able to be identified in the publications.

This final step is necessary because I committed to it in the Massey University Human Ethics Committee application for the end of season interviews. The pre-season interviews were covered by a low risk MUHEC application that did not include the requirement for transcripts to be returned to, and released by, participants.

Thank you in anticipation of your help with this.

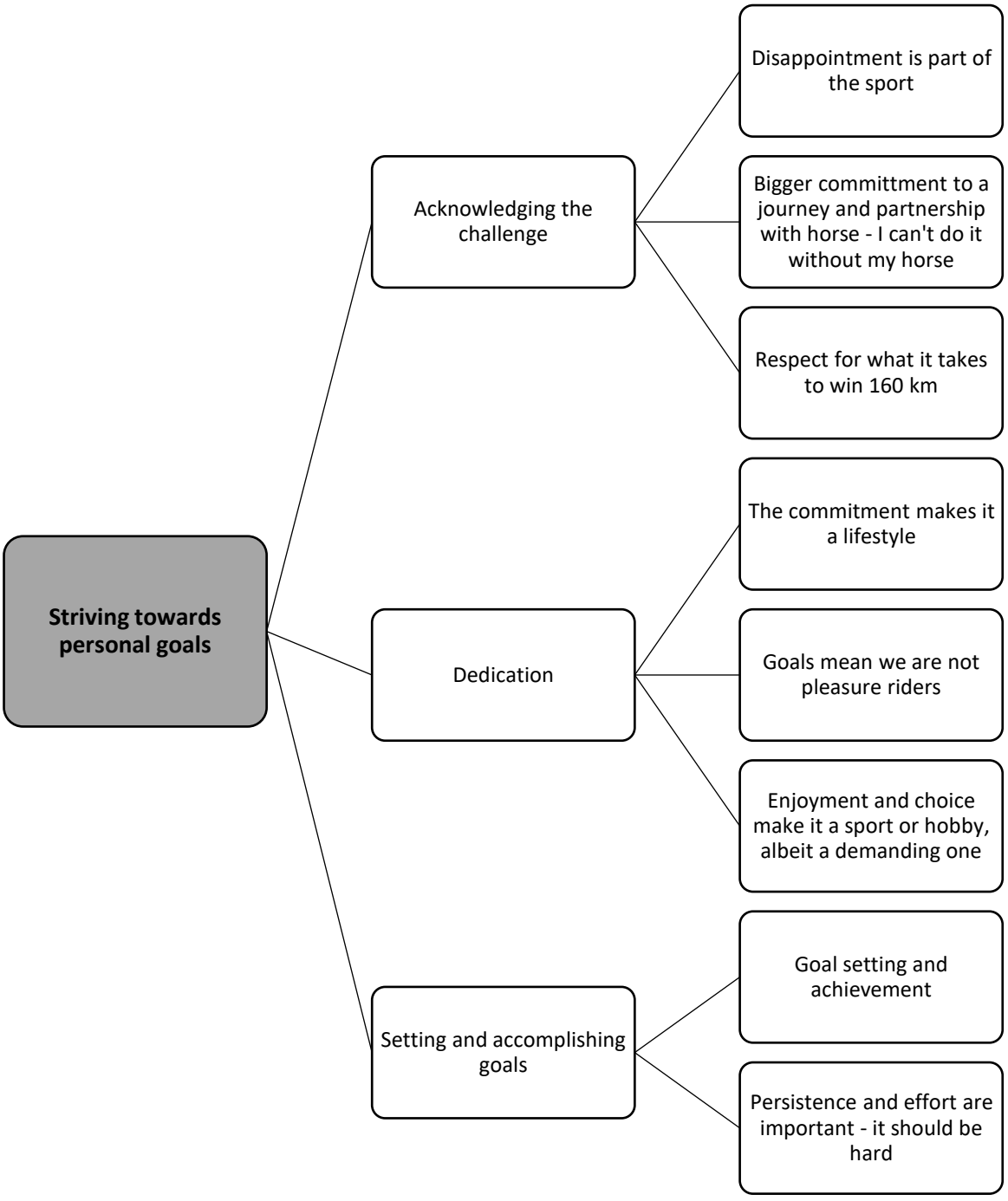
Kind regards,

Hilary Webb

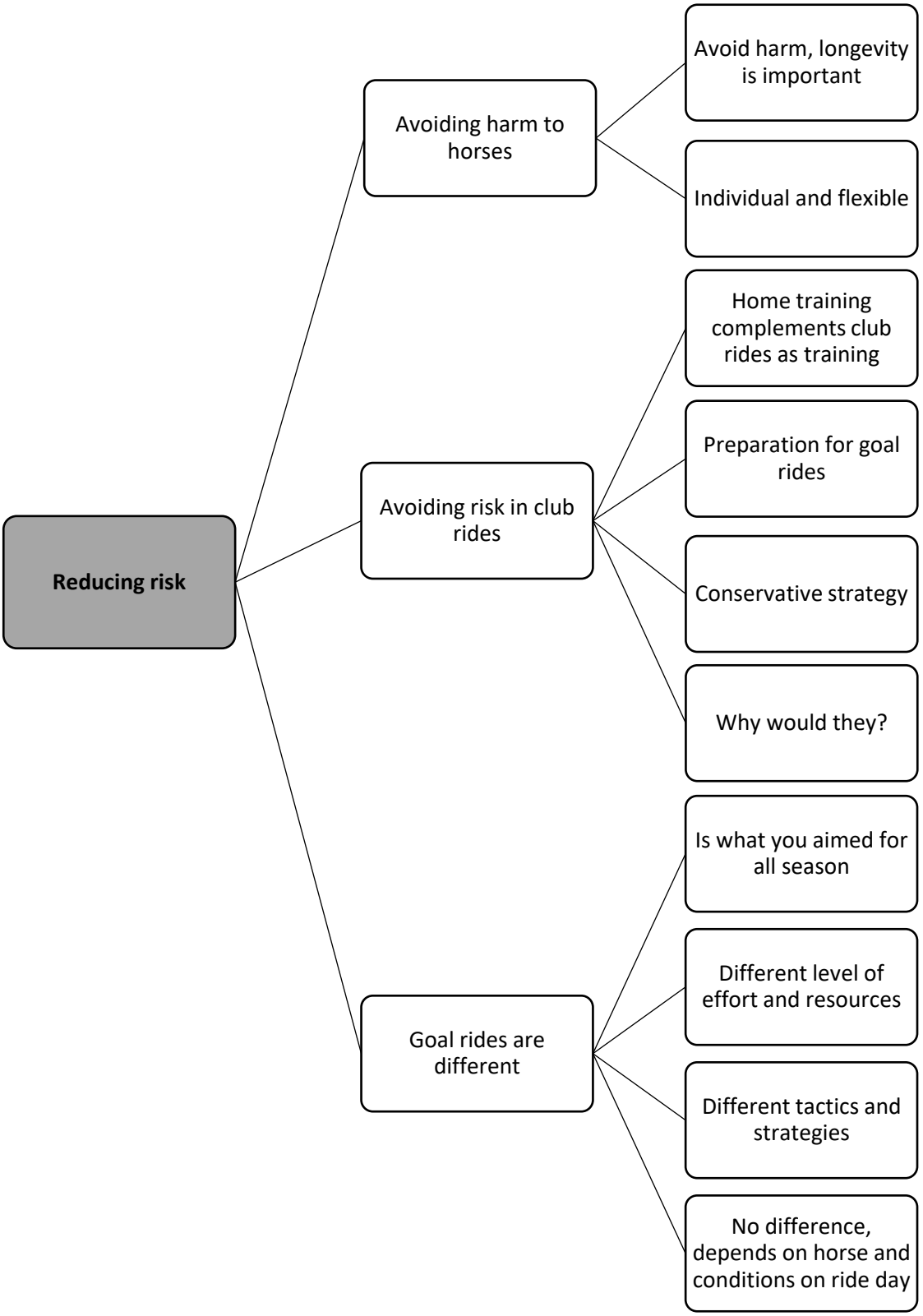
Encl: your transcript, Transcript Release Authority, and a return SAE.

Appendix 15 - Post-season study coding trees

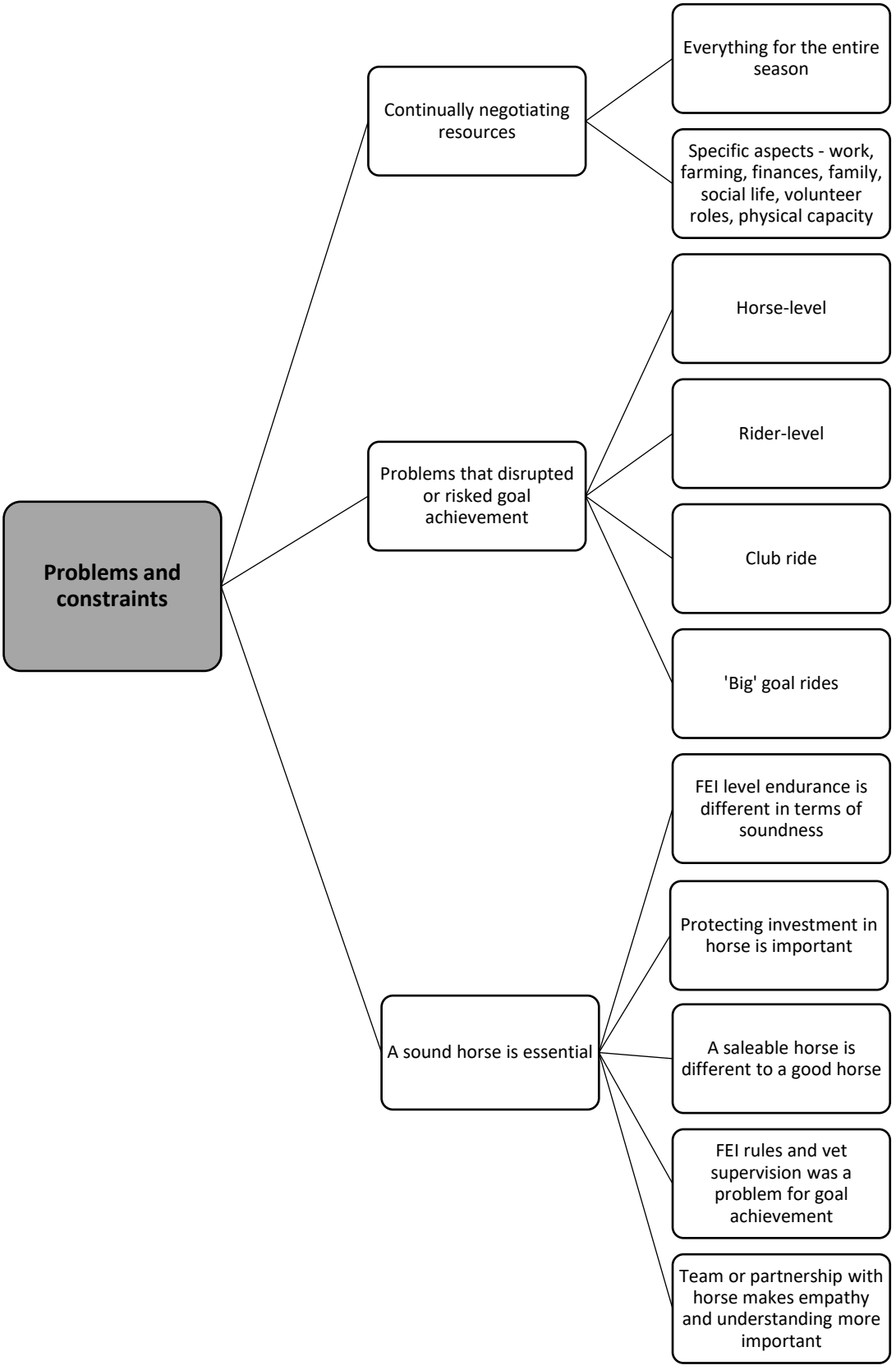
Theme 1: Striving towards personal goals



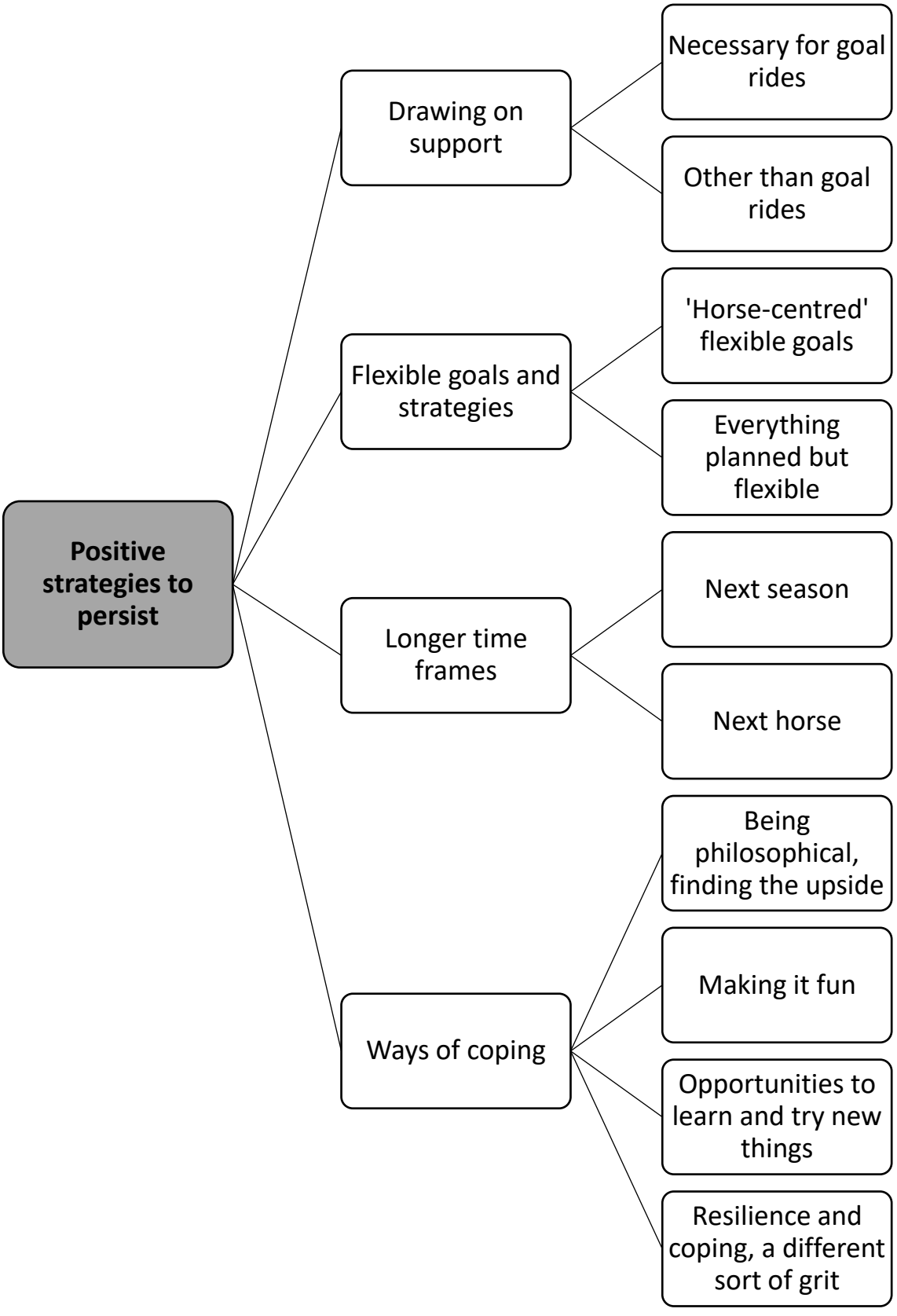
Theme 2: Reducing risk



Theme 3: Problems, disruptions, and disasters



Theme 4: Positive strategies to persist



Theme 5: Success was …