"ONLY 50K TO GO": EXPLORING THE LATE-RACE EXPERIENCES OF ULTRA RUNNERS

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ABSTRACT

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Ultra-marathons are unique types of races that go beyond the traditional marathon distance. Typically at least 50 kilometres long, these races test a runner's ability to push through extreme levels of fatigue. In most such races, a majority of the starters do not even finish. Yet, a surprising statistic reveals that almost all runners who make it to a certain point in the race will eventually finish. This occurs despite them having as much as an entire marathon's distance remaining. Although it is a battle for all athletes to finish an ultra-marathon, the worst of the battle appears to end some time before the finish line, when an athlete reaches their "tipping point", an interesting occurrence that invites exploration.

The aim of this research was to explore the experiences of ultra-runners across an entire race with a particular focus on the unique point of time where, statistically, almost all runners will finish if they successfully make it to that point. The study was conducted with 13 runners, 8 male and 5 female, in a 50-mile and 100-kilometer ultra-running race in Alberta, Canada. Data collected from participants included quantitative data in the form of two questionnaires performed during the race, before and after a specific section of the race, and qualitative data through pre-race and post-race interviews.

The quantitative results were analyzed using a Wilcoxon signed-ranks test, which showed no significant difference between the two samples. Although some participants' scores improved, few of the results showed a statistically significant change in emotional experience. In some cases, the scores decreased, suggesting a negative emotional reaction. The qualitative results were analyzed using an interpretive phenomenological approach, and told a different story from the quantitative data, one of distinct changes in mindset, feeling, and positivity. These positive changes were brought on by a wide variety of mental strategies used to overcome particular stressors noticeable among most participants. The results of the quantitative and qualitative aspects of the studies were compared after the analysis of both parts was complete, similarities and differences were also considered.

Overall, the results suggest that ultra-marathoners do experience a "tipping point", a strong positive experience, which is closely related to a feeling of being able to finish the race, or to achieve their goals. This was not reflected in the quantitative data, demonstrating that the "tipping point" is not necessarily specific to a certain point of the race. While most participants report having the experience, it clearly does not manifest itself in the same time, place or manner for all. The results do, however, teach about how runners get to a "tipping point" experience, what it feels like, and how other athletes could train themselves to achieve that feeling sooner.

Keywords: Ultra-running, ultra-marathon, tipping point, mental strategies, fatigue.

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1   INTRODUCTION

Ultra-distance running is a relatively new and unique discipline in the world of running. It can be defined as an event that is at least longer than a typical marathon distance, usually 50 kilometres or longer. Typical events, like the 50 mile or 100 kilometre distance can take participants between 8-16 hours to complete, though because the terrain of each race can vary significantly, the event may take even longer. In the past decade, the popularity of ultra-races has exploded, with the number of ultra-running events being held growing around 400% from 2004 to 2014 (Ultrarunning Magazine, 2014). Similarly, the German Ultramarathon Association's database of ultra-races around the world lists 3,010 events and just over 360,000 finishers in 2015, compared to 612 events and just under 69,000 finishers in 2004 (Deutsche Ultramarathon Verenigung, n.d.).

Ultra-marathons are often contested in more extreme terrain than traditional marathons. Ultra-marathon courses are frequently on trails, in hilly, mountainous, or extreme terrain, often with considerable elevation change, harsh weather conditions and difficult footing. Ultra-marathons are so demanding that the percentage of competitors that successfully finish is significantly lower than in typical marathons. For example, in the 2014 New York City Marathon, the world's largest marathon, only 305 people out of 50,869 starters did not finish, for a completion rate of 99.99% (Dalek, 2014). In stark comparison, in 2013, the world's largest and oldest ultra-marathon, the Comrades Marathon in Durban, South Africa, had 13,895 starters and 10,185 finishers, for a completion rate of 73% (Collier, 2013). Another of the world's largest trail ultra-marathons, the Ultra Trail du Mont-Blanc, has a finishing rate of around 65% (Results UTMB, n.d.). These two races are actually on the high end of completion rates. Many smaller ultra-marathons see a significantly lower finishing rate.

Yet, even with such a high drop-out rate, the percentage of finishers among the runners who pass a certain part of the race increases dramatically. This point is still a long way from the finish, though a relatively short distance compared to the distance travelled. Common sense and the prevailing research into fatigue in ultra-running suggest that a person will get more tired in the latter part of the race and will find it physically harder and harder to continue. The fact that most runners who reach the latter part of the race

finish it suggests that getting to the finish line is as much a mental challenge as it is a physical one.

In the ultra-marathon world, "professional" runners are a very small fraction of the total participants. For example, the Hardrock 100 Mile, a prestigious North American ultra-race, had only two runners out of 140 who define themselves as professional athletes, and about 10-15 more with jobs but also some support from corporations, such as shoe companies (Hardrock100.com, n.d.). This study therefore focused on the amateur athletes, ones who may not consider the possibility of winning the race, but are striving to achieve a personal goal, or even just finish. The purpose of this study is to examine the mental experiences of people who represent the majority of ultra-marathon runners, to see if they cross a mental threshold that gives them the fortitude and belief they will finish their race, even with a long distance to go. It will also examine whether it is possible to see a measurable quantitative change in a psychological measure when that occurs.

The practical implications of this study relate to the fact that athletes face continuously increasing levels of fatigue that they must overcome, yet realistically, there are no physical ways to significantly reduce fatigue aside from completely stopping. Thus, they must have strategies to overcome the fatigue, and these almost certainly include mental strategies. Ultra-marathon runners (commonly referred to as "Ultra-runners") face this fatigue more often than most other athletes and, whether they have discrete mental strategies or not, have surely found some form of strategy to overcome it, or else none would ever finish.

Being in an optimal state has been demonstrated as one way of experiencing positive, goal-oriented responses to fatigue. The results of this study will examine the experiences athletes have when they cross a threshold and become confident that they will achieve their goals and consider what mental strategies they used to influence their race in a positive way. Academically, this study contributes to the increasing research area focusing on understanding the mental experiences of ultra-endurance athletes during their races, particularly as it relates to realizations of success or failure. While the qualitative material increases the understanding of the studied phenomenon, providing insights to the experiences the runners had throughout the entire event and at a specific point in time, the collection of subjective quantitative data mid-race is also relatively

novel aspect and contributes some initial data in this area to the study. In an applied setting, this information may be beneficial for sport psychology practitioners or endurance athletes who want to develop new strategies to persist in the face of extreme fatigue.

2   LITERATURE REVIEW

2.1   Analyzing Fatigue in Endurance Events

2.1.1   Physical Fatigue

Unsurprisingly, the concept of endurance sport is to maintain the highest speed for as long as possible before fatiguing. Competitors in endurance sport do not necessarily maintain their fastest speed, but rather, maintain a speed that is continually sustainable for the duration of the competition, all the while resisting the ever-growing amount of fatigue their body is experiencing.

One common way of measuring the fatigue a person feels at any given moment, is using "Rating of Perceived Exertion" (RPE), a simple numerical scale that allows a person to rate their fatigue quickly. A large body of research explores changes in cognitive states during performance of long-distance endurance events using RPE.

In ultra-marathons, multiple studies show that RPE increases relatively linearly across the duration of the race. For example, Utter et al. (2003) studied the relationship between RPE and physiological measures, such as heart rate, in runners of a 67km ultra race, but found no significant correlation. Across the duration of the race, RPE progressively increased, even though heart rate progressively decreased. More recently, Ramos-Campo et al. (2016) studied runners of a 54-km ultra-endurance race, and, among other things, measured RPE and perceived lower limb muscle soreness. For both variables, there was a significant and linear increase from the beginning to the end of the race.

Many studies of shorter endurance events have shown similar results. For example, Acevedo, Gill, Goldfarb, and Boyer (1996) examined RPE changes during a 2-hour treadmill submaximal treadmill run and also found a significant increase in RPE over the duration of the test. Thus, it could be concluded for endurance sport that over the duration of a race, a person will feel progressively more tired and the end of the race is when they are, physiologically, the most tired. The longer one participates in an activity, the greater the fatigue.

However, some ultra-running studies have found contrasting results in particular situations. Micklewright et al. (2009) explored how perceived exertion influenced pacing in ultra-marathon competitors of 73.4km trail run in South Africa. In the final

15% of the race, the subjects showed a decrease in RPE, however a major factor was that the final section of the race course was also almost entirely downhill. Although not necessarily increasing aerobic fatigue, downhills have been shown to have increased levels of muscle fatigue due to increased myoelectric recruitment of the leg muscles to absorb the increased shock (Mizrahi, Verbitsky, and Isakov, 2001).

Tam, Hew-Butler, Papadopoulou, Nolte, and Noakes (2009) showed similar findings in their study of physiological reactions to an ultra-running race. During the last quarter of the 80km ultra-running race, participants experienced a distinct decrease in rating of perceived exertion. It should be noted that the race used for this study also featured a long downhill during the final portion of the race.

Some evidence has shown that in ultra-endurance events, parts of the race can serve as ways to psychologically reduce the perception of fatigue. Parry, Chinnasamy, Papadopoulou, Noakes, and Micklewright (2011) measured mood, anxiety, and perceived exertion in Ironman athletes. As the athletes progressed through the event, RPE increased, as would be expected, however, there was a "re-setting" (p. 1091) of RPE at the start of each section of the race, during the transition period. The transition point of multi-sport races or ultra-endurance races is where one distinct discipline or section of the race ends, and another one begins. At these points, there is an opportunity to take a short break to change equipment, re-fuel or do any number of other activities seemed to have a small rejuvenating effect on the athletes. The authors found no clear reasoning for this reset, though they theorized that transition is essential a period of recovery, and "may allow for a reduction in the integrated afferent signals that may contribute to the perception of effort" (p. 1091). Thus, although physiological fatigue logically should continue in an upward trend across the entirety of an ultra-distance race, some situations can cause a decrease in feelings of physical fatigue.

2.1.2   Mental Fatigue

Fatigue in endurance sports is not solely manifested as physical fatigue. Mental fatigue is also a major factor. Part of ultra-running's attraction to most of its participants is the struggle is against oneself; "For me, ultra-running is a microcosm of life itself: It contains the drama, the struggle, the joy, and the redemption that makes life worth living. It brings the best of the human spirit" (Ehret, 2000). Few runners start an ultra-race intending to win. For most, goals are modest, such as going the whole distance

within a time limit, or personally significant, to succeed in a difficult challenge or prove strength of character in the face of physical and mental fatigue.

Mental fatigue, as described by Marcora, Staiano, and Manning (2009), manifests itself similarly to physical fatigue, being characterized by "subjective feelings of 'tiredness' and 'lack of energy', but is primarily a result of long periods of 'demanding cognitive activity'" (p. 857). Marcora et al. (2009) studied mental fatigue's impact on physical performance with 16 cyclists performing an endurance cycling workout after watching a simple video or performing a demanding mental task. They found that the demanding mental task did not have a significant physiological impact on performance over a neutral activity. They did, however, find that mentally fatigued subjects' performance was still affected, because the cyclists "reached their maximal level of perceived exertion and disengaged from the physical task earlier" (p. 862). The authors also noted that a further common feature of mental fatigue is the desire to avoid further effort.

More specific to endurance, Brownsburger, Edwards, Crowther, and Cottrell (2013), explored mental fatigue further in self-paced exercise, and found that although physiological stress was similar between participants who were mentally fatigued and those who were not, the perception of fatigue was higher in mentally fatigued participants. Mood, as measured using a visual analogue scale from "negative" to "positive", was also worse during exercise for those that were mentally fatigued. The authors concluded that their study supports the idea that mental fatigue has a negative impact on performance, and is in part, a result of an "altered perception of effort" (p. 1035). Notably, both Marcora et al. (2009) and Brownsburger et al. (2013) noted that motivation towards the task was not affected by mental fatigue, which suggests that dropping out of a race is not necessarily related to an athlete deciding they do not want to achieve their goals.

Mental fatigue has been described in other ways. One way is using the strength model of self-control, proposed by Baumeister, Vohs, and Tice (2007). Self-control, defined by the authors, is the "capacity for altering one's own responses … to bring them into line with standards such as ideals, values, morals, and social expectations and to support the pursuit of long-term goals" (p. 351). However, it is also suggested that this self-control capacity is a limited resource, and each time an effort of self-control is needed, that resource is depleted and subsequent performances may be diminished. Some studies

have shown the diminished performance of a basic physical task after making cognitive tasks, and that this can reduce a person's persistence at a physical exercise task. (Dorris, Power, & Kenefick, 2012).

Another term relevant to endurance sport is "competitive suffering". Evans, Hoar, Gebotys, and Marchesin (2014) defined this concept as the period of time when endurance athletes realize "that they are failing to achieve meaningful goals during competition [and] experience a negative affective state". They also make the important distinction from otherwise "normal" exercise fatigue, as competitive suffering also includes a "perceived inability to attain valued personal goals" (p. 368) but is not necessarily coupled with a performance drop.

2.2   Ultra-runners – Defying Fatigue

Ultra-running has a much more significant dropout rate than shorter distance races. This will come as no surprise to anyone who has run, or even heard of, an ultra-marathon. A traditional 42 km marathon, usually considered a challenge, is far easier than an ultra-marathon, which often includes two or more marathons back-to-back, frequently in difficult terrain.

Since few ultra-runners enter with the intention of winning, and for most, reaching the finish line within the allowed time is the primary goal; competition against others is not an over-riding factor. The culture of ultra-running is said to be "built upon community and the 'spirit of the sport', rather than self-recognition and technicalities" (irunfar.com, n.d.). Further, "speed is relatively unimportant … the more important factors such as maintaining an even pace, nutrition and keeping a positive mindset make it a true test of mind, body and spirit" (Styler, n.d.).

Considering the evidence presented thus far, with the typically linear increase in fatigue throughout the duration of endurance races, and the limited mental resources remaining to athletes who persist in the face of extreme fatigue, it may be reasonable to assume that most ultra-runners will drop out at later stages of the race. However, results from various ultra-races suggest a different trend. There appears to be a point in the course, relatively close to the end, after which the number of racers who quit falls to almost zero.

The Canadian Death Race, in Grande Cache, Alberta, for example, is a 125 km ultra trail race that includes a total climb of 5,181 meters over three mountains. Competitors have a time limit of 24 hours to complete the course. From 2010-2014, on average, 45% of the starters managed to finish the race within the allowed time. However, the finishing rate for those who were within the allotted time and could choose to start the final leg of 21km, averaged 94.1%.

The Lost Soul Ultra in Lethbridge, Alberta, Canada, is a 100 mile ultra-marathon that climbs and descends out of a major river valley. From 2011-2014, the race had an average finishing rate of 49.8%. Of runners who were still within the time cutoff and therefore allowed to start the final 53km lap, an average of 90.7% finished.

Some example statistics from selected 2014 ultra-marathon races around the world are shown in Table 1. Values in brackets beside the race name represent the length of the final leg.

Race	Starters	Finishers	Finish rate	Runners starting final leg	Finish rate of runners who started final leg
Canadian Death Race (21 / 125km)	279	114	40.9%	116	98.3%
Lost Soul Ultra (53 / 161 km)	44	21	45.5%	21	100%
Sinister 7 (47 / 161 km)	168	51	30.4%	62	82.3%
Hardrock 100 (31 / 161 km)	140	104	74.3%	111	94.5%
Ultra Trail of Mt. Fuji (31 / 169 km)	1422	849	59.7%	895	97.5%
Blackfoot Ultra (25 / 100 km)	61	37	60.7%	45	97.4%

The table shows a common phenomenon; that the finish rate for those who have reached a point that is relatively closer to the end than to the beginning is significantly higher than the finish rate for the entire race. This is despite the fact that there is still a very long way to go and the runners have already travelled an extremely long distance.

Thus far, the evidence has suggested that runners should be extremely physically fatigued and mentally fatigued as well, which theoretically diminishes their desire to persist at the task. Some studies have shown that in select ultra races, athletes have

perceived themselves to be working less hard as they get closer to the finish, though in those studies, the final sections of the race have been predominantly downhill. The effect of aid stations or transition points (like the end of a lap, or where one course leg ends and another beings) where runners can stop, refuel, meet supporters and change equipment, has already been seen to have a positive effect. Yet at the same time, the cumulative effect of mental fatigue has been shown to reduce a person's persistence at a task, suggesting that a runner's drive to continue may decrease as the race continues. Thus, aid stations or transition points may serve as a "test", where runners must weigh both their physical and mental feeling and make decisions on whether to continue or not, and the impact of the decision point itself has an effect on this decision.

The next factor to consider is how athletes mentally cope with their fatigue, what experiences they go through, and how fatigue affects them when making a determination of whether to continue.

2.3   How to Describe the Mental Experience of an Endurance Athlete

In any sport, an athlete will go through a wide variety of mental experiences. Given the length of an ultra event, it is possible their experiences will be especially varied. There are many terms referring to a person's mental experience, all of which are related, have slightly different components, and affect each other in different ways. Terms include "affect", "feeling", "emotion", "mood", and "mindset" to name just a few.

Distinguishing between these terms can be difficult. They are frequently used in tandem, either as interchangeable, or as being distinctly different (Beedie, Terry, & Lane, 2005). First, consider some mainstream sources. The emotional intelligence organization "Six Seconds" suggests that a key differentiator is time. Emotions are defined as "immediate physiological responses to perceived stimulus", feelings are "how we begin to make meaning of the emotion", and finally moods are "a mix of feelings and emotions … a semi-persistent mental + physical + emotional state" (Freedman, n.d.). In effect, it is implied that emotions inform feelings which inform mood.

In contrast, Taylor (n.d.) suggests, that emotion is "a blend of current feelings, thoughts, and memories, triggered by a current event", a definition that seems to contrast to the

previous source. Mood, however, is noted as being a more "sustained state of emotion" (Taylor, n.d.).

The same level of ambiguity of terms also exists in scholarly literature. Particularly, the concepts of mood and emotion have a close association with one another, to a point where there is not always consensus among sport scholars on how the two relate (Lane, Davis, & Devonport, 2011).

Beedie, Terry, and Lane (2005) discussed some of the dimensions which have been found to be some of the most confounding aspects of the difference between mood and emotion. They found the main perceived differences (among 17 total dimensions) related to "cause", "duration", and "control". Cause, as described by Lane et al. (2011) suggested that mood relates to "feelings that are not attributed to a specific antecedent" (p. 400), distinguishing it from emotions, which are a result of a specific event. Duration tended to lean towards mood being more sustained, with emotion being more immediate, yet Beedie et al. (2005) noted that a small percentage of their participants suggested the opposite, where a mood is experienced briefly, and an emotion is longer lasting. In the dimension of control, it was perceived that emotions were less controllable, that they were just "felt", and it was possible to decide to be in a particular mood.

Another issue may be that, as Lane & Terry (2016) note, some specific words people used to describe their experience, such as feelings of "anxiety", "happiness", and "sadness" can become difficult to clearly categorize as only an emotion or only mood. Considering the distinctions of Beedie et al. (2005), it may be reasonable to conclude that, depending on the context, many experiences could be defined as either an emotion or a mood.

Lazarus (2000) considered emotion a phenomenon that is "an organized psychophysiological reaction to ongoing relationships with the environment" (p. 230). He took the position that emotion needs to also include "the causal cognitive, motivational, and relational variables and processes involved in arousing and sustaining an emotion" (p. 230). Thus, emotions result not only from a "person-environment" interaction, but also from an inward dimension that considers a person's motivations, the importance of the event, or their proximity to achieving their desired result (Lazarus, 1991). This could be, for example, the race distance an ultra-runner has remaining.

In summary, Lane & Terry (2016) proposed some ways to distinguish between the two, suggesting that emotions can be more intense than moods and stem from an identifiable source, but that moods tend to be more stable, enduring, less visible, and more controllable. Using this explanation, both have relevance in the context of ultra-marathons. Considering the whole impact of an ultra-marathon on an athlete, one may examine the various moods experienced across the entire race or specific emotions resulting from particular incidents, such as the effect of being passed or hearing someone cheering for you by name.

Regardless of definition, however, it is clear that both mood and emotion influence cognition and behavior, and, in particular, it is not clear an ultra-runner would use the terms in a scientifically "correct" manner. Thus, it is helpful to understand what the research has found about how both mood and emotion affects performance and whether an alternative perspective may adequately capture an ultra-runner's experience.

2.4 Relationship Between Performance and Mental State

Mood responses have been found useful in predicting performance outcome (Beedie, Terry, & Lane, 2000). Beedie et al. (2000) found that as the duration of an event increases, the effectiveness of pre-performance measures of mood diminishes, which also suggests that mood fluctuates more as events get longer. Referring specifically to ultra-running, Micklewright et al. (2009) speculated that a runner's mood is a result of the "cognitive processes that develop during the race … as they become gradually aware of whether or not they will achieve their expectations" (p. 171). They also suggest that these performance appraisals are continually changing during the race and have an influence on mood. A conclusion that can be drawn from Beedie et al. (2000) and Micklewright et al. (2009) is that the longer the endurance event continues the more fluid "mood" becomes, in a sense, taking on the characteristics of emotions, in being less controllable and less enduring relative to an otherwise "normal" mood, yet still not about anything in particular.

Tharion, Karis, & Potter (1990) showed that tension level of ultra-runners was highest before the race, and hypothesized this was primarily due to the "great personal investment in preparation" (p. 1315). The participants in that study also saw a sizable drop in tension after finishing the race. This, along with Micklewright et al. (2009) also

suggests that an athlete's performance appraisals (and thus, moods) can also be influenced by various other things that are established before the race begins, like personal investment or expectations.

Some studies on ultra-runners showed that mood could also relate to perceived exertion and has a significant impact on performance (Tharion et al., 1990). Concepts that reflect this idea are that of "mood-as-information" and "mood-as-input", two somewhat contrasting models relating to decision making and the impact mood has on it. Laborde & Raab (2013) described mood-as-information as a source of information in itself, a model that they suggest explains mood-congruent functioning, that "moods always have the same effect" (p. 340). In contrast, mood-as-input suggests that mood is used as "input by other processes … [and that] "mood will influence people's assessment of a situation, and this, in turn, will shape the way they consider options" (p. 340). Considering the research discussed previously, assuming that an ultra-runner is experiencing high levels of fatigue late into the race, the mood-as-input concept would suggest that the now somewhat blurry moods or emotions a runner is experiencing would have a major impact on their option selection; whether to continue and finish or to quit.

A possibility, then, is to consider the "state" an athlete is in, which may not need to be categorized as a mood or an emotion. In the individual zones of optimal functioning model (IZOF, Hanin, 2000, 2007) emotions are considered components of a "psychobiosocial state", so named in consideration of the psychological, biological, and social components of their performance experience (Hanin, 2007; Ruiz, Hanin & Robazza, 2016). Five dimensions: form, content, intensity, time, and context, serve to describe individualized emotional experiences (Hanin 2003). The IZOF model also contributes to understanding the relationship of emotion and performance, in part suggesting that an athlete should understand when they are in their optimal zone (and by extension, when they are not in an optimal zone), how being in their optimal zone manifests itself, and how they can enter said zone and stay there (Robazza, Pellizzari, & Hanin, 2014). Ruiz et al. (2016) suggested that considering these psychobiosocial states may assist in individualizing each participant's responses. They defined their approach as focusing on "capturing individual meaning and a description of task- and person-relevant experiences" (p. 213).

2.5   Applications to Ultra-marathon Running

One potential gap in previous research in this area related to is that many research papers typically only measure mood or emotions before and after the race. As noted by Tharion et al. (1990), pre-race mood responses can contribute to predicting performance outcome. However, in an ultra distance race, the time between "pre-race" and performance outcome may be many hours. In Tharion's study, in particular, the event lasted only two hours, so his conclusions may not apply to, for example, a 12-hour event. Beedie et al.'s meta-analysis on mood states and athletic performance also admitted that mood fluctuation is greater as the duration of events get longer, and so the effectiveness of measuring pre-performance may decrease (Beedie et al., 2000).

Similarly, Micklewright et al. (2009) in introducing their study suggested that further consideration is needed in understanding "how intra-individual differences in runners' circumstances, motives, perceptions of the race environment and conscious cognitive processes potentially influence the way endurance running sensations are interpreted by a runner as an antecedent of perceived exertion and affective experience." (p. 168). Thus, a potentially interesting gap in the literature could involve looking at a person's assessment of their capability to complete their task in particular situations and examining how those assessments are similar or different between individuals or between different circumstances.

In some ultra-running studies, researchers have seemed to accept the clear interaction between emotions and moods by using a different term, "experience". Holt, Lee, Kim, and Klein's (2004) paper specifically explores ultra-runner's "experiences" including discussions of the emotions experienced and the moods of the athletes during the event. Philippe, Rochat, Vauthier, and Hauw (2016), also investigates ultra-runners "courses of experience", in discussing withdrawal from ultra races, and repeatedly discusses other studies that looked at both moods and emotions. Simpson, Post, Young, and Jensen (2014), is an exception, which also describes the "experiences" of ultra-runners, yet only refers to these in relation to mood.

While these and other studies have examined ultra-runner's experiences as a whole, and some having also looked at a particular incident (such as withdrawing from the race), it has yet to be closely studied as to whether there is a clear point where runners have an experience that represents the belief they will finish.

2.6   Theoretical Framework

The following research is rooted in Lazarus' cognitive-motivational-relational theory (1991). It aims to find connections between emotions and behaviour, acknowledging that individuals have personal "encounters" with their environment, and examining resultant behaviours as a result of those encounters.

The research in the previous section on physical and mental fatigue in ultra-endurance events shows that both have a strong influence on the psychology of athletes, so much so that it can be difficult to identify the specific dimension of fatigue that has the most influence. Similarly, the differences between emotion and mood suggest that a person's physical and cognitive perception of themselves and their environment will affect their behaviour. In an effort to try to tie an ultra-runner's experience of fatigue and its effect on mood/emotion, Lazarus' theory may provide some guidance on how to initially frame and further explore the relationship.

In Lazarus' original paper on the Cognitive-Motivational-Relational theory of emotion he also proposes that the experiences of a person's relationship with their environment are "personal encounters" and are appraised on a personal level, and that a person will "experience the emotion linked to the appraised meaning" (2000, p. 826). These appraisals come in the form of "primary" and "secondary" appraisal. The primary appraisal relates to what is at stake for the person in an encounter, such as how important the race is, as well as whether each encounter is appraised as being harmful or beneficial. Secondary appraisal concerns the subsequent options for coping with the appraised encounter.

Lazarus' theory melds well with the nature of ultra-running and its participants. The stakes are high given the serious commitment required, both during the event and before it with the many hours of training needed to be successful. The stakes are also high because the frequency of opportunities to attempt an ultra-marathon are significantly lower than for other running events, in that one can only physically handle a few ultra-marathons in a year.

Furthermore, the idea of there being an individual appraisal of encounters as harmful or beneficial may provide an explanation as to why similar encounters may be viewed as

positive for one person and negative for another. It may instead depend on how the person appraises the encounter (similar to the different responses individuals have to extremely hot weather). Following that with the secondary appraisal where coping strategies are created, there is a clear stressor-strategy dynamic that occurs across the duration of an ultra race.

A key aspect of this is based on his idea of casting appraisal statements in an "if…then" form, wherein if a person "appraises [their] relationship to the environment in a particular way, then a specific emotion, which is tied to the appraisal, always results" (p. 825). Lazarus concludes that if two people make the same appraisal, they will experience the same emotion. It could be speculated that if each runner's appraisal is the same when related to a particular occurrence in the race, then they may have similar experiences. Alternatively, having similar experiences may result in similar behaviours. Lazarus suggests that using a cognitive-motivational-relational theory of emotion can help to "reason forward" and consider how emotion shapes behaviour, and to "reason backward" to consider patterns of emotion and theorize causes. This seems to be the foundation of much of the previously discussed research on the ultra-runner's experiences and their impact on behaviour.

The behaviour, persisting in an ultra-marathon despite intense fatigue, is theorized to be significantly influenced by the emotions experienced at a particular point in the race. These experiences may, for example, be a sudden improvement in mood, a highly motivating positive emotion, or a different otherwise positive emotional experience, like a feeling of accomplishment. It proceeds to explore those "cognitive, motivational, and relational variables and processes" that created those positive emotions, and how (or if) those emotions are sustained. Likewise, if the aforementioned experiences do not occur or do not have the predicted influence on behaviour, Lazarus' theory still provides a basis from which to consider the patterns that did occur and their impacts on behaviour.

3   PURPOSE OF THE STUDY

For most individuals participating in an ultra-marathon, the primary goal is simply to finish the race within the allowed time. However, given the difficulty and length of the race, the typical rate of finishing an ultra-marathon is much lower than a traditional marathon. Analysis of results from many ultra-marathons worldwide have shown that the finishing rate is significantly higher once participants pass a certain distance in the race, often at an aid station or transition point in the race. Prior research has shown that physical fatigue and perceived exertion still increase linearly across the entire length of the race. This would suggest that as fatigue increases near the end of the race, the drop-out rate would also increase, but the opposite occurs. This study quantitatively examined changes in psychobiosocial states during these transition periods and qualitatively documented the athlete's recalled experiences to cope with their fatigue and optimize their mental performance, with a particular emphasis on their transition periods.

For the quantitative aspect of the study, it was hypothesized that there will be a noticeable change in the results of the psychobiosocial states between the first and second surveys, as the athletes will have crossed the threshold to where they are significantly more confident in their ability to finish and accomplish their goals. It was also hypothesized that the majority of the participants will not report specific mental strategies prior to the race, but upon reflection after the race, will be able to recount strategies they used, intentionally or not.

Thus, the research question involved exploring whether there is a clear change in mindset for ultra-runners when they have determined they will achieve their goal. Further, if there is a clear change in mental state, when does it happen and what is the experience like?

4   METHODS

4.1   Overview

This study used a mixed-method approach. At its core, it is a phenomenological qualitative study, wherein the phenomenon in question is the extremely high percentage of ultra-runners who all finish the race after crossing a certain point in the race, in contrast to the low percentage of starters who finish. Considering prior studies of ultra-running, it was anticipated that the ideas and themes learned from this study could yield a variety of results. An Interpretive Phenomenological Approach (IPA) was used to understand the phenomenon and the subjects' experiences throughout the race and at this specific point. It was intended less to make firm statements on what athletes experience, but rather to compare varying experiences and show how early portions of the race influence the middle and end, and how the runners themselves interpreted their experiences. Quantitative measures were used to supplement the quantitative data by measuring the participants' changes in their experiences at a specific point of the race.

4.2   Participants

The target participants of this study were competitors of an ultra-marathon, running a distance of at least 50 miles. An event was chosen that had both a 50 mile event and a 100km event, and the research first received approval from the race organizers. Participants were recruited also through the race organizers: a request for participants was e-mailed to the race organizer who forwarded the information to all entrants of the 50 mile and 100 km event. This request was sent approximately two weeks prior to the race.

A total of 15 participants were selected on a first-come, first-serve basis, 10 men and 5 women. Participants who, after confirming their participation, decided they would no longer be participating in the study or competing in the race were replaced by the next interested volunteer. All participants were entered in either the 50 mile or 100km events. Of the participants, 5 were entered in the 100km event, all of whom were male runners, and 10 were entered in the 50 mile event. Ultimately, 2 participants selected did not fully complete all parts of the study and were therefore not included in the study.

Mean participant age was 47.6 (SD=9.5). As there was a relatively small number of people registered in the entire event, providing a specific age range of the participants

may allow for identification of the participants. Participant ultra experience ranged from this event being their first ultra-marathon to having completed well over 10 ultra-marathons.

All participants can be described as "competitive amateurs". They are athletes who spend a portion of their free time to play or train on a regular basis (Stanley, McGann, Hall, McKenna and Briffa, 2004), and may have specific competitive goals, though the caliber of that goal is not important (Kuchynka et al., 2009). They are athletes who do not receive for money or free equipment through sponsorship or other corporate agreements. As noted earlier, the "competitive amateur" population represents the large majority of the type of people that participate in ultra-marathons. In the competition used for this study, no participants would be considered professional athletes.

4.3   Procedure

Prior to beginning participant recruitment, the information letter, consent form, and study procedures were reviewed and approved by the research supervisor, whose contact information was also provided to all participants as part of the study information letter.

Participants who expressed interest were provided with an information letter and statement of consent. The information letter and consent form are shown in Appendix 1. The information letter went into detail about all aspects of the study. This information included contact details for both the researcher and the supervisor, the background of the study, further details on the procedures of the study and the time commitments required, the anticipated benefits for the researcher and the participants, the potential risks and how they will be managed, information on their rights and a voluntary participant, and information on confidentiality. This letter was sent approximately one week prior to the race. Those who were interested in participating confirmed their interest by signing two consent forms. One was given to the researcher, and one was retained by the participant. The consent forms were either scanned and returned by e-mail or signed and returned to the researcher at the first meeting.

A simplified timeline of the procedure followed in this study is as follows: pre-race interview, pre-race questionnaire preparation, during-race filling of questionnaire, and

post-race interview. Each aspect of the procedure will be described in more detail below.

4.3.1 Pre-race Interview & Questionnaire Preparation

Before the race, a short interview was performed to learn the participant's previous running experience, their goals for the upcoming race, how they were feeling about the upcoming race, and any strategies they had to deal with the challenges they may face during the race.

This pre-race interview was collected in two ways, depending on the situation of the participant. During the two days before the race, race numbers could be picked up at a local business. If the participants were local and planned on visiting the race number pick-up, then the short pre-race interview was conducted at that time in person. If participants were not able to appear in person to the race package pickup, a list of questions was prepared and answered using e-mail.

The in-person interviews were based upon an interview guide. The interview was structured in this way so that similar answers were received from all participants regardless of whether the pre-interview was performed in person or over e-mail. There were specific items, such as "what is your goal for this race?" that were considered important information to determine. Participants were free to elaborate on the questions however they saw fit, but given the short duration of this interview, the conversation was quickly returned to the specific questions to be asked.

After the pre-race interview, the questionnaire was prepared. If the pre-race interview was performed over e-mail or phone, similar instructions on how to prepare the questionnaire were described via the same medium. Participants were shown how the survey would work during the race, including how and where the scale would be administered, and provided an opportunity to ask any further questions.

4.3.2 Questionnaire Implementation Process

The procedure of how the scale will be implemented during the race was explained to the participants in the pre-interview and is described below.

The course map for the race is shown in Appendix 2, which also shows the location where the questionnaire was given to the participants. The course is a loop, with a short two-way section just before the start and the finish. When participants leave the

start/finish area, they follow a short two-way section before the course splits. The participants ran the loop counter-clockwise, and then returned to the same split point again before continuing to the start/finish point.

The split point was the location of where the scale was implemented to the participants. The participants filled the scale in at the split point when approaching the start/finish point, and then again at the split point when leaving the start/finish point. The scale was filled out twice. The first time when they were finishing their penultimate lap, the second time when they were departing for their final lap. For the 50 mile (80,467 km) competitors, this meant they filled the survey out at approximately 54 and 56 km of their race, for the 100km competitors, it was at approximately 74 and 76 km. Given the possibility that several competitors might pass at the same time, possibly in different directions, an assistant was recruited to help implement the scale.

Each participant was identified by their race number when coming up the trail and approaching the split point. A researcher took that participant's scale and attached it to a clipboard with a pen attached to it. As they approached the researcher, participants were made aware that this was the time to fill out the scale, and reminded that they did not have to stop.

Participants were given the clipboard with the pen. They filled out the scale, making a mark along a continuum for each dimension identified in the pre-interview. Once finished, the participants would either hand the clipboard back to a researcher or place it on the ground to be retrieved by a researcher.

Participants were permitted to either stop or continue moving while filling out the scale. If they chose to continue moving, a researcher followed alongside to ensure participants did not injure themselves while splitting their attention between moving and filling out the scale. Most participants made conversation with the researchers, though explicitly encouraging participants was avoided.

Once the participants filled out the scale the first time, they continued to the start/finish area, where they did whatever they typically do at that point. There was also no time-restriction; they were permitted to take as much or a little time as they desired.

Upon setting out for their final lap, the participants approached the same location where they filled out the first scale, and a researcher was waiting with another clipboard with a

scale featuring the same words as before, but in a different order. The same procedure as in the first time was followed, and then participants continued on their final lap. Once the participants filled out the scale the second time, no other actions related to the research study were expected of them during the race.

4.3.3 Post-race Interview

The post-race interview was held as soon as possible after the completion of the race. No interviews were performed in the evening after the race. The interviews were held within 10 days after the race, the majority between 24 and 72 hours after. This time frame was chosen to avoid any initial emotional response from success or failure and provide the participants a certain amount of time to reflect on their experience, but not so long to experience excess recall decay.

The post-race interviews were performed at a location of the participant's choosing. Locations varied between public locations, such as coffee shops, to the participant's home, or a neutral quiet location. Some interviews with remote participants were performed over the telephone or over Skype, and were scheduled and pre-arranged ahead of time, so participants were able to budget the necessary time for the interview into their day. Each interview lasted, on average, 54 minutes.

4.4 Measures

4.4.1 Profiling of Competitive Experiences

Participants' experiences were assessed using a slightly modified procedure based on the states modalities identified in the Individualized Profiling of Psychobiosocial States (IPPS; Ruiz et al. 2016). The IPPS identifies 8 state modalities within the three components of a psychobiosocial state (psychological, biological, and social), each of which can be manifested in a functionally helpful (as in, beneficial for performance) and functionally harmful (literally, harmful to performance) ways. In each modality, over separate studies, key adjectives were identified by athletes that best represented their experiences prior to their best and worst performances. Over the studies, for each modality these adjectives were culled to a small handful that were most frequently identified as being a descriptor of their respective modality. IPPS is noted by the authors as being a foundation for more qualitative data, particularly in the individualized profiling that will be compiled as part of this research

Participants are able to select those modalities and states that they feel best represents themselves is more representative of their states than a generalized scale. Initial validation of the scale by the authors suggested that it may be used for measurement of situational experiences, potentially relating to state changes in interventions or influential situations.

IPPS was used in a somewhat different way for the purposes of this study. As the interest was to assess how intensely each runner was experiencing each modality, there needed to be a range for the athletes to select from an extremely intense feeling of that experience, to a complete absence of that feeling.

First, participants were shown a table, where each cell contained the list of adjectives from the IPPS for functionally helpful and functionally harmful modalities. For example, one box showed the words "enthusiastic, confident, carefree, joyful", which represented the "affective pleasant functionally helpful modality. Second, participants were instructed to recall their feelings from a past performance which they considered their best, and select one adjective from each of the functionally helpful modalities that best described how they had felt. If participants felt a particular cell contained words that never applied to them in a race situation, they could write in their own similar word, or skip it entirely. It was speculated that encouraging participants to consider feelings outside of their normal race experience may have an influencing effect on their overall race performance; thus this was avoided. Third, the participants were then asked to repeat the procedure for the functionally harmful modalities which included "unmotivated, uninterested, and uncommitted", while considering the experiences associated with their recalled worst performances.

After choosing from the 20 different cells, a scale was created for each individual person using the words selected. For every word, an opposite condition was given. These opposite words were not included in the original IPPS and were developed specifically for the purposes of this study. In most cases, it was possible to add a prefix to the word. In other cases, a thesaurus was consulted to choose a contextually appropriate antonym. For example, if a participant chose the word "focused", then the opposite word shown on the scale would be "unfocused". On a numerical scale, this could be compared to giving a +5 for feeling focused and a -5 for unfocused, where 0 would be "neither focused nor unfocused". Because the list contained words that

described both functionally helpful and functionally harmful words, it was also possible that words chosen from the helpful side naturally paired up with words chosen from the harmful side, such as the aforementioned "focused" and "unfocused". In cases as that, the words were paired up, meaning one less word-pair was needed for the scale, which reduced the time the participants would need to spend filling out the survey during the race.

Fourth, after choosing the words, the participants were shown how to fill out the survey using an example sheet, and informed that the position of the word pairs would change between the sampling times. This was to prevent the participants from simply remembering how they answered in the first sample and repeating the same answers in the second to save time. The top of each sheet also had a brief sentence providing instructions: "Make a mark on the line that best describes how you feel right now".

Once the scale was completed and all the pairs were plotted on the scale, the participants were also given an opportunity to review and suggest any changes if they felt particular pairs did not represent how they experienced the opposite feeling of a particular dimension.

The resultant data collected from each participant consisted of two pages with the visual analogue scale marked with each participant's answers, one sheet representing the first time they filled out the scale, the other being the second time. An example of what the filled-out continuum would look like is shown below in Figure 1.
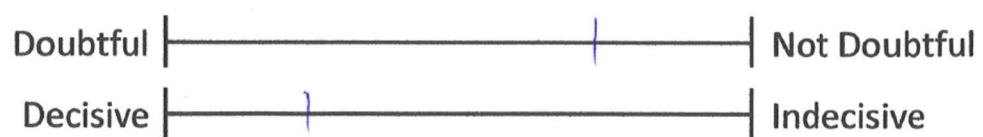
Figure 1. Partial sample of a completed scale.

Each mark was converted into a numerical value representing the distance in millimeters from the "base" condition of each modality on the scale. For example, if the key word was "focused", then the maximum score for that modality would represent 100% focused, and a score of "0" would represent being "completely not focused". Because the length of the scale on the paper was not exactly 10 centimeters, the scores were then normalized into a number out of 10. This process was performed for each measurement of every participant, and thus, the resultant raw data for analysis consisted of a spreadsheet consisting of a "before" and "after" value for each participant

4.4.2 Post-race Interview

An interview guide was also produced for the post-race interview; however, in practice the interviews followed a much less structured path. While potential questions were written, they were not strictly followed, in favour of simply ensuring each theme was discussed. Many studies of a similar nature employ a strategy like this when taking a phenomenological approach, where the participants are considered the "experts" on their experience. Although an interview guide is used to help keep a conversation flowing, participants are not restricted from speaking on the meaning of their experience however they wish (Cotterill, 2015). The role of the interviewer in these sessions was to establish rapport and direct attention to important elements during the natural flow of the conversation.

The themes contained in the interview guide included:

- How did the race go?
- A timeline of the experiences of the race
- Stressors
- Mental Strategies
- When did you 'know' you were going to finish?
- The specific time period around the quantitative stage of the study
- Motivations for ultra running

The post-race interview documented several key elements. First was a discussion of the coping strategies runners mentioned in the pre-race interview, whether they employed them or not, and whether any strategy was effective. Second was to have participants reflect on their experiences and thought processes over the entire race, and specifically during the part of the race that this study is examining. Third was a brief exploration of the participant's motivation for ultra-running. During the course of the interviews, a fourth element evolved, involving having the participants reflect on their ultra-running experience and attempt to provide advice to other runners on how to cope with fatigue during races.

Every interview was recorded using an electronic recorder or recording software on a computer. All interviews were transcribed verbatim by the primary researcher using oTranscribe.com and transferred to a word document.

4.5   Data Analysis

Because the study gathered both quantitative and qualitative data, various methods of data analysis were performed, which will be described below.

4.5.1   Qualitative

All interviews were transcribed verbatim by the primary researcher using oTranscribe.com and transferred to a word document. Analysis was performed using Atlas.ti software (Scientific Software Development GmbH, 2016).

The methodological approach for the qualitative analysis utilized for this study was Interpretive Phenomenological Analysis (IPA), which is considered an effective method to understand how the subjects making sense of this particular situation and understand what may make it unique from other situations (Pietkiewicz & Smith, 2014). This approach also bears some similarity to the biopsychosocial approach, which, as noted earlier, aims to understand individual meaning to a person's experience. The approach involved a thorough listening and reading of the interviews and transcripts multiple times, and then coding each interview transcript in Atlas.ti. Meaning units were used and general comments were added for each notable passage in the interviews. The meaning units were coded so that sub-themes could be created. Each participant had a "profile" created that consisted of distinct categories that represented aspects of the race and each sub-theme, corresponding quotes, and additional observations or comments were placed within each of those categories.

The notable themes for each individual were compared amongst the themes from the other subjects to find conceptual similarities, or, as Pietkiewicz and Smith (2014) described it, to "try to recognize what essential components make a given phenomenon special" (p. 8). The goal was not to prove that all the subjects were the same in some way, but rather to examine if the situation had a unique effect on each individual, and what similarities and differences could be seen. It was a goal to create themes in a form that best represented the experiences as described by the athletes, rather than to fit them into existing categories from other studies or scales.

4.5.2   Quantitative

The resultant data was then analyzed using *SPSS Statistics software* (IBM Corp., 2016). Data analysis was performed for intra-participant change, that is, to examine the statistical significance of the change in each modality for each individual participant,

rather than the statistical significance of the change in each particular modality across all participants.

A Wilcoxon signed-rank test (Wilcoxon, 1945) was performed for each participant to compare their modality scores between the pre-transition and post-transition time periods. Each of the modalities also had a Wilcoxon test performed to compare the changes for each modality across all participants. A statistical analysis was also performed of the average total change across all positive and negative modalities across all participants.

4.6   Ethical Considerations

All participants were fully informed of all aspects of the study and provided consent prior to any collection of data. Given that some of the data collection occurred while the athletes were competing, consideration had to be given to reducing the impact of the research on the athlete's performance. The participants were informed that they were permitted to choose not to participate in any part of the research at any time, which included choosing not to fill out the scale during the race.

All data collected was treated confidentially, and no names were recorded. Each participant was given a participant number, and that number was associated with their race number during the race, and then removed from the data immediately afterwards. All data was handled exclusively by the researcher and stored on external storage devices. As there were relatively few subjects, both male and female, and in two different categories, it would be possible to identify who each participant was, so gender-neutral language is used wherever possible, and no specific reference is made to the distance each participant ran.

5 RESULTS

5.1 Qualitative

5.1.1 Race Day Context

The Blackfoot Ultra uses a 25 kilometer loop of mostly hard-packed dirt or grass. The trails gently wind through a forest and have many small hills, no larger than 20 meters high. The 100 kilometer runners run 4 loops and the 50 mile runners run 3 loops plus an additional 5 kilometer loop. Finish times for the 50 mile range from between 7 and 13 hours, and 9 and 14 hours for the 100 kilometer event. Throughout the loop are several aid stations, with water and various types of food. Each loop ends at the location of the start and finish, with another aid station where runners may access their own equipment. This is also where most spectators wait, so runners may see family or other supporters.

The race day weather was an average spring day in Edmonton, Canada, with early morning temperatures around +5 degrees Celsius, mid-day temperatures around +12C. There was a light breeze and some cloud. Sunny periods in the afternoon caused the temperature to rise significantly to around +20C. Although athletes have different preferences for ideal weather conditions, all participants in this study considered it a good day for running. Of the 12 participants who ultimately completed all parts of the study, 11 finished their respective distances of the ultra-marathon within the allowed time. The one participant who did not finish pulled out of the race due to injury in the latter half of the race.

5.1.2 Stressors

Documenting the stressors and the participants' coping mechanisms helped to provide context of the impact of a specific point of time late in the race as it related to their experiences of the race as a whole. In addition, although it was not necessarily the purpose of this study to generalize the experiences of ultra-runners, and, participants experienced a wide variety of stressors, there were recurring themes across many participants that are worth drawing attention to.

Table 2 below shows the varied list of stressors coded across the participants. Several stressors were cited multiple times by the participants, and many were only mentioned by one participant.

Table 2

Race stressor themes coded and their frequency of occurrence

Multiple Time Coded Stressors	Frequency
Self-doubt	5
The Course	3
Comparison to Other Competitors	3
Pre-Race Nerves	3
Physical Pain	2
Boredom	2
Unexpected Problems	2
Thoughts of Quitting	2
Negative Thoughts	2
Distractions (People, Things)	2
Having to Stop	
Lack of familiarity with course	
Encountering negative situations	
The Weather	
Not hitting stretch goal	
Cutoff Times	
Fear of Losing Focus	
Loneliness	
Mental Fatigue	
Fear of Disappointing Others	
Focusing too much on just running	
Wasting time	
Guilt	
Feeling unprepared	
Expectations	
Resigned feeling of no longer being in control of performance	
Despair on how far is left	

The below discussion touches on some of the most commonly cited stressors, as well as some generalizations about many of the stressors, though they do not necessarily represent "higher-order themes", particularly because there was a clear dynamic in the way each stressor interacted with other stressors. The combination of multiple stressors across different themes makes it impossible to devise single themes that can apply in a uniform way to all ultra-runners. Therefore, the results aim to simply document the most common stressors and describe the impact they had on the various competitors.

5.1.2.1 The Race, The Course, The Competitors

These themes have been joined together because they represent external factors that all of the competitors faced approximately in equal measure. In addition, the race, the course and other competitors all tended to be stressors that were catalysts for other stressors cited above.

The course can be defined as relating to all aspects of the race terrain such as the surface of the trail and the immediate environmental surroundings like the forest, lakes and meadows, the uphills and downhills, and even the weather. The course was the most commonly reported stressor, and was closely linked to internal stressors like boredom, loneliness, or the larger internal stressor theme "expectation mismatches". In large part this was because of the nature of this particular course, with seemingly endless turns and small hills, causing many runners, even the most experienced, to become disoriented. As one runner stated:

> Between the unmanned station and the last station, that loop back in there, that must be 6-7k, that one just kills me. It's because, in all the years I've been at it, I still can't memorize it, I don't have the turns memorized, whereas pretty much all of the rest of the course I have memorized. So in the middle part there, it just seems to go on and on forever, until I get up around the corner to where they have the toilets and that little opening there, then. Then I know where I am.

Others commented that on this course, everything seemed to look the same, with the result that the mind tended to wander to negative thoughts. As one runner described:

> It wanders to, just, I guess, whatever's hurting. So then it's hard to pull yourself out of that. I really enjoy that where you just have to think about the next second, rather than, at Blackfoot it's kind of mindless, right?

Because it is a loop course, many runners found that by the third or fourth lap, the repetitiveness became hard to tolerate:

> It's all sorts of turns and all sorts of corners … you're not sure if you're in the backside of the second loop or the early part of the third loop or the late part of the third loop ... it just turns into all the same and if there's just that monotony, there's just nothing that causes me to focus on something. It's almost like I need something to focus on that brings everything else into resolution.

Most participants acknowledged that they were unlikely to win the race, but were nevertheless competitive people. Ultra-running is well established as a very social sport, so while there are long periods of loneliness, there are also occasional encounters with other runners. In this race, a loop course with multiple distances being run at the same time, runners doing shorter distances are also likely to be seen. Many of the runners

commented that seeing other competitors had an effect on them, even if they weren't "competing", and this usually manifested itself in some sort of comparison to the others.

Few runners stated that the issue of comparison with other competitors was related to whether they were going slower than others. Some acknowledged that they did not enjoy being passed, but knew it was outside their control:

> When you recognize the people that have passed you that are... you know they are in the 50 miles, that hurts a little bit. So there still is that somewhat of a competitive spirit there, but at that point there's nothing you can do about it because I just physically can't keep up.

Instead, the issue tended to be that they did not enjoy seeing the suffering of others, since it seemed to direct their attention to their own suffering as well:

> Everyone I saw was just like a walking zombie, and, it just looked like they were really struggling, so for me, still running, it was kind of tough to stay motivated when everyone was struggling so much. So... yeah, it wasn't that motivating for me to keep trying to run while everyone else was walking. I don't feel a boost at all, I just feel sorry for them. No, I'd be way more motivated if you could see my competitor ahead of me and like, try to reel them in.

Another runner let a fellow competitor create negative thoughts from what he said as they were running together:

> Shortly about, halfway through, met someone else and he was a little negative, saying 'just think, we have to do three of these', and I'm like 'oh, shit', and I don't know if I would have had those thoughts myself, or if [because] it was somebody else saying...because really, he was just confirming what we have to do, right? And then he said to me 'the second loop's going to be the worst'. I thought the third loop is going to be the worst, and I said "why is the second loop going to be the worst?", and he said, "Because you gotta do another one after that one, and they say that for most people, it's that second loop." And so then I'm thinking about it, and making it almost come true, in a way, in my mind. But then, it really wasn't, I felt great after 50. It was weird, that someone could suggest something and then you can easily... you know.

5.1.2.2 *Encountering the Unexpected*

The final quote of the previous section also alludes to the next common stressor. Although the runner had expected the race would feel a particular way, the new idea that had entered her mind – that a different section of the race might more difficult than expected, caused undue stress. Many of the other stressors were a result of facing obstacles runners were not necessarily prepared for, and could be classified into a category called "encountering the unexpected". Several participants acknowledged that the stressors discussed so far were expected to occur; they knew the course could be boring, they knew they would be passed by other people, they knew there were many hills. However, other stressors were resulted from something happening that was not what they anticipated would happen or was not a part of their plan.

As noted, this race was on a particularly difficult course, due to the isolation, repetitiveness, and the disorientating nature of the constant ups, downs, twists and turns. As will be seen in the mental strategies section, having a sense of where one is on the course was important to many people, but the feeling of expectations not lining up with reality caused rapid stress for several participants:

> And then once I hit km 75-ish, that was probably the toughest point because I thought I hit this one hill, and I'm like "okay well that's sort of the last big hill that I've got to climb, I remember that one", and as I climbed it, I realized it wasn't, it wasn't the last hill, I thought it was but it wasn't … so I got to the crest of hill and I realized it was going down again and there was another one and I'm like "aw"!" That was the only one where I'm like, "Aw, I thought that was the last one". And that was the only point where I felt kind of deflated.

Other participants who had particular race strategies suffered if what they expected did not occur. For example, some athletes came into the race anticipating that it would allow plenty of opportunity to interact with other runners, and, when did not see anyone, they had few strategies to deal with their expectation mismatch:

> I didn't see anybody and I didn't expect that at all. So in my head I was like "Oh man... can I do this?" I could start feeling the hills, and then.... at one of the aid stations... the one coming out of the... the "first" aid station, I knew one of the girls there, and she said "Oh, one of your friends, she just passed, she was waiting for you.

Another runner had a similar experience:

> I was feeling tired... and again, thinking that there was going to be people
> around. I didn't see anybody… [so] then that expectation wasn't met. And I kind
> of knew, going into the third one, that I probably would be by myself, so I
> already knew that, but, in the second one, I just thought there would be more
> people around me.

This mismatch of expectations to reality was more pronounced for runners who were less experienced with ultra-running. The more races runners had done, the more they could anticipate every single possibility. Still, they were not immune from the unexpected:

> It cooled off significantly after the first loop. So I think that was probably the
> lowest point, I was kind of unprepared to be that cold. I was prepared to be tired,
> I was prepared to be thirsty, I was prepared to be hungry, but I wasn't really
> prepared to be cold.

These situations seem particularly difficult because they are also outside a person's control. For one runner, it was not even necessary to encounter something unexpected to experience stress from it; the mere anticipation of the possibility was enough:

> Well, I just felt that if I, if I sort of lost the rhythm, lost the momentum, I might
> come out of my, well, zone or whatever that I was in … I feared that I would
> lose that focus, and I didn't want to do that.

5.1.2.3 *"Creep"*

"Creep", one of the most frequent phrases used throughout all of the runners' comments, refers to some sort of negative thought or feeling that began a cascade of further negative thoughts, eventually causing them to question whether they were capable of completing the race or not. It often started off as a simple thought and slowly evolved into a significant stressor: essentially, a slowly building level of self-doubt.

This concept of self-doubt was not a binary thought, as in one moment thinking they might be able to finish, and then the next moment thinking they could not; it was closer to a continuum. For many athletes a small amount of self-doubt became a slippery slope to more doubt and negative thoughts. One runner said: "It's when I start sliding down

the scale on the self-doubt and apprehension, that's where my emotional state really takes a tanking. And as soon as that doubt creeps in, the wheels very quickly come off after that."

Another athlete said as much:

> Yeah, the doubt creeps in. The doubts in terms of "have I trained enough"? Or the negative thoughts of "you didn't train enough", "you haven't eaten well enough" or "you haven't lost enough weight" or "you're running heavier than you should be....", "you didn't sleep", like all these doubts come in. Yeah, just to doubt what I'm doing.

Self-doubt was the pre-cursor to other stressors, such as thoughts of quitting or feelings of loneliness. One runner acknowledged that the build-up of those other stressors simply amplified the stress of being alone on the trails:

> It was, I know I've been situations like this before, not necessarily running, where you're on your own, and then.... you've been out there for a long time, you're feeling fatigue, you're losing your confidence, and you don't see anyone? Loneliness is not anything that helps, I think, in that case.

Almost all of the athletes admitted to moments of self-doubt, where they faced a crossroads, to determine whether they had the ability to deal with the situation, or whether they did not. Many of the athletes referred to this as being "in control". When one athlete was asked about having thoughts of quitting during this race, the response was that "the idea flashes through your mind occasionally, but, no, I was always in control in this race", suggesting that a lack of "control" leads to more negative thoughts.

The "creep" also brought on thoughts of fear and guilt. One runner began to feel afraid that all the people that had supported her would feel let down if she did not finish,

> I felt I couldn't not finish. And for number of reasons. For myself I think I would feel very disappointed in myself. And I didn't want to disappoint my husband, and not that he'd care. And I didn't want to disappoint my friends, because they were all just...really excited, and they all think, you know, I can do anything, and so I didn't want to let them down. It's kind of silly, but that's how I felt. Like it would just be embarrassing.

While these thoughts could be perceived as motivating, they can also equally see as negative. Another runner experienced fears that made a section of the race very difficult.

> Then I started running scared because of "oh my god am I going to make the cut-off? Am I going to make the cut-off? and then I still had lots of time for the last leg and I'm thinking "geez its only 10k", but, that was the hardest and the longest 10k I've ever done in my life, I think, but it was because my goal was so attainable, it was right there, but I was afraid it was slipping away from me.

5.1.2.4 *Physical Pain*

Most athletes experienced physical pain during the race, but it was consistently acknowledged as being part of the experience. And, although pain was expected, it always drew some of the athlete's attention, because not unlike "creep", physical pain always had the potential to get worse. As one runner stated, pain is going to be part of it, and aside from major medical emergencies, the general plan is to let it go and see what happens:

> Obviously, when you are in dehydration, or heat stroke, those kind of things, you'd stop. So, it's not like I have a couple ideas in my head, but a lot of times I just let it take its course. Rather than try to fight it, just go with it…

Many runners acknowledged that experiencing physical pain clearly impacted their confidence, with one runner saying

> Every once in a while I do get an ankle sore … I was worried a little bit if something started hurting, it would have been at that end of the second lap, and that I would have [dropped out] ... and if I was slow and a little more mentally depressed, any sort of major ache at all would play a factor in throwing in the towel.

That same runner commented that even the smallest pain drew (or demanded) attention, which had a negative effect on the rest of the race,

> The wrist was hurting from the couple of ounces of water bottle on them. I was shoving it in my shorts because I didn't want to hold them anymore … I was switching a lot … it was a mental game for me.

Even the anticipation of pain was a cause for stress

> I knew I wasn't prepared for it very well, but, when I realized … "I haven't even finished the first loop and I already feel like I've finished the second one because my legs are killing me", I'm thinking, "this is going to be a real long day!"

Similarly, the possibility of physical pain particularly caused stress, when they recalled a previous experience of the same type of pain. One runner noted brief stomach discomfort, something that had happened on occasion before, and it caused a certain level of panic about what might happen, "my stomach would feel a bit funny, and kind of wasn't sure where that was going to go. Was I going to get sick, or, why was that happening? And then it would... go away."

Regardless, certain levels of pain were expected, and runners who had some sort of pain that was perceived to be manageable continued regardless, one runner saying, "I still would have gone, regardless, even if the pain had still been there."

5.1.3 Mental Strategies

A wide variety of mental strategies were employed to get through the race. Every runner used strategies that were fundamentally a reflection of their personalities and their motivations for ultra-running. Many participants prefaced answers about their mental strategies with information about the type of person they are For example, one participant, when asked whether having social interaction during the race helped, said: "I think so, I mean, I tend to be an extroverted person, so I get energy from other people, and I certainly like that aspect."

Table 3 below lists the frequency of the themes for the mental strategies employed by the runners.

Table 3

Mental strategies used by the participants

Mental Strategy	Frequency
Social Interaction / Shared Experience	11
Focusing on other external things	11
Breaking the race down to chunks / Knowing their location on course	9
Inward Focus / Focus on Self	9
"Just Keep Moving"	7
Personal Inspiration / Self-affirmation / Focus on Personal Values	7
Having a plan and sticking to it	7
Think Positive / Acting Positive	6
Having an achievable goal / Knowing Oneself / Keeping Perspective (also consistent evaluation of goals)	6
Music	5
Appreciating the Situation / Being in the Moment	5
Acceptance of Negative Things	5
Drawing on Experience	4
Rationalizing the Situation	3
Self-Talk	3
Drawing on Competitive Nature (against others OR against self)	3

Although it may have been possible to further organize these strategies into higher-order themes, table 8 instead illustrates of the wide variety of responses that still remain even after narrowing the many codes into slightly more focused categories. There was never "one best strategy" that each runner identified, instead, the table shows that every runner had several, and which one was used depended on the moment and the situation they were in.

5.1.3.1 Interaction and Distraction

The most frequently cited mental strategies involved the use of external stimulus, be it people or things. On one hand, this was a reflection of the person's personality, particularly relating to being social and interacting with other people. One runner, who valued having fun while racing, appreciated being social because it just increased the fun:

> I'm a sociable runner, and I'm good at one word answers and one word questions to keep other people talking. I enjoy talking to the people who are running, and even when I'm out there and all those 25k people are coming by on my third loop, I say something and get a response from just about every one of them. Because it's fun talking to runners.

Also notable is the runner's appreciation of not necessarily needing to contribute to the conversation so much as just be a part of it. This was particularly the case at aid stations and at the end of each lap. Most athletes found this time to be a small pick-me-up, either from the ability to change clothes, manage any problems they were having, or just feel the appreciation of the crowd or loved ones that were waiting there to support them. One runner referred to this as a feeling of familiarity:

> I notice that, especially on my last lap coming in … it was great, because you had people there. Also, it was more of... I liken it maybe to that feeling of when you come home, its familiar. And... I knew my girlfriend was there, she had pretty much everything except moleskin…. new clothes, new socks, food. So, familiarity, I guess. It was very good.

Many of the participants even stated during the race or in post-race interviews that the sight of the researchers themselves provided a positive encouraging boost. On one hand, this could be considered a limitation, on the other hand it could be evidence of the influence of social interaction, or another sign that runners use to know how close they are to fulfilling their goal.

The aid stations also served as an opportunity for external positive support. Whether or not every runner desired something positive from the aid stations, almost all said they appreciated it in some way, most often to be able to see a friendly face. One athlete reported feeling noticeably better after each aid station, "because you take a quick break, you know, you get to, especially when you get to talk to the volunteers, and they're like, cheerleaders. And they fire you back up again."

The athletes were also asked how they think they would handle a race where there were no aid stations at all, with no one to meet along the way. In most cases, they suggested they would still be able to handle it, and their expectations would simply have to change.

> I guess I would think, being a pragmatic person, that I would, you know, set my expectations for that situation, but.... the power of hindsight, right? That central point, on the way back was helpful, very helpful. I probably would have changed my expectations, or my mentality, carried different things, but I think it would have been harder.

Some athletes suggested they would need to focus on alternative mental strategies. No athlete suggested they had only a single mental strategy they used, and if social interaction was not available, the focus would revert to a different one. Again, however, this required an understanding of the situation and an opportunity to set the appropriate expectations beforehand.

5.1.3.2 *"Staying in my head"*

Many of the other strategies were more personal and individualized. Some runners actively avoided social interaction, in part because they did not feel they needed it, but also because it distracted them. One runner said that having to be with other people in races takes away the choice to run the race the way they want:

> I prefer actually to go by myself … if it works out conveniently, I'm not necessarily against it, but there's always that feeling that you think, "well maybe I'm holding them back, or maybe I'm being held back!" I mean, I kind of just wanted to run it however I was going to run it.

 This was especially important for this runner, who preferred to either listen to music, or focus on the factors needed to have a strong race, such as race strategy:

> Particularly the last time around, I was really starting to strategize when I was eating … I was kind of strategizing to make sure I had a least enough water and fluid, that last time around, and food … I was [also] paying a lot closer attention to where exactly I am between the aid stations.

Even those who did not necessarily desire social interaction saw its benefits: "usually I don't go looking for people, the few times that I have hooked up in races, it's always been good for me, I think. It passes the time". That same person also acknowledged that in the worst moments, having people around was a positive thing,

> Going into the second lap I thought would be my low point. And, it probably would have been if I hadn't been with somebody. I think that was a real gift for me, that I didn't break up that conversation and ran with him. Because I would have, I would have dragged a lot more.

Clearly, interaction, distraction, and opportunities to stay in one's own head were not mutually exclusive. Many runners preferred to have opportunities for both; to have

social interaction as a means of distraction, and on other occasions, to have moments of calm.

Some runners who saw themselves as social also appreciated periods of solitude, to be able to be "in the moment," or just enjoying being out running. One runner wanted to simply run, without thinking of anything in particular:

> Our body is trained to run, and is pretty good at it. So if you focus on nothing, you actually run better. If you let your brain think of all sort of things, it will think of reasons why you should slow down, because frankly it's motivated to stop you from hurting it.

The most common strategy used was the concept of breaking the race down into more manageable chunks, as a way to make the total distance seem less daunting. The size and scale of these chunks tended to vary widely, from a short distance like 5 kilometres, to longer periods of time, distances between aid stations or prominent landmarks, or even as short as focusing from one hill to the next.

The way in which the race was broken down differed based on what sort of pacing strategy the athletes used. Those that closely followed their watch tended to use discrete measurable distances, while those who ran on feel would focus on something else meaningful, like landmarks along the trail. For example, one runner would get through difficult parts by using the aid stations, focusing on "one aid station to the next aid station", and looking forward to the positive experience of seeing a friend, "knowing that my friend was up there as well, you know, just going to that corner, and then that corner, and then that corner...".

Another runner used music to focus on and create measurable time periods:

> I find the music extremely helpful, because you can just focus on the music. And you can break it up and say "every three songs, I'm going to have a gel" or something like that. So, again you get those microgoals. Whereas I can't imagine running a straight marathon, that's' like, self-supported, without any music. That would be really hard. I think.

5.1.3.3 *"Just Keep Moving"*

A key strategy referred to by many of the runners was the idea of "just keep moving". No matter what their mental or physical state was, as the race went longer, the desire to stop and rest, or to take breaks, got higher, but their mental attitude told them that all of those things increased the risk of not wanting to start again. It was already noted in the stressors section that one big concern for many athletes was needing to stop. Particularly as the race wore on, stopping seemed to be a higher risk thing – once you stop you may not continue.

In spite of the occasionally overwhelming desire to stop many runners simply focused on continuing to move. One runner said that this was the response to hitting a low point:

> I stop thinking about the race. I look at my feet. I just keep on looking, say, 20 feet ahead. I keep looking at points... I'm going to get to this point, and then I'm going to get to this point. If I could... if I have music on then I just focus on that. I just try to transfer everything away from what I'm doing, like, the race, the whole idea of what I'm doing, and just keep on going forward.

This strategy was also most frequently used for dealing with expected obstacles in the race, such as thoughts about quitting, physical pains like blisters or cramps, or particularly low points of the race. The assumption was that eventually those problems would pass, one way or another:

> There's always ups and downs, so if you just keep going it will get better. But in a 10k, you don't have enough time to turn it around. But what you could say, that you're okay with that level of pain you're in right now, and the feeling when you get to the finish line is going to be amazing, because you gave it your all. Whereas if you're in pain and then you slow down and walk, then you're going to be kicking yourself at the finish line.

In a way "just keep moving" seems like a "last-ditch strategy", where all other planned strategies have been used to excess or are no longer working. It also draws on several other themes that were coded, such as, "rationalizing the situation" and "learning from past situations", both of which seemed to be strategies to help runners keep pushing.

In those cases, runners would try to look at the obstacles facing them in a non-emotional way. Although it has been shown that most runners try to direct their attention away

from their fatigue, it inevitably happens. The more experienced runners again come up with strategies to deal with those thoughts. The runner from the above quote provided an example: "At Blackfoot, I would ask myself, well, do I need to walk? And then the answer was always, 'No'. So then I would keep running. So that's how I knew I was just, kind of feeling bad, and not very bad."

Experienced runners can typically draw upon what they have learned from past races to deal with the present situation. Having been through it before, they knew it would not last forever:

> I just think it's important for runners, who are trying to build up from where they are, that each race is a learning opportunity, right? So, it's just important to write down how you felt about it, and what you can learn from it to do better. I know for me, at Blackfoot, that was huge, being able to look back on past experiences, [and] say "okay I felt this pain before, it's no big deal it will go away, and it won't get worse". Yeah, so you don't have to panic.

Many of the strategies employed were catalysts to enable a person to focus on "just keep moving". A good example of this was when runners drew upon personal values or inspiration as to why they are running. For example, one runner said a reason to keep going was having made a commitment, "my integrity's a big thing, so if I say I'm going to do it, I will."

In the end, even strategies not specified in this section are a reflection of a person's values; knowing and drawing upon those are the primary means to motivate a person to "just keep moving". As another runner stated, in describing what advice to give to new runners:

> I would say, know who you are, and know what means the most to you, and... focus on that. For me it's really easy to focus on data. For other folks, she picks a focal person, every kilometer, and she focuses on that person, and it means a lot to her. So if you're honest with yourself and you know who you are and what works for you, find it and focus on it. Some people think about their friends, some people think about food.

5.1.3.4 Keeping in Control

Regardless of the specific mental strategy, many of the runners stated what was truly important was having control of the situation. This particularly seems to mirror the stressor of "encountering the unexpected". Frequently this was first reflected in those that had a pre-race plan. The more experienced runners clearly knew more about what might go wrong, what obstacles they might face, and capable of controlling the situation. One runner said as much, keeping plans as structured as possible:

> I kind of had a couple things in my head … "if this happens, this is what I'll do", you know, actually a guy I consult with, because I hope to solo S7, and he said "write down everything that can go wrong, and then put a column beside them, put a solution".

"Control" also meant that they would be able to focus on doing the things they needed to do to have a successful result. Some runners specifically avoided interaction with other people because it gave them a feeling of the lack of control to run the race they needed to run. An earlier quote described a runner who felt that having to run with other people meant not being able to run the way they wanted to. In this case, control meant not feeling socially obligated to continue running with other people.

Other athletes recognized the mental aspect of control, and losing control of one's mind meant letting their thoughts make decisions for them that they know are not necessarily helpful, "Let's face it, that's where it is, a lot of it is 90% mental. It is, because your mind controls your body, right? So if you can control your mind then you can control your body." Many athletes particularly worried about this near the beginning of the race; that the excitement of the start would potentially cause them to run faster than necessary, resulting in other problems well down the line.

5.1.3.5 Positive Thoughts

Thinking positively took on many different forms. The runners used various personal things to maintain a positive outlook. Recalling the reasons for running, reminding oneself of their personal inspiration for doing an ultra race, drawing on one's own competitive desire, acting positive to think positive, or simply mentally pausing to appreciate the situation, were all examples of positive thoughts.

Many athletes cited that they attempted to stay focused on their motivations for ultra-running, all of which took a positive, accomplishment-focus approach. Such motivations included finding inspirations from others. One runner explained:

> 5 years ago, my son was diagnosed with Type 1 diabetes, so, I kind of combined my joy of running with raising money for diabetes … it started out as halfs, started out as fulls, and then it kind of graduated from there. So there's that, I guess I use that as my inspiration, if you will.

When the runners were asked to offer advice to newer runners, finding something inspiring or motivating to think about was the most frequent advice:

> When you're fatigued … think of, someone or something that you find motivating or inspiring, whether it's a person, or a situation, and think about that as you're running through those tough parts… my mom passed away of cancer last October. And she battled for years with it, and especially in the last years of her life, really struggled through it. And I thought, if she can do that, and, struggle through that, I mean, I can simply struggle through this race or this last part of the race where it's a little bit tougher than I want.

That same runner also offered up that sometimes, even when you do not necessarily find personal inspiration, simply thinking anything positive at all can be helpful, saying that

> Negative thoughts are going to creep in, and doubt, and that kind of stuff, and to have a very simple, phrase or mantra or something I think, really helps … when you're getting fatigued and when you're getting those negative thoughts, just try to have something positive.

Others used self-affirming thoughts to stay positive, "I certainly had a couple of negative thoughts, but they did not last very long, and I was able to overcome them, either through positive self-talk, or affirmations".

Some athletes had something positive pre-planned, whereas others would try to come up with something positive on the spot. Others would draw on their surroundings for positive thoughts, by appreciating the environment they were running in. This could be as simple as "running along and noticing fully open Alberta wild roses and a little rosebud just barely peeking out, and three hours later it's a little more open, 3 hours

later it's a little more open, so, things like that". Although this race was not necessarily the most scenic of ultra races, many athletes told stories of other races and how they would occasionally take a moment to pause and truly appreciate the environment they are in. One runner described it as a moment of perspective:

> I'm always looking at the view, and … for example, I sprained my ankle, and actually, like, tore the ankle muscle in a race. I was in so much pain, I was just doing 20 minute miles and I was bawling my eyes out and I was in this meadow with beautiful flowers and mountain peaks and all I could think about was how beautiful this terrain was that I was in and how lucky I was to be there, even though I could hardly walk. Yeah, so for me that's really important.

Another runner said that a big motivation is the unique experiences ultra-running always provides:

> The thing that really intrigues me about ultras, is not only the distance and I think mentally the challenge that it provides, but also I think that one of the rewards for it, is other than saying "yeah I've done one", is the scenery and the stuff you get to see and experience that a good percentage of the population doesn't.

Finally, when all else fails, several runners employed a tactic of "positive on the outside, positive on the inside", where if they carry themselves in a positive light, it may help them feel a bit more positive. One runner essentially described it as "faking it", saying "I tried to still smile and try to get whatever energy I could from the competitors around me. You just fake it. And, I found, it would help by just faking it every time I came to an aid station."

5.1.4   "Certainty of Finishing" Experiences

The primary focus of the study was the question of whether participants experienced a change in mindset upon a realization that they were definitely going to finish.

First, it was asked whether they experienced some form of change in mindset. When asked directly, many participants acknowledged that there was a change of mindset, though perhaps not necessarily because of a certainty of being able to finish, as much as knowing that the finish was near enough that no obstacle, save for major injury, would prevent them from finishing. One runner said "when I got to that, it was like, 'okay, I

can do it'. That's when I started to think that this was actually going to happen. That I was actually going to probably achieve my goal."

This is similar to the mental strategy of "rationalizing the situation", wherein most people said that the reason they knew they were going to finish is that they could not imagine a reason why, at this point, they would not be able to. As the finish gets closer and closer, the reasons to stop become less and less and the reasons to continue become more and more:

> I guess my thought on that … you've come this far, and this much time, and only this much distance relative to how far you've gone, it's a no brainier now that you're going to finish. I mean, it might not be pretty, probably not going to be pretty, but you're, you're going to finish.

One participant did not acknowledge as profound an attitude change in this particular race, but did acknowledge that in other races a distinct change had been experienced:

> When I did my [first] 100 miler, at 62 miles, you pick up your pacer, and then there's no more time-cut-offs at the aid stations, you just have to get to the finish. And I remember when I got to that 62 mile mark, and I knew there was no more time cutoffs and I just have to basically walk to the finish, it was a huge change in mindset. So I think it depends, kind of, where your suffering level is at, how close you are to the cutoffs, if you'd been struggling even to make it to that point. So there's different factors.

5.1.4.1 When Did It Happen?
The occurrence of this change in mindset did not necessarily occur at the same time. In general, one could say that the time in the race that it did occur was closer to the finish than the start. Some even experienced a change multiple times, since they had multiple goals, one for when they were certain they were going to finish, and again when they felt as though they would also be able to achieve some sort of performance goal they had set for themselves. Table 4 lists the various parts of the race where the participants acknowledged experiencing a positive change in mindset.

Table 4

Section of race participants cited experiencing a positive change of mindset

Time of "changes of mindset"	Frequency
End of penultimate lap → Start of Final Lap	7
Start of penultimate lap	1
Halfway through last lap	2
Halfway through entire race	1
Later part of the penultimate lap	1
5k to go	1
10k to go	1
2k before the end of the penultimate lap	1

The most typical point was when the runners ventured out for their final lap, which makes sense because, as one runner put it "I would start my last loop and I wouldn't have to see everything again".

The point seemed to occur as a result of crossing a certain threshold. One way it occurred was based on their distance in the race, that once they crossed a particular point in the race, they knew they would finish. This occurred more frequently for people who had more ultra experience, especially in this race, though even those who were relatively inexperienced had a particular distance in mind:

> I knew ahead of time, that if I could finish the third lap, that I would start the fourth lap and that I would finish the distance. I may not finish the race, but I would finish the distance. I think, from my experience, this being, well, only my third ultra, but, I find that as the race goes longer and my fatigue increases, or my energy decreases, I find that my mental strength increases.

In a sense, this is saying that once they cross a certain point in the course, they expect to feel a different way.

Others said that they would feel certain they were going to finish because they knew how it was supposed to feel. They may not know where the point would be, but as one runner put it, there was a distinct feeling that signaled that things were going to go well; in this case, it occurred while leaving for the final lap:

> I think I think that definitely that tipping point is there, for me, at that point in the course. When I get past it and I know that the body is still in one piece. Then it actually gets fun. You know, you're still hurting but it gets fun. So, its uh, I guess trying to get that, realize that tipping point sooner rather than later, that

> you knew that if I've got 30k left to finish, I know I'm going to finish and use that to keep upbeat and just keep moving.

In this case, the runner knows how it is supposed to feel when they know they will finish, and in a way their race strategy is focusing on achieving that feeling as soon as possible.

Similarly, another participant, reflecting on not just this particular race, but on many past races, concluded that the most profound changes in experience tended to occur around two-thirds of the way through all races.

> I would say that if they're not, physically badly injured or somewhat being tortured to some extent, physically, then mentally, when you're 2/3rds of the way through, any distance of an ultra, then, it seems to me that you're going to finish it.

It was quite clear that the fact that it was a loop course provided the runners a reasonable place to evaluate their progress, both from a performance and a physical/mental feeling perspective. One runner acknowledged two occasions in the race where a mental boost occurred, once at the start of the penultimate lap, and once at the start of the final lap. The first was for the feeling that they were going to finish,

> I think probably mentally … as I started that second lap I'm like, "okay, I'm going to finish" [I] probably got slightly energized by that, realizing okay I'm going to finish, I'm going to do this, and now its just a matter of "okay, how long is it going to take me?"

However, some did not feel entirely certain of finishing until very close to the end, or, at least, they did not have a mentality that they had succeeded until very close to the end:

> Well, the last 5k, I said, well "we're done", like we've got this. I mean, we're not going to not finish now. And, during the second loop, I think it was, someone had made a comment, I can't remember where it was that a lot of people had dropped out. And I thought "people drop out? Why would they do that?" You know? But, then again, why wouldn't they do that? … it just seemed like, when someone said that, I thought "I didn't really know that was a thing."

However, one can also see contrasting attitudes with that sort of quote. Some runners, including this one, insisted they never had any doubts that they would finish, no matter what happened. Thus, if there were never a doubt of finishing, arguably there should be no point of realization that they are going to finish, and if they do experience one, as the above quote suggests, it does not manifest in a profound change.

It should not come as a surprise that a common mental boost point was at the end of each lap, as it represented a logical place for runners to choose to either stop or go. Yet, when asked whether, during that transition to the final lap they considered dropping out, most of them answered with a "no". Conversely, the one runner that did end up dropping out arrived in transition with the intention to continue:

> …my mind was made up … I was going to ice it, I'm going to rub it, I have lots of time, I'm going to try to treat it. And I did, I stretched, you know, I did my stretches for it, I iced it and I rubbed it, and I was still refueling and stuff, and it's just... it still didn't feel right. Like, it still felt tight, it still didn't loosen up at all, so I thought "mmm.... I'm gonna have to pull the plug...".

5.1.4.2 *Describing the Experience*

Few participants actually reported a point where things felt more positive, rather, they noted that after a certain point, things felt more certain. They had crossed a threshold where they were close enough to the finish that they were confident they could manage the remainder of the race. One participant noted there was an inverse relationship, between confidence in finishing and nervousness, "My nerves are inversely proportional to my confidence that I'll be able to finish. The more I think I can finish it, the less my nerves are; the less I think I can finish, the more my nerves are." This statement, thematically, matched many of the other runners; as they questioned less about their ability to deal with possible obstacles ahead, they felt more confident they would finish.

The feelings that occurred in light of this change varied widely between participants, so it would not be possible to generalize. For some, it was a change of attitude, perhaps a brief injection of renewed energy, or a feeling of refreshment. One runner experienced a moment when the race started to feel "fun" again. Another runner found a point where mental strength increased. One runner described the feeling as "exciting", saying:

Because I didn't think I would do that … halfway through the third loop, I realized if I just kept going steady, that I would make it. So its kind of ironic, because that's when I was... kind of being, I don't know, slower I guess, because everyone was walking around me, and that was the only thing that motivated me to keep running, knowing that that time was within reach.

Another runner observed that after crossing that threshold, the certainty was a result of more positive thinking:

No matter what kind of shape you're in, as long as you're still making adequate progress that you can make the cutoff. That you're mentally locked on to the positive thinking, I guess, that you're going to finish this race and you're going to make the cutoff. And once you're past there, you're okay.

Other runners reported a feeling of relaxation, particularly when their perception of whether they would make it had depended on making cutoff times: "When I knew that we could walk it in, and still make the 12.5 hour... I'd say that it might have relaxed me a little bit". That same person, however, did experience another "low point" with 10k to go. So, it is not necessarily the case that the boost received from realizing one is going to finish is a permanent feeling.

In another case, the runner's mindset was improved by realizing that the main goal was attained, and felt motivated to further stretch goals:

I felt, okay, I'm going to do this, my stretch goal still is attainable, but in order to do that, I've got to have this strategy, this is how I've got to approach this last lap. Knowing that it's going to be tougher, but here's sort of the strategy I'm going to have to do it.

At this point they felt confident enough that they could refocus their focus on additional goals. This particular runner acknowledged that they would have been satisfied even if they did not achieve this "stretch goal", but they recognized the opportunity and tried to use it for more of an emotional boost. When asked about that transition between the penultimate and last laps, he said

I had calculated it, because I have on my Garmin that it was 10:40/mile that I had to do to finish in under 9 hours. So I was starting that final lap [and] I was

right around averaging a 10 minute mile. So I knew I had some time to spare but I also knew that I was starting to slow down.

In this runner's case, the change in mindset was a cue for re-focusing on the task.

For some, there was not necessarily a discrete noticeable change, or perhaps the change was much more gradual, but in either case they recognized there was a point where they "knew" they were going to succeed:

That space, with the water station in it, I passed him before that, I passed a couple more people, I passed a small group of people, I passed another couple people, so, you know, I just got on in the zone and at that point I definitely knew I was going to come in under 13 hours.

5.1.4.3 *Catalysts for Positive Change*

It was clear that athletes did not necessarily expect the rest of the race to be obstacle-free, rather, that they could deal with obstacles, as one participant discussed regarding blisters:

I had blisters on a couple of my toes, and I just wasn't sure, I thought, "Geez I didn't bring any moleskin", and in my mind I'm thinking "that's the only thing that's going to get me though this" because I mean, if I'd gone through that pain, it would have been horrible. But, just, new socks and.... buttering my feet up with body glide, and it was like "Wow, I didn't even feel them". Like, the pain was just gone... and plus the blisters had already broken by then, so I'd already crossed that bridge!

In this case, the runner faced an obstacle, but found a solution for it and recognized that without that solution, things would have been significantly worse. In contrast, as noted previously, the one runner who did not finish attempted all possible solutions, and ultimately felt it was not going to be possible to deal with the knee pain for another lap.

Another important qualifier in many of the participants' discussion of a turning point in the race was the contingencies placed upon the situation at the time. It was rarely simply of a matter of "I'm here now, so I'll continue". There was, first and foremost, a consideration of how they were physically feeling. Second, there was always a

consideration of the time, whether relating to a cut-off time to be allowed to continue or the necessary pace to achieve their finishing goal.

The one participant who did not finish also suggested that heading out on the last lap would have been a trigger to continue and finish the race: "I guess, if I have started the last lap, then it would have been well, I'm on it, so I gotta finish it. That would have been my mindset". This particular participant also reflected upon making this decision saying,

> I second guessed myself on the way home... yeah.... but, like I said, it's just, I knew I still had a lot of running to do, with the races this year, and I guess now, I'm just kind of within my mind that it was okay to stop. I probably could have finished even walking it, but like, overall I'm happy, with how the day went for me up to that point, but now I kind of second guessed myself that maybe I shouldn't have maybe....

5.1.4.4 *Contrasts to Low Points*

Participants were asked to identify a low point, a point that seemed the worst part of the race for them, and almost all were able to do so.

There was little consistency as to when it occurred and how it manifested itself. It did not appear to be related to feelings experienced when they hit their success threshold. The low point seemed independent of their certainty of success.

On average, the low point tended to happen in the middle of the race, prior to the tipping point, but as noted above, feeling certain of success did not exclude someone from still having a low point. One runner who had cited the tipping point as being at the start of the last lap (75 km) identified the period just before this as being the worst point, stating:

> I'd say 65-75 [km], and the reason being, you're still far away from the finish … you're not quite, you can't quite taste the end, but, you're still far enough along, that you've accomplished a lot but you've still got work to do.

Similarly, another runner's switch in mentality came after experiencing a low point:

> I think my slowest... and I'm waiting for the results to come out because I haven't seen it yet, but I know that my second loop was my slowest loop …

especially the first part of that second loop [was the toughest], you know, before the 40k, before I switched my head to thinking I was good.

Other runners experienced a low point, even though they acknowledge they had already experienced feelings of success and were certain they would finish. One runner had the toughest moment on the final lap, and was able to identify exactly where it was, at the furthest point away from the finish, with about 12.5 k go to. The runner observed:

It was tough because I knew in my mind that I was on the last lap, but, I mean, by this point, I'm feeling fatigued, and, maybe irrationally, somewhat, worried about, "okay am I going to have enough food, energy, water, and all this stuff", and you're as far away from civilization as you can be. And, there was no one out there. Well, there were few people and they looked like they were near death anyway.

How the low point manifested itself was related to their stressors, and could be simply described as the most intense stressor experienced on the course. It seemed to be most closely related to encountering the unexpected. One runner described it this way:

It kind of came in slowly, nothing really in the first lap. Not much in the third lap, but more in the second lap than third, there was a period, and it only lasted I'd say five minutes, if that, at the most, where I was feeling... my stomach would feel a bit funny, and kind of wasn't sure where that was going to go. Was I going to get sick, or, why was that happening?

The same runner went on to describe this low period as a time of behaviour that was complete opposite to their behaviour when feeling good: "I think that was where I realized, 'oh, things aren't going so well, I'm not feeling 100%', and then I'd get very quiet, which is what I tend to do when I get stressed. I get quiet."

It was clear that feelings of certainty of finishing did not necessarily provide a permanent boost of energy nor did it make runners immune to having temporary negative experiences after that point.

5.2 Psychobiosocial States

Because one participant did not complete the entire race, their psychobiosocial states data were removed from this analysis.

Table 5 & 6 below shows an example table of the resultant data for an individual participant. The values in the table represent the normalized results of the scale, which were converted to a score from 0-10, where a value of 0 represents a total absence of the state described by the modality, and a value of 10 represents the maximum. Blank rows represent when the participant said they did not experience that particular modality.

Table 5

Sample survey results for helpful modalities for a selected participant

Modality	Survey 1	Survey 2	Change	
Cognitive	1.4	2.2	0.8	
Pleasant	7.9	7.7	-0.2	
Anxiety	-	-	-	
Anger	-	-	-	
Motivational	7.7	8.0	0.3	
Volitional	6.6	7.6	0.9	
Bodily	6.3	6.2	-0.1	
Sensory-Motor	6.5	4.9	-1.6	
Operational	6.2	7.6	1.4	
Communicative	8.5	8.1	-0.3	
			Mean Change	**SD**
			0.15	0.95

Table 6

Sample survey results for harmful modalities for a selected participant

Modality	Survey 1	Survey 2	Change	
Cognitive	6.4	6.5	0.1	
Pleasant	2.2	2.3	0.1	
Anxiety	3.5	3.7	0.2	
Anger	-	-	-	
Motivational	4.1	2.9	-1.2	
Volitional	3.7	3.8	0.1	
Bodily	4.0	2.6	-1.4	
Sensory-Motor	3.8	2.4	-1.4	
Operational	1.5	1.9	0.3	
Communicative	6.4	6.5	0.1	
			Mean Change	**SD**
			-0.38	0.79

Table 7 below represents each participant's data when considering all the functionally helpful modalities. For this measure, "N" represents the number of modalities each participant identified, and mean represents the average change across all modalities.

Table 7

Functionally helpful modality change by participant

Participant	N	Change		Wilcoxon Test	
		Mean	SD	z	p
1	7	-0.74	2.20	-0.59	0.55
2	8	0.15	0.95	-0.42	0.67
3	8	-0.30	1.24	-0.85	0.40
4	9	0.17	1.11	-0.83	0.41
5	8	0.96	0.99	-2.25	0.02
6	9	1.26	3.10	-1.01	0.31
7	6	0.70	1.31	-0.95	0.34
9	9	0.66	4.00	-0.18	0.86
10	9	0.11	1.43	-0.18	0.86
12	10	-0.11	1.22	-0.46	0.64
14	7	0.94	0.71	-2.20	0.03
15	8	-0.99	1.05	-1.96	0.05

Table 8 shows psychobiosocial states data for all participants in the functionally harmful modalities.

Table 8

Functionally harmful modality change by participant

Participant	N	Change		Wilcoxon Test	
		Mean	SD	z	p
1	9	-0.20	1.72	-0.42	0.67
2	8	-0.39	0.79	-0.42	0.67
3	9	-0.09	0.40	-0.95	0.34
4	9	0.02	0.57	-0.09	0.93
5	6	-0.72	2.15	-0.94	0.35
6	9	0.33	1.49	-0.59	0.55
7	8	-1.15	2.55	-1.33	0.18
9	9	-1.41	1.86	-1.96	0.05
10	9	0.11	1.43	-0.42	0.68
12	6	0.95	1.23	-1.78	0.07
14	2	0.30	0.14	-1.34	0.18
15	3	0.47	0.40	-1.60	0.11

Within the functionally helpful modalities, 8 of the 12 participants had mean scores that increased, while within the harmful modalities, 6 of the 12 participants had mean scores

that decreased. Statistically significant changes based on the Wilcoxon Test were only noted for three participants in the functionally helpful modalities, though in the case of one of the three, their scores were statistically significant for being worse in the helpful modalities. Only one participant in the functionally harmful modalities had a statistically significant score.

Table 9 represents the change across all participants in each of the functionally helpful modalities. As some participants did not select a word for some of the modalities, not all are necessarily used with every participant.

Table 9

Measurement change across all participants by functionally helpful modality

Helpful Modality	N	Change		Wilcoxon Test	
		Mean	SD	z	p
Cognitive	12	0.41	1.16	0.00	0.31
Pleasant	12	1.05	1.99	-1.65	0.10
Anxiety	9	-0.88	2.19	-0.89	0.37
Anger	6	0.00	1.94	0.00	1.00
Motivational	12	-0.22	1.19	-0.40	0.69
Volitional	11	-0.46	1.30	-1.07	0.28
Bodily	10	0.12	1.49	-0.10	0.92
Sensory-Motor	11	-0.35	1.63	-0.36	0.72
Operational	5	-0.21	1.33	-0.14	0.89
Communicative	7	1.32	1.13	-2.20	0.03

Table 10 represents the change across all participants in each of the functionally harmful modalities.

Table 10

Measurement change of all participants by functionally harmful modality

Harmful Modality	N	Change		Wilcoxon Test	
		Mean	SD	z	p
Cognitive	7	-0.18	0.91	-0.53	0.60
Pleasant	11	1.03	1.26	-2.67	0.01
Anxiety	7	-0.48	1.01	-1.15	0.25
Anger	8	-1.29	2.38	-0.98	0.33
Motivational	8	-0.27	0.80	-0.68	0.50
Volitional	9	-0.25	1.90	-0.12	0.91
Bodily	10	-0.43	1.56	-0.36	0.72
Sensory-Motor	10	-0.36	2.44	-1.68	0.09
Operational	9	0.29	1.22	-0.56	0.58
Communicative	8	-0.81	1.33	-1.47	0.14

Statistically significant changes were in only one helpful and harmful modality. Within the functionally helpful modalities, one extreme outlier was removed from the "communicative modality", which changed the significance value from the Wilcoxon test from a p-value < 0.05 to > 0.05.

Of the functionally helpful modalities, the mean scores increased only 4 of the 10 modalities, with one modality having a mean score that did not change at all. In the functionally harmful modalities, 8 out of the 10 modalities decreased.

5.3   Considering the Profiles and Interviews Together

Some participants also shared insights into the quantitative aspect of the study and how they identified with the modalities and the keywords they chose.

Those participants identified which words on their list they most identified with over the course of the previous race. In all cases, they were able to identify particular areas that meant the most for them, prior to seeing how they answered those particular modalities during the race. However, there was no specific relation between the modalities and the words the participants specifically identified, in some cases they were mildly surprised at their own results, expecting them to be much different than what they actually said. Some participants had increases in their functionally helpful modalities and decreases in their functionally harmful modalities, while others had decreases and increases in functionally helpful and harmful modalities, respectively.

6   DISCUSSION

The purpose of this study was to explore the experiences of ultra-runners in an ultra race, to examine whether runners reach a point in the race where they are certain they are going to finish and experience a mental boost as a result, and how this is manifested. It was the aim to answer the question "is there a clear change in mindset for ultra-runners when they have determined they will definitely become confident they will achieve their goal? When does this mindset change happen and what is the experience like?" It comes as no surprise that there is a wide variation in experience throughout the race. Many prior articles on the experiences of ultra-runners have acknowledged that individual variation is so great that it is difficult to make many wide generalizations on their experiences.

From the 13 participants' qualitative interviews, it was clear that there was a positive mental experience, manifested, for example, by a pleasant emotion or a boost in a positive state as a result of feeling more confident of reaching their goals. When, how, and why varied widely between participant, primarily as a reflection of the stressors they faced, their personalities, their mental strategies in overcoming those problems, and their motivation for ultra-running.

The results of the quantitative data further illustrated that experiencing an increase in some of the functionally helpful psychobiosocial modalities, such as increased feelings of focus, willingness, or inspiration, is not necessarily focused on one particular point in time, or a specific location on the course.

6.1   The "Tipping Point"

As described in the athlete interviews, the "tipping point" is an apt term to represent a point that describes the runner's experiencing some sort of positive boost as a result of crossing the threshold to be certain of finishing. Previous research suggests analogous findings. The "desirability bias" is based on studies where participants were found to predict a certain outcome when there was a potential reward associated with that outcome (Windschitl, Smith, Rose, & Krizan, 2010). Another study related to predicting completion of tasks found that optimistic predictions of how long a task will take may lead to finishing the task quicker (Buehler, Peetz, & Griffin, 2010). Parallels exist here: it is likely that ultra-runners would perceive finishing the race as an extremely

significant reward, and having an optimistic view of how far they have to go to "complete the task" may become part of an unconscious desire to finish sooner.

Other studies more closely related to running have documented the emotional experiences of athletes after finishing or winning an important event. Tharion et al. (1990) measured mood differences between the beginning and the end of the race, as well as for periods of time after the race. On average, participants had an increase in most of the negative mood states, demonstrating they felt worse at the end than the beginning, which would be expected given intense physical fatigue.

However, much later, another similar study by Tharion, McMenemy, Terry, and Rauchus (2013) compared the same moods between those that finished and those that did not in two different races, one in summer and one in winter. It was clear that those that did not finish the event had higher negative mood states, even feeling significantly more fatigued. Unsurprisingly, there is a clear link, mood states upon successfully completing an event are improved over not completing, even if, in both cases, the over moods states have declined since the start.

Additionally, the differences in mood from the winter event were much smaller than those in the summer event, which the authors noted was likely because of the increased physical strain of the summer event over the winter one, a result of the hot conditions on the day. In part, this could suggest that the more time an ultra-runner spends on the course and the closer to the finish they get, the higher the negative impact not finishing would have on them, as a result of the progressively higher physical strain they have experienced. This has some parallels to the present study when participants would ask themselves why they would stop, having come so far, as if the thought of stopping made less sense as the race went on, and stopping would seem like a more negative option than simply continuing through the fatigue.

This idea also has parallels to Lazarus' (2010) discussion of primary and secondary appraisals. In this case the primary appraisal of considering what is at stake has a higher impact as the runners overcome obstacles and progress further and further from the start and closer and closer to the finish. What is "at stake" in this case could simply be the last 6 hours of effort, and at some point in the secondary appraisal the "best" coping option consistently becomes "keep going and finish."

For the one participant that did not finish, although they were disappointed, it could be argued that there was less of a negative impact from not finishing because the environmental conditions did not present an unusual challenge, that there were relatively low levels of struggle up until that point. This may suggest that the results of a similar study would be completely different if the conditions had been more difficult. For example, at the same race two years prior, it had been snowing for most of the race. In that context, that participant may have felt more driven to finish, and hit their tipping point sooner.

How the "tipping point" was reached was highly individual. It did not necessarily result in a measurable improvement in the psychobiosocial states, or at least one that may be quantitatively measured. While some participants' quantitative measures on the Psychobiosocial Scale did not change significantly between the measurements, it may be that those measures would have changed, at different times. On the other hand, many runners acknowledged points of feeling distinctly more positive, such as noticing that the race had "become fun" or hitting a time cutoff and experiencing a "huge change of mindset".

The "tipping point", however, does not appear to preclude runners from having negative moments. Some runners experienced low points even after experiencing their "tipping point", and all experienced some adversity at some point during their final lap. This suggests that the positive boost is not necessarily stable or permanent. This seems logical, when considering the stressor of "encountering the unexpected", and the need to maintain feelings of control. The further they are from the finish line, the less control they perceive having. A reasonable conclusion could be that as runners get closer to the finish line, their feelings of control increase; they feel that no obstacle cannot be overcome for the short time remaining in the race, that whatever happens, they will finish. They will likely encounter other things that will cause stress but it will no longer affect their certainty of finishing the race.

6.2 Impact of the Overall Race Experience on the Tipping Point

Qualitatively, the runners described an overall race experience that involved a slow decline in their physical and mental well-being, followed by occasional low points, a distinct positive experience upon realization that goals may be met, and then a final

period of varied fleeting emotions. These were not necessarily consistently good or bad, but rather, simply an indication that the runners had travelled a very long way and still had a relatively long way to go.

Discussion of the runner's stressors and mental strategies were important in this study as they contributed to understanding the entire experience and how their "tipping point" related to the rest of the race. In terms of stressors, the concepts found were quite similar to the few previous studies that exist of this topic. The difficulty of the course, cutoff times, and other competitors are well-known sources of stress in all races, not just ultra-running, in addition to the physical pain of competing in marathon-style events. Self-doubt, thoughts of quitting, loneliness, and similar negative thoughts were observed by Holt et al. (2014). Guilt and the possibility of disappointing oneself and others was a stressor noted by Yair (1992), particularly related to amateur athletes like the participants in this study who invest large amounts of time in their sport at the expense of other pursuits.

This study aimed to describe the athlete's experiences to more closely reflect the athlete's description. Occurrences like "expectation mismatches" and "creep" seem to more closely mirror how the athletes described the stressors. Phrases like "I was expecting it to happen, and then it didn't, and that made me feel bad", illustrated this. Similarly, when asked about mental strategies, the simple mantra of "just keep moving" illustrated the basic universal simplicity of most ultra-runners' mental strategy. Even physical pain seemed to have a psychological root. It was possible in many cases that the pain was not in fact physiologically significant, but because runners were unable to focus on something else, their focus was drawn towards the pain, and it slowly became larger and larger.

The qualitative data from the athletes demonstrate that a large part of the reason for a "tipping point" is that the runners have come to the conclusion that they A) have enough time to finish the race or achieve their goals, and B) are close enough to the finish to be certain they are capable of dealing with any additional stressors that come their way. Unexpected stressors can simply be ignored or resisted all the way to the finish line.

There is also an inherent logic built into when the "tipping point" occurs, and it is likely variable between the races and the nature of the course. The fact that the Blackfoot Ultra course is in a loop meant that there were multiple occasions with a logical place that a

person might otherwise stop or to continue venturing forward. In multiple similar cases, a large proportion of the quotes by ultra-runners in the study by Philippe et al. (2016) referred to making decisions on dropping out or not were a result of interactions that occurred at "resupply points", suggesting that this is repeatedly a case where athletes experience periods of influence and actively make decisions on their race and whether they will continue. Other parts of the course in these types of races are in relatively remote areas in relative solitude and do not present easy opportunities to drop out. The end of each lap served as a place to re-affirm that they "will" do it, and they can draw on that re-affirmation that they will do it each time they leave.

6.3   Success vs Withdrawal – Similarities and Differences

Few studies have specifically examined this "tipping point" in ultra racing. Philippe et al., (2016) performed a similar study, looking at the opposite experience, that of withdrawing from ultra races, including asking similar questions to the present study, like whether choosing to drop out was a "progressive process or is the decision to give up relatively sudden?" (p. 362). They also discussed previous studies that withdrawal was a consequence of a "progressively changing course of experience" which over time nudged the athletes towards their conclusion.

Philippe et al. (2016), add extra components that also have some parallels to the current study. First, they suggested that a succession of "sequences" slowly "funneled the runner toward an overall experience where withdrawal becomes the only option" (p. 371). Certainly, the runner in this study that did not finish had an experience like this, where they came to the conclusion they would not finish after trying everything and feeling as though they had run out of options.

It could be observed that similar negative thoughts may have occurred to the athletes that finished, but they were continually able to see another path; the path towards finishing. Many of the quotes from the athletes in the present study suggest that their realization they will finish is a product of concluding that it is now their only option. By rationalizing the situation and having thoughts like "I've come this far, I can't quit now" in a runner's mind, regardless of the many challenges they have faced and will still face, there is perceived to be only one possible option, continuing and finishing. This realization is a result of concluding that finishing is the only reasonable option.

Holt et al.'s (2014) study of ultra-runner's experiences also demonstrated that withdrawal from an ultra race is a result of "sudden or instantaneous negative experiences". Reasonable minds would likely conclude that there is a possibility for both cumulative withdrawal experiences and instantaneous ones, and the same would apply to finishing. Enough runners in the current study did acknowledge one particular moment when they had sudden positive boosts. These occasions related to realizing that they will make a cut-off, that they have recognized a particular aspect of the course they were waiting for, or that their stretch goal was achievable. Previous research has shown that these feelings of success can be both cumulative as in Philippe et al. (2016) and an instantaneous realization as in Holt et al. (2014). Philippe et al. (2016) also suggest that the runner's progression towards not finishing is "characterized by the cumulative effects of the runner's experiences" (p. 371). The progression toward finishing can be described in the same way.

6.4   Examining the Psychobiosocial States Data

The quantitative results showed few statistically significant changes across all of the participants and all of the modalities. Despite this, the majority of participants had a non-significant increase in the score for the functionally helpful and a decrease for the functionally harmful state modalities. Yet, of the three participants who had a statistically significant change in the functionally helpful modalities, one of them was a decrease.

The fact that there is little statistically significant evidence for a psychobiosocial state change at this particular point in time suggests that while there may be a point where participants would experience a statistically significant change in these modalities, it is just not at the particular point examined in this study. Although many participants noted that starting out on their last lap was encouraging and uplifting, many also said they had a "tipping point" experience somewhere else on the course, and it was not necessarily related to any fixed point in the race, rather, it was a fixed experience, and that experience was difficult to predict.

It is worthwhile pointing out that this particular scale, with the relatively low number of modalities for each participant, would be very susceptible for skewing of results due to a singular outlying modality change. However, in the case of the participants who had a

statistically significant change, there were no specific outlying modalities. If a participant had a statistically significant change, it was because approximately all modalities increased or decreased. This does suggest that, at least, for those participants, their overall change was non-specific; it was not that they were feeling specifically more "communicative" or "focused", rather that they were overall having experiences that were more functionally helpful or less functionally harmful.

For participants that specifically noted one modality that was especially important to them, there was not a clear correlation either. In some participants the results agreed strongly to what they said, yet in others it was not. It is possible that this was in part because they may have expected to feel worse on their final lap than they in fact did. As in, that particular modality was important, and the absence of a negative experience becomes construed as a positive experience. One participant even said as much, expressing surprise and pleasure that they were not feeling bad as they thought they would.

6.5   Alternative Explanations

To some extent the various feelings runners reported could have been simply a part of the ebb and flow of a person's states and experiences during a long ultra-running race. In their study on decision making theory, Renfree, Martin, Micklewright and St Clair Gibson (2014), suggested that an athlete's environment is highly uncertain, and decisions continually need to be made. A successful athlete is one that can make those decisions with an appropriate level of imprecision as a result of that uncertainty. In other words, athletes should have a plan for their performance, but have appropriate awareness of how their environment may change and the flexibility to adjust their plan as needed. For example, the authors describe the uncertainty of an athlete being able to maintain a particular speed, and possibly deciding to slow down to avoid the risk of excess fatigue. Thus, although the ultra runner's intent is to have a pleasant and subjectively positive experience for the entire race, both subjectively positive and negative experiences at relatively random parts of the race could be partly a result of the runner adjusting to their uncertain environment.

The results could also be explained by the positive bias a person may have had after the race because they achieved success. An inevitable factor with any retrospective

interviews is the participant's tendency to emphasize positive qualities after a successful race, and negative qualities after an unsuccessful race (Smith, Leffingwell, and Ptacek, 1999).

The fact that some participants acknowledged that the nature of course changed their expectations confirms this, to a certain extent. This also suggests that runners prepare themselves with expectations of how the race will go. Their "tipping point" is a reflection of both their continuously updated expectations, and whether their level of uncertainty of finishing has become low enough to feel certain of achieving those expectations. One counter-argument may be that some athletes suggested they never had any uncertainty; that they were going to finish no matter what. Renfree et al. (2014) also discuss called the "Hazard Score", a scale described as "the hazard of a competitively catastrophic collapse faced by the athlete" (p. 3-4). The hazard score is specifically calculated as "the product of momentary RPE and the fraction of the event remaining at the same point" (p. 2).

While the Hazard Score specifically refers to increasing or decreasing velocity, it is also reasonable to conclude that the determination of avoiding a catastrophic collapse is as much mental as physical, which was demonstrated from the various stressors the athletes described. For ultra-runners, the "tipping point" may also be a product of concluding that they are both a) able to achieve their goals, and b) capable of doing it at an effort level that is unlikely to cause a catastrophic collapse. In effect, a "low" hazard score.

Ultimately the key question is not unlike a classic question: "which came first, the chicken or the egg?" The results have shown that for some people, the realization that goals will be met brings on positive feelings, emotions, and the like, while others achieve the realization that they have hit their "tipping point" when they experience a positive change. It is unclear if there is even a way to definitively determine this. Regardless, athletes may benefit from discovering about the precursors to their tipping point, so they can try to experience it sooner.

6.6   Limitations

Being a multi-method approach with both qualitative and quantitative data, one perspective could be that the data was spread too thinly. Further studies may benefit

from focusing on a single methodology to get a narrower set of data. In addition, as this study focused on a particular point in time, it quickly became clear that the phenomenon being studied was quite individual and not necessarily fixed to a particular point in time. Selecting the Blackfoot Ultra, although effective from a logistical point of view for the quantitative data, was also a potentially limiting factor; other races may have held a higher importance for some racers. Choosing a larger or more prestigious race may raise the importance of finishing for participants.

Clearly, an important part of this study was to collect data in the middle of the event, which inevitably means asking some runners to perform a task that is not relevant to their race. Some participants felt somewhat distracted by filling out a survey during the race, and one participant even noting a little bit of nausea trying to write while moving. In the future, if quantitative data collection is to be performed specifically during the event, more careful consideration on the implementation of the data collection may allow for a less disruptive experience for the participants. This could include, for example, providing quantitative data verbally, instead of written.

6.7   Further Research

A lot of previous research has focused on stressors and the obstacles, both physically and mentally that ultra-runners experience during a race. This particular study has focused on the positive: where athletes draw their sources of inspiration from, and how athletes persist in the face of intense fatigue after many hours of racing. As the participant size was not large, further research could be well-served by either reducing the group size to get an even more in-depth look at a very specific number of people, or by increasing the participant size to get a larger-scale overview of the "tipping point" in the hope of making larger generalizations on an ultra-runner's experience.

In addition, with a relatively non-specific population, it is likely that the experiences documented will depend on the particular set of participants. Further research could concentrate on a specific group of runners, such as elite athletes, very experienced runners, or totally new runners. Ultra race distances also widely vary, and include multi-day races, races throughout the night, races during winter, or races exclusively on roads. The non-regulated nature of ultra-running means the challenges runners face differs greatly between each individual race.

Further studies may benefit from more preparation with the participants to help them reflect on their experiences, which may provide richer results. As one participant put it, "we all have these thoughts that go through our head and sometimes trying to verbalize it or explain it in explicit terms can be easier said than done".

6.8   Practical Implications

Almost all runners will go through high and low points during the many hours of competing in an ultra race. Fundamentally, this study suggests that most ultra-runners do experience a change in their frame of mind when they believe they are going to finish their race. For most of the interviewees, having to reflect on how they felt during this change was acknowledged as being helpful because they actually gave discrete thought to what they experienced after hitting their tipping point. It could be surmised, therefore, that with a close understanding of how it feels to believe with certainty that one will finish, a runner could develop strategies, either mental or physical, to help get that state sooner.

If nothing else, the recognition that reflecting on one's mindset during the race helps an athlete to recognize their subjective judgments of "feeling good" or "feeling bad" and understand the functional impact of those experiences (whether pleasant or unpleasant) allowing them to take proactive steps to improve their performance.

7   POSTSCRIPT

As I was driving home from a long weekend of competing in the backwoods of Finland, it occurred to me that I had been experiencing my own "tipping point" in a context far removed from running. Upon driving past a familiar landmark relatively close to home, I realized that this, for me, was a point where I felt a change in mindset.

For two hours, the drive was insufferable. Endless twilight, slow, a bit too much traffic, extremely boring, and feeling the fatigue of the race earlier in the day, the kilometres ticked by all too slowly. Yet, passing that one sign I've seen so many times now triggered something in my brain; "I'm finally there", even though I was still a half hour away. The fatigue, however, was gone, and I felt a wave of relief that the light at the end of the tunnel had appeared. Soon, I will be home, and right now, everything feels great.

And then the police's speed camera flashes. My own tipping point is not without an element of complacency.

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Information Letter and Consent Form

Study Title:

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Background

You are being asked to be in this study as a participant of a 50 mile or 100 kilometre ultra running event. The purpose of the study is to investigate the experiences (e.g., emotions), and mental strategies of ultra runners during the final stages of an ultra running race. Ultra runners are well-known for their ability to persist in the face of extreme fatigue. I hope to learn about how ultra runners respond to that fatigue when fulfillment of their goals is relatively close.

Study Procedures

There are three parts to the study. The first is a brief 15 minute interview before the race to discuss your previous race experiences and your plans for the upcoming ace. The second part is another interview, approximately 1 hour long, held within 3 days after the race. This interview will primarily discuss your experiences during the race. Both interviews will be arranged at a time and location that is convenient for you. The audio from the interviews will be recorded so that they may transcribed later. Collection of personal information will be limited to age and race experience.

The third part of the study involves filling out a short survey at two points during the race. Filling out the survey will occur for the 100km runners at approximately 74 kilometres and again at 76 kilometres into the race and 54 and 56 kilometres for the 50 mile runners. The survey will contain no more than 20 questions where you will identify how you are feeling based on various adjectives.

During the first interview, we will work on modifying the survey so that it is most relevant to you and your experiences from past events. Thus, you will be completely familiar with the survey prior to the race.

Equipment will be provided so that you will be able to fill out the survey without stopping. It is estimated the survey will take no more than 1 minute to complete.

Benefits

This study intends to learn about the mental strategies and emotional responses athletes go through during the later stages of an ultra marathon. Participation will provide you with information on what you experienced during the race. Whether you are an experienced or inexperienced ultra-runner, and whether or not you have specific mental strategies in mind, an understanding of your mental state during a race may be useful. Having this information may help you to learn what mental strategies you can use to improve your performance in future races.

After you have participated in the study, the researcher will provide you with further information on the concepts being studied during this research. You will also be given some ideas on how to best utilize your own data as it relates to the results you provided.

Risks

Certain risks may arise while participating in the research during the event. Attempting to fill in the survey while moving will cause you to briefly take your attention off the trail, with a possible risk of stumbling. We will attempt to minimize this risk by having a researcher walk along with you to act as a spotter. To avoid influencing your responses, the researchers will not provide verbal encouragement. Also, being completely familiar with the survey before the race will minimize the time it takes to finish it.

A second risk is a possible impact on the performance goals you have in mind for the race. The survey is designed to be as short and simple as possible to fill out to reduce the impact of the study on your race.

Voluntary Participation

Your participation in this research is completely voluntary. If you choose to participate in it, you have the right to withdraw from the study at any time without any consequences. This includes, but is not limited to, during either of the interviews, or during the race. You may also request that any data collected be removed from the study and not included in the results. At any point, you will have the right to receive further information about the research.

Confidentiality

This data is used for the fulfilment of the requirements of the Master's Degree program in Sport and Exercise Psychology at the University of Jyvaskyla. The organization and conduct of the research and the reporting of its findings will be done so that your identity is treated as confidential information. No personal information collected will be disclosed to anyone besides you and the researchers named above, and is retained solely in order to provide for the purposes of providing you with information after the research is completed. All information and recordings collected will be stored on a physical hard drive and not on any online (e.g. cloud-based) services.

THIS INFORMATION SHEET IS YOURS TO KEEP

Informed Consent

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it. Any questions I have asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study.

I understand I can withdraw at any time without giving reasons and that I will not be penalized for withdrawing nor will I be questioned on why I have withdrawn.

Participant:

_____ _____ _____

Name of Participant   Signature   Date

I confirm that the participant was given an opportunity to ask questions about the study / all questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and consent has been given freely and voluntarily.

Researcher:

_____ _____ _____
Name of Researcher   Signature   Date