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## DEFINING ULTRA-ENDURANCE: A SURVEY OF ATHLETES AND COACHES TO ACHIEVE A CONSENSUS DEFINITION

Kate Spenceley, Richard Humphrey, and Candice Lingam-Willgoss

### INTRODUCTION

The original starting point for this research was to investigate ultra-endurance sporting activities with a focus on the psychological, rather than physiological, preparation and fortitude of athletes. A literature review was undertaken in order to identify a working definition of ultra-endurance for the purpose of the planned psychological study. This initial literature review failed to retrieve a suitable definition. The definitions that were identified defined ultra-endurance in the light of what each specific race or discipline that was being studied. Thus the majority of the literature reviewed for the prospective research was consequently rejected, despite having considerable value and interest, as no all encompassing definition of ultra-endurance in terms of time, distance, specific physical training or race preparation could be found. In order to construct a comprehensive understanding of psychological ultra-endurance preparation and fortitude across a spectrum, a generalisable definition needs to be constructed.

The desire of athletes to test their abilities over long distances is a well-known phenomenon (Cejka et al, 2014; Hoffman, Ong & Wang, 2010). For a runner of average capability, the goal of a marathon is a sufficient challenge. For others, a marathon-length run is only the start of their odyssey. Ultra-endurance races can take place in hostile environments, which provide additional challenges to tax both the physiological and psychological capacities of the athletes who attempt them (da Fonesca-Engelhart et al, 2013; Hoffman et al, 2015; Park, 2005). As with any act that extends the human condition (i.e. the characteristics, key events, and situations which compose the essentials of human existence), there is curiosity regarding both how and why athletes seek to complete and compete in protracted races. Existing physiological research examines the preparation for and/or impact of these extreme events. However, the psychology of ultra-endurance is uniquely placed to study how a person endures these challenges, even when the body is failing.

To varying degrees each event creates its own definition: each physiological study does likewise. Indeed, some studies do not define the distance (Schuler, Wegner, & Knechtle, 2014), instead using other means to define their challenge. In addition, while science has considered the physiological preparation and subsequent impact on the body, there are few studies focus on the mental aptitude required to take an athlete over distance, terrain and hours or days of effort. Whatever specific physical preparation is required for the event, tempering mental capacity is an important element. However, the literature for a comprehensive view of psychological preparation for ultra-endurance was sparse. The existing literature variously describes ultra-endurance as runs longer than the standard marathon of 26.2 miles (Mueller, 2012; Krouse, Ransdell, Lucas & Pritchard, 2011); cycling over 100 miles (Linderman, Demchak, Dallas, & Buckworth, 2003), events of duration longer than 6 hours (Zaryski & Smith, 2005); multiple distance triathlon (Kenechlet, Schwanke, Kenecht & Kohler, 2008) and multiday races (Lahart et al., 2013). Some physiological studies do not define ultra-endurance except solely in terms of the specific event studied (Kenecht,

Enggist, & Jehle, 2005; Knechtle, Rust, Knechtle, Rosemann, & Lepers, 2012).

Due to the extremes that athletes take their bodies to, the field of ultra-endurance is apposite for physiological study. Within this field, scientists have the opportunity to research the human body when voluntarily extended beyond its physiological capacity for a relatively short, intense period. Cotter (2014) suggested that the ability of humans to control and regulate their living and working environments for comfort controlling stressors such as heat/cold, can restrict or prevent both physical and intellectual adaptation. Ultra-endurance athletes, by placing themselves freely in challenging situations, enabling physiologists to study human tolerance and accommodation to inhospitable/challenging settings. In physiological studies (Cotter & Tipton, 2014; Bescós, Rodríguez, Iglesias, Knechtle & Benítez, 2012; Geesmann, Mester, & Koehler, 2014) there has been some debate concerning continuous versus multistage races, specific to physical recovery. To date, limited literature has been located that views recovery from a specifically psychological perspective apart from a study following the replication of a long-distance walking event of 1000 miles in 1000 hours (Breslin, Murphy, Kremer, McClean & Davison, 2014). The study of this specific event found that the athlete was assessed to have a high degree of intrinsic motivation and mental toughness prior to the outset of the event. The athlete's fear of failure was a positive motivator for him completing the task.

When seeking to generate an understanding of ultra-endurance that was not limited to a specific sport or research study, the researchers needed to consider how to generate a suitable definition. The starting point for this was a study by Chidley, MacGregor, Martin, Arthur and Macdonald (2015) on downhill mountain biking. The authors of this study sought to discover which skills were most pertinent to downhill mountain biking. Other related disciplines such as cross-country mountain biking, motocross and off-road vehicle driving did not allow the authors to infer the necessary skills as "objective risk between the disciplines make inferences from these other sports difficult" (Chidley et al, p.183). To create a list of specific skills for downhill mountain biking, the authors consulted with an expert panel who generated a definition of the qualities required by downhill riders, and checked the validity of this definition by surveying competitive riders.

As a working definition of ultra-endurance, valid across disciplines, could not be located, a similar approach canvassing athletes' knowledge and opinion was utilised for this study. Athletes and coaches were invited to define and/or comment upon the existing definitions available within the literature. In addition, simple questions offered athletes the opportunity to expand on how they viewed ultra-endurance. The researchers were aware that while attempting to generate an overarching definition for all ultra disciplines was sought after in academic terms, there was a distinct possibility that no such definition could be obtained but that similarities between athletes or their preparation could be explored further.

## METHODS

The methods adopted were broadly based upon the study of Chidley et al (2015). A survey was constructed for online distribution via Survey Monkey. Maori consultation was undertaken and ethics approval applied for and gained through Otago Polytechnic Ethics Committee. Participants were recruited, initially through personal contact and snowballing recruitment methods (i.e. initial participants forwarding to others they believed would have information to contribute). Professional coaches in the endurance field were also canvassed and invited to email the survey link through to their athletes. The coaches approached were known to the researchers as specialists in the endurance/ultra endurance coaching.

Given the relatively low numbers competing in this sport, the survey was aimed at attracting the maximum possible number of participants, with accessibility being an essential element in ensuring a high response rate. It is common for coaches to utilise online methods to communicate with and guide their athletes. Therefore, it was anticipated that the snowball method would bring in endurance athletes not only in the Pacifica region but worldwide. All respondents self-identified as endurance athletes. Initial response was slow so further requests were made via interest groups' Facebook pages. The initial page of the survey explained the purpose. Consent was obtained from participants by informing them that continuing with the survey inferred consent to participate and for the data they provided to be included. Participants demographics such as sex, age range and general geographical location were collected and all data collected was de-identified prior to analysis.

## RESULTS

All participants chose to respond to this question and there was a near even split between the sexes; female 51.69%, male 48.31%. Details of age were collected since anecdotally endurance athletes occupy an older age group at an elite level than observed in other sporting endeavours. As can be seen below (see Figure 1), the highest grouping was in the age category 35-44 years (38.64% of respondents) and 45-54 years (29.55%).

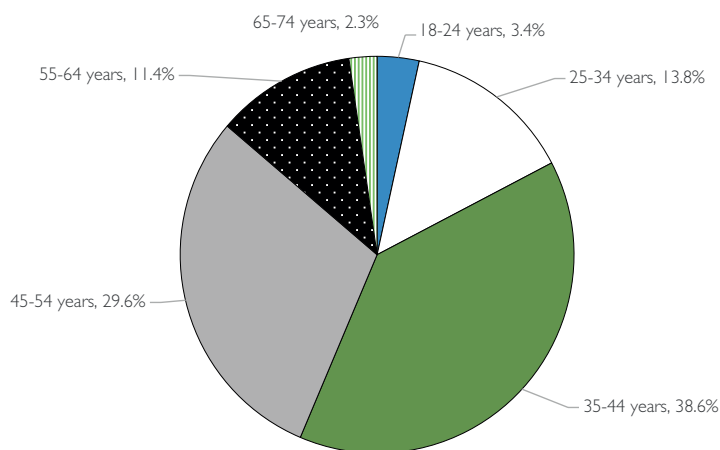


Figure 1. Age of respondents

While few conclusions could be drawn from this relatively small sample, in literature pertaining to ultra-endurance, where age was a component of data collected, most participants fall into the  $\geq 39$  years of age. The data collected in the present survey concurred with the findings in the literature considered.

Data were collected to ascertain the level of race knowledge/participation in respondents (see Figure 2). Frequency of race entry was not associated with expertise but it was anticipated that a greater depth of understanding would be acquired with experience.

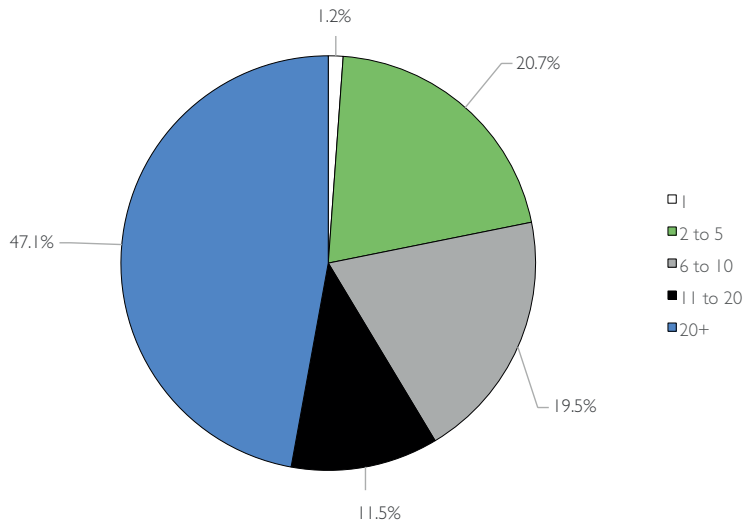


Figure 2. Number of races participated in

The population participating in ultra-endurance is relatively small (Doppelmayr & Molkenthin, 2004), although interest in long-distance events is increasing (Williams et al, 2011). When forming the question regarding ultra activities, the authors considered the most popular events covered in the existing literature (da Fonesca-Engelhart et al, 2013; Mueller, 2012; Krouse, Ransdell, Lucas & Pritchard, 2011; Zaryski & Smith, 2005). Ultra running is possibly the best known and most popular, although the most recognised in non-athletic circles could be professional multi-stage cycling events such as the Tour de France (Humphrey, personal communication, 2017). The researchers listed running; biking; mountain biking; multi-stage races (which could include a variety of disciplines such as mountain biking, running and kayaking); paddling; swimming and an open category to accommodate other long-distance/time efforts.

Literature retrieved for this study suggested the discipline respondents most frequently identified with (Figure 3) was runners (85.23%) followed by adventure racing (28.41%). Adventure races are multi-stage, continuous event comprising of two or more activities over several days, for example mountain biking, running and kayaking. For those who defined their events as 'other' the largest number indicated that they competed in long distance triathlon (Ironman). Debate exists, even in the Ironman community, over whether an iron length triathlon is ultra endurance or endurance due to the relatively short time elite athletes take on each discipline. This same paradox exists between the various adventure racing events available. Nevertheless, total time for accomplished athletes to complete a long-distance triathlon is typically eight plus hours, which falls into the definition of being over six hours (Zaryski & Smith, 2005). There was only one respondent who identified themselves as a solo off-shore single-handed sailing. Further efforts are required to ensure that responses are gathered from this community.

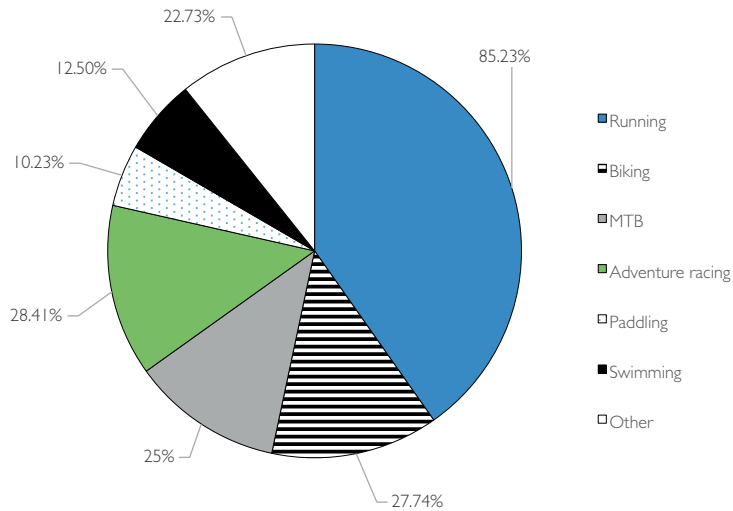


Figure 3. Ultra-endurance disciplines

Respondents identified the following as their definition(s) for ultra-endurance. Since the preponderance of ultra athletes identified as runner; the most commonly identified definition for ultra-endurance was 'run over marathon (42.2km) length (63.64%). Respondents also identified events longer than six hours (44.32%) or multi-day events (27.27%). The aim of this question was to elicit a collection of opinions for ultra and then encouraged the respondents to elaborate further in the subsequent question.

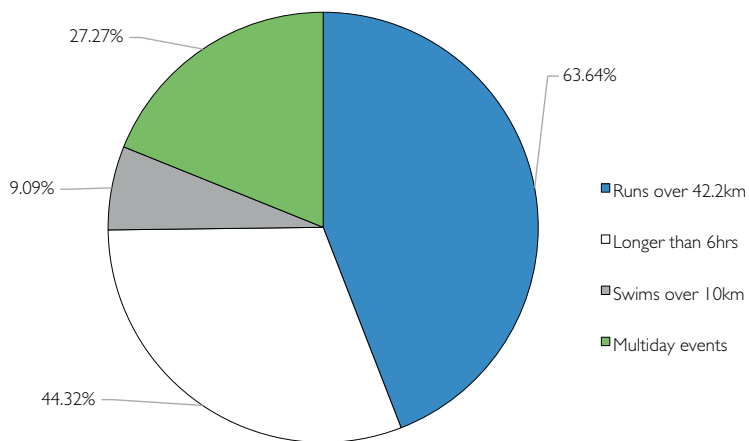


Figure 4. Ultra-endurance definitions

Respondents were invited to explore the provided definitions and elaborate with their own embellishments and comments. These were experienced athletes and coaches who had competed across a wide variety of events. The responses were categorised into five main themes: time; distance; perception of effort or challenge; training; suffering. Suffering was included as it represented a separate issue from being tested by the nature of the chosen event.

## DISCUSSION

Time/distance was an anticipated theme from the participants' responses. Most of the runners concurred with a distance equal to or greater than marathon length, but with caveats. One athlete stated: "a 60km flattish course can be a lot easier than a hilly 45". Another added elevation gained during the event "a significant amount of ascent gain, for example more than 1000m of climb" and a further athlete that ultra "require(s) more than just the normal flat/road running". Some athletes added a specific distance such as over 50km or 80km for runners, over 160km for road cycling; over 10km for swimming. As most of the respondents were runners it was noticeable that distance figured prominently in their responses.

Comments regarding time featured consistently throughout the participants' responses. The definition offered to respondents was 'events over six hours'. For the majority of participants, a time of six hours did not qualify as an ultra-endurance event, with one respondent identifying 'anything over 8 hours'. A marathon swimmer participant, however, combined the time of the definition with the distance he would swim. For this respondent, an ultra-endurance swim would be  $\geq 20$ km. Further comments linked the grade of athlete to the length of time. A respondent stated: "for slower runners, a marathon could easily take 6+ hours, and represent an ultra-endurance race for them". This athlete compared the time taken by an elite athlete to do the Kepler Challenge, a 60km off-road race, at under 5 hours and his own time of 11 hours. This difference between professional and amateur athletes was echoed by another respondent who argued that the nonstop nature of Ironman events, although there are three events in the discipline, is ultra-endurance as "it is continuous over a minimum of 10 hours for most people".

A notable factor in participants' comments was that simple time/distance descriptions were not sufficient for the participating respondents. The time taken on the event and the distance covered were interlinked with other factors which contributed to the challenge of the event. Time and distance definitions were not adequate to encompass the effort made by the individual to complete the event undertaken. In addition, the respondents included all levels of athlete competing over extended distances and time, but specified that effort and challenge was a necessary factor in the definition.

One respondent stated: "Ultra-endurance is an event that extends the human condition" and it is arguable that this is possibly the most concise and accurate definition of the genre. As noted above, on time and distance, what one athlete found achievable might for another be well outside their capabilities. The same athlete noted "someone who has just learned to swim 200m without stopping would not think a 5km training session is 'normal' to them". Other athletes commented that ultra-endurance was "not something you can bluff your way through" or that ultra-endurance is "a mental challenge as much as the physical". It may be possible to surmise from these statements that there should be a significant amount of effort for the person involved in an ultra-endurance event but, as another stated, definitions are somewhat arbitrary as the concepts of effort and challenge are subjective. This notion of effort/challenge was reflected throughout many of the respondents' comments and is an area in ultra-endurance that requires further research.

Respondents stated: "ultra-endurance must include a high degree of commitment in training", and "something that requires a sustained period of training" and this corresponds with the concept that ultra-endurance is above and beyond the normal run of competition. A respondent stated that ultra-endurance "involves sleep deprivation, nutrition training, hard physical exertion, mental toughness, isolation" all of which require extensive preparation and training. Another athlete stated, "where your starting energy is fully depleted so you rely on fuelling to complete

the race" and further respondent specified "non-stop events, i.e. no allowance made for sleeping time". It is not possible, according to the respondents, to "wing" it or "bluff your way through". The event requires multiple forms of training, not simply in the discipline of the event but in nutrition replacement, stamina and ability to function on little sleep. There appears to be a background assumption that the participant must not only be trained but should be prepared to endure hardship to complete the event.

The theme of training was also associated with the notion of suffering or hardship in the respondents' comments. "Races where I have been on the brink or tears, or actually crying", "a degree of mental and physical suffering is necessary...the sense of truly digging deep into oneself", "an ultra is an event in which all competitors will endure some suffering in an effort to complete". Although not specifically stated, these comments would appear to illustrate that ultra-endurance athletes embrace hardship and suffering as a positive rather than negative feature of their events. It is this aspect of ultra, this acceptance of hardship and the ability to "endure the daily rigours" of the event which requires greater exploration.

## CONCLUSION

This survey was constructed to gather responses from the ultra-endurance community regarding a broad definition for ultra-endurance. The literature retrieved did not supply a definition that adequately encompassed the breadth of ultra-endurance endeavour.

Within the comments from the respondents the authors found that there was no conclusive agreement on time or distance but there was consensus that the events should be outside the standard athletic endeavour. In addition, respondents considered that what could be ultra for one athlete in terms of time and/or distance may not be for an athlete who was more experienced or able.

Respondents cited the necessity for an extensive preparation period for the event, and this preparation would include physical training in the sport, nutritional preparation and mental discipline. Further to the training required, the respondents evinced an expectation and acceptance of suffering, both mental and physical, in completing their chosen event. It is particularly this aspect of the survey that is apposite for further research.

The survey continues to be available for completion by athletes and the body of opinion and themes will gain greater depth. The researchers anticipate that even if an encompassing definition of ultra-endurance cannot be formed, exploration of the methods and preparation used by athletes to embrace the suffering they face could be the next phase of this research.

**Kate Spenceley** is a Registered Nurse and Midwife, with a BA(Hons) and an MPhil in midwifery. Seven years ago, an "activity epiphany" changed her from a "sedentary lecturer" in midwifery at Otago Polytechnic into an Ironman competitor; and led her to complete a Diploma in Personal Training at the Otago Institute of Sport and Adventure. Kate now seeks to introduce others to the joy of movement by working in the Green Prescription team at Sport Otago. Outside work, Kate's main interests lie in ultra-endurance events, in particular long-distance self-supporting mountain bike rides called brevets. This explains her research interest in psychological preparation for ultra-endurance events.



**Richard Humphrey** began his academic career at the University of Southampton (UK), where he taught sport studies and sport management and development. Following some postgraduate study at the University of Bristol, he emigrated to New Zealand in 2013 and took up a lecturing position at the Institute of Sport and Adventure at Otago Polytechnic. Richard teaches and supervises undergraduate research in the fields of exercise, health and research methods. His research interests include the therapeutic use of exercise and substance misuse, particularly in the case of people with coexisting mental health issues.

**Candice Lingam-Willgoss** has a BSc in sport science and English from St Mary's University, London, and an MSc in Sport and Exercise Psychology from University College Chichester. For her PhD, she is investigating the transitional experiences of elite sportswomen. She is also a level 2 BTF triathlon coach, and has supported elite endurance athletes with their mental preparation for events. As a lecturer in sport and fitness at The Open University, she specialises in sport and exercise psychology, with research interests in exercise adherence, motherhood, career transitions in sport, and ultra-endurance performance. Candice's sporting interests include triathlon, swimming, running and waterskiing, and she has been a competitive ski racer.

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