

Exploring their Dark Side or Death before DNF: ultra-athletes' motivation to compete  
in and complete ultra-distance races.

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## Abstract

Athletes undertaking ultra-distance races, especially in ultra-running, are a growing phenomenon. These events are frequently held over demanding terrain, such as mountains or deserts, and can involve many metres of vertical ascent as well as hundreds of kilometres. There is an expanding body of research into the physiological impact of such undertakings on the human body. Long-distance racing impacts adversely on the body of the athlete. Research has included the nutritional needs and calorie deficit in ultra-racing; difficulties in maintaining euhydration and avoiding hyponatraemia; sleep deprivation and its impact on mood and psychological drivers. However, there is a limited amount of literature exploring these psychological drivers that motivate athletes during ultra-distance events. The literature retrieved focussed upon specific races and athletes in specific contexts. This study set out to discover the psychological drive of athletes undertaking ultra-distance races, and how they maintained this impetus during the event itself. An ethnographic approach was used for data collection and analysis. Athletes were interviewed to elicit what drove them to pursue ultra-distance sports, and the tools they used during training and the event itself sustain their motivation. Findings from the analysed data were arranged into six broad themes: training; commitment; self-belief; mental toughness; support; addiction. During analysis, a further theme was discerned suggesting that challenging life events or changes could cause athletes to seek out ultra-distance events. Whilst links to past trauma were tenuous, as this was not identified at the outset of the study, it was identified as a theme requiring further investigation.

## Personal statement.

Ultra-endurance has become my passion and fascination over the last few years. In a previous iteration, I was a nurse and midwife, latterly a midwifery lecturer in the School of Midwifery at Otago Polytechnic. I gained significant weight after the birth of my children, and academic life caused me to become sedentary. I was a desk-bound teacher who debated each morning about the wisdom of walking up the two flights of stairs to the office. In 2009 I made a life change and embraced exercise and positive eating as fervently as I had previously rejected them. I joined a local gym and my trainer there was a triathlete. When he suggested Challenge Wanaka, I entered the full Iron length distance without truly understanding what was involved (3.8km swim, 180km ride and 42.2km run). The day of that race was more than testing. The winds were strong enough to tax even the professional athletes and, in the dark on the final lap of my marathon, I went to a place in myself I did not know existed. I was deeply focussed, deeply committed and absolutely certain I would complete my race. It was a long day but, to date, the best day of my life.

Several half and full Iron length races later, I was injured and unable to ride my beloved road bike. By now, I was determined to maintain my active lifestyle so I bought a mountain bike and painstakingly taught myself to ride off-road, something I had declared I would never do. I rode several long days of 150kms plus and thereby came to find brevet riding. A brevet is long-distance, unsupported riding. It differs from other rides in that it is usually on mountain bikes and involves both road and trail riding. The trails are often single track and involve a degree of difficulty, especially with a loaded bike.

Not wishing to sound glib, Ironman had ceased to be a challenge. Being out on the trail alone, answerable only to myself, appealed. Ironman is regimented, well supported with aid stations every thirty kilometres on the ride and every three kilometres on the run. On my long, lonely rides and runs I had dug into corners of myself, faced things that I had hidden from in the busyness and noise of everyday

life. It was both terrifying and attractive. In Tour Aotearoa I believed I had found my next challenge. It was a huge goal to ride a brevet from Cape Reinga to Bluff. As with Challenge Wanaka, I entered with naïve confidence.

Preparation for Tour Aotearoa did not occur in a vacuum. In January 2015, my younger brother died. He had a disease that was treatable but not curable, and I did not expect his death to be so soon or so sudden. This was devastating and, as he was in the UK, I could not afford to make the sudden trip to his funeral. On the start line for Tour Aotearoa in 2016, however, I was as fit as I had ever been. I had done long hours on my bike and felt confident that the distance was doable. At Cape Reinga I felt that Bluff was within my grasp. Out alone on the road and trails, however, my lack of mental preparation ambushed me. I wept my way through 1500 kilometres, mourning desperately for the adored brother I had grown up with. In Wellington I could do no more and gave up. In doing so, I opened the door to a new place of sadness—failing in something I cared deeply about.

My supervisor encouraged me to utilise my experience and this study sought to gain insight into how athletes prepare psychologically for long-distance events. The psychological training for team athletes has been investigated but there is little exploration of the drivers for athletes whose events span many hours and/or days.

This thesis is dedicated to my brother Cameron who was and is my inspiration in ways I cannot begin to describe.

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## Introduction and rationale

Before beginning the current study, a suitable definition of ultra-endurance was essential. Literature was retrieved to construct a definition which spanned the broad range of ultra-endurance. In the studies consulted, ultra-endurance was defined in the light of *which* specific race or sport was being studied. No all-encompassing, specific definition of ultra-endurance in terms of time, distance, training or preparation could be found. Moreover, athlete preparation becomes rises in complexity as time and distance increase. None of the literature located considered commonalities between athletes undertaking long-distance events. Due to this lack of clarity around the definition of ultra-endurance, a survey was conducted to canvass the athletes and coaches across long-distance sports for their definition(s). The detailed results of this survey can be found in Spenceley et al. (2017).

Given that the consensus regarding the definition of ultra-endurance is tentative at best, and that the ultra-endurance extends across a range of sports, a rudimentary definition is insufficient for this thesis. Comments from the preliminary survey found distance featured strongly for all the participants. In addition to kilometres travelled, the athletes also felt that difficulty in terrain should be a feature of an ultra-event, particularly regarding elevation gained and lost during the race. Time required for athletes to complete the event was a second common aspect noted by contributors, the majority considering that the definition found in the literature of over six hours (Zaryski & Smith, 2005; da Fonseca-Engelhardt et al., 2013; Sehovic et al., 2013; Scheer, 2019) to be insufficient.

Spenceley et al. (2017) found that survey participants also highlighted on the need for significant training prior to the event. This corresponded with the concept that ultra-endurance is above and beyond the normal run of competition, but no indication was given as to the weeks/months training required for an event. Training would include practice of the sport; nutrition advice; and decision making while sleep deprived. Some of these factors lie outside regular sports training and are designed to prepare the athlete for the adversities encountered in the chosen event.

The definition of ultra-endurance, therefore, is far more complicated than stating a certain time or distance. This study will presume a degree of challenge to the athlete that required a depth of training and resolve that extended beyond the level experienced outside ultra-endurance events.

The introduction to this study described my interest in ultra-endurance sports that arose from competing in Iron-distance triathlon. Failing to complete an event due to insufficient mental preparation caused me to consider the drivers that long-distance athletes use to compete in events that tax their physical and psychological limitations.

Ultra-endurance racing has increased in popularity over the last decade, and participation trends, especially in ultra-running, have risen exponentially (Cejka et al., 2014; da Fonseca-Engelhardt et al., 2013; Gerosa et al., 2014; Knoth et al., 2012; Sehovic et al., 2013; Shoak et al., 2013). This growth in long-distance racing has allowed researchers to examine the physiological effects on the body as athletes compete over many kilometres and multiple hours. Literature retrieved explored nutrition, especially in hostile environments (Costa et al., 2019; Dempster et al., 2013; Geesmann et al., 2014; McCubbin et al., 2016; Paulin et al., 2015; Stroud et al., 1997; Thurber et al., 2019); hydration requirements (Belval et al., 2019; Knechtle et al., 2010, 2011; Rehrer, 2001); problems such as hyponatraemia (Hew-Butler et al., 2017; Rehrer, 2001) and exertional rhabdomyolysis (Chlíbková et al., 2015; Cleary, 2016; Sanchis-Gomar et al., 2016; Skenderi et al., 2006). Most of the articles retrieved were quantitative studies and some included the athletes' mood responses, but very few described the experience from the participants' viewpoint.

Mental toughness was a factor noted by respondents in the preliminary study (Spenceley et al., 2016). There is a wide variety of studies on the subject (Cooper et al., 2018; Crust & Clough, 2005; Crust et al., 2010; Crust & Clough, 2011; Connaughton et al., 2008; Gucciardi et al., 2009, 2016; Jaeschke & Sachs, 2012; Sheard & Golby, 2010; Weinberg et al., 2017) a selection of which were reviewed for this

study. Closely allied to mental toughness is hardiness (Sheard & Golby, 2010) and resilience (Galli & Vealey, 2008). Cooper et al. (2018), expressed mental toughness as having a situational component which was dependent upon the person and the demands made upon them. Therein the athlete recounted his experiences in a series of ultra-distance races and how his understanding of mental toughness shifted depending upon the demands made of him. This concept of mental toughness being situational and person dependent revealed that mental toughness or strength can be personal and specific to the athlete and/or the event.

There was limited research on psychological preparation and support for ultra-distance athletes. Breslin et al. (2014) studied the psychological support for an athlete in a unique event of walking the same mile course 1000 times in 1000 hours. Despite noting that the athlete was committed to the project and remained highly motivated throughout, the researchers did not explore how the athlete experienced the event and how he remained committed to the project.

Although long-distance events have increased over the last decade, they remain a minority sport. The distances involved and the demands on the body place them out of the reach of many athletes. The question of obsession or compulsion was examined as athletes continue to seek to compete in harder and longer races. Outside ultra-distance sports there is a lack of understanding about why or how a person would choose to do such arduous distances. Exercise addiction is a behavioural addiction, such as gambling or excessive sexual contact. Exercise addiction was explored (Berczik et al., 2012; Di Lodovico et al., 2019; Freimuth et al., 2011; Gonçalves Baptista et al., 2019; Lichtenstein et al., 2017; Nogueira et al., 2018; Pierce et al., 1993; Scharmer et al., 2020) as many athletes progress through endurance sports to longer-distance racing, searching for more significant and taxing challenges. Addiction or compulsion is pertinent to ultra-racing, as athletes frequently sacrifice parts of their lives to training and racing. However, not all ultra-athletes are

compulsive exercisers. Addiction or compulsion did not adequately explain the drive to compete and complete ultra-distance events.

The literature retrieved for this study did not sufficiently explore what drives athletes to embrace ultra-distance racing or maintain their commitment during the event. The literature cited above explored the impact of long-distance racing on the body, and both training and event go far beyond that needed for health benefit. Hoffman and Krouse (2018) found that most ultra-runners would not abandon their sport even if evidence found it to be detrimental to health. Ultra-distance events place immense physical and psychological demands on the athlete. The body and mind of the athlete can be severely compromised. This study aimed to elicit from the athlete participants themselves why they sought ultra-distance races, and how they maintained their commitment and drive in these taxing events.

## **Literature review.**

The desire of humans to test themselves in extreme environments and/or over long distances is not a new phenomenon. The story of Pheidippides running from the battlefield in Marathon to Athens to announce the defeat of the Persians is well known (Harvie, 2011). While that athlete died at the end of his endeavour, modern athletes would expect to fare better than he. This study focussed on ultra-endurance; these being running events covering greater distances than the standard marathon of 26.2miles, or 42.2 kilometres; and races in cycling, mountain biking and swimming that are longer than 6-8 hours duration (da Fonseca-Engelhardt et al., 2013; Sehovic et al., 2013; Scheer, 2019 Zaryski & Smith, 2005). These long-distance events can cover hundreds of kilometres and stretch over many days and nights, testing the limits of the athlete both physically and mentally.

The definition for ultra-endurance lacks definition and allows for a wide variety of times and distances. An ultra-run is one that is over a marathon length ( Holt et al., 2014; Jaeschke et al., 2016; Knechtle, 2012; Knoth et al., 2012) cycling has few guidelines, other than the time definition stated above; only marathon swimming has a detailed statement regarding what is permitted in a marathon swim ([www.marathonswimmers.org/rules/](http://www.marathonswimmers.org/rules/)). For a swim to be verified, as in a channel crossing such as the Cook Strait, the swimmer is required to adhere to the rules set down by the Marathon Swimmers organisation. As running and cycling/mountain biking do not have similar definitive rules, an attempt was made to gain a consensus from the athletes themselves about what constituted a long-distance event (Spenceley et al. 2017). A survey completed by the respondents did not attain any consensus about distance or time for an ultra-distance race. Most respondents aligned with the research and considered that the event should be testing, require significant training and commitment, and be in a taxing environment (Costa et al., 2019; Dempster et al., 2013; Geesmann et al., 2014).

Ultra-endurance racing is a comparatively new area for scientific research. There has been an increase in events over the last ten years (Cejka et al., 2014; da Fonseca-Engelhardt et al., 2013; Sehovic et al., 2013; Shoak et al., 2013), particularly in the field of ultra-running (Gerosa et al., 2014; Sehovic et al., 2013). Due to the increase in events, researchers have had the opportunity to study the physiology of the human body when subject to extreme stress. Survival in extreme circumstances, such as exploration of the South Pole, has been described by authors such as Cherry-Garrard (1915) writing before the first World War, Bickel (1977) and Stroud (1997; 2004). Although ultra-athletes do not usually experience such dire conditions it could be said that they voluntarily expose themselves to exceptional demands and are thus an ethical target for legitimate research

While the focus of this study is the psychological component of long-distance racing, it is inadvisable to exclude the physical component of these events. To complete/compete in ultra-racing, nutrition is a significant factor and has been the focus of a large volume of research, not all of which will be addressed here. For this study, examination of the physiology focussed on three main areas: nutrition; hydration; physiological impact on the athlete's body; sleep deprivation. All the above are known to have significant effects on mental capability.

### Nutrition.

It is difficult to understate the importance of nutrition for athletes who are planning to race over many continuous hours or days. Despite adequate planning around nutrition, most athletes who complete long-distance events are deficient in their energy balance by the end of their race (Costa et al., 2019; Dempster et al., 2013; Geesmann et al., 2014). Deficiencies in nutrition and hydration affect the athlete's ability to cope with fluctuations in mood (Bescós et al., 2012). Moreover, studies show that energy shortfalls cannot be replenished simply by supplying additional food or items that are energy-dense during the event (Geesmann et al., 2014; Sjodin et al., 1994). There is a physiological limit to the amount of energy the body can absorb

during periods of intense activity (Thurber et al., 2019) . The remainder the body sources from the athlete's fat, muscle and bones.

Planning nutrition for long distance activity is a growing field as world-wide interest in ultra-endurance grows (Bescós et al., 2012; Costa et al., 2019; Dempster et al., 2013; Geesmann et al., 2014a; McCubbin et al., 2016; Thurber et al., 2019). Studies dating back to 1995 however, indicate that energy balance cannot be maintained, even with specially prepared foods of high energy density (Stroud et al., 1997). In Stroud's study, participants hauled all the supplies required for their 95 days of strenuous activity. Latterly, McCubbin et al. (2016) studied competitors in the Marathon des Sables in which athletes are required to carry all their provisions, apart from water. The Marathon des Sables is a five-day multi-stage race in the Sahara Desert in which athletes cover approximately 230kms. With both studies, there is a necessity for the athlete's supplies to withstand extremes of environment as well as being of a minimal load. Both Stroud et al. (1997) and McCubbin et al. (2016) note the physical difficulty of maintaining adequate nutrition in testing circumstances, where the mouth is dry or ulcerated, or the foods, while edible, are rendered unpalatable by the harsh environment. Moreover, McCubbin et al. (2016) noted that there was a significant psychological impact of eating a limited diet, despite the participants' understanding of the need for sufficient energy.

In Stroud et al.'s (1997) study, the participants had access to a high kilojoule diet but lost significant weight and muscle mass by the end of their exertions. Thurber et al. (2019) found that despite having sufficient calories available, there was a limit to how much the body can draw from an alimentary energy supply. Thurber et al. (2019) surmised that there is a plateau of ~2.5 times the basal metabolic rate (BMR) of the athlete. This being the case, any energy deficit will be made up from the body but can be partially reduced by lowering energy expenditure during the race.

The above studies stated that body fat/composition is compromised by the inability of the gut to supply the required energy from food intake, despite enough calories

being available. This is particularly noticeable in extreme environments. Other research supports this: Bescos et al. (2012) stated that in a 24-hour race even though adequate macronutrients were available, athletes could not meet expended energy requirements. McCubbin et al. (2016) observed that even with careful preparation of diet, and athletes carrying more supplies than required, nutrition still did not meet the demands of the race. Geesman et al. (2014), found that during a biking event of 1230km the intake of the athletes fell below the recommended values. They concluded that improvements in eating and drinking behaviours were needed to prevent this. Studies by Stroud et al. (1997), Paulin et al. (2015) and Thurber et al. (2019) of athletes performing in extreme environments suggest that it is not possible for participants to maintain adequate macro/micro-nutrient levels. Adequate nutritional support and consistent intake of solid and fluid nutrition cannot mitigate these deficits.

There is also significant debate around the balance of nutrients in the nutrition used by athletes during training and when competing in long-distance events.

Traditionally, the staple supply of energy for a long-distance athlete has been carbohydrate as this is the body's 'go-to' source. Burke (2015) indicated that the popularity of the Low Carbohydrate High Fat (LCHF) diet has been gaining credibility and popularity for competitive athletes but notes that there is a lack of research to support this. Inigo (2019) studied a world-class triathlete who followed the strategy of a LCHF diet due to gastrointestinal distress. His performance was markedly decreased, and his gastrointestinal discomfort was not changed.

Furthermore, the diet impacted negatively on his wellbeing and mood. Pyke (2017) concluded that there is some benefit in the LCHF diet to athletes who are performing at submaximal intensity. Athletes performing at higher intensities found a decrease in their performance. It is also noteworthy that the above studies recognised that how each athlete metabolises fat, protein and carbohydrates is different, and thus race nutrition requires a specific, individual focus.

The field of ultra-endurance nutrition is extensive, and this is a limited example. Authors study athletes in specific races; extreme environments; over multiple days and nights; during training, racing and post-race. Stroud (2004) pointed out that research around human physiology, nutrition and hydration for humans performing arduous tasks in extreme environments had advanced significantly in the last century. Nevertheless, nutritional status and hydration in ultra-distance endeavours remains difficult to maintain.

As noted above, Geesmann et al. (2014) surmised that athletes required better eating and drinking behaviour during a long-distance race. The ability to drink an adequate amount and to not over-hydrate is problematic to ultra-endurance athletes.

Linderman et al.(2003) noted that participants in a 12-hour mountain bike race could not maintain hydration or adequate calorie intake. Their performance in the race did not decline, however, despite a deteriorating mood. Linderman et al. (2003) concluded that ‘the mental aspects of ultra-endurance sports participation may be more challenging than the physiological challenges’ (p.22).

### Hydration

In 2001 Rehrer stated that sweat rates, ambient temperature and the type of exercise will influence individual fluid losses. Hydration also depended upon the ability of the athlete to absorb the ingested fluid, and a sodium/electrolyte component is vital to counteract sodium losses. Several authors (Costa et al., 2019; Dempster et al. 2013; McCubbin et al. 2016; Hoffman et al., 2019) have found that drinking *ad libitum* rather than to a set target maintains euhydration<sup>1</sup> and prevents exercised-induced hyponatremia<sup>2</sup>.

Moyen et al. (2015) evaluated the link between dehydration, mood and pain sensation in a race situation. Dempster et al. (2013) reviewed dehydration and mood

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<sup>1</sup> Euhydration: the state of maintaining body water “within its optimal homeostatic range” (Belval et al., 2019, p.1).

<sup>2</sup> Hyponatraemia: low blood sodium. In this case developed during or after physical activity (Hew-Butler et al., 2017)

in a controlled setting. In a race setting, Moyon et al. (2015) found that dehydrated athletes had increased pain, thirst, fatigue, and thermal fatigue. They conclude that being euhydrated can 'minimise negative emotions and facilitate performance' (p.1968).

Merry et al. (2010) found that physical endurance performance in a laboratory setting was impaired by mild hypohydration. In the trained individual, however, aerobic fitness mitigated the physiological impacts. It is noteworthy, however, that this was a laboratory examination of hypohydration. For this study, research conducted in the field has a greater impact but is difficult to conduct under real-time conditions.

Weitkunat et al. (2012) considered the influence of body composition in male and female open-water swimmers during a 26.4km swim in Lake Zurich. There has been significant work the loss of body mass in ultra-endurance athletes competing in long-distance events (Bischof et al., 2013; Chlíbková et al., 2019; Knechtle et al., 2008; Weitkunat et al., 2012). As noted above, athletes are found to be energy deficient and frequently dehydrated or hyperhydrated, depending upon conditions. Weitkunat et al. (2012) found that females retained more body water than males, and that males used stored energy in the skeletal muscles. It could be inferred, therefore, that the sex of the ultra-athlete should be incorporated in nutrition/hydration planning. One size does not fit all.

### Physiological studies

Nutrition and hydration are vital parts of how athletes physiologically manage their events. Studies have examined the blood picture of the athlete(s) (Dantas de Lucas et al., 2014; Lucas et al., 2008; Sanchis-Gomar et al., 2016) ; neuromuscular fatigue (Garbisu-Hualde & Santos-Concejero, 2020; Guillaume, 2011; Lepers et al., 2019; Millet et al., 2018; Temesi & Millet, 2015); pain tolerance as related to physiology (Best et al., 2018) ; rhabdomyolysis<sup>3</sup> and ultra-endurance (Chlíbková et al., 2015;

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<sup>3</sup> Exertional rhabdomyolysis (ER) is a reaction to prolonged and strenuous exercise in which skeletal muscle is broken down and toxic by-products released into the blood. Acute kidney damage is a possible and serious self-effect of the condition (Skenderi et al., 2006).

Cleary, 2016; Sanchis-Gomar et al., 2016; Seedat et al., 1989; Skenderi et al., 2006; Wichardt et al., 2011). The drawback or limitation with physiological research is that, for the purposes of this study, each paper has a specific locus for the research. Few studies, if any, assess the broad spectrum of long-distance racing. Researchers restrict their attention to ultra-running; multisport or cycling. Most of the research retrieved centred on ultra-running as this has the greatest number of participants (Bischof et al., 2013; Chlíbařková et al., 2019; Knechtle et al., 2008; Weitkunat et al., 2012) Researchers note the impact of suboptimal nutrition and hydration on the mood and pain tolerance of the athlete but do not specify how the athletes manage this situation.

The blood picture of an ultra-athlete completing a long-distance race does not remain unchanged for the duration of the event. Dantas de Lucas et al. (2014) discussed the mechanical stress during a multisport race. Prolonged exercise can cause increased blood flow to muscles, considerable damage to the muscle tissue, and increased bodily oxygen use. There will also be an inflammatory response and oxidative stress. Such a response exceeds what is commonly found in healthy exercise. Such damage to the body will impact on the athletes' both physically and mentally during the race. Suarez et al. (2011) monitored creatine kinase, urea, triglycerides, haemoglobin, creatinine, creatinine clearance and lactate throughout a 24-hour relay race. These markers indicate protein and muscle breakdown, but Suarez et al. (2011) found that renal function was not affected. Mrakic-Sposta et al. (2015), however, studying ultra-runners throughout their race, found that prolonged exercise promotes the reactive oxygen species (ROS). ROS, also known as free radicals, can cause the athletes to experience oxidative stress, inflammation and transient renal impairment (Mrakic-Sposta et al., 2015).

Exertional rhabdomyolysis (ER) is the breakdown of damaged skeletal muscle (Cleary, 2016). This is indicated by myoglobin levels in the plasma and urine. ER is not an uncommon feature of prolonged exercise, especially in running. It can also be

found in biking and triathlon, but is not as common (Chlíbková et al., 2015). Acute kidney injury is a potential, serious outcome of severe ER. Kidney injury can be exacerbated by dehydration due to poor fluid intake or excessive fluid loss due to diarrhoea and/or vomiting (Seedat et al., 1989; van Zyl-Smit et al., 2000). Insensible loss due to sweating and breathing in arid situations can also contribute to fluid loss. Difficult situations will cause greater or lesser degrees of fluid requirements which are problematic to anticipate. Over-hydration can cause exercise associated hyponatraemia (EAH). ER and EAH can co-exist but require separate and opposing treatments (Chlíbková et al., 2015). Both can cause severe injury to the athlete. In a study in 2015, Chlibkova et al. (2015) reviewed ER and EAH in ultra-athletes in running and biking and it was noteworthy that the participants did not evince signs of requiring treatment despite having ER/EAH. Chlibkova et al. (2015) found that 15.9% of participants had subclinical symptoms not requiring treatment, which indicated that ER was present in a sizable number of athletes. The pertinence to the current study is the question: does the possible knowledge or understanding of ER/EAH impinge negatively or otherwise on the participating ultra-athletes?

The above research has been included as the impact of long-distance racing is not a simple breakdown of tissues or muscles: there are effects at cellular level in the body. Indeed, a study by Freund et al. (2012) found that during a 4,487km TransEurope race the brain volume of the runners was reduced by 6% over the two months of the race. Normal volume loss due to ageing is approximately 0.2%. This reduction in volume was found to be reversed in the eight months following the event. Regular, demanding exercise over days or months is a highly damaging process. Despite this, ultra-endurance events, particularly ultra-running, continue to flourish.

### Sleep deprivation

Interrupted sleep, lack of deep sleep or sleep deprivation is known to cause deleterious effects on physiology and coping strategies. Its impact on decision-making and resolve are well known to those in defence services (Hoffman et al.,

2018; Jovanović et al., 2012; Kamimori et al., 2015; McLellan et al., 2007). Nindl et al. (2002) examined the effects of reduced and interrupted sleep on military personnel during a sustained operations (SUSOPS) simulation. They found that the servicemen in the study could maintain their operational abilities over the short term but also had a “self-reported increases in tension, depression, anger, fatigue, and confusion mood state” (Nindl et al., 2002, p.1818).

For ultra-athletes who compete in long-distance and/or multistage races, it is vital to factor in the influence lack of regular sleep on their ability to manage the event. However well-trained and prepared the athlete, months of training and planning can be negated by sleep deprivation and the poor decisions it can trigger.

Scott et al. (2006), studied sleep deprivation in a laboratory environment. One group of test subjects did moderate exercise during a period of 30h of sleep deprivation. A second group was also sleep deprived but did not exercise. This was repeated a week later with a crossover of the participants. Although the researchers conducted their study in the laboratory and not in the field it is noteworthy that participants reported “negative disturbances to vigour and fatigue” (Scott et al., 2006, p.406). In addition, there was increased depression scores for both study groups.

Scott et al. (2006) noted that having an increased depression score would enhance the sensation of reduced vigour. Moreover, the researchers found that periods of moderate exercise did not mitigate the effects of sleep deprivation on their subjects.

Lucas et al. (2009) conducted field research on three teams taking part in the Southern Traverse adventure race. This race required competitors to complete a 411km course, navigating sections of kayaking, running and mountain biking. The race covered several days and the stages do not have specific breaks. Rest/sleep time was decided within the team.

Lucas et al. (2009) recruited three teams pre-race and conducted a series of physical and cognitive tests prior to the event. The teams were similarly tested within 60 minutes of completion of the race. The cognitive testing was reaction time to a series

of Stroop<sup>4</sup> tests. Scott et al. (2006) noted a decline in cognitive testing. Conversely Lucas et al. (2009) observed that response times for simple testing was stable but that the duration of the test was relatively short, approximately 30 seconds. Scott et al. (2009) cite Dinges (1992) who stressed the importance of context on sleep deprived subjects. As the brain is made vulnerable by the need to sleep, the more environmental monotony will cause it to succumb to physiological sleepiness. Indeed, the athletes at the end of the event required prompting as they completed the Stroop test to prevent them falling asleep. When performing the physical tests, however, the athletes were able to remain awake. This contrasts with the findings of Scott et al. (2006) but as Lucas et al. (2009) point out there had been no studies where participants have exercised throughout the period of sleep deprivation. Although Lucas et al. (2009) did not consider the effects of sleep deprivation on the mood of the participants they do note that these athletes, who have been racing between 96 and 116 hours, have the ability to make quite complex decisions and to keep moving during all of that time.

Lahart et al. (2013) studied the effects of broken sleep in a four-man team competing in the Race Across America (RAAM) with specific reference to emotional regulation. The team had rest blocks of either 3 hours or 6 hours. Lahart et al. (2013) found that the participants experienced optimal mood states for only 50% of the time. Nevertheless, they managed to place third in their class. Lahart et al. (2013) noted varying emotions running through the team, including anger and, conversely, intense enjoyment of feeling “the strongest throughout the whole race” (Lahart et al., 2013, p.484). Despite these positive feelings while riding, issues around food and sleep when stopping for a break could lead to negative emotions when interacting with support crew. The salient factor from this study was that the team continued to race well throughout these difficulties. This supported the findings of Lucas et al.

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<sup>4</sup> Stroop test: the Stroop test measures the reaction time when a respondent is presented with a mismatch in stimuli, for example, the word *blue* is shown in the colour *red*. The participant must focus on the colour, rather than reading the word.

(2009) in that the team continued to function effectively over the period of the race. It was noticeable, however, that teams in the Lahart et al. (2013) study were sleeping at pre-set periods whereas the adventure racers in Lucas et al. had no schedule except that decided upon by the team. Lahart et al. (2013) found that as the RAAM continued sleep latency (i.e. the period of time it took athletes to fall asleep) increased. The amount of refreshing sleep the cyclists obtained was thus reduced. Lahart et al. (2013) suggest that to promote restful sleep the breaks for the athletes should be longer but one would speculate that during an intense race such as RAAM facilitating this requirement would be problematic.

### Mental toughness

There is a broad range of research into the physiological impact of ultra-endurance events on the bodies of those competing. The above studies are only a small sample ranging across a wide area. Many studies, especially those focussed on nutrition and hydration, regard their research as guides for improvements in planning for events. As ultra-running is the best known and fastest growing of ultra-endurance sports, it is logical that much of the research is directed towards that area. The research retrieved above assess mood in relation to hydration; nutrition; sleep deprivation; muscle damage. While it is undeniable and inevitable that physiology will impact upon the mental state, even the best preparation cannot sustain an athlete in extremis. Even a well-prepared athlete will still incur physical damage and face psychological challenges.

Ultra-distance racing provides researchers with the opportunity to examine human physiology under duress outside a laboratory environment. As identified above, ultra-races frequently take place in harsh and challenging environments, such as the ultra-marathons Marathon des Sales and Badwater, which are in desert environments. Others feature loops in which competitors complete as many circuits of a track in a given time. Races that feature remote and demanding territory, or continuous, repetitive circuits are taxing both physiologically and psychologically.

Training and preparation can carry an athlete only so far as new difficulties will arise in an event whether the athlete is an experienced ultra- competitor or a novice. The athlete is frequently alone, traversing the course in the dark or in adverse conditions. It is at this point that the psychological capacity of the athlete will supplement or even replace the physiological strength s/he has.

Cooper et al. (2018) recounted the experience of one author, Cooper, being part of a two-man team for RAAM focussing on how mental toughness is constructed. In relation to my study, the construction of mental toughness is a significant concept, and one that has been much discussed in many sports. Indeed, the researchers noted that it has become “a ‘catch-all’ for numerous positive psychological constructs” (Cooper et al., 2018, p.2). They went on to suggest that in studies (Crust et al., 2016; Crust & Clough, 2011; Gucciardi et al., 2009, 2016, 2017; Jaeschke et al., 2016; Jaeschke & Sachs, 2012) mental toughness could be identified as a set of positive responses to an adverse or challenging situation. It cannot, however, be seen in isolation but involves a “person-situation interaction” (Cooper et al., 2018, p.2). Crust et al. (2016) and Jaeschke et al. (2016) examined the athlete perception of mental toughness in ultra-racing but the study by Cooper et al. (2018) underlined the variety of emotions and situations that impact, negatively and positively, on the experience of mental toughness.

While mental toughness is most associated with positive psychological qualities, studies suggest (Crust et al., 2016; Gucciardi et al., 2017; Hoffman & Krouse, 2018; Wickens et al., 2015) that there is a limit beyond which the obverse is the case. Those performers who overvalue mental toughness can make unwise decisions about their safety, (Crust et al., 2016) or take unnecessary risk. A “summit or die” mindset (Wickens et al., 2015) or excessive levels of commitment or competitiveness can see athlete overtrain, have insufficient rest or ignore significant injuries (Crust et al., 2016).

The research into ultra-distance swimming is sparse compared that of ultra-running but is valuable, nevertheless. Swimmers are in a foreign environment and their senses are moderated by their surroundings. Open water swimmers, in addition, have the hazards of wind, tides marine life and, in some cases, shipping to take into consideration. As noted above, marathon swimming has specific rules about the completion of a long-distance swim ([www.marathonswimmers.org](http://www.marathonswimmers.org)). De Ioannon et al. (2015) and Schumacher et al. (2016) studied, respectively, the mood changes and the coping mechanisms of swimmers undertaking a channel crossing.

De Ioannon et al. (2015) examined both the physiological and psychological changes in a swimmer making the first crossing of the Adriatic Sea, a distance of 78.1km. The researchers conducted pre and post event tests of the athlete's body composition and evaluated his mood using a Profile of Mood State (POMS) questionnaire. During the swim his stroke rate, stroke count and rate of perceived effort (RPE) was analysed. The swimmer experienced a change in wind speed as the swim progressed and near the conclusion of the swim his RPE was at 10 and his speed through the water decreased as conditions changed. A POMS test administered within 90 minutes of completing of the swim showed, not unremarkably, a significant rise in fatigue and a corresponding fall in vigour. Anger, raised in the pre-swim test, had fallen post-swim.

This comparatively limited study undertakes to examine a swimmer who is making a first time crossing of a large body of water. The stated aims of the paper were to examine pacing of the athlete during his attempt, but they went onto to say that a Hazard Score (HS) combines the momentary RPE with the amount of the swim remaining. The athlete received both encouragement from his support crew and information of the distance remaining in the swim. This tactic was used both to inform the athlete and to encourage his commitment but may have impacted upon his estimation of RPE and HS.

Schumacher et al. (2016) examined swimmers crossing the English Channel, a distance of 21 miles/35km. They separated their findings into environmental experiences; physical experiences; social experiences and psychological experiences. Swimmers are uniquely out of their environment: having trained in a pool or open water can only prepare an athlete so far for the hours dealing with a situation where they are required to be so internally focussed. There is little in the environment to support or distract them: rather the environmental experience was a challenge to be overcome. Shumacher et al. (2016) described “rough seas and strong winds, extreme weather shifts, cold water and strong currents” (p. 330). The English Channel is a shipping lane and swimmers were required to navigate around large vessels heading for the ports. Additionally, athletes under marathon swimmer rules cannot use protective wetsuits and spend many hours in cold sea water. Physical and mental fortitude is thus a requirement for this type of undertaking.

Schumacher et al. (2016) described the mental focus of these athletes as coping. They separated the coping strategies into internally and externally focussed. An example of an internally focussed strategy would be the swimmer concentrating on achieving a smooth steady stroke rate. An external strategy was swimming to the next feed or for the next hour. Swimmers rarely dwelt on the entirety of the swim but going from feed to feed or to the next communication with their crew.

Furthermore Schumacher et al. (2016) discussed the swimmers’ relationship to time. The concept is pertinent to this study as all ultra-athletes cover long distances over a substantial number of hours. One of the swimmers in the study remarked: “You’re supposed to be comfortable with the idea of an open-ended swim” (Schumacher et al., 2016, p.332). In addition, undertaking a swim in the English Channel is weather dependent so the start window can vary by several days. Thus, the start and finish of the swim was not predictable. While swimming the athletes were dislocated from time and from external stimulation and were required to be internally focussed. Such circumstances necessitated a limited focus: the next stroke, the next feed, the next

contact with the support boat. Mentally, the athletes experienced negative thoughts and doubts; physically any pain or discomfort was exacerbated.

The athletes studied by Schumacher et al. (2016) were well prepared for the environment and their own possibly damaging negative thoughts. Their training allowed them to be confident in their abilities to complete the swim but they still battled with negative emotions. Unlike land based ultra-distance events, these athletes had no opportunity to rest and then return to their race. Physical contact with the support vessel would indicate an end to their attempt so, as one participant stated their choices were limited to “you can get out, you can cry for your mommy or you can swim” (Schumacher et al., 2016, p.334). To rise out their low moods, all the swimmers could draw on was their mental strength.

Of all the literature retrieved for this study, perhaps the most remarkable was by Breslin et al. (2014) that followed the preparation for a unique ultra-endurance walking event. Breslin et al. (2014) followed the psychological preparation of an athlete as he trained to replicate a walking challenge first performed in 1809. Unlike other research on ultra-events that involved races or competition, for this study a single athlete walked the same mile course 1000 times in 1000 hours, which amounted to approximately forty-two days. The feat was unique not simply for the distance covered but for the repetition required and the duration of the event. The task necessitated almost six weeks of interrupted sleep and accumulation of fatigue and thus, as demonstrated by Lucas et al. (2009), a deterioration of performance. Moreover, as noted by Dinges (1992), because the athlete walked a repetitive course there was little environmental stimulation to mitigate the effect of the cumulative sleep deficit.

During the challenge, Breslin et al. (2014) utilised a POMS questionnaire to assess the athlete’s mood state. The questionnaire evaluates six mood states: anxiety, depression, anger, vigour, fatigue and confusion. The researchers employed tests that had demonstrated reliability and validity in previous studies. Breslin et al. (2014) cite

Scott et al. (2006) who found that moderate exercise had a positive regulating effect on mood. Given that the subject would experience extreme sleep deprivation over the course of the event, the research team utilised the results of the POMS test to support and encourage the athlete.

Breslin et al. (2014) briefly explore the concept of mental toughness as expressed by Clough et al. (2002). There are four core traits of mental toughness according to Clough et al. (2002). These are described as “The 4 Cs”: Commitment; Confidence; Control and Challenge. The participant needed to demonstrate a commitment to completing the challenge; he required confidence in his ability complete the challenge; a belief in his ability to control what can be achieved and the ability to recognise that the challenge presented an opportunity rather than a threat.

Researchers administered the MTQ48 prior to the event to provide a baseline for the athlete’s mental preparation. As with the POMS test the results of the MTQ48 was used to give positive feedback and support to the athlete over the course of the event.

The athlete did not have a sport psychologist with him for the duration of the event so maintained a diary that recorded how he felt each day. The purpose of the diary was to depict how the athlete viewed the problems and the threats he felt as the challenge progressed. The athlete utilised the diary to assist with his motivation.

Breslin et al. (2014) found that the participant was highly motivated to complete the challenge and had a significant amount of confidence based on his having previously completed events in hostile environments. In addition to this intrinsic motivation, the athlete had extrinsic motivation from the interest of friends and colleagues, and fund-raising commitments to charities. Nevertheless, he perceived that some issues were beyond his control, such as injury. While this remained unlikely as walking is low impact, as the athlete became more fatigued, the possibility remained.

Surprisingly, given the duration and the repetitious nature of the challenge, the participant remained psychologically balanced throughout the event. The researchers

found that the athlete “did not markedly alter (in) cognitive performance or mood over the 42-day period” (Breslin et al., 2014, p.69).

Murphy et al. (2012) presented an overview of the physiological and psychological effects of the “1,000 miles in 1,000 hours” walking challenge. This study gave more detail of the athlete’s responses to the POMS and MTQ48 questionnaire. Throughout the challenge the athlete demonstrated an “‘iceberg’ profile...consistent with previous research with elite athletes” (Murphy et al., 2012, p. 787). He retained his positive mood and vigour throughout the challenge, apart from a decline in vigour at 200 and 400 miles. The authors surmise that this was because the athlete was negotiating injury at this point as his anxiety and confusion scores rose correspondingly. Throughout the task the athlete’s scores for the MTQ48 questionnaire remained stable, and his commitment and confidence remained high. As Murphy et al. (2012) pointed out, their study of sleep disruption of this duration was unique and offered insight into how the body copes with prolonged sleep deprivation with the addition of prolonged low-intensity exercise. It is noteworthy, however, for the purposes of this research, that the athlete was able to have planned breaks at set times. In addition, he was able to maintain some form of diurnal rhythm as he did not sleep during the day but only during his night-time rest periods. This more regimented schedule could have had the effect of supporting the participant through his fatigue, although as noted by Lahart et al. (2013), sleep quality and sleep latency is negatively impacted by short duration breaks.

Jaeschke et al. (2016) explored ultra-runners’ perceptions of mental toughness. This qualitative enquiry examined how long-distance runners viewed mental toughness, and how they defined its qualities. Unlike the more formal construction of the MTQ48 questionnaire, the authors stated that mental toughness as an aspect of ultra-running was “a challenging construct to define and develop due to the social context in which it is studied” (Jaeschke et al., 2016, p.243). Moreover, mental toughness is highly dependent upon the athlete and her/his environment, that is a “contextual variance

of mental toughness” (p. 244). Cooper et al. (2018), when researching mental toughness in a RAAM rider, cite Gucciardi et al. (2016) that stated mental toughness had a “within-person variability” (p.3) that varied across situation and time. Moreover, the disposition of the person added further variation to the expression of mental toughness. If it is accepted that mental toughness can be context dependent, a person can therefore be mentally tough in some situation and times but not in others. It could be argued that the environment of an ultra-race is calculated to evince the mental toughness of its participants.

The concept of mental toughness being situation specific is pertinent to the current study. The participants of Jaeschke et al. (2016) were ultra-runners and to Cooper et al. (2018) cyclists: the respondents to this research spread across the field of ultra-distance. Jaeschke et al. (2016) pointed out that adverse environmental conditions are integral to ultra-distances races. Indeed, some races are renowned for being set in desert or polar locations. Lucas et al. (2009) researching athletes in the Great Southern Traverse noted that weather conditions had a wide variation of temperatures (2.6-22.3 degrees Celsius over the five days of the race), and hail and snow above 1000 metres. Contestants in ultra-racing expected to face weather challenges, physical hardship, sleep deprivation, minor injury or equipment failure, nutritional issues and time pressure but remain sufficiently resilient to push on towards the finish. A notable theme in the definition of mental toughness by the respondents in Jaeschke et al. (2016) was the ability to persist in an event when in pain or injured. Indeed, one participant recalled witnessing finishers who had suffered damaging injuries finishing races. Similarly, competitors who had been battling fatigue, sleep deprivation or adverse conditions maintain the desire to finish the event and complete the challenge.

A further feature of the research conducted by Jaeschke et al. (2016) in relation to the current research was the concept of camaraderie or social support between the competitors in a long-distance race. Thus, a vital part of ultra-distance events is the

notion of support. While this may not appear likely in an event focussing individual performances rather than a team effort, support from the ultra-athlete community or support from family or volunteers during the race is vital to the ultra-distance athlete. In Cooper et al. (2018) the athlete described being emotionally supported and encouraged by his family while racing. The support of his wife and presence of his daughter buoyed his sense of mental toughness. Cooper et al. (2018) cite Connaughton et al. (2008) who demonstrated that the encouragement of significant others in the life of an elite athlete enhanced the development of mental toughness.

There is a plethora of literature that can be retrieved examining mental toughness and its application to a wide variety of sports. It is closely allied with resilience, grit and hardiness, all of which cause an athlete to endure in adverse circumstances for eventual gain. In ultra-endurance, however, it could be argued that such qualities can cause the possessor to take unnecessary risk (Crust et al., 2016), or to continue a race when severely injured (Jaeschke et al., 2016). Although ultra-racers value the camaraderie of their group highly (Hoffman & Krouse, 2018) it could be argued that the 'war stories' athletes share have the effect of promoting mental toughness over rational decision-making (Hoffman & Krouse, 2018).

As noted above, mental toughness is most associated with positive psychological qualities, studies suggest (Crust et al., 2016; Gucciardi et al., 2017; Hoffman & Krouse, 2018; Wickens et al., 2015) that there is a limit beyond which the obverse is the case. Hoffman and Krouse (2018) explored the notion of ultrarunners' commitment to their sport by asking whether they would consider giving up ultra if evidence confirmed it was bad for their health. Unsurprisingly, most respondents replied that they would not cease running, demonstrating that they felt that running had a significant life-meaning for them outside the perceived health benefits. Hoffman and Krouse (2018) speculated that this could indicate that this group "consists largely of individuals with addictive behaviour or other psychopathology" (p.217) but do not explore this further. They deduced that the most significant

influence in continuing to run is psychological coping and life meaning. It is not examined why these athletes pursue such a taxing means to assist their coping skills.

### Exercise addiction

The effects of having an undue regard for mental toughness can lead an athlete to make decisions that impact upon his safety or wellbeing. In 2016 Crust et al. investigated the attitudes of high-altitude mountaineers. They found that those who constantly monitored risk, thinking ahead rather than being completely goal or summit focussed, were more successful and less likely to be injured. This aligns with the concept that the ability to disregard pain, injury or risk, while beneficial for the ultra-athlete, can also be detrimental. Crust et al. (2016) found that becoming goal obsessed could lead to athletes taking undue risks, ignoring indications of severe damage or injury. Ultra-athletes admire those who finish despite severe injury, but this could be argued to be a pathological symptom rather than a strength. The current study found that there was certainly the possibility that ultra-athletes go beyond commitment and comfort to achieve their goals. In races it is not unusual for athletes to continue despite injury, sleep deprivation or dehydration (Holt et al., 2014). Considering the putative negative effects of excessive resilience or mental toughness, the concept of behavioural addiction was examined.

Exercise addiction, compulsive exercise or obligatory exercise are terms used to indicate exercise that can have adverse effects upon the athlete. Behavioural addictions are, for example, excessive gambling, compulsive shopping and unfettered sexual behaviour. In the past the term “positive addiction” was used (Glasser, 1976) to contrast with negative addictions such as alcohol or drug use. Latterly, it has been argued (Landolfi, 2013), that addictions always have harmful effects and excessive exercise can lead to injury and major life disruptions by subsuming other obligations in the need to exercise. Researchers (Allegre et al., 2007; Landolfi, 2013; Schüller et al., 2014) draw a clear distinction between committed exercisers and those who feel compelled to exercise. Committed exercisers, such as

an athlete with a long-term Olympic goal, are aware of and can sustain a balance between their sport and other responsibilities.

Behavioural addictions, as noted above, are becoming more widely known but there is discussion whether such pursuits are addictions or compulsive behaviours. Berczik et al. (2012) contend that addiction is the appropriate term “because it incorporates both dependence and compulsion” (p.404). Moreover, researchers (Allegre et al., 2007; Berczik et al., 2012) emphasise that exercise addiction is separate from and different to committed exercise in that negative outcomes from overtraining are known but ignored. In a modern context the difficulty arises in that exercise is mainly seen in a positive light with health-affirming benefits, unlike alcohol or substance abuse. A fervent exerciser is seen as a “fitness freak” with more admiration than censure. An alcoholic, however, is viewed with pity or disgust. Studies (Berczik et al., 2012; Hoffman & Krouse, 2018; Landolfi, 2013) indicate that negative effects can be found in exercise addiction in that the addict gains pleasure and/or relief from the behaviour; repeated inability to control the behaviour; withdrawal symptoms if the behaviour is stopped and impairment of daily functioning (Freimuth et al., 2011).

The current study did not explore exercise addiction in the participants: nevertheless, several respondents ascribed to the principle of ‘death before DNF’ (did not finish). Robin stated, *‘I’m the type of person that would be carried off in a gurney before they say I pulled the pin’*. Such was the drive to complete the event that athletes preferred injury to pulling out of an event. As the literature for psychological preparation or support for athletes undertaking ultra-events was sparse, it was challenging to assess what tools the athletes used to prepare for their races. Most of the literature accessed considered team sports (Anthony et al., 2020; Fourie & Potgieter, 2001; Gucciardi et al., 2017; Haugen et al., 2016) or studied a specific event (Breslin et al., 2014; Chidley et al., 2015; Crust et al., 2016; Schumacher et al., 2016; Wickens et al., 2015). As described above, one particular piece retrieved researched the preparation of an athlete for a unique ultra-event of walking 1000 miles in 1000 hours (Breslin et al.,

2014). In a related article, Murphy et al. (2011), examined the challenges to the athlete on all levels, biochemical, physiological and psychological. The subject was an elite athlete with a strong commitment to the project, and his mood remained remarkably constant throughout the challenge. However, there was little to indicate why the athlete embarked upon such an undertaking or what tools he used when his mood was low.

There is a substantial volume of research into the impacts of long-distance events on the body of the athlete, the nutrition and hydration support required and the concept of mental toughness or resilience in the athlete. The literature retrieved is a limited selection of an increasing body of research. Nevertheless, there is little on how the athletes perceive or manage the psychological aspects of their training and event. Most studies are specific to one event and branch of ultra-distance sport.

#### Extreme sports.

While retrieving literature for this study, research pertaining athletes performing extreme sports was perused but given limited consideration. Kotler (2014) and Swann (2016) described the 'flow' state athletes attained when they were focussed and performing at an optimal level. In this state Kotler (2014) stated that the athlete bypassed the pre-frontal cortex of the brain and existed absolutely in the present moment. Kotler (2014) did not suggest that the athlete had not planned and assessed the risks involved in her/his actions but rather that they did not allow fear of possible difficulties or dangers to impinge upon their actions. Actions followed decisions smoothly and without hesitation. They entered 'the zone' where decision making was almost subconscious. Maintaining this putative level of peak arousal continuously over many hours and/or days appeared to exclude athletes completing long-distance events and thus the literature pertaining to extreme sports was not included. Further reading (Brymer, 2010; Brymer & Schweitzer, 2013; Swann, 2016; Swann et al., 2017a, 2017b), however, caused the researcher to review this decision, especially considering that many participants described races in which they existed

from one footfall to the next. Swann et al. (2017a) describe a flow state as an 'intrinsically rewarding state characterised by intense focus and absorption in a specific activity' (p.376). A clutch state, however, is distinguished from flow by 'heightened and deliberate concentration, intense effort, and heightened awareness' (Swann et al., 2017b, p. 2272). In addition, Swann et al. (2017b) also noted that clutch also included the notion of control. Consideration of flow and clutch states, therefore, had more significance and merits more research than was given in this study. Moreover, entering and losing the flow or clutch states could align with the athletes' descriptions of the highs and lows experienced during their events. The access to flow and clutch states, and the concomitant nutritional/hydration status of athletes, could also merit further study.

There is a continuing fascination in both research and popular literature with those who willingly expose themselves to extreme situations. Athletes pursuing risky sports or explorers traversing ice or sand deserts are the subject of books or television programmes. In recounting his journey across Antarctica with Ranulph Fiennes (1994), Dr. Mike Stroud notes that, once they had made the decision to end their unsupported trek, they became almost incapable of moving. Their abused bodies could no longer support the damage they had sustained. Yet, up to that point, they had been walking up to ten miles a day, unbearably cold, frostbitten, hungry and injured. One can surmise that it was their mental fortitude that allowed continuation against everything their bodies were telling them. This is an extreme case, but ultra-athletes willingly and repeatedly expose themselves to physiological peril and psychological anguish to compete in and complete long-distance events. The literature cited above is an example of the physiological preparation athletes required to complete their events: the psychology behind these taxing events is far less clear. Literature examining mental toughness and similar qualities is extensive, especially for team sports. Ultra-sports are largely trained for and completed alone, and thus psychological preparation is far more personal and specific. For individuals

in ultra-races there was a far more complex rationale to compete and complete events, and to continue even when physical resources are dangerously depleted.

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Exploring their Dark Side or Death before DNF: ultra-athletes' motivation to compete in and complete ultra-distance races.

Abstract

The rise of ultra-distance racing, especially in ultra-running, is a recent phenomenon. These events are frequently held over demanding terrain, such as mountains or deserts, and can involve many metres of elevation change as well as hundreds of kilometres.

Long-distance racing impacts adversely on the athlete and thus there is an expanding interest in the physiological effect on the human body. Research has included the nutritional needs and calorie deficit in ultra-racing; difficulties in maintaining euhydration<sup>5</sup> and avoiding hyponatraemia<sup>6</sup>; sleep deprivation and its impact on mood and psychological drivers. However, there is a limited amount of literature exploring the psychological drivers that motivate athletes to compete in and complete ultra-distance events. The majority of the literature retrieved focussed upon specific races and athletes in particular contexts. This study set out to discover the underlying drive of athletes to undertake ultra-distance races in a broader context, and how they maintained that impetus during the event.

An ethnographic approach was used for data collection and analysis. Findings from the analysed data were arranged into five broad themes: training; commitment; self-belief; mental toughness; addiction. During analysis, a further theme was discerned suggesting that challenging life events or changes could cause athletes to seek out ultra-distance events. Whilst links to past trauma were tenuous, as this was not

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<sup>5</sup> Euhydration: the state of maintaining body water "within its optimal homeostatic range" (Belval et al., 2019, p.1).

<sup>6</sup> Hyponatraemia: low blood sodium. In this case developed during or after physical activity (Hew-Butler et al., 2017).

identified at the outset of the study, it was recognised as a theme requiring further investigation.

Key words: ultra-endurance; psychological drivers; ultra-distance; athlete(s); ethnography.

## Introduction.

*I think I just got so unbelievably cooked and my legs were so unbelievably sore, the sorest leg pain I've ever had in my life...I thought that this is my physical limit, because I started to think do I have rhabdomyolysis<sup>7</sup>?...my legs were just- I couldn't even kneel to bend down on them... I was just like what's happening, do you know?... I just have to get out of this town. And I was moving, and that always comes back to it. That if you are moving, it doesn't matter how slow it is, it's faster than not moving. When you're still making headway towards where you're going, so just yeah. Just went. I don't know why I did it, well, the reason I wouldn't have stopped, I guess, is like what do you do then? (Luke).*

The athlete quoted above had just ridden the hardest four days of his career in a self-supporting long-distance biking event. He had ridden continuously for eighteen hours out of twenty-four, resting only for the required six hours a day. His leg pain was so severe he wondered if he had rhabdomyolysis, in which the body breaks down skeletal muscle and can lead to acute renal failure. He was so profoundly affected that he struggled even to ride his bike up small inclines yet did not consider stopping until he had completed the event.

The desire of humans to test themselves in extreme environments and/or over long distances or time duration is not a new phenomenon. The story of Pheidippides running from the battlefield in Marathon to Athens to announce the Persians' defeat is well known (Harvie, 2011). While that athlete died at the end of his endeavour, modern athletes would expect to fare better than he. There is no specific definition for constitutes ultra-distance and an attempt was made to gain a consensus from the athletes themselves about what constituted a long-distance event (Spenceley et al., 2017). A survey completed by the respondents did not attain any definitive conclusions about distance or duration for an ultra-distance race. Most felt, however,

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<sup>7</sup> Exertional rhabdomyolysis is a reaction to prolonged and strenuous exercise in which skeletal muscle is broken down and toxic by-products released into the blood. Acute kidney damage is a possible and serious self-effect of the condition (Skenderi et al., 2006).

that the event should be testing, require significant training and commitment, and be in a taxing environment, similar to what was found in other studies (Costa et al., 2019; Dempster et al., 2013; Geesmann et al., 2014).

The popularity of long-distance or ultra-events has risen in the last decades, especially in ultra-running (Cejka et al., 2014; Gerosa et al., 2014b; Sehovic et al., 2013). The definition of what comprises ultra-distance is varied, and much is dependent upon the event chosen. Ultra-running is over the standard marathon length of 42.2km or 26 miles or events that take six or more hours to complete (Scheer, 2019; Sehovic et al., 2013; Shoak et al., 2013). Only long-distance or marathon swimming has specific guidelines on how their events are defined and conducted ([www.marathonswimmers.org](http://www.marathonswimmers.org)). Despite the increase in numbers ultra-racing is still a lesser-known sport. For example, in 2018 almost 1.3 million runners completed a marathon; ultra-races, however, attract far fewer competitors although that number is rising (da Fonseca-Engelhardt et al., 2013; Gerosa et al., 2014; Knoth et al., 2012; Sehovic et al., 2013; Shoak et al., 2013).

Ultra-endurance racing is a comparatively new area for scientific research. As noted above, there has been an increase in events over the last ten years (Cejka et al., 2014; Gerosa et al., 2014; Sehovic et al., 2013). Due to this, researchers have had the opportunity to study the human body's physiology when subject to extreme stress. Although survival in dire circumstances is known, for example, polar exploration, (Stroud, 1997) ultra-athletes voluntarily expose themselves to high demands and thus an ethical target for legitimate research. The focus of this study is the psychological component of long-distance racing, but it is impossible to exclude the physical component of these events. Examination of the physiology for this study will concentrate on three main areas: nutrition and hydration, physiological impact on the athlete's body, and sleep deprivation. All the above are known to have a significant effect on mood and psychological capacity.

It is difficult to understate the importance of nutrition for athletes planning to race over many continuous hours or days. Despite adequate planning around nutrition, most athletes who complete long-distance events are deficient in their energy balance by the end of their races (Costa et al., 2019; Dempster et al., 2013; Geesmann et al., 2014). Deficiencies in nutrition and hydration affect the athlete's ability to cope with fluctuations in mood (Bescós et al., 2012). Moreover, studies show that energy shortfalls cannot be replenished simply by supplying additional food or items that are energy-dense during the event. Thurber et al. (2019) found there was a physiological limit to the amount of energy the body can absorb during periods of intense activity.

Planning nutrition for long-distance activity is a growing field as world-wide interest in ultra-endurance grows. Previously, in 1997, Stroud et al. indicated that energy balance cannot be maintained, even with specially prepared foods of high energy density. Latterly, McCubbin et al. (2016) studied competitors in the Marathon des Sables in the Sahara Desert where athletes are required to carry all their provisions for the duration of the race. In both studies, there is a necessity for the athlete's supplies to withstand extremes of environment as well as being of a minimal load. In their disparate studies both Stroud (1997) and McCubbin et al. (2016) note the physical difficulty of maintaining adequate nutrition in testing circumstances. The mouth could be dry or ulcerated, or the foods, while edible, are rendered unpalatable by the harsh environment. Moreover, McCubbin et al. (2016) noted significant psychological impact from eating a limited or repetitive diet, despite the participants' understanding of the need for adequate energy. Thurber et al. (2019) found that despite sufficient calories, there was a limit to how much the body can absorb. They surmised that there was a plateau of ~2.5 times the athletes' basal metabolic rate (BMR) which could be obtained from the alimentary system. Any energy deficit would be made up from the body's fat, muscle and bone.

Despite athletes having ample calories available, extreme environments will exacerbate the loss of body fat and muscle tissue. Other research supports this premise; for example, Bescos et al. (2012) stated that in a 24-hour race even though adequate macronutrients were available, athletes could not meet expended energy requirements. McCubbin et al. (2016) observed that even with careful preparation of diet, and athletes carrying more supplies than required, nutrition still did not meet the demands of the race. Geesman et al. (2014), found that during a bike marathon of 1230km the calorific intake of the athletes fell below the recommended values. They concluded that improvements in eating and drinking behaviour was needed to prevent this. Nevertheless, nutritional support and consistent intake of solid and fluid nutrition could not mitigate the deficit in both macro and micro-nutrients.

There is continuing debate around the balance of nutrients in the diet used by athletes during training and when competing in long-distance events. Traditionally, the staple supply of energy for a long-distance athlete has been carbohydrate as this is the body's 'go-to' source. Burke (2015) stated that the Low Carbohydrate High Fat (LCHF) diet had been gaining credibility and popularity but there was a lack of research to support this. Pyke (2017) concluded that there was some benefit in the LCHF diet to athletes performing at submaximal intensity. However, Inigo (2019) found that the LCHF could marked reduced performance in an elite athlete. The authors also recognised that each athlete metabolised fat, protein and carbohydrates differently, and consequently race nutrition must have a specific, individual focus.

The field of ultra-endurance nutrition is extensive and is only briefly examined here. Authors study athletes in specific races; extreme environments; over multiple days and nights; during training, racing and post-race. The importance of nutrition in ultra-racing is not purely a matter of fuelling the body to continue. The literature cited above illustrates that athletes are unlikely to maintain an adequate calorie intake for the race duration. The impact of being under-fuelled for an event is noticed not only in physiology but also in the athlete's coping mechanisms and emotional

stability (Dempster et al., 2013). The author has been instructed by her coach to “eat your way out of it” (Personal communication, Graham, 2016) when experiencing a low mood in a 12-hour multi-lap race. The subsequent rise in blood sugar and mood resulted in a better finish than was expected.

Geesmann et al. (2014) surmised that athletes required better eating and drinking behaviour during a long-distance race. The ability to have an adequate fluid intake and not over-hydrate is problematic to ultra-endurance athletes. Linderman et al. (2003) noted that participants in a 12-hour mountain bike race could not maintain hydration or adequate calorie intake. However, despite athletes’ experiencing deteriorating mood, Linderman et al. (2003) found performance in the race did not decline. Hydration will also depend upon the athlete’s ability to absorb the ingested fluid, and a sodium/electrolyte component is vital to counteract sodium losses.

Several authors (Costa et al., 2013; McCubbin et al., 2016; Hoffman, et al., 2019) have found that drinking *ad libitum* rather than to a set target maintains euhydration and prevents exercise-induced hyponatremia.

Moyen et al. (2015) evaluated the link between dehydration, mood and pain sensation in a race situation. Other authors (Dempster et al., 2013) had reviewed dehydration and mood in a controlled setting. In a race setting found that dehydrated athletes had increased pain, thirst, fatigue, and thermal fatigue. They conclude that being euhydrated can ‘minimise negative emotions and facilitate performance’ (Moyen et al., 2015, p.1968). The management of adequate nutrition and hydration is vital on a physiological level. These studies also demonstrate their importance on a psychological level in maintaining a positive mood and coping with the pain and stresses of the long-distance event.

Nutrition and hydration are a vital part of how athletes physiologically manage their events. Other studies have examined the blood picture of the athlete(s) (Cleary, 2016; Lucas et al., 2008; Sanchis-Gomar et al., 2016); pain tolerance as related to physiology (Best et al., 2018; Millet, 2011; Moyen et al., 2015); rhabdomyolysis and ultra-

endurance (Chlíbková et al., 2015; Cleary, 2016; Ramos-Campo et al., 2016; Seedat et al., 1989; Skenderi et al., 2006; Wichardt et al., 2011). In the small cross-section presented here, the limitation with much of similar physiological research is that, for this study, each paper has a specific focus for the research. Few studies assess the broad spectrum of long-distance racing. Researchers restrict their attention to ultra-running; multisport or cycling. Most of the research retrieved centred on ultra-running as this has the highest number of participants (Cejka et al., 2014; Gerosa et al., 2014; Sehovic et al., 2013). Researchers note the impact of suboptimal nutrition and hydration on the athlete's mood and pain tolerance but do not specify how the athletes manage it.

### Sleep deprivation

Interrupted sleep, lack of deep sleep or sleep deprivation is known to have a deleterious effect on the physiology and coping strategies of those who suffer it. Its impact on decision-making and resolve are well known to those in defence services (Hoffman et al., 2018; Jovanović et al., 2012; Kamimori et al., 2015; McLellan et al., 2007). Nindl et al. (2002) examined the effects of reduced and interrupted sleep on military personnel during a sustained operations (SUSOPS) simulation. They found that the servicemen in the study could maintain their operational abilities over the short term but also had "self-reported increases in tension, depression, anger, fatigue, and confusion mood state" (Nindl et al., 2002, p.1818). For ultra-athletes who compete in long-distance and/or multistage races, it is vital to factor in the influence of a lack of regular sleep on their ability to manage the event. However well-trained and prepared the athlete, months of training and planning can be negated by sleep deprivation and the poor decisions it can trigger.

Lahart et al. (2013) studied the effects of broken sleep in a four-person team competing in the Race Across America (RAAM) with specific reference to emotional regulation. The team had rest blocks of either 3 hours or 6 hours, and the researchers found that the participants experienced optimal mood states for only 50% of the time.

Nevertheless, they managed to place third in their class. Lahart et al. (2013) noted varying emotions running through the team, including anger and, conversely, intense enjoyment of feeling “the strongest throughout the whole race” (Lahart et al., 2013, p.484). Despite these positive feelings, issues around food and sleep could lead to negative emotions when interacting with support crew. The salient factor for this study is that the team continued to race well throughout these difficulties.

Scott et al. (2006) studied sleep deprivation in a laboratory environment. One group of subjects did moderate exercise during a period of 30h of sleep deprivation; a second group was also sleep deprived but did not exercise. The test was repeated a week later with a crossover of the participants. Although the researchers conducted their study in the laboratory and not in the field, it is noteworthy that participants reported “negative disturbances to vigour and fatigue” (Scott et al., 2006, p.406). In addition, depression scores increased for both study groups. Scott et al. (2006) noted that having an increased depression score would enhance the sensation of reduced vigour.

There is a broad range of research into the physiological impact of ultra-endurance events on the bodies of those competing. The research detailed above is a limited sample ranging across a wide area. Many studies, especially those focussed on nutrition and hydration, regard their studies as guides for improvements in planning for events. Much of the research is directed towards ultra-running as the fastest-growing ultra-endurance sport (Cejka et al., 2014; da Fonseca-Engelhardt et al., 2013; Gerosa et al., 2014; Knoth et al., 2012; Sehovic et al., 2013; Shoak et al., 2013). The studies noted above assessed mood in relation to hydration; nutrition; sleep deprivation; muscle damage. It is undeniable and inevitable that physiology will impact the mental state and thus even extensive preparation will not sustain an athlete in extremis. Each race is different, and a well-trained athlete will evidently incur physical damage and face psychological challenges. Ultra-distance racing provides researchers with the opportunity to examine human physiology under

duress outside a laboratory environment. In addition, the harsh and challenging environments of ultra-races, such as the desert ultra-marathons of Marathon des Sales and Badwater, add a further dimension to the research. Other events feature loops in which competitors complete as many circuits of a track in a given time. Races that feature remote and demanding territory, or continuous, repetitive circuits are taxing both physiologically and psychologically. The athlete is frequently alone, traversing the course in the dark or in adverse conditions. It is at this point that the athlete's psychological capacity will supplement or even replace the physiological strength s/he has.

### Mental toughness

Cooper et al. (2018) recounted the experience of the researchers being part of a two-person team for the Race Across America (RAAM), focussed on how mental toughness is created. The construction of mental toughness is a significant concept that has been explored in many sports. Indeed, the researchers noted that it has become "a 'catch-all' for numerous positive psychological constructs" (Cooper et al., 2018, p.2). They went on to suggest that in studies (Crust et al., 2016; Crust & Clough, 2011; Gucciardi et al., 2009, 2016, 2017; Jaeschke et al., 2016; Jaeschke & Sachs, 2012) mental toughness can be seen as a set of positive responses to an adverse or challenging situation. However, it cannot be seen in isolation but involved a "person-situation interaction" (Cooper et al., 2018, p.2). Crust et al. (2010) and Jaeschke et al. (2016) examined athletes' perceptions of mental toughness in ultra-racing. While both studies emphasised commitment and tenacity, they also identified the support of other athletes within the ultra-community. The study by Cooper et al., (2018) underlined the variety of emotions and situations that impact, negatively and positively, on the application of mental toughness.

While mental toughness is most associated with positive psychological qualities, studies suggested (Crust et al., 2016; Gucciardi et al., 2017; Hoffman & Krouse, 2018; Wickens et al., 2015) that there is a limit beyond which the obverse is the case.

Performers who overvalue mentally toughness can make poor decisions about their safety (Crust et al., 2016); take unnecessary risks. A “summit or die” approach (Wickens et al., 2015) that creates excessively high levels of commitment or competitiveness can see athletes overtrain, have insufficient rest or ignore significant injuries (Crust et al., 2016). Concerning this, Hoffman and Krouse (2018) explored the notion of ultrarunners’ commitment to their sport when they asked if runners would consider giving up ultra-distance if evidence confirmed it was bad for their health. Unsurprisingly, a majority felt they would not, evincing that they felt that running had a significant life-meaning for them outside the perceived health benefits. Hoffman and Krouse (2018) speculated that this could indicate that this group “consists largely of individuals with addictive behaviour or other psychopathology” (p.217) but do not explore this further. They deduced that the most significant influence in continuing to run is psychological coping and life meaning (Hoffman & Krouse, 2018). The authors did not examine why these athletes pursue such a taxing means to assist their coping skills.

A plethora of literature can be retrieved examining mental toughness and its application to a wide variety of sports. It is closely allied with resilience (Galli & Vealey, 2008), grit and hardiness, all of which cause an athlete to endure adverse circumstances for eventual gain. In ultra-endurance, however, it could be argued that such qualities can cause the possessor to take unnecessary risk (Crust et al., 2016), or to continue a race when severely injured (Jaeschke et al., 2016). Although ultra-racers value the camaraderie of their group highly, it could be argued that the “war stories” athletes share have the effect of promoting mental toughness over rational decision-making (Hoffman & Krouse, 2018).

Being overly reliant on mental toughness can lead an athlete to make decisions that impact upon his safety or wellbeing. Crust et al. (2016), when studying high-altitude mountaineers, found that those who constantly monitored risk, thinking ahead rather than being completely goal or summit focussed, were more successful than the

“summit or die” climbers. This aligns with the concept that the ability to disregard pain, injury or risk, while beneficial for the ultra-athlete in a race, can also be detrimental. Crust et al. (2016) found that becoming goal obsessed could lead to athletes taking undue risks, ignoring indications of severe damage or injury. Ultra-athletes admire those who finish despite severe injury, but this could be argued to be a pathological symptom rather than a strength. In this study, there is undoubtedly the possibility that ultra-athletes go beyond commitment and comfort to achieve their goals. As noted above, ultra-distance sport is a lesser-known sporting activity, and those outside it barely comprehend the distances covered by these unassisted athletes. In races it is not unusual for athletes to continue despite injury, sleep deprivation or dehydration (Holt et al., 2014). Considering the possible adverse effects of excessive resilience or mental toughness, behavioural addiction was considered.

#### Exercise addiction

Exercise addiction, compulsive exercise or obligatory exercise are terms used to indicate exercise that have adverse effects upon the participant. It is termed a behavioural addiction similar to excessive gambling, compulsive shopping and unfettered sexual behaviour. In the past the term “positive addiction” was used (Glasser, 1976) to contrast with negative addictions such as alcohol or drug use. Latterly, Landolfi (2013) argued that addictions are always harmful and habitual excessive exercise can lead to injury and significant disruptions by subsuming other obligations. Researchers (Allegre et al., 2007; Landolfi, 2013; Schüller et al., 2014) draw a clear distinction between committed exercisers and those who feel obliged to exercise. Committed exercisers, such as an athlete with a long-term Olympic goal, are aware of and can sustain a balance between their sport and other responsibilities.

Behavioural addictions are becoming more widely known, but there is discussion about whether such pursuits are addictions or compulsive behaviours. Berczik et al. (2012) contend that addiction is the appropriate term “because it incorporates both

dependence and compulsion" (Berczik et al., 2012, p.404). Moreover, researchers (Allegre et al., 2007; Berczik et al., 2012) emphasise that exercise addiction is separate from and different to committed exercise in that negative outcomes from overtraining are known but ignored. In a modern context the difficulty arises in that exercise is seen as having health-affirming benefits, unlike alcohol or substance abuse. Studies (Berczik et al., 2012; Hoffman & Krouse, 2018; Landolfi, 2013) indicate that negative effects can be found in exercise addiction in that pleasure and/or relief is obtained from the behaviour; there is an inability to control the behaviour; withdrawal symptoms if the behaviour is stopped and impairment of daily functioning (Freimuth et al., 2011).

The literature for psychological preparation or support for athletes undertaking ultra-events was sparse. Most of the literature accessed considered team sports (Anthony et al., 2020; Fourie & Potgieter, 2001; Gucciardi et al., 2017; Haugen et al., 2016) or a specific event (Breslin et al., 2014; Chidley et al., 2015; Crust et al., 2016; Schumacher et al., 2016; Wickens et al., 2015). One specific research piece retrieved researched the preparation of an athlete for a unique ultra-event of walking 1000 miles in 1000 hours (Breslin et al., 2014). In a related article, Murphy et al. (2011), examined the challenges to the athlete on all levels, biochemical, physiological and psychological. The subject was an elite athlete with a strong commitment to the project, and his mood remained remarkably constant throughout the challenge. However, there was little to indicate why the athlete embarked upon such an undertaking or what tools he used when his mood was low.

There is a substantial volume of research into the impacts of long-distance events on the body of the athlete, the nutrition and hydration support required and the concept of mental toughness or resilience in the athlete. The literature retrieved is a limited selection of an increasing body of research. Nevertheless, there is little on how the athletes perceive or manage the psychological aspects of their training and event. Most studies are specific to one event and branch of ultra-distance sport. This study

explored what psychological drives ultra-athletes harness as they compete over distances that cover multiple kilometres and/or days.

### Method

It could be said that ultra-distance racing is dangerous and has no value or meaning, apart from that attributed to it by the competitors. Such extreme exercise has few health benefits and, if anything, can be destructive. It can impact hugely on the lives of its adherents and their families. Literature has demonstrated (Hoffman & Krouse, 2018) that ultra-runners would be unwilling to abandon their sport even if evidence proved it to be harmful. Nevertheless, as noted above, participation in ultra-distance events has increased (Cejka et al., 2014; da Fonseca-Engelhardt et al., 2013; Gerosa et al., 2014; Knoth et al., 2012; Sehovic et al., 2013) and thus is a legitimate target for research.

This study aimed to gain insight into athletes competing/completing ultra-endurance events, and how they maintained their motivation over the many hours and miles of their races. Krane and Baird (2005) noted the purpose of ethnography is to understand the culture or setting of the phenomenon from the view of the participants. Moreover, Sparkes and Smith (2014) stated that being part of or investigating the mindset, behaviour or language of a group allows the researcher into the experience itself. Atkinson (2012) stated that to be “a realist ethnographer” one needed to be a member of that culture and “have direct contact with the members of the culture over time” (p. 25). Ethnography espouses “intense familiarity with the setting” (Krane & Baird, 2005, p.88) with the intention of gaining thick description of the environment. In addition, the use of ethnography allowed the study to evolve as the research progressed. Although this study did not observe the participants in their specific races, the athletes were known to the researcher as she had been a competitor in several of the same events. Thus, both researcher and athlete had a shared knowledge of similar ultra-events. The participants recognised the researcher as a fellow competitor and while this assisted recruitment, it also

made her aware of the likelihood of over-familiarity and normalisation of the distances involved with ultra-endurance. The interviews were semi-structured so the participant had more say in the direction of the interview rather than be regulated by the pre-set concepts of the researcher (Kallio et al., 2016). The guide to the semi-structured interview can be found in Appendix 1.

Ethical approval was applied for and obtained through the Otago Polytechnic Ethics Committee, and the study undertaken with local athletes. As the researcher was known in the ultra-community, a gatekeeper was used for recruitment to allow athletes to decline if they wished. Once invited, and athletes had indicated their interest via the gatekeeper, their email addresses were forwarded to the researcher. Data were collected via face-to-face, semi-structured interviews which were recorded on a digital voice recorder (Toshiba WS-110). The interviews were semi-structured to allow the athlete to guide the description of their sport and the psychological tools they used in racing and training. (Interview guide Appendix 1). Interviews were then transcribed from recordings by professional audiotypists who had signed a non-disclosure agreement. The transcripts were corrected, de-identified and cleansed, then returned to the participants for member checking. Member checking asked the participants to agree that the transcript was an accurate reflection of the recorded interview (Sparkes & Smith, 2014). Once the participants had indicated the transcripts were satisfactory, each athlete was ascribed a pseudonym and MAXqda software (version 12) was used to assist in organising themes arising. Ethnography predicates an intense involvement with the data collected and that analysis can commence as the data are collected. Repeated perusal of the data was undertaken, both during and after collection. Themes that emerged illustrated why athletes entered long-distance races and the tools they used to complete these taxing events. Inductive analysis allowed themes arising from the data to illuminate the research question of how/why athletes managed their long-distance events. Replication was noted after ten interviews had been collected with no new items had emerging, and it was deemed data saturation had occurred. Although Hancock et al. (2016) stated

that data saturation is difficult to define consistently, for this study data saturation occurred when no new information was gained in data collection (Sparkes & Smith, 2014).

During the interview process the researcher was cognisant that s/he was known to most of the participants. As stated above, there was a gatekeeper to ensure that athletes did not feel compelled to join the study. Ethnography encourages the researcher to be a part of the phenomenon under consideration and while such involvement can lead to bias and assumption, it also facilitates credibility and understanding. To ensure trustworthiness, a de-identified script was analysed by an academic associate using the researcher's identified codes. A comparison between the two coded transcripts indicated that both readers had identified similar overlapping sections of data as themes.

### Findings.

Table 1: Participant demographics.

Level	Gender	Pseudonym	Age
Amateur/competitive	Male	Joshua	48
Amateur/competitive	Male	Luke	32
Professional/elite	Male	Brian	33
Professional/elite	Female	Kara	38
Amateur/competitive	Male	Joseph	44
Amateur/competitive/elite	Female	Sally	43
Amateur/competitive/elite	Male	Robin	38
Amateur/beginner	Female	Freya	33
Amateur/competitive	Male	Tom	31
Amateur/competitive	Male	Philip	28

## Normalisation

Many amateur runners have completed a marathon distance of 42.2km (26.2 miles) as their longest race. For ultra-distance athletes, distance and time are extended beyond this. Tom stated, *“it’s normal for people to go and do 100K race and will do 150 K’s or 160 K’s running in a week...the likes of (Name), it’s normal for him to ride 1,000 K’s and do that in a couple days and not really sleep”*.

Shorter distances become distances anyone can do: *“like the ... marathon I did, **anyone can get to 30 kilometres alright**, but who can still run at a reasonable click for that last 12 kilometres”* (Joseph, my emphasis). Half marathons become *“just a half”* (Freya, my emphasis), and as ultra-athletes surround themselves with others who race long events, their perception of this being normal is reaffirmed. Robin said of one of his events: *“It was just a 100k”*. Freya, a beginner ultra-athlete, stated: *“You’ve kind of surrounded yourself with people who normalise what you do. So, it doesn’t actually seem like this crazy idea”*.

Tom recognised that the viewpoint of racing over long distance is, for most people, unrealistic: *“Yeah, the perspective’s distorted because it’s normal for people to run a hundred miles”* but acknowledged that in his circle this was a common occurrence and that this extreme had become his norm. When speaking of an event considered to be an arduous adventure race ([www.redbull.com/nz](http://www.redbull.com/nz)), Philip felt this was *“going to be a reasonably relaxed race”*. As he and his partner were not racing for a position but simply *“to keep fit”*, Philip felt that race was well within his capabilities and felt comfortable and ready to enjoy the challenges. Such prosaic matter-of-factness was far from being over-confident but a measured acknowledgement of his abilities. The normalisation of the distances within these ultra-races allowed the athletes to come to terms with the number of hours they would be moving. These events were not about *“max it out go, go, go”* as Tom observed, but about the ability to keep moving forward to the finish.

## Training

*“When you’re ticking over, you’re kind of doing your 12 to 15 hours”* (Robin). That athletes do extensive training for ultra-distance events is a given. From the data, it became apparent that for athletes to do the training volume necessary to do long-distance racing significant commitment was required. Moreover, the amount of training was itself normalised by the athletes, as Robin noted above. Even when *“ticking over”* Robin was still completing a significant number of hours per week. Within the data several important factors arose: that athletes should actively enjoy their training; that support from loved ones was vital and the athlete would sacrifice other activities outside training to complete their programme. Such is a given for any athlete undertaking a strenuous event, but these athletes voluntarily committed to a level of training beyond a single event. Luke stated that for his Coast to Coast training:

*For five years, that’s all I focused on. I’d get done with one, recover from it, and then I’d start planning for the next one. All the little events in between were just stepping-stones for it. My whole year was based around it.*

Although not explicitly identified as training, the athletes spoke of their nutrition identifying it more as fuel for their endeavours. During training Philip deliberately pushed himself into nutrient deprivation to simulate race conditions: *“I think I like doing it in training because you know you’re going to hit that point in racing when you’re pushing yourself that much harder...you can either smile and enjoy something or have a cry and quit”*.

The athlete embraced the process of preparation and the demands it placed upon them. All the participants in the study followed a training programme, either written by themselves or an employed coach. Commitment to the process, naturally, did not always entail enjoyment or pleasure. Indeed, many of the athletes felt as Kara did: *“I’ve got in my programme ...I got a really sore back and it was just agony and I was like, ‘Why am I doing this to myself?’ It’s like, ‘Hang on, the aim is just to make it up the hill.’”*.

Kara questioned why she was continuing with a training session that was painful. She had two reasons: it was in her programme and, ultimately, all she needed to do was get to the top of the hill. Similarly Sally on a training ride stated: *"I'm cold, and I'm wet. And I wanted to turn around. But I thought, 'No, just go and finish anyway'"*. Neither athlete abandoned their sessions due to pain or physical discomfort. By being committed to the training session they psychologically prepared themselves for adverse conditions during their ultra-event. If an athlete does not undertake training pertinent to the event entered, simple physical fitness will be insufficient.

### Self-belief

The athletes in this study evinced a strong sense of belief in themselves as ultra-endurance performers. This core belief heightened their confidence in having prepared for the event adequately. Extensive training for the event was a given, and if the preparation went as planned, the body should perform its required tasks. Luke viewed the body like an engine:

*(give) the body stimulus to adapt and to improve the engine's capacity and you just keep building the engine's capacity and then when you line up at the start line you go out and have faith that the engine's gonna keep running. As long as you keep putting the fuel in, it keeps running.*

Freya, preparing for her first 100km, said *"I feel confident that I have trained and I have done the best training I could've done...if it's cold or windy or rainy, I still go"*.

When describing a training swim in rough water, Joshua, called it *fun*:

*they looked like they were three metre waves, we were swimming in, big, big, monster waves. They weren't breaking, or they were, too far in, but where we were, so you're actually felt like you're climbing up a mountain, and then racing down the other side, it was really fun.*

For many athletes, open-water swimming can be outside their comfort zone. Kara stated: *"that has always been my biggest fear because I'm not a good swimmer"* and Philip noted that *"I've definitely seen people freak out in open water"*. For Joshua, however, embracing this challenge had become normal: he had trained for it and felt confident

in a completely different element. He was not reckless but secure in his abilities to the extent that he considered rough seas *“fun”*.

The impression that endurance sport can be fun and thus strengthen confidence and self-belief arose from participants' data. Philip said: *“I quite enjoy endurance sport and mountain biking. And...yeah any endurance sport”*. Kara, after her first long-distance event, said *“And here I was bouncing around, ‘Ba ba ba ba ba’.”* The strong sense of their own ability to complete the task enabled the athletes to find enjoyment in completing events that for others would be excessive. Joseph noted that there was *“self-achievement that you're going to get out of it I think is the key”*.

Despite the positives that athletes gained from their training and events, they were also mindful of the difficulties that they face. Brian described training as *“a sport for loners. You can't train and compete in the Coast to Coast or an Ironman or an adventure race without being comfortable in your own company”*. Luke noted: *“And the long races, no matter when they stop, you're very pleased that they're over. But if they were longer, you would keep going”*. In those moments, the athletes had gone beyond pleasure, fun or even self-achievement. They kept going until the event was complete, whether winning or not. Sally, battling through a cold, wet and muddy training session, would not give up or turn back: *“Because that's giving up. I wasn't going to give up. Even if I was slower, just do it anyway. It's about finishing”*. Despite the difficulties she faced, she did not give up. Her attitude was direct and straightforward: *“Yeah just keep going”*.

### Mental toughness

The most extensive category to arise from the data was the idea of mental strength or toughness. Although none of the athletes expressly defined this concept, all the participants without exception felt that this was an essential factor in their ability to complete an event. Robin linked his notion of mental toughness with exploring his limits: *“that and the combination of maybe mental toughness. Or maybe more with fascination of how far you can push yourself or how far you can go, how long you can go”*.

Luke's data echoed this idea: *“I want to be one of those people that can keep pushing when*

*the body says no—well, the mind says no, but we're just going to keep going anyway". It appeared that the athletes used their understanding of mental toughness to explore how far they could push themselves, how far they could keep going "when the mind says no". Luke went on to say: "There's never an end to it, I think, until you fall down". Luke accepted that his ability to keep going would only end when he is physically unable to continue. Robin reiterated this: "I think I'm the type of person that would be carried off in a gurney before they say I pulled the pin". The participants used their definition of mental toughness to keep themselves moving in their events. Sally stated: "It gives you better mental ability. Because it's a mental thing as well. Because you get to, what, 16 hours and all you want to do it stop." Sally recognises that she wanted to stop but is determined to complete the event.*

Although Brian did not explicitly identify mental toughness, he stated: *"the mental capacity to push through those periods where you're just so exhausted that all you can literally think about is falling asleep, but you know it's the one thing you can't do."* Similar to Sally, the athletes have a prime focus on maintaining movement or momentum. Freya put it simply: *"Just keeping on going. Just not stopping."* The athletes described times of immense fatigue, pain and suffering but their overwhelming drive was to keep moving. Luke described his darkest moment in the opening quote of this article when, after several days of intensive effort, there came a time where he considered he might have rhabdomyolysis. *"I thought that this is my physical limit, because I started to think do I have rhabdomyolysis?"* At this point he considered staying where he was to rest but after he had eaten part of a meal *"(I) put the rest of it in my back pocket and was 'let's go, we're getting out of here'. I started riding just very, very slowly"*. Although Luke was alone and in considerable pain, he did not consider giving up the event: *"When you're still making headway towards where you're going, so just yeah. Just went. I don't know why I did it, well, the reason I wouldn't have stopped"*.

Several participants described going through these difficult and painful times as "pushing through" and making forward progress, however slow. Even in moments

of particular discomfort, as Luke was above, he commented: *“if you are moving, it doesn't matter how slow it is, it's faster than not moving”*. Those who are determined to finish the event, despite setbacks and pain, hold to the idea of relentless forward progress and do not allow even what could be considered viable excuses to derail them. As Robin said he would have to be: *“carried off in a gurney”* before conceding an event had beaten him.

As with Crust et al. (2016) it could be argued that an excess of mental strength causes athletes to ignore their wellbeing in order to complete a race. Joseph stated: *“you don't want to have a DNF. I've never had a DNF, I don't start a race and say, hey I'm not going to finish this race you know”*. (DNF: did not finish). Such dedication is beyond what many others commit to as it caused athletes to train early in the morning or through the night: *“so I can leave home half past three in the morning and be home at six... you're getting used to running overnight and running when you're tired as well ...”* (Robin); *“if it means I've got to get up early and go for a run while they're still sleeping, do that or once they're all in bed”* (Joseph); *“So I train early in the mornings, so hopefully before everyone wakes up”* (Luke). No-one compelled the participants to train so extensively or to enter the race. It was their choice to continue with an event. As with Joseph and his unwillingness to have a DNF the athletes' determination to continue was similar to the “summit or die” mentality of the mountaineers Crust et al. (2016) found in their study. Despite the pain and injuries experienced during the ultra-events, the athletes' drive was to *complete*, even if they could not *compete*, their races.

### Addiction

The athletes' determination to complete the event arose to some degree in their commitment and training. It could also be argued that within the race itself moving from the lows to the highs, which as Brian remarked: *“must be pretty close to what it feels like to be a crack addict...total, total euphoria”*. Joseph stated: *“pushing through those lows and trying to get that high, that runner's high”*. Such awareness indicated that some rewards for extended training and in the event itself lie in achieving these euphoric

states. There is an intrinsic reward in the race itself for the suffering that they endured during preparation. Not all ultra-distance athletes enter races to experience the euphoria described by Brian, but the data indicates that for some participants the intensity of the experience was enhanced by the highs and lows they undergo. Brian added *“you’re going to go through highs and lows, so I think those highs and lows are just magnified”*. Kara’s description after completing her first long-distance race was even more specific: *“Yeah. It was the best of high. Oh, it was so good. Yeah...it’s like you’re just on this cloud...yeah, it’s amazing”*. The term “runners’ high” is bandied about in popular literature but these athletes indicate that the intensity of these moments of exultation are as extreme as the lows and difficulties they face. For Brian, *“the highs are just like floating”*. Joshua’s description of these moments of high pleasure took another form:

*sort of a moment of zen...when you’re swimming across a big distance, there is a moment that kicks in...where it feels like you’re swimming across a lake of mercury. It just feels like you’re sort of gliding across this thing.*

His depiction created a sensation of being in the moment, of being part of the water he was swimming in. It is a particularly visual moment, one in which the athlete seemed to be outside himself, looking at himself swimming, what Joshua goes on to call *“the hero shot”*. Although not expressed by all the participants in this study, many of the athletes acknowledged their awareness that their deep lows were matched, or exceeded, by the intensity of their highs. As Brian said, *“total, total euphoria”*.

Although there has been considerable exploration of the concept of flow in sport (Jackson & Eklund, 2002; Kotler, 2014; Swann, 2016), ultra-distance athletes are required to maintain their efforts for many hours or days. It could be speculated that during an event the athletes move into and out of flow, which thus impacts on their perception of effort.

Across the spectrum of ultra-events the data appeared to support the idea that competing/completing longer distance races meets a desire that daily life does not fulfil. Despite the toll that training takes on the bodies and time, they repeatedly

return to these taxing events. Luke says that he feels *“The urge for adventure, for that unknown, feels kind of extreme”*. Joseph echoes this but brings the concept that for him seeking a greater challenge, going a greater distance is in some way compelling: *“So it just became a bit addictive really, and sort of liked the challenge of, how far can you go?”*. Embracing the challenge, the adventure has some compulsion: *“how far can you go?”*

Although Tom doesn't mention challenge or compulsion his description of his planning for an ultra-event portrays how everything is excluded except his training: *“kind of drive, drive, drive that was the only thing. I was eating, sleeping, everything to do with the race”*. He adds that he *“let grades and friends and all that kind of carry on slip”* in his desire to get to his event. As Berczik et al. (2012) found, as a person becomes obsessed with an idea, other parts of their lives become unbalanced. For Tom, this was the case, as he later recognised.

Several participants labelled themselves as having an “addictive personality”. Robin stated: *“it's a wee bit of addictive personality or a semi kind of hard-core that way”* (Robin). Likewise, Kara: *“I've got quite an addictive personality”*. Both these athletes described their drive to compete in ultra-distance as something which is almost outside their control. Unlike the race-driven reward of the highs alluded to by Brian, both participants appear to feel that this is a fundamental part of their character that is expressed in the event. Luke, despite fitting his training commitments around a busy life, realised that there is a compulsive nature to his competing in ultra-distance events: *“I find that if I'm not doing it, then everything suffers in terms of I'm pretty reliant on it I guess. It's probably an addiction to a certain extent”*. Despite his hesitation, Luke acknowledged that, if not training for or competing in an event, his life beyond training and competing deteriorates. The drive for ultra-distance enabled him to stabilise his everyday life. He says: *“If I'm not preparing for something, I find that it doesn't feel the same positive direction. Drifting so to speak. Just going to work and coming home”*. Luke describes the average life of many people yet for him, if he is not

training or competing, it is without substance. In her direct and pithy manner, Sally summed this up when illustrating her relationship to her sport. When asked in interview what biking was for her she simply said, "*It's life, isn't it*".

### Discussion

The aim of this study was to discover if long-distance athletes have specific drivers when entering and completing long-distance events. Much of the data supported the concept that these are very committed and competitive individuals. They embraced the process of training and placed great value on mental toughness. However, there was little to indicate a single, specific driver for their desire to compete/complete longer and more demanding races.

Across the various long-distance events there is an attraction for the participants of this study that goes beyond competition. Although the athletes above spoke of *addiction*, this did not imply that all ultra-athletes are physiologically dependent upon the highs generated by the taxing nature of their events. However, both supporters and race organisers should be aware that athletes may endanger their physical and psychological health in their desire to compete in or complete events.

During the analysis of the data an unanticipated theme of trauma emerged. In interview, several of the participants for this study indicated that they had undergone a challenging life-changing experience that could have caused them to find motivation or meaning in doing long-distance sport. Various, the athletes at some point have been separated from a loved family member; required an extended period of hospitalisation; gravitated from hard partying to intense training; shifted their focus from alcohol and food to arduous training. One athlete described running a marathon where he took analgesia during the race to attain a good finishing time. He went on to describe walking during a training run as "*a weakness*". Although the literature links compulsive or obligatory exercise with eating disorders (Plateau et al., 2014; Scharmer et al., 2020), there is little research currently to suggest that such driven exercise is associated with previously experienced trauma or life disruption.

Although the data in this study only gives a tentative indication of this, it is grounds for further consideration. Research shows that exercise has a positive effect on mental health: the form of training and exercise these athletes embrace is far more arduous and committed. It would seem that these athletes embrace the highs and lows of their ultra-distance events and seek catharsis therein.

During data collection the participants were asked about their darkest time. Kara was starkly honest: *"Sometimes I can drown in my dark place"*. Coming up to an event she said: *"I couldn't get out of this dark place, it was just like this spiral. Just feeling sad and not happy."* Nevertheless, during the race she was able to compete and deal with her *"dark place"*, balance herself nutritionally and *"it worked amazingly and I was actually quite happy. Afterwards, I was really happy that I've done it."* Although feeling despondent, the event enabled Kara to rise out of her darkness and compete in the event. Kara used her dejection as reason to compete, to lift herself out of herself. It is this apparent ability for taxing competition to lift the athlete out of themselves which will bear further investigation.

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## Findings.

<u>Level</u>	<u>Gender</u>	<u>Name/pseudonym</u>	<u>Age</u>
Amateur/competitive	Male	Joshua	48
Amateur/competitive	Male	Luke	32
Professional/elite	Male	Brian	33
Professional/elite	Female	Kara	38
Amateur/competitive	Male	Joseph	44
Amateur/competitive/elite	Female	Sally	43
Amateur/competitive/elite	Male	Robin	38
Amateur/beginner	Female	Freya	33
Amateur/competitive	Male	Tom	31
Amateur/competitive	Male	Philip	28

This study sought to discover what drives athletes to complete/compete in ultra-endurance events, and how that motivation was maintained throughout these gruelling races. Unlike much of the literature retrieved, this study investigated across the span of ultra-endurance rather than one specific sport. Rather than track a group of athletes in a particular race or setting, the goal was to seek any commonalities in ultra-event competitors whatever their event or event setting.

Given that ultra-distance events are becoming more popular, especially in the field of ultra-marathon, participants were recruited from the local environment. The South Island is well known in New Zealand as a fertile training ground for endurance and ultra-endurance training and events. The Coast to Coast race ([www.coasttocoast.co.nz](http://www.coasttocoast.co.nz)) is raced yearly; GODZone adventure race ([www.godzone.com](http://www.godzone.com)) is frequently raced on South Island as is the Red Bull Defiance adventure race ([www.redbull.com](http://www.redbull.com)). Thus, this area of New Zealand has a significant number of potential participants for this study. Moreover, my own involvement in

endurance sport enabled me to access and have credibility with the athletes I wished to recruit. All of the athletes in this study were cognisant of how poor psychological preparation could impact upon their races but few had a specific training regime.

The athletes recruited for this study came from a variety of backgrounds. Prior to focussing on their current sport, the majority had competed in or experienced other sports including basketball, rugby or competitive swimming but none had concentrated on a single sport for the entire span of their career. All participants, however, had been active in some respect from a young age. Brian recalls his father *"he was still sweating, even though he'd had a shower he was trying to fit in as many K's at lunchtime as he could"*. Other athletes were supported by their families. When young, Luke would run home: *"my dad would drop me off 20 kilometres from home and I'd run through tracks and get home and that sort of thing"*.

Several of the participants indicated that they had had significant life-changes before their involvement with ultra-endurance. Luke said: *"him and my mum separated, and I decided to stay on in (place name) and live with him, my (siblings) went to live with my mum"*. Kara's life previous to being a professional athlete was interrupted: *"I went to hospital for nine months, came back, and then I was sort of on a rehab, getting back into life"*. Sally first started biking to lose weight. Originally a bodybuilder who lost thirty kilogrammes she states: *"Then I bought a bike, to lose more weight"*. Biking changed from a tool to lose weight into an end in itself: she found the metier that brought her both enjoyment and the ability to win.

In his interview Robin describes a background of *"some pretty serious partying back in my younger days so this may be just the next phase of that sort of my personality coming through"*. Robin's background of all-night partying is now transferred to his ability to continue moving in an ultra-event for many hours.

### Themes.

To present rich data such as this, data were examined and themes were identified. Several themes overlapped and were collated under a collective heading. Several

themes within the data were grouped together. While it is possible to debate how the themes were collated, the groupings chosen appeared cohesive. Nevertheless, it would be possible to re-examine the data paying greater attention to the participants' individual experiences followed by a secondary analysis evaluating subordinate and superordinate themes (Braun & Clarke, 2014).

### Mental toughness

The theme with the most segments coded was described as mental toughness.

Although, as noted above, the concept of mental toughness overlaps with descriptions for resilience and, to some extent, grit. Mental toughness was chosen as it was frequently used by the athletes themselves to describe their ability to continue when faced with tiredness, pain or other obstacles in their events. Most of the athletes referred directly to the ability to be mentally strong. In others, their statements have an implicit acceptance that mental fortitude is required to complete the event.

There are various references by the participants to the ability to "push through" difficulties. Brian states: *"you've either got the mental capacity to push through those periods where you're just so exhausted that all you can literally think about is falling asleep, but you know it's the one thing you can't do. And I guess there's only one way to find out if you've got it or not"*. What is noticeable about Brian's comments is that he suggests that it is not until racing that an athlete can definitely know that s/he can withstand the exhaustion incumbent in long-distance racing. The crux of training is within the event, and the ability to continue even when tired and drained.

Kara, when speaking of the pain and fatigue when racing said: *"And that's when you get caught up with, "Ah, this is terrible," and "Ah, it's agony," whatever. And then usually I'm quite good with blocking out those thoughts and just looking in the moment, like focusing on my breathing or just focusing on the next aid station. Or, 'Okay, I'm gonna come off the bike in a minute'"*. Kara spoke of "looking at the moment" and of breaking the race down into smaller segments, rather than reaching ahead to how much longer or

further she needed to go. Kara's focus was not on her mental capacity or strength but instead on small, attainable objects. In her racing, Sally had similar small aims: *"Keep pedalling, one more hill, one more downhill"*.

Several of the participants explored the concept of being solely in the moment during the race. The object of their focus was simply to keep moving forward, rather than contemplate the end of the race. Luke, after a particularly gruelling section of his event stated: *"I was moving, and that always comes back to it. That if you are moving, it doesn't matter how slow it is, it's faster than not moving"*. By concentrating exclusively on remaining in motion, Luke was able to cope with the enormity of the ultra-distance event. Sally did not want to contemplate the amount of time left in her race as she said: *"Well I never really think about it too much. Because then it just stresses me out"*. By being in the present moment, athletes did not contemplate the possibly finite limit to their mental abilities. Their resilience was only required for that specific portion of time.

Joseph was quite specific about his preparation: *"So you mentally prepare yourself, you know what's involved, you roughly know how long you're going to be out there for, so you go into the race mentally tough anyway"*. Joseph trained himself to visualise the entire time that his race could take and prepared himself. He did not wish to be directed by the circumstances but sought to control them. In a race that took longer than expected, however, he found he needed far more mental energy: *"in the end it took me 36 or 38 hours, so I was out there for a lot longer than what I expected. So I was really, really mentally—I was battling on that one because I didn't know what was around the next corner"*.

In the study by Schumacher et al. (2016), swimmers found that they needed to be comfortable with the prospect of an open-ended swim time. Joseph had planned on his event taking him 24 hours to complete: as the time required increased his ability to cope was taxed. Nevertheless, he completed the event but stated: *"it just about broke me"*.

To accommodate being in the moment and not being tied to a time, participants frequently used distraction techniques to assist them. In a swim where he felt he was being distracted by the conditions Philip would *“concentrate on 5 or 6 really nice strokes and relax and make sure it all becomes quite smooth again”*. Philip moved away from the environment of the swim and focussed on the physical act of being smooth and relaxed. There was a sense of the physical act re-asserting control over the swim conditions.

Joshua counts his strokes when swimming *“not just a straight three, it’s usually something like 1-1-3-5-5-3-1-1”*. As the swim progressed, however, he distracted himself: *“I play mind games in my counting. I do things like counting binary or count the prime numbers”*. Despite the facility to distract himself during a long-distance swim, Joshua also presented a moment similar to land-based athletes where he felt connected to his environment: *“a moment of zen, but...when you’re swimming across a big distance, there is a moment that kicks in, it’s sort of frustrating if it doesn’t, where it feels like you’re swimming across a lake of mercury”*. Ultra-distance swimming appears to be a solitary and introspective event for the competitor. However, Joshua depicted an intensely visual and immediate image that almost presents the swimmer outside himself, seeing himself in the swim. Although there has been considerable exploration of the concept of flow in sport (Jackson & Eklund, 2002; Kotler, 2014; Swann, 2016), ultra-distance athletes are required to maintain their efforts for many hours or days. It could be speculated that during an event the athletes move into and out of flow, which thus impacts on their perception of effort.

Philip and Joshua compete in what is for many a foreign and unstable environment. Both use counting to distract themselves and to maintain control over the swim and any discomfort or anxiety they may feel in the water. Joshua’s image of *“swimming across a lake of mercury”* is both distraction and a singular awareness of the present moment.

The principle of breaking time down into manageable segments runs through the concept of mental capacity. As Freya said: *“you’re uncomfortable, but it’s just one day.*

*It's one day in your whole life and you're uncomfortable, but it's going to end. It's not this forever". Although some events are spread over several days, the athletes were able to rationalise the pain or exhaustion they felt. Brian said that it made him aware of the things he valued: "in situations when I'm really eyeing up the devil and things are pushing me to the edge of my capacity to tolerate it, I tend to reflect a lot on things that I consider really important in my life". The description Brian used is exceptionally powerful: "eyeing up the devil". Such an analogy presented an athlete who struggled both with the testing time he experienced, the drive to continue the event and the temptation to give up and to accept a limit to his ability to continue.*

During his event Luke derived strength both from memories of one of his family members during the war who survived internment and a Nazi death march, and accounts of pioneering polar explorers. He reminded himself that, unlike those in wartime, he had chosen to do the event and had voluntarily exposed himself to this discomfort. Compared to that, Luke stated, *"it never gets that bad"*. Luke goes on to say: *"And I think that physical exposure to challenge really helps build mental inner strength to adversity, and resilience"*.

Luke and Brian both looked inside themselves to assist the mental capacity or toughness. For Brian, it was what he valued: *"my family, my health...discomfort is relative to comfort, so if I think about how much I appreciate my warm bed at home"*. Luke challenged himself to consider those who did not have the choice, who were in dire situations while he sought risk and adventure. He says: *"I chose to be there, this is what I'm looking for"*.

Other athletes found that the beauty and remoteness of their surroundings made them grateful to be fit enough for the experience. Philip stated: *"beautiful views and beautiful scenery and even though you're suffering it, was still quite nice to be there"*. Tom used the beauty of his event as support during a lap race: *"And if you're having a bit of a bad patch, you can admire the view or stop and think about where you are, as opposed to thinking, "Okay, I'm gonna go past this another ten times before I finish"*. Several athletes,

while they did not discount the arduous nature of the race nevertheless felt themselves to be privileged by being in a remote and beautiful environment. Kara, while riding at night stated: *you've got a clear sky, it looks so beautiful...and you see that stars and the moon*". An adventure involved riding through the night when physically exhausted and sleep-deprived, but the athlete could draw pleasure and strength from the moment. Indeed, Brian said: *"I feel privileged because I have the body and the mind that are willing to offer me these opportunities to experience these events"*.

Participants drew strength from various sources: the beauty of the remote areas the events covered or from within, their values or the recognition that the event was a race, a challenge they had chosen to attempt. Nevertheless, they also valued the simple grit and determination. Philip stated: *"you're going to hit that point in racing when you're pushing yourself that much harder. And it's like anything in life. You can either smile and enjoy something or have a cry and quit"*. Such a belief is quite uncompromising. Either face the challenge or give up. Even Philip's phrasing is disdainful: *"have a cry and quit"*. His disdain is self-focussed, however, dismissing in himself the opportunity to *"have a cry and quit"*.

Freya, new to ultra-running, felt that running long-distance had an advantage for her: *"Maybe that was another thing that drew me to longer distances was that the longer it is, the more you can rely on mental grit"*. For Freya, the ability to be mentally strong outweighs simple physical running ability. She went on to say that, for her, a long association with running or excellent form are less significant in ultra-distance than the mental capacity to cope with the demands of running for many hours. Freya, unlike the other athletes in this study, was undertaking her first ultra-distance race. From crewing at ultra-running events, she was very aware of the importance of mental preparation alongside the physical training. Her drive at the time of the interview, however, was not to test her limits but to fully experience the moment. She ran without a watch or timing device. She stated: *"I don't like to run with a watch. I don't even own a watch. I like the knowing your own body. You run on how you're feeling"*.

### Self-talk.

For many of the participants, self-talk was a necessary part of how they sustain themselves during an event. However, it was a two-edged sword where the participants felt conflict between two differing opinions. Robin stated: *“But again, your mind’s always to-ing and fro-ing ‘cos there’s so many things that kind of get in your way over a 24-hour period or 100 miles or whatever”*. Consequently, self-talk could also be destructive to the athletes’ psychological wellbeing during their races.

Moreover, the data revealed that the athletes frequently referred to themselves in the second person when explaining their self-talk. There was a distinct sense of the athlete speaking of a separate person when describing how they managed during difficult moments of their long-distance events. This form of self-talk presented to some degree as though the athletes were outside themselves, disassociated from the race. In this section of the data, athletes moved from a first-person account *“I did the event”* to the second person *“you”* or *“we”*. Such self-talk was not in the form of encouragement or cheerleading but emerged in the form of exhortation to take one more step or get to the next aid point. The data did not reveal any of the encouragement form of self-talk: more often the participants were telling themselves to *“push through”* (Joseph) or *“you can push up there”* (Robin). Some of the participants were able to divorce themselves from the situation or the pain they were in *“you’ll essentially switch off for ... or you’ll be kind of in the zone”* (Philip). Robin, however, was fully aware of the pain and discomfort he experienced after kicking a large rock when tired near the completion of a 100-mile event. He managed this by embracing the pain, the *“suffering”* and telling himself: *“Every footstep is gonna hurt a little less”*. Following a particularly dark time in his event, Luke reported saying to himself: *“let’s go, we’re getting out of here”*. He felt he had to move away from the town as *“when you’re out by yourself (because) there’s people, there’s things, there’s food and it’s comfort and they draw you to them”*. He addressed himself as *“we”*: *we’re getting out of here”*. Luke exhorted himself to continue his event by stepping outside himself and acting as a coach. Luke believed in moving forward, however slowly that might be.

Luke was more specific and noted that: *“It’s these bargaining debates that go on in your head about let’s do this and then we get that and if we can just get here then this will happen and before you know, you’re at the finish line”*. The debate assisted him to continue the event and also acted as a source of distraction. It was a means of solving one problem at a time, tackling one facet of the event, then another until he reached the finish line. Similarly, Robin spoke of keeping going in his ultra-distance event: *“Like a lot of things, you run past it. Just run on, keep running... you start riding those waves of euphoria and desperation and up and down”*. Sally is far more prosaic and factual: *“Keep pedalling, one more hill, one more downhill”*. Yet the concept remained the same: keep moving forward, take on one challenge, then the next.

Much of the self-talk evinced from the data, therefore, was from the athlete to him/herself and took the form of a second person narrative. It was noticeable how the participant appeared to be viewing the event or the situation in the race from outside themselves. Although the self-talk was largely supportive but, as Robin identified, there is also *“toing and froing”* in the mind during the course of the event. Luke noted: *“There’s probably lots of people in my head. I dunno. It’s just an ongoing conversation with yourself, I guess”*.

Athletes also identified assistance from their families and crew during these long-distance races. Even though some of the events were unsupported, the presence of family and friends or the knowledge of their encouragement was very important. All participants, whatever the type of sport pursued, were supported in some manner.

### Support

It was not surprising that all the participants acknowledged that support was vital for completion of their event. This support was not only from those crewing for the race itself but also throughout the long period of training required for an ultra-event. Family and friends were acknowledged for their tolerance and understanding: *“There’s going to be (a) support person there, you’re going to see someone that you really care about all the time”* (Tom). Participants also depended on support from those who

knew of them and their race. While completing a long-distance coast-to-coast challenge Joseph stated: *"it was quite unbelievable the people that sort of just turned up to come and run"* (Joseph). These runners or pacers came out on his route to run with him at different times, but were particularly useful during the latter stages when Joseph was tired *"and I think everything hit home at that point, and I remember I was crying. I was sobbing, I had tears running down my face"*. After time alone to work through his emotions, Joseph completed the challenge. The simple presence of the runners was reassuring, and he noted that it was *"humbling that people were giving up their time to come and support me"*.

The type of support Joseph experienced was very different from simple verbal encouragement. Joseph experienced the affirmation and physical presence of running colleagues who were not close friends but valued his efforts. At one point he was overwhelmed by emotion but rather than detracting from the experience of his undertaking, he used it to deepen his resolve.

Brian noted that *"It's amazing how many people you feel you need to rely on to get you through a race like that, it does take a village"*. Brian was also aware of the impact on his family and support team if he did not complete a race: *"I'd let my family down, and my coach down, and so many people had been part of that campaign"*. As with self-talk, support for an athlete can also bring pressure to bear during the event. Whether present or not, Brian felt that his expectations of himself were also those of his supporters. In addition, he was cognisant of the financial cost to his family of travelling to an event he could not complete. Thus, the involvement of family, friends and coach can be both a goad and a burden to the athlete. Sally also noted the adverse side of having supporters anticipate needs. While acknowledging their care of her, she noted that during a 24-hour race: *"My support crew gave me a chair so I sat down"*. She found when sitting to eat it was then harder to return to the race so in another event instructed them: *"last time I said I don't want a chair. Don't tell me to sit down"*. Sally found that sitting made starting again more problematic so thereafter

stood to eat or to change. Her crew tried to anticipate her needs but interrupted her momentum. As with Luke, Sally valued continuous forward movement towards her goal.

In adventure racing, although there is outside support, the team itself is vital with each team member at times drawing strength from the others. Kara stated: *"You have to know that they've got your back, and you have to feel the same thing towards them, that you would go out of your way to ensure that they're safe.....no one person more important than another"*. In adventure racing the team is a single unit and all of them must cross the finish line. Kara's focus was not merely on her own success but that of the team, a very different feature from individual events. She went on to say that it was vital to make your teammates aware of how you were coping in the long race: *"make sure you communicate and let your teammates know"*. Unlike the support crew, each team member is aware of the challenges they face, and the required commitment. For success, team cohesiveness is essential.

The concept of support is a small but significant strand in the data. All the participants acknowledged that long-distance racing is impossible without the encouragement of family and friends, and marshals' and volunteers' presence during the race itself. The athletes all acknowledged that they could not continue in their sport without support. Indeed, Robin admitted that, as an ultra-athlete himself, he *"had to do a lot of growing up I suppose through that as well which has been good for me"* when supporting his partner doing her first race. Being crew for an ultra-distance event is no small task itself and, as can be seen with Sally, supporters can wrongly anticipate the needs of the athlete. Such an error can be costly if, at that juncture, the athlete is feeling vulnerable to self-doubt regarding completing the event. In the team situation, Kara stressed that such vulnerability should be expressed so team support enables the athlete to continue.

### Training, commitment, self-belief.

The data collected for training, commitment and self-belief overlap. It is an axiom in long-distance racing that it will involve significant and sustained training.

Consequently, the athlete must accept and value the process of preparation and believe in her/his ability to complete the training and the event. All the study participants followed a training programme, either written by themselves or an employed coach. Commitment to the process, naturally, did not always entail enjoyment or pleasure. Indeed, many of the athletes felt as Kara did: *"I've got in my programme ...I got a really sore back and it was just agony and I was like, 'Why am I doing this to myself?' It's like, 'Hang on, the aim is just to make it up the hill.'"* Kara questioned why she was continuing with a training session that was painful. She had two reasons: it was in her programme and, ultimately, all she needed to do was get to the top of the hill. Similarly Sally on a training ride stated: *"I'm cold, and I'm wet. And I wanted to turn around. But I thought, 'No, just go and finish anyway'"*. Neither athlete abandoned their sessions due to pain or physical discomfort. By being committed to the training session they psychologically prepared themselves for adverse conditions during their ultra-event. Freya's coach advised her, when starting a run on a wet and unpleasant day to *"embrace it"* and Freya added: *"What if it's like this on race day?" You've just got to run in that"*. By exposing themselves to inclement and taxing conditions during training, the athletes equipped themselves to deal with comparable difficulties during the event. Similar hardships would be an additional frustration to add to the physical toll ultra-events present to the body. The settings of ultra-events frequently tax their competitors as much as the distance involved. As noted above, long-distance races have courses set in desert locations, such as the Marathon des Sables or Badwater; set in mountainous regions such as the Ultra trail du Mont Blanc (UTMB) or, in adventure racing, require orienteering across challenging terrain. If an athlete does not undertake training pertinent to the event entered, simple physical fitness will be insufficient. When undertaking Badwater, in order to acclimatise to the desert, heat Joseph stated: *"I'd done a lot of training, I'd built*

*myself a heat box here, I'd run stupid in that"*. Participants trained in the winter, in the dark and poor weather. Robin, describing his training, remarked: *"I'll get out of bed at three in the morning to go running on a frosty morning or when it's raining or in the snow. And I'll smile when it's rubbish cause if I'm suffering everybody else is"*. Robin welcomes the "suffering" as he realises that all his co-competitors will be similarly affected. Moreover, he understood that by doing the miles that others might avoid, his physical and psychological preparation would be the greater. In embracing the discomfort and challenge, he hardens himself and increases his mental resilience to the adversities he faces.

As noted above, commitment, training and self-belief are intersecting themes in the data. All the participants exhibited confidence in their abilities to complete the training tasks and the events they had entered. Most stated quite definitely that they would not pull out from a race unless severely injured and unable to continue. In his race, Brian does not recall being pulled from the course with hypothermia during an unexpectedly cold race: *"I do remember feeling embarrassed and cold...my first real memory was being in the medical tent, wrapped in an emergency blanket"*. Brian's concern was not for his condition but that he had not completed his race. Joseph stated decisively: *"I've never had a DNF, I don't start a race and say, hey I'm not going to finish this race you know"* (DNF: did not finish).

It is essential to view the athletes' self-belief as stemming from both their commitment to the event, and their confidence in having done the correct training. Freya, before her first ultra-event, stated: *"I feel confident that I have trained and I have done the best training I could've done"*. In addition, the participants feel curious about how far they could go, how far they could push their bodies. Tom noted that he was *"always kind of striving for that little bit more, to be a little bit different to everybody else"*. This marries the concept of the athletes always seeking to go beyond the limit and is echoed by Philip: *"it's always good to see what you can do"*. Throughout the data relating to commitment and self-belief there is the question of whether a particular

event or specific race in a testing setting is going to be the limit for that athlete. Luke stated that his aim was to *“get to the finish ...and it’s not necessarily a given. Well, it is a given”*. In a long-distance event that he had not tackled before, Luke felt getting to the finish was not in question as he had physically and psychologically prepared himself. Nevertheless, he was aware that he was going to make demands of himself that he could not yet envisage. His doubt, although momentary, was expressed in *“not necessarily a given. Well, it is a given”*, a brief admission of all the unknowns he could not control.

Sally is far more matter-of-fact and prosaic when she described her ultra-event, but it demonstrated her confidence: *“What do you want to know? I went and rode it”*.

Although competing for a title, she never questioned her ability to finish the race. She stated quite baldly: *“Because that’s giving up. I wasn’t going to give up. Even if I was slower, just do it anyway. It’s about finishing”*. Although determined to win her title, she had no hesitation that she would be able to complete the race, whatever her position. Sally’s certainty stemmed from self-belief that, whatever the outcome for the title, her ability to complete the event was not in question.

Joshua, when swimming, prefers to have company. He stated: *“I find swimming hugely social...which seems weird... you’re talking to someone for five seconds every minute and a half”*. When swimming long-distance, Joshua has a support swimmer or kayaker in the open water for safety’s sake: *“There just has to be somebody else there as well”*. Despite that caution, however, Joshua enjoys the challenge of the open water *“they were three metre waves, we were swimming in, big, big, monster waves... felt like you’re climbing up a mountain, and then racing down the other side, it was really fun”*.

Joshua did not feel out of his element and was aware of the possible dangers but was confident in his abilities to deal with the water conditions. Rather than feeling threatened by the large surf, he had fun and was exhilarated where others could have felt endangered. Such a situation is not one in which a pool swimmer, however skilful in the indoor environment, would have been at ease. Joshua is secure in his

skills and knowledge, having trained and competed in the open water. For Joshua as a swimmer, the data on support and self-belief intersects in a specific manner. Unlike other participants, Joshua is in a hostile element and cannot inadvertently fall asleep or stop. Support in this situation is vital, as is the training to cope with unexpected water-conditions. These components meet in self-belief in that Joshua had the skill and ability to find a three-metre surf *“fun”*.

### Competitiveness.

It is evident from the data that the athletes in this study are highly competitive. Even those who stated that their goal was to complete their ultra-event, the drive to pit themselves against other athletes was apparent. Robin demonstrated this particularly clearly: *“You never want to walk away from running 100 miles and being disappointed because you’re third, or something like that”*. From the viewpoint of sports where such endurance is not required, being disappointed with third place after one hundred miles of running is unimaginable, as completion would have its own satisfaction. For Robin, however, crossing the finish line is a given. His training for the race included the tactics to win, and win within a given time. He went on to say, after completing an arduous hundred mile race in a good time: *“which is pretty smart for 100 on some pretty challenging conditions at the time and I was still disappointed that I was second”*. Robin is fully aware that in pushing as hard as he does to gain success, he might forego the pleasure of simply completing a race but, for him, completion is not sufficient. Even during training, he set his standards very high. He stated: *“I don’t take failure when I set myself something very well”* and goes on to say, *“I don’t want to live with myself if I can’t do this part”*. Robin described his training ethic as *“carrot and stick”*, a determination to train himself to *“live in a zone of physical discomfort”* that will be necessary to achieve the success he desires.

Joseph has a similar viewpoint when training and stated bluntly: *“I go out and I make sure I run the whole way, and I don’t walk because I look at it being a weakness”*. Joseph, too, aimed to condition himself to be able to withstand discomfort in order to

complete tough races. During what was, for him, a shorter race he stated: *“Like the marathon I did ... I was taking pain killers before and during the race, and I really pushed, pushed, pushed”*. The application of such discipline was not only to compete against other runners but also against his own inclination to stop. Joseph completed runs that were not organised events but arose out of his desire to attempt what had not been done before. On such a run, the only competition was himself and he said: *“it was just a matter of just chugging along...it was just a matter of, well that’s another 50 kilometres down let’s do another 50”*. Joseph went on to describe the pace as *“leisurely”*, normalising this extended run by describing his undertaking in such terms. Joseph still held himself to complete the task he had set himself.

Luke competed in unsupported events and might not see many other entrants. Luke’s competitiveness was not specifically with those in the same event but related to times and completing the event as fast as he was able. As with Joseph, Luke competed against his own expectations and wanted to compare himself with *“these other guys that have ridden bigger events around the world and done really well, how I stacked up against them”*. Luke admitted that *“I don’t like having people in front of me”* but even when riding alone he compelled himself *“to ride and complete it as fast as I could even though there wasn’t a result sheet at the end”*. As with Joseph completing his self-set task of running across the island, Luke maintained his commitment to the event even when alone. His drive continued to be as fast as he could. He stated: *“I’m not going to sleep any longer than the minimum rest time because I want to ride as much as possible to get it done as fast as I can”*. In both pieces quoted, Luke’s goal was to complete the event as fast as he was able. The drive, the competition was with himself, a challenge to keep going as long as he could each day and sleep as little as possible.

Freya claimed not to be competitive when she entered for her first ultra-race. She said: *“I would just like to complete it. But I am aiming to do it in twelve-and-a-half hours”*. Despite asserting that she is not competitive, Freya still sets herself a goal time that

demonstrated both her self-belief and determination. If she had been content solely to complete the race, her aim would have been far more loosely framed. Freya's competitiveness did not appear to be triggered by her fellow runners but by her personal objective of completing the race well, in whatever way that might be defined. As it happened, Freya completed the race under her goal time and won her category.

Sally's competitiveness arose from her resolution to win. She enjoyed riding but more, she enjoyed winning. When questioned about what made her train and compete in long distance events she stated succinctly: *"Simple as that. Winning"*. Her ability to hold that goal in mind and to maintain an even pace even during the night when her fellow competitors all *"went and had a snooze (laugh)"* enabled her to win her ultra-events. Sally used her focus on winning to augment her strength and training. While others slept, she made continual steps towards her goal.

Competitiveness was inherent in the data, even when the participants competed with a time or a task that they had set themselves. For Joseph, completing a coast to coast crossing of the island was a self-driven event and if he had failed to complete the task he had set himself, no result sheet would be published. Similarly, on his self-supported rides, Luke was competing only with himself to complete the event in the shortest time he could. The competition came from his own goals. Each athlete carried within themselves the determination or drive to complete the event, even if winning ceased to be or was not an option.

### Addiction

The data contained a strand that suggested some participants depended upon the sport for part of their identity, or it provided a vital element in their lives. This factor appeared to go beyond what they defined as mental toughness, and in part may have accounted for the 'death before DNF' attitude many of them expressed. As Robin said: *"I think I'm the type of person that would be carried off in a gurney before they say I pulled the pin"*. The mind-set is that of accepting of bodily damage before agreeing to

pull out of an event. Luke expressed it differently but the desire to complete the event is evident: *“you would keep going, I guess. There’s never an end to it, I think, until you fall down”*.

In all the athletes there was a competitive drive to do as well as they could in their chosen events, despite facing elements that they could not control. As Sally said concisely: *“you can’t control what everyone else can do”*. For some of the participants to this study, however, the data suggested that the training and ultra-event itself provided a degree of catharsis. Embracing the suffering of the event provided more than satisfaction, it afforded liberation. These athletes sought the limits of what they could sustain mentally and physically when competing in their long-distance events. Unlike athletes experiencing exercise addiction or obligatory exercise needs, these participants appeared to adopt ultra-distance racing to rationalise challenges or difficulties faced in their past, or to manage life changes. This emerged from the data when the participants described how they came to ultra-racing, or from their own descriptions of themselves as athletes. In the semi-structured interviews, the athletes were not expressly questioned regarding life changes or challenges. However, this theme became apparent within specific transcripts.

As ultra-athletes are a minority within a minority, it was easy to dismiss their participation in these sports as being abnormal. As discussed above, however, the athletes themselves have normalised their activities to a great extent. Nevertheless, aspects of the data pertaining to identity became apparent with repeated readings of the transcripts. Not every transcript exhibited these markers, and the participants themselves did not discuss trauma or lifestyle changes, except in passing or as part of the discussion. It was also important to discern healthy drive or training from aspects that indicated that the athlete felt that their identity was enmeshed with their sport. It is fair to say that all committed athletes take their sport seriously: from this strand of data, however, there emerged a suggestion that some participants used their sport as a means to overcome or rationalise incidents in their past.

Some participants identified aspects of their lives prior to becoming ultra-athletes that impacted upon their choice of sport. Several athletes described themselves as “addictive” when practicing their sport. Robin described a major change in his life: “*a wee bit of addictive personality or a semi kind of hard core that way, I used to do some pretty serious partying...those sorts of extremes have always ... whether in my 20s raving all night, to now...out running all night, there’s something that’s attractive to that*”. Robin compares the ability to party all night when young to his present ability to run all night. He felt his capacity to tolerate the challenges of long-distance running and partying is “hard core”, something that not everyone would do. Robin described living “*in a zone of physical discomfort*” and being able “*to be happily to be here for longer and longer and longer*” (my emphasis). Robin has a sense of pride in his ability to run all night, to withstand physical discomfort for a long time and “*I like being that individual that will go out and run 30Ks before they come to work on a Monday morning*”. To Robin, his ability to withstand tiredness and physical discomfort sets him apart from what other runners will do. Moreover, he aligns it with his former life “*raving all night*”. Both situations appear to provide him with satisfaction.

Luke’s data echoed a similar reliance on physical activity: “*And I find that if I’m not doing it, then everything suffers in terms of I’m pretty reliant on it, I guess. It’s probably an addiction to a certain extent*”. Luke relies on his ultra-activity to stabilise his day-to-day life, suggesting that for him his sport is a fundamental aspect in how he sees himself. Luke goes on to say, regarding pulling out of races: “*it’s not even an option. It doesn’t even cross my mind...And it’s just not what I do*”. As a person, as well as an athlete, completing a race he has entered is essential to how he views himself: “*it’s just not what I do*”. As a young man Luke chose to stay with his parent in the area he loved when his parents split. He says quite frankly: “*if my dad left, I would’ve stayed ..on in (placename)*”. Luke’s decision was based not on family reasons but on staying where he could be active. His desire to push himself existed from when he was young and his need to pursue physical activity was a deciding factor during his parent’s separation.

Kara described a challenging journey to becoming a professional athlete. Unlike Brian, whose drive towards professionalism was tough but relatively consistent, Kara related a significant space in her life where she could not do any sport at all: *“three years off where I basically just didn’t really have a life. And then I went to hospital for nine months, came back, and then I was sort of on a rehab, getting back into life”*. From there, she was able to get fit enough to do an Ironman and on completing her Ironman described the euphoria she experienced: *“ah, it was the best of high. Oh it was so good. Yeah, like I said it was one of the best days, it’s like you’re just on this cloud. Cloud, you just ... Yeah, it’s amazing”*. Kara went on to become an elite athlete but is aware that she uses her ultra-events and training to *“get rid of emotions and all sort of things”*. She said of herself: *“I’ve got quite an addictive personality and I guess my, what is it? My other side of my personality, that I want to do things always 100%”*. Kara’s desire to give her sport everything facilitated her return to fitness and drove her to be a professional athlete. Nevertheless, she stated quite clearly: *“Sometimes I can drown in my dark place”*. Kara’s emotional span is wide.

Sally’s data was unusually matter-of-fact and her emotional connection to her sport hard to elicit. When asked about her journey to elite status on her bike she stated tersely: *“I just rode it”*. Sally saw nothing remarkable in her ability, or in her change from an overweight smoker to a champion athlete. It was just what she does. Nevertheless, within her sparse phrases there is a sharply focussed drive. In all other participants there was a sense of how their time needed to be allocated to cope with the conflicts of home and work. For Sally, there was no conflict. She stated: *“I don’t have a life outside. I go to work and I ride my bike”*. Sally’s attention was all her on her riding. Her work only involved her as far as it enabled her to meet the cost of living and biking: *“I forget about work. When I turn it off at 5:00, I’m gone”*. At the end of her interview, when questioned about her work, she stated that it *“pays the bills. It’s the only reason I do it”*. For her work is just a necessity, but about biking she stated: *“It’s life, isn’t it”*. All of Sally’s life revolved around riding, and riding to win, and was deeply satisfying to her. She did not, like Kara, speak of the highs experienced

during her activity but under her stark words lay a deep and immovable commitment to her sport. Sally spoke of being overweight and a smoker, of being active at first just to lose weight. However, as an ultra-athlete her dedication to her sport has become far deeper than simply a means to an end.

In the data other participants spoke of commitment to training and a specific race that went beyond enthusiasm and into necessity. Tom, when training for his first Ironman spoke of many of the symptoms of obligatory exercise:

*it was a nine-month kind of drive, drive, drive that was the only thing. I was eating, sleeping, everything to do with the race...relationships at the time kind of failed. And just, that was just all consuming, all yeah, at that stage.*

This almost frenzied drive towards the race earned Tom a good result but it was not something he sustained after the event. His focus became more balanced when he realised in retrospect how much his training and competing had affected his life.

Joseph's data revealed an awareness that during an ultra-event he can be swept from an emotional trough to a pinnacle. Joseph has strong views on what is acceptable in his events but is conscious that there are times *"where you feel invincible and you feel really good, but you're going to have heaps more lows, and it's just a matter of pushing through those lows and trying to get that high, that runner's high"*. Joseph acknowledges that it *"gets pretty ugly at times"*. Despite Joseph recognising that he will experience these devastating lows: *"I was crying. I was sobbing, I had tears running down my face...all the emotion was just overflowing"*. The breadth of emotion or sensation that Joseph confronted does not alarm him. Rather it attracted him and caused him to add: *"So it just became a bit addictive really, and (I) sort of liked the challenge of, how far can you go?"*

The section of data that I have entitled "addiction" does not appear to meet the requirements found in the research cited above regarding compulsive or obligatory exercise. The athletes were not specifically addicted to their sport but rather find in the activity, in the training and in the event, a means to purge their anguish,

frustration or anger. Moreover, some respondents in this study competed to the point of self-harm during their events. It could be argued that addiction is not solely a compulsion but also a rationale for these athletes.

For some of the athletes in this study their identity as an ultra-athlete is vital to them as individuals. While not asked during interview, I would argue that the question: *“what would you do if you could not run/bike/swim?”* would give the athletes pause. This is particularly relevant to those respondents who, I would postulate, have experienced major life changes or challenges on their journey to being ultra-athletes. Unlike Tom, whose fixation on training and competing lasted for his event but caused him to realise the sacrifices he made to race; or Brian, whose context is his professionalism and his family; a number of these participants find justification and release in the profound and taxing times they encounter on the race course. They embrace the physical and mental pain that they are causing themselves. As Luke stated: *“That’s what you signed up for, you wanted a challenge, here it is. Now’s the time to take it”*. For these individuals, the trauma or trials they have experienced in life are exorcised in accepting and welcoming the difficulties of the ultra-race. The experience is not masochistic, it is cathartic.

## Conclusion

This study aimed to discern why ultra-athletes competed in long-distances races, and what tools they used to achieve completion of their event. Although the respondents to this study were highly competitive, all participants exhibited the conviction that injury was preferable to not completing a race. Ultra-endurance sports are in the minority compared to other events, yet the literature retrieved demonstrated a considerable increase of long-distance races, especially in ultra-running (Cejka et al., 2014; da Fonseca-Engelhardt et al., 2013; Gerosa et al., 2014; Knoth et al., 2012). My interest in this subject arose from my involvement in ultra-endurance events, and the study was conducted with athletes from a local setting.

There is a significant amount of research into the physiology of ultra-events and the effect on the bodies of the competitor. The current study focussed on the psychological drivers for competitors and the psychological tools they used while racing. If not addressed in training, both the physiological and psychological impact of nutrition, hydration, and sleep deprivation can derail athletes' efforts on race day. The literature researching psychological tools or support accessed for the study was limited and specific, directed to a particular race or an individual athlete. There was little which spanned the scope of ultra-endurance racing.

The topic of mental toughness was evident in both the literature retrieved for ultra-endurance and the data collected from the athletes themselves. Despite the necessity of having mental fortitude, the research highlighted the need for athletes to act with caution. Those athletes who over-valued mental toughness were liable to take extreme risks or disregard physical damage to themselves in their desire to succeed. The concept of excessive hardiness and ignoring risk generated a literature search into behavioural addictions and obligatory exercise. Several of the participants identified themselves as having addictive tendencies and considered that part of their wellbeing was attached to their identity as ultra-athletes.

The concept of being mentally tough or resilient was a consistent theme for the participants. A complex ethical issue ensued: that of safety of the athletes in races that are designed to challenge and test the competitor. Having ultra-endurance experience myself, I acknowledge that part of the attraction of a long-distance event is the challenge of completing the event. Participants recognised that their familiarity with ultra-events caused them to normalise the distances and risks involved. Nevertheless, the physiological or psychological rigours the many competitors undergo are a cause for concern. In today's risk aware environments race organisers tread a thin line between providing a stimulating and challenging course and exposing the competitors to unacceptable danger. Moreover, supporters should consider that they too, by facilitating the athletes' desire to compete/complete their event, could expose them to health risks. The participants in this study expressly stated that they espouse a 'death before DNF' (did not finish) philosophy. Thus, the question arises: at what point should supporters and/organisers intervene to prevent an athlete from continuing in a race? Participants and their support crews should be able to agree on how this is managed. Organisers must be cognisant of the duty of care they have towards competitors.

Most of the themes that emerged from the data were expected. They revolved around preparation for the event, the support of family, friends, colleagues and event staff, self-talk and mental toughness. Those who discussed being driven and having addictive tendencies also identified an unexpected theme: that of past life challenges or trauma. These athletes described events that had had a profound impact on their lives before being involved in ultra-events. This theme, while not anticipated, correlated with Harvie's (2011) comment: "every ultra has a back-story" (p.142). Although this can be said of many sports, ultra-distance athletes voluntarily embrace prolonged mental and physical anguish during their events. At present, the link between ultra-distance and previous life challenge or trauma is tentative but worthy of further investigation. Van der Kolk (2015) suggested that traumatised people keep alive within their bodies the memory of trauma and pain. They then revisit their

trauma in various ways, such as unwarranted anger or addictive or risky behaviour. While this study did not validate this supposition, it is an avenue worthy of further exploration.

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## Appendix 1

Interview schedule.

Participants will be:

- Reminded of their right to withdraw at any time or refuse to answer a question. If the participant decides to withdraw after the conclusion of the interview, they are requested to do so within **two weeks** of the interview taking place;
- That their responses will be de-identified prior to use in the thesis or any publication;
- Asked if they consent to having the interview digitally recorded;
- Their signed and dated consent form is completed.

Icebreaker conversation: thanks for participating; is the athlete currently training for an event; have they just completed an event.

**How** did the athlete start in ultra-endurance racing?

- How old was athlete?
- What type of racing? (Run, bike, multi, water-based).
- What, if anything, preceded ultra-racing in their sporting lives?

**Why** did the athlete start to compete in ultra-racing?

- Knew a fellow racer.
- New challenge.
- 'Bucket' list event.
- Start in one sport or into a combination event.

Do you have any specific feature or tool you utilise when training?

- Are you aware of any specific weak area or blind spot that you need to focus on during training?
- Do you practice any particular mental preparation for your events or do you consider it develops in racing?

Race tactics: what do you do in events when the going gets really tough?

- Is there a mental/physical ploy that you use?
- Does your support crew have certain instructions to use during these dark times?

What is your worse racing moment, your darkest time?

What impact does training/racing at ultra-level have on your everyday life, if any?

Conclude with thanks and reiterate that participant can withdraw within **two weeks** of interview.



