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Enablers and barriers in ultra-running: a comparison of male and female ultra-runners

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ABSTRACT

Female participation rates in ultra-running is considerably lower than that of males, but the reasons for this are not fully understood. In this study, online questionnaire responses were collected from ultra-runners taking part in the Scottish Jedburgh 3 Peaks ultra and Highland Fling race. One-to-one-semi-structured phone interviews were conducted with a subset of runners to further explore themes from questionnaire responses. Similar experiences among male and female ultra-runners were identified. Enablers were: wanting a challenge, nature/outdoors, and the friendliness of the ultra-community. The main barrier was training time. Qualitative responses suggested negotiation-efficacy was important for factoring in training around work and family commitments, and although a greater proportion of males had dependants compared to females, female participation was considerably lower than males. This may be due to the historical influences of traditional gender roles however this effect may be diminishing as female participation in Scottish ultra-races appears to be increasing.

KEYWORDS

Gender; barriers; motivation; ultra-running; endurance; negotiation-efficacy; participation

Introduction

An ultra-marathon is any footrace event that is in excess of a standard marathon distance (26.2 miles; 42 km) (Mueller, Landon, and Graefe 2019). Ultra-marathon events vary in terrain (e.g. sand, mountainous), technical aspects (e.g. navigation), format (e.g. set time or set distance), and environmental conditions (e.g. altitude, extreme heat or cold). Ultra-marathons are rapidly increasing in popularity, with the number of races and entrants growing continually (Hoffman, Ong, and Wang 2010). It is thought that the number of ultra-marathon events has tripled since the 1980s (Krouse et al. 2011). However, female participation is considerably lower than that of males. For instance, the ‘Badwater’, a race in excess of 200 km in extreme heat typically sees females make up around 19% of all runners (da Fonseca-Engelhardt et al. 2013). The low proportion of female participants is not unique to that race. Between 2003 and 2012, less than 13% of runners were female in the ‘Marathon des Sables’, a 250 km race over several days in the Sahara Desert (Knoth et al. 2012). Similarly,

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the Western States 100-mile Endurance Run also saw female participation of around 22% (Hoffman and Wegelin 2009). Of note, this figure was only 10% for that race in the late 1980s (Hoffman and Wegelin 2009), which although it suggests some improvement in female participation, it still remains dramatically below that of their male counterparts. Low female participation is not unique to ultra-marathon events, as it is also seen in other ultra-distance endurance sports. For example, ultra-triathlons may only see females make up less than 10% of starters (Knechtle, Knechtle, and Lepers 2011).

Despite evidence that female participation in ultra-marathons has increased a little over the years in some races (Hoffman and Wegelin 2009), there are no recent studies which have evaluated ultra-marathon participation by gender since the early 2010s, therefore it is not known whether female participation rates have continued to improve. If female participation remains below that of males, perhaps fundamental differences exist between men and women in what brings them to endurance events beyond the marathon distance (Wegner et al. 2015). Although the sociodemographics of ultra-runners (Hoffman and Fogard 2012), their general health (Hoffman and Krishnan 2014), motivations (Hoffman and Krouse 2018), psychological factors (Roebuck et al. 2018), and exercise behaviours (Hoffman and Krishnan 2013) have previously been explored, studies evaluating gender differences in ultra-running tend to focus on differences in performance parameters and finish rates between males and females (e.g. Knoth et al. 2012). However, there is little known about the differences between male and female ultra-runners regarding motivations, barriers and/or constraints experienced in the sport. Krouse et al. (2011) explored the motivation and goal orientation of female ultra-runners, which identified that the two strongest motivators for engagement in ultra-running in women were general health and psychological coping. This provides a valuable insight into the motivators of female ultra-runners, but without a similar male data set, it is difficult to make direct comparisons between motivations of male and female ultra-runners. Similarly, it is important to understand what barriers may be experienced in ultra-running and whether this differs between males and females.

The constraints model originally defined by Crawford, Jackson, and Godbey (1991) encompasses three aspects of constraints in leisure; intrapersonal (an individuals' psychology, preferences and predisposition), interpersonal (an individuals' relationship with others), and structural (e.g. social factors). Building on this constraints model, it is proposed that activities associated with greater health and enjoyment motives, as perceived by an individual, will increase that individuals' efforts to negotiate constraints, thereby enabling participation (Hubbard and Mannell 2001; Jackson, Crawford, and Godbey 1993). Thus, greater levels of motivation to participate in an activity encourages greater efforts to negotiate resources to overcome constraints (White 2008). How an individual believes they are able to negotiate constraints is termed negotiation efficacy (Ridinger et al. 2012). Distance running requires considerable amounts of time to train, and this time requirement competes with time-need for other commitments such as family, friends, and work (Mueller, Landon, and Graefe 2019). As such, constraints negotiation is particularly relevant in distance running, and this concept has previously been explored in half-marathon and marathon runners (Goodsell and Harris 2011; Wegner et al. 2015). Greater levels of negotiation efficacy were similarly found in both male and female marathon runners compared to half-marathon runners (Wegner et al. 2015), suggesting that the greater event distance, rather than gender, reflects greater negotiation efficacy need. Whether high levels of

negotiation efficacy are equally present in both male and female ultra-runners, is not yet known.

Despite the emerging knowledge of gender influences on half-and full-marathon event participation, barriers, enablers, and constraints negotiation have not been evaluated across male and female ultra-runners, therefore the reasons for lower female participation in ultra-running are still largely unknown. Furthermore, identifying what encourages runners to progress through taking part in more challenging ultras, and how this may differ between genders, has also not been explored. This is somewhat surprising, given that anecdotally the distinct under-representation of female participants in ultra-running seems to be more pronounced as the distance of the ultramarathon increases. By identifying the enablers and barriers experienced by those currently actively participating in the sport, it may provide insight into reasons for gender differences in ultra-running participation. Therefore, this study aims to explore the enablers and barriers experienced by male and female ultra-runners. As the literature on enablers and barriers in male and female ultra-running participation is sparse, this study takes an exploratory approach and will include two Scottish ultramarathons. To put participation rates from those two races into context (e.g. distance and format), this study will also identify the proportion of females that have taken part across a range of Scottish ultra events over recent years. This is particularly beneficial as most research in ultra-running has focussed on a range of international events, but to our knowledge, not any in Scotland.

Materials and methods

Study design

This mixed methods study consisted of an online questionnaire with quantitative and qualitative questions, followed by telephone semi-structured interviews in a sub-set of the participants who completed the online questionnaire. It also included an analysis of female participation rates across ultra-running events in Scotland held between 2010 and 2018.

The races

Two not-for profit Scottish ultra-marathons, the Jedburgh 3 Peaks (J3P) ultra, 38 miles (61.2 km), and the Highland Fling Race (HFR), 53 miles (85.3 km) were included in this study. The HFR runs along the first 53 miles (Milngavie to Tyndrum) of the long-distance route the West Highland Way. The race is held in April each year and race entry is via a ballot. A minimum level of running experience is required before a runner can be considered in the ballot, thus applications for the ballot are checked for eligibility by the race organizers. In total approximately 1000 places are allocated. The terrain is a mixture of mostly trails and paths, and some roads. It has a total ascent of 2300 m. Until 2017, this race also included a relay option (team of four runners).

The J3P is held in October each year and takes place in the Scottish Borders, starting and ending in Jedburgh and includes the Eildon Hills. Total ascent is just over 850 m and the route is predominantly on trails and paths. This race does have a relay option (team of four runners). No minimum level of experience is required, and entry is on a 'first come

first served basis' for the individual race, although a ballot is used for the relay team entries. Given our focus on enablers and barriers to ultra-running, the HFR was selected due to it being a well-known race in the Scottish ultra-marathon calendar which attracts both experienced and those new to ultra-running but with relevant experience. The J3P was selected as it perhaps sees more novice ultra-runners and it is organized by some of the same race directors as those involved in the HFR.

Participants

Runners were invited to take part in the online questionnaire on completion of their online race sign-up. The eligibility criteria were runners aged 18 years or over. Both races attract some runners from outside the United Kingdom and international runners were also eligible to take part in the study. Ethical approval was obtained from the university School of Health and Life Sciences ethics committee and online informed consent was obtained from runners prior to starting the questionnaire.

Procedure

An online questionnaire was created using the platform QuestionPro. Questions were designed to obtain demographic data, followed by open and closed questions which explored enablers and barriers to ultra-running. Prior to the questionnaire going live, it was piloted with a number of male and female runners with a range of ultra-running experience, and based on feedback from them and the race directors of the J3P and HFR, the questionnaire was further refined. As entries to the J3P and HFR are open at different times of the year, the final questionnaire was first made available from 26/4/18 to 23/9/18 to the 337 runners signed-up to the J3P, where 40.9% were female ($n = 138$), 58.2% were male ($n = 196$), 0.6% were non-binary ($n = 2$), and one person changed their gender status after sign-up from non-binary to male.

On completion of the questionnaire, respondents were asked if they were willing to take part in a one-to-one semi-structured phone interview to further explore themes generated from the questionnaire responses. The interview schedule included questions which allowed investigation of potential enablers and barriers for engagement, such as reasons for sustained involvement and personal pathways into ultra-running, circumstances that allowed for participation at that moment, and barriers to participation that had been faced in the past or were anticipated in the future.

From the J3P questionnaire responses and interviews, the questionnaire was further refined for the HFR by e.g. changing some open questions to closed questions to aid questionnaire brevity. The modified HFR questionnaire was made available from 21/10/18 to 31/12/18 to the 1022 runners successful in the HFR ballot, where 28.7% were female ($n = 293$) and 71.3% were male ($n = 729$). HFR responders who indicated that they had completed the J3P questionnaire previously were not required to repeat common questions to avoid duplication. The same semi-structured interview questions as those used in the J3P were used in the phone interviews for the HFR. All interviews were audio recorded and were carried out by the same researcher.

As interviews served to supplement the qualitative data gained from the questionnaires, sufficient interviews were conducted until there was a state of ‘code’ and ‘meaning’ saturation from the combined questionnaire and interview thematic analysis, thereby allowing for meaningful findings to be reported (Hennink, Kaiser, and Marconi 2017).

In addition, the proportion of female starts from Scottish ultras up to 100 miles in distance or not exceeding 24 hrs in duration from 2010 to 2018 were collected. These data are freely available online.

Data analysis

Quantitative data analysis on closed questions from the online questionnaires was performed using Microsoft Excel and SPSS v.25 (IBM). Descriptive statistics were obtained for continuous and categorical variables. The distribution of continuous data was assessed using the Shapiro-Wilk test and by visual inspection of the frequency and residuals plots. Independent t-tests were performed to identify between-gender differences for continuous variables. A Chi-squared test for association was used to evaluate between-gender differences for categorical variables. For all tests, $\alpha = 0.05$. For closed questions where participants could tick more than one answer, the frequency of responses of each answer per gender was calculated and presented as a percentage of the total number of males or females that could answer that particular question.

For the qualitative data, a form of codebook thematic analysis was employed (Braun and Clarke 2021). Initially, two of the researchers independently familiarized themselves with the qualitative J3P questionnaire data by reading through all the responses in the Excel output from QuestionPro. They then employed an inductive coding process to code the qualitative questionnaire data before working together to produce a codebook. Specifically, both coders took the same 10 cases initially and independently identified codes and sub-themes. From there, the coders compared and discussed their coding and sub-themes, allowing the coding to be refined and agreed, thereby forming the codebook (Roberts, Dowell, and Nie 2019). Then the primary coder used the codebook to code the remainder of all the J3P questionnaire responses. The coders then discussed how the sub-themes related to each other, and pooled themes were created. This process also improved the robustness of the coding as discussions involved challenging codes and clarifying their meaning. This offered the primary coder the opportunity to reflect and justify the inclusion and meaning of codes in the codebook, and it ensured that coding drift had not taken place.

A similar process was used for qualitative analysis of the HFR questionnaire responses. Both coders familiarized themselves with the data by reading through all the qualitative responses. The initial codes used were those that emerged from the J3P responses, and both coders independently coded responses from the same 20 HFR responses. These were discussed, such that new codes and sub-themes were created where required and existing ones refined, thereby further developing the codebook. The remainder of all the questionnaire responses were evenly split between the coders and evaluated. Once completed, all the coded text was reviewed by the primary coder who raised discrepancies with the secondary coder. This further round of challenge and clarification gave both coders the opportunity to reflect and justify their use of the codebook. From there, sub-themes and themes that

were developed after the J3P analysis were expanded to include those developed from the HFR questionnaire.

Audio from the qualitative interviews was transcribed verbatim. Names were removed from transcripts to ensure anonymity, and participants given a unique identifier number. Transcribed data were imported into NVivo 12 (Qualitative Solutions Research International) and evaluated by two researchers using a hybrid approach of inductive and deductive codebook thematic analysis (Fereday and Muir-Cochrane 2006); they employed a comparison of the interview data to codes in the existing codebook, while remaining open to the possibility of generating new codes from the interview data, which might result in revision of the codes and ultimately the overarching themes of the study. The researchers then agreed that through the analysis of all of the qualitative questionnaire data and the interview data, a state of 'code and meaning saturation' had been reached, or 'the point when no additional issues are identified and the codebook begins to stabilise' (Hennink, Kaiser, and Marconi 2017, 594) and where there was a rich understanding of the meaning of the data. This allowed for the researchers to then agree on the overarching findings and themes of the study with regard to the research questions.

Lastly, the proportion of female runners across all Scottish ultra events up to 100 miles or up to 24 hrs in duration was calculated from the total finishers of the respective race and year, and these data were presented graphically using R. Events were categorized by distance or time depending on the format of the race.

Results

In total, 640 questionnaire responses were received across the two races, which provided a wealth of qualitative data. Questionnaire response rates for the J3P and HFR were 38.0% ($n = 128$) and 50.1% ($n = 512$) respectively. Of those responders, 69 (53.9%) in the J3P and 151 (29.5%) in the HFR were female. A total of 13 interviews (7 female) were conducted to supplement and expand on the primary qualitative data that was collected through the questionnaires.

Participant characteristics

Findings from the quantitative analysis on participant demographics are shown in [Table 1](#).

Males were significantly older than females in both races but this only reached significance in the HFR (mean \pm standard deviation; male HFR: 44.9 ± 9.3 , female HFR 42.7 ± 8.3 , $p = 0.012$; male J3P: 44.2 ± 9.1 , female J3P 41.2 ± 9.4 , $p = 0.158$). There was no significant difference in running experience or time since first ultra between males and females for the HFR, however there was evidence to suggest more females in the J3P had fewer years running experience compared to males ($p = 0.045$) and less time since their first ultra ($p = 0.003$). A significant difference for relationship status by gender was found for responders from the HFR ($p = 0.002$). Specifically, there were fewer single male responders than female responders (9.4% vs 19.5%). Although this was not statistically significant for the J3P, a similar trend existed. Both races found significant differences in dependents status by gender (HFR $p = 0.012$, J3P $p = 0.011$); from the J3P responses, 60.3% of males had dependents, whereas this was almost half of that in females (37.7%). From the HFR, these

values were 62.3% and 50.3% respectively. There were no significant differences between males and females for either race in whether the race entered was their first ultra event or whether they would consider a harder ultra event in the future.

Categorical responses from the questionnaires on the reasons for ultra-running participation split by males and females, are depicted for the J3P and HFR in Figures 1 and 2 respectively. 'Wanting a challenge' was overall the most common reason for taking part in

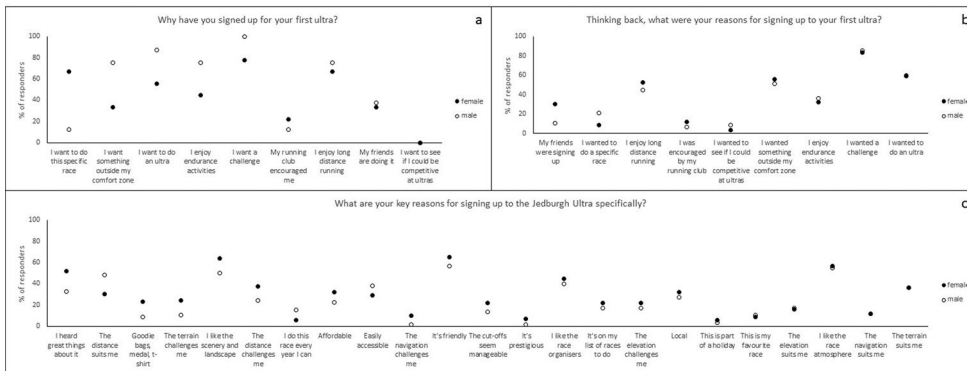


Figure 1. Percentage of male and female responders per answer option from the Jedburgh 3 Peaks 2018 questionnaire for (a) reasons for signing up to their first ultra – this race is their first ultra (female $n = 9$, male = 8), (b) reasons for previously signing up to an ultra – any ultrarace excluding Jedburgh Ultra 2018 (female $n = 59$, male $n = 47$), (c) reasons for signing up to the Jedburgh Ultra race specifically (female $n = 69$, male $n = 58$).

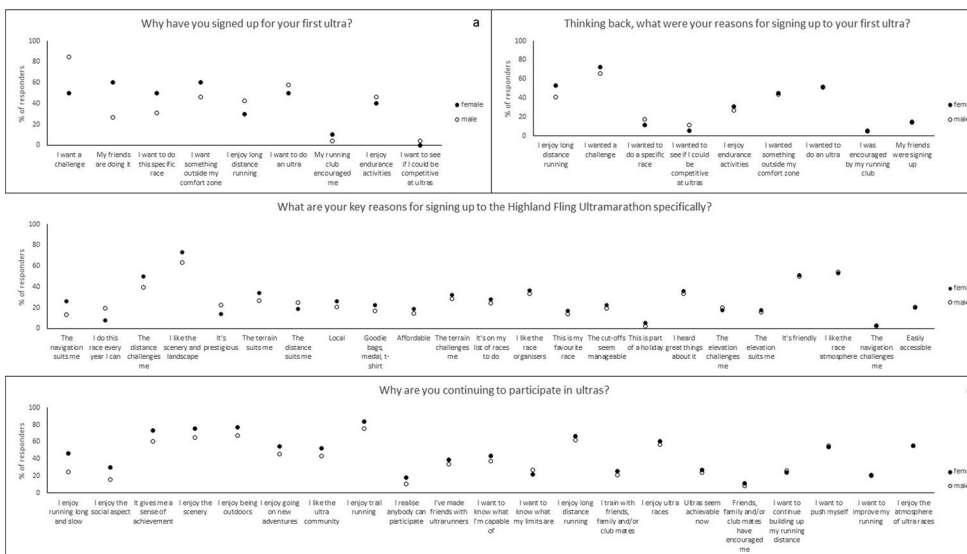


Figure 2. Percentage of male and female responders per answer option from the Highland Fling 2019 questionnaire for (a) reasons for signing up to their first ultra – this race is their first ultra (female $n = 10$, male = 26), (b) reasons for previously signing up to an ultra – any ultrarace excluding Highland Fling 2019 (female $n = 136$, male $n = 306$), (c) reasons for signing up to the Highland Fling race specifically (female $n = 158$, male $n = 342$), and (d) reasons for continuing to participate in ultras (female $n = 136$, male $n = 306$). Note, responders could tick multiple answer options per question.

an ultra event, although females for whom the HFR event was their first ultra event most commonly reported taking part because ‘my friends are doing it’. Scenery, race atmosphere and friendliness were similarly reported for males and females across both races as reasons for signing up to those races specifically.

Thematic analysis

From the qualitative questionnaire responses and interviews, three themes and their associated sub-themes were identified, and these are described in more detail below. The themes and subthemes are also summarized in Figure 3 and example responses of male and female responses for each theme are given in Table 2.

Table 1. Participant demographics of the Jedburgh 3 Peaks and Highland Fling race, split by gender.

Variable	Jedburgh 3 peaks			Highland fling		
	Males	Females	p-value	Males	Females	p-value
Age (years), mean (SD)	44.19 (9.14)	41.82 (9.42)	0.158	44.90 (9.30)	42.67 (8.27)	0.012
Years running experience, n (%)			0.045			0.415
<5 years	14 (24.1)	18 (26.9)		78 (22.7)	27 (17.4)	
5–9 years	15 (25.9)	25 (37.3)		98 (28.5)	48 (31.0)	
10–14 years	9 (15.5)	15 (22.4)		68 (19.8)	27 (17.4)	
15+ years	20 (34.5)	9 (13.4)		100 (29.1)	53 (34.2)	
Years since first ultra, n (%)			0.003			0.130
<3 years	17 (39.5)	39 (69.6)		77 (28.8)	40 (35.1)	
3–5 years	15 (34.9)	14 (25.0)		102 (38.2)	48 (42.1)	
5+ years	11 (25.6)	3 (5.4)		88 (33.0)	26 (22.8)	
Relationship status, n (%)			0.342			0.002
Single	6 (10.5)	11 (16.4)		32 (9.4)	30 (19.5)	
Relationship	51 (89.5)	56 (83.6)		309 (90.6)	124 (80.5)	
Dependents status, n (%)			0.011			0.012
None	23 (39.7)	43 (62.3)		131 (37.8)	78 (49.7)	
Yes	35 (60.3)	26 (37.7)		216 (62.3)	79 (50.3)	
This race first ultra, n (%)			0.834			0.766
Yes	8 (14.5)	9 (13.2)		26 (7.8)	10 (7.0)	
No	47 (85.5)	59 (86.8)		306 (92.2)	132 (93.0)	
Consider harder ultra, n (%)			0.707			0.238
Yes	39 (72.3)	47 (71.2)		208 (68.9)	81 (60.9)	
No	5 (9.3)	9 (13.6)		36 (11.9)	22 (16.5)	
Don't know	10 (18.5)	10 (15.2)		58 (19.2)	30 (22.6)	

Correlation is significant at the 0.05 level.

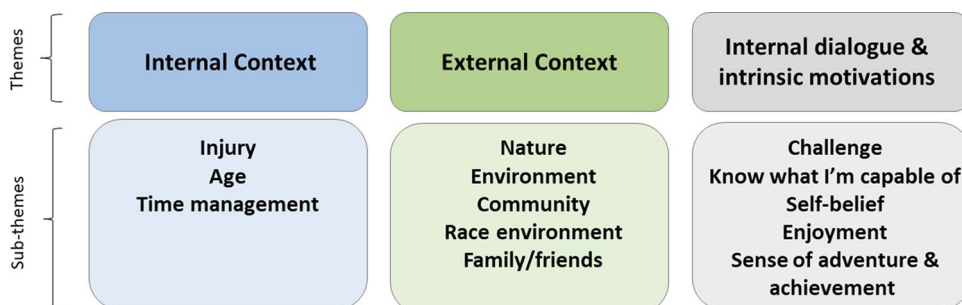


Figure 3. Themes and sub-themes.

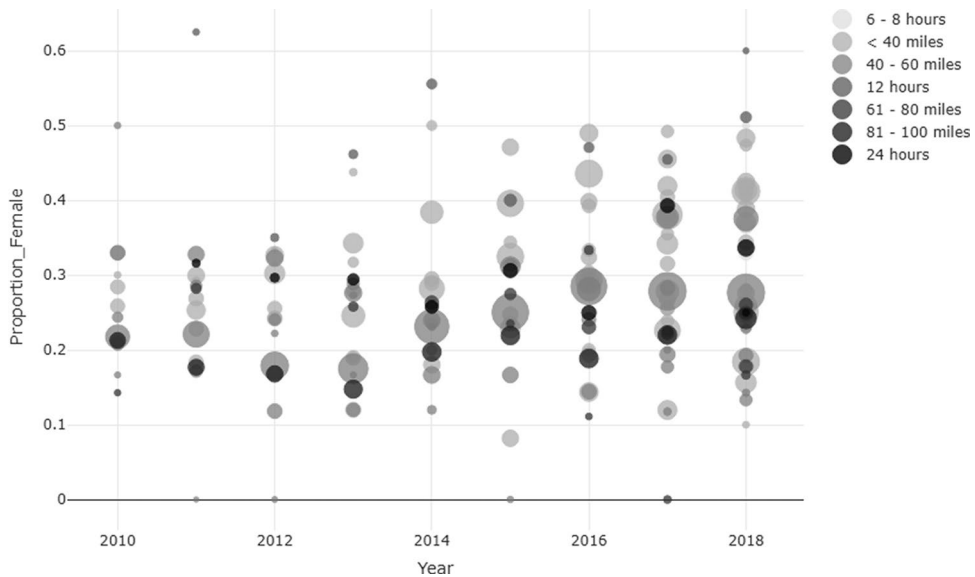


Figure 4. Proportion of female runners from finishers of 45 Scottish ultras of different distances from 2010 to 2018 ($n = 193$ events). The greater the number of runners in a race, the greater the size of the bubble.

Internal context

The sub-themes identified under ‘Internal Context’ were age, injury, and time management. Some responders considered taking part in more challenging ultras as a positive influence on age:

‘attempt to stave off getting older’ (male, 59, HFR, questionnaire)

However, age was more often considered a limiting factor:

‘It’s always a bit of a struggle; as I’ve got older, I’m aware it seems to take more work to stay at the same level’ (male, 50, HFR, questionnaire)

‘Not getting any younger. It’s a pity this sort of sport wasn’t available when I was younger. Only professional athletes did this sport when I was growing up. Now anyone is welcome and it’s about personal best’ (female, 51, HFR, questionnaire)

‘worried about picking up injuries because of my age’ (male, 49, HFR, questionnaire)

Injury was frequently reported by both male and female questionnaire responders as a barrier to ultra-running, both to training and taking part in events. Qualitative responses around injury included those related to injury prevention and also strategies on how to deal with injuries when they occurred. Both males and females in this study reported that they used a similar range of pro-active approaches to reduce their risk of injury, which primarily included incorporating additional strength and conditioning as part of their training programme, yoga, and seeing a physiotherapist.

A lack of time to dedicate to training was very often reported both by male and female participants. This lack of time was primarily due to family and work commitments:

Table 2. Themes, sub-themes, and example quotations from the questionnaires/interviews split by males and females.

Theme	Sub-themes	Female example quotations	Male example quotations
Internal context	Injury	'remaining injury free'	'getting stronger/faster while staying injury free'
	Time management	'Trying to find the time to train for them when I run my own business and have a small child to take care of as a single parent'	'Fitting enough training miles in around four children and a busy job'
	Age	'I still did it - even at my age!'	'I am not getting any younger so want to try it before age potentially makes it more difficult'
External context	Nature	'it's a day outside in beautiful scenery'	'a day out on the trails, a day out in the hills, ... just enjoying being outside, yeah, away from everything else'
	Environmental conditions	'having to train when I'm getting tired and the weather's cold/wet'	'Running in the dark late at night and in all weathers.'
	Ultra-running community and race environment	'It's very sociable and everybody chats ... I did like that, the contact you get from people round about you [during a race]'	'very supportive community, ... nobody would think worse of anyone for speaking to them [during a race]... having a joke with them or something, it's much more of an inclusive supportive atmosphere round about it'
	Family and friends	'having supportive husband and family'	'A very patient and supportive wife'
Internal dialogue and Intrinsic motivations	Challenge	'I quite like the challenge of seeing how close I can get to a course record'	'it's all about the challenge'
	Know what I'm capable of	'Now I want to see how far I can go'	'to find out what I'm capable of both mentally and physically'
	Self-belief	'I still have that fear but I suppose I have done more races where I have managed to do what I thought I couldn't do so my confidence has improved a bit.'	'Ultra's are a bit beyond me. I don't know why I've entered this one!'
	Enjoyment	'I get a lot of enjoyment out of them'	'Sheer enjoyment'
	Sense of adventure	'I get to see parts of the countryside I wouldn't normally see which gives me a great sense of adventure.'	'...the adventure in running. New routes every day. Never the same route twice'
	Sense of achievement	'the sense of achievement is huge!'	'the feeling of achievement after completing a race'

Example quotations include those from the Jedburgh 3 Peaks and Highland Fling race.

'Balancing work, personal life, seeing family and my husband and training is challenging - it takes a lot of compromise' (female, 35, HFR, questionnaire)

'The single biggest challenge is time. Committing to running 50 training miles a week and yoga and weight training and a demanding job and a partner is a logistical, emotional nightmare' (male, 40, HFR, questionnaire)

'I would say that the time commitment is one of the most difficult things, because realistically, if, well I like to go to an event overprepared, so realistically you're out on the hills for hours at the weekend, both the Saturday and the Sunday. I'm also I'd say middle of the pack pace, so, as a lot of my friends are quite a bit quicker, their runs will take maybe 4 hours, mine will take me six and a half. So it's just the actual logistics of fitting all that in and then kind of time for family and friends as well.' (female, 26, J3P, interview)

'trying to fit a full time job and getting the training that you require, family commitments, particularly I've got an elderly parent who's in a nursing home so visiting her and getting any sort of running in the evening is pretty hard, so finding the time round about other commitments really.' (male, 52, J3P, interview)

Negotiating time to train around other demands appeared key and this was evident from both male and female responses in this study:

'I work shifts...I've got two kids age 8 and 5 and my wife is a nurse as well so it is really tricky actually to try and fit in the training...at the start of the month I'll just look at what I've got on, what shifts I'm doing, what kids commitments we've got you know for after school club...try and figure out when I'm going to fit in a long run, when I'm going to fit in a couple of short runs and really just try and accommodate everything' (male, 38, HFR, interview)

'Structured training programme overlaid onto work and personal commitments leading up to the race to anticipate when busy and less busy weeks will be. Compromise and support from friends and family' (male, 31, HFR, questionnaire)

'I guess it's harder to find time to train sometimes and you sort of have to work around kids and childminders sometimes, so either going earlier or later, or going when you drop them off at football training, go for a run, these sort of things' (female, 38, J3P, interview)

'Getting up early and using my lunch times wisely to get my training in' (female, 35, HFR, questionnaire)

One other facet in relation to time negotiation that was identified in the present study was whole family involvement in running and training, thus essentially combining caring responsibilities and training:

'[the kids] quite often come to races and they know that's what we do, or we go to parkrun together and do 5k together and then I go off and do my long run...' (female, 36, J3P, interview)

'Have easier weeks every now and then, buggy run, run with my wife alongside me on a bike' (male, 30, HFR, questionnaire)

In families where both parents were long-distance runners, a tag-team approach was also occasionally reported as a way to factor in running time for both parents.

'we trade off on the weekends, sometimes he'll go out for his long run and then I'll go out the next day. So yeah we just kind of work it out between us' (female, 36, J3P, interview)

Although lack of time was similarly reported as a frequent barrier to training by males and females, and effective time management, negotiation and compromise reported as ways to overcome that, differences between genders in the process of negotiation, or when it is

deployed, was observed. For example, some females had reported delaying taking up running in order to prioritize family whilst their children were young, whereas this was not identified from any of the male responses:

'...when [the kids] were more independent and that meant I could have more time on my hands so I could go out on Sunday, for example, leave the house for a run. When they were younger I wouldn't have done that...[my husband] does a lot more [running] than me, but yeah, he sort of has done consistently you know whereas I have fitted it in around what I thought the children needed' (female, 51, J3P, interview)

External context

The sub-themes identified under the External Context theme were Nature, Environmental conditions, Ultra-running community and race environment, and Family/friends. Winter training in wet and cold conditions were reported as a challenge to training for an ultra-running event:

'I don't anticipate any challenges [to training], other than rotten weather' (female, 47, HFR, questionnaire)

'having to train when I'm getting tired and the weather's cold/wet' (female, no age provided, HFR, questionnaire)

'Making sure I get the long miles in, particularly when we get winter weather.' (male, 50, HFR, questionnaire)

'[my husband] is very understanding and as long as I plan [my training] in advance. This means going out in all weathers.' (female, 49, HFR, questionnaire)

Overall however, nature, the landscape, and being outdoors were rated highly by both males and females, and contributed to a sense of enjoyment in ultra-running:

'...you're going to be out there for a day out, a day out on the trails, a day out in the hills, and you know just, with the elements and the landscape...' (male, 47, HFR, interview)

'Glenogle up in Killin is one of my favourites purely for the scenery... So yeah, the scenery is quite a big draw.' (female, 44, HFR, interview)

'I love being in the mountains and experience nature while running.' (female, 24, HFR, questionnaire)

Friends and the ultra-running community were frequent enablers to the sport and this was identified commonly in both male and female responders:

'...as I've got into the ultra-running community and made more friends... nice chance to catch up with people as well before races and after races that maybe you only see a handful of times a year but in a weird way you can sometimes feel more close to than people you've known for 10-15 years, just because that experience that you have out there in an ultra, it's so indescribable to somebody who doesn't do something like that, it kind of brings you together when you can share that experience' (female, 39, J3P, interview).

'There is a wonderful feeling of camaraderie and friendship and people are very supportive if you ever have any problems, people aren't going to walk past you and leave you by the wayside, not

that I've ever had any, I mean, you certainly wouldn't continue on if you saw someone in difficulty, you'd stop until they got help or whatever.' (female, 69, J3P, interview)

'There's a very supportive community, things like you know, if you're running a marathon people start and run and nobody speaks to you but if you're doing at an ultra, nobody would think worse of anyone for speaking to them and checking if they're alright, having a joke with them or something, it's much more of an inclusive supportive atmosphere round about it' (male, 52, J3P, interview)

In other cases, families acted as enablers to start distance running, or husband/wives were also training partners:

'...started running in my late 30s... really because my kids were getting involved, my eldest son... he was 11 at the time and he wanted to join in with some of his pals who were going to the local running club... my wife went along with him and it very quickly developed into a family activity so that's where I got involved properly you know I suppose I'd tried on and off before but nothing too serious... then kind of got interested in longer distances than was happening through the running club... myself and my wife we run a lot together now and with friends you know she's running ultras now too and we are signing up with the same events and training together so that's good.' (male, 47, HFR, interview).

There were no comments in the questionnaires that suggested any responders had personally experienced any gender bias in ultra-running. However, three female interviewees had initially perceived, or indeed experienced, ultra-running as a 'masculine' environment:

'This might more be an experience I had from a specific race that I went to, and the company that organised it, but it felt very male, maybe not male dominant, maybe masculine would be a better word to describe it. I've seen other ultras where there's lots more women, it's a lot more inclusive, however I think the one I managed to pick was just kind of yeah a bit more kind of masculine, and there seems to be people there who are doing it for a badge of honour not just to enjoy it...' (female, 26, J3P, interview)

'In the ultra I would say that the average person who enters is probably going to be male and younger than me certainly a lot quicker than me so I don't know how many 51 year old mums would, I don't expect to see them lining up on the ultra start line' (female, 51, J3P, interview)

'there's all the gender roles you know generally women raise the kids have less time to train but for me it would be really great if there was something for the big ultras in particular or maybe more the famous ultrarunners could do to really encourage and bring more female runners in the sport in some ways.' (female, 36, J3P, interview)

Internal dialogue and intrinsic motivation

Under the theme Internal Dialogue and Intrinsic Motivation, the following sub-themes were identified: Challenge, Know what I'm capable of, Self-belief, Enjoyment, Sense of adventure, and Sense of achievement. 'I want(ed) a challenge' was a very common response for reasons to take part in ultra events for both males and females. However, lack of confidence in their ability to complete the race they had signed up for was also reported by both males and females:

'[being at the start line] will be quite daunting, I have to get round that. I find that mentally quite challenging, that's the impostor syndrome thing that comes out' (female, 51, J3P, interview)

'Ultras are a bit beyond me. I don't know why I've entered this one' (male, 59, HFR, questionnaire)

There were no gendered reports in relation to confidence, however a female respondent did touch on how women may be less confident taking part in an ultra-running event:

'Something that I notice a lot as an ultrarunner that is female, is that a lot of races are very male oriented. In fact it's not unusual to have sort of less than 30% of the field be women and I think the tougher the races are, the less women you see as well and I think part of that is it's a bit of a natural thing that I definitely felt myself which is that as women we are a little bit more cautious and I think we kind of think we almost need to have done something before we are ready to do it, so I think a lot of us think I couldn't to do this so I'm not willing to try.' (female, 39, J3P, interview).

Enjoyment and a sense of achievement from taking part in ultras were very common amongst both males and females. The experience of enjoyment and sense of adventure was

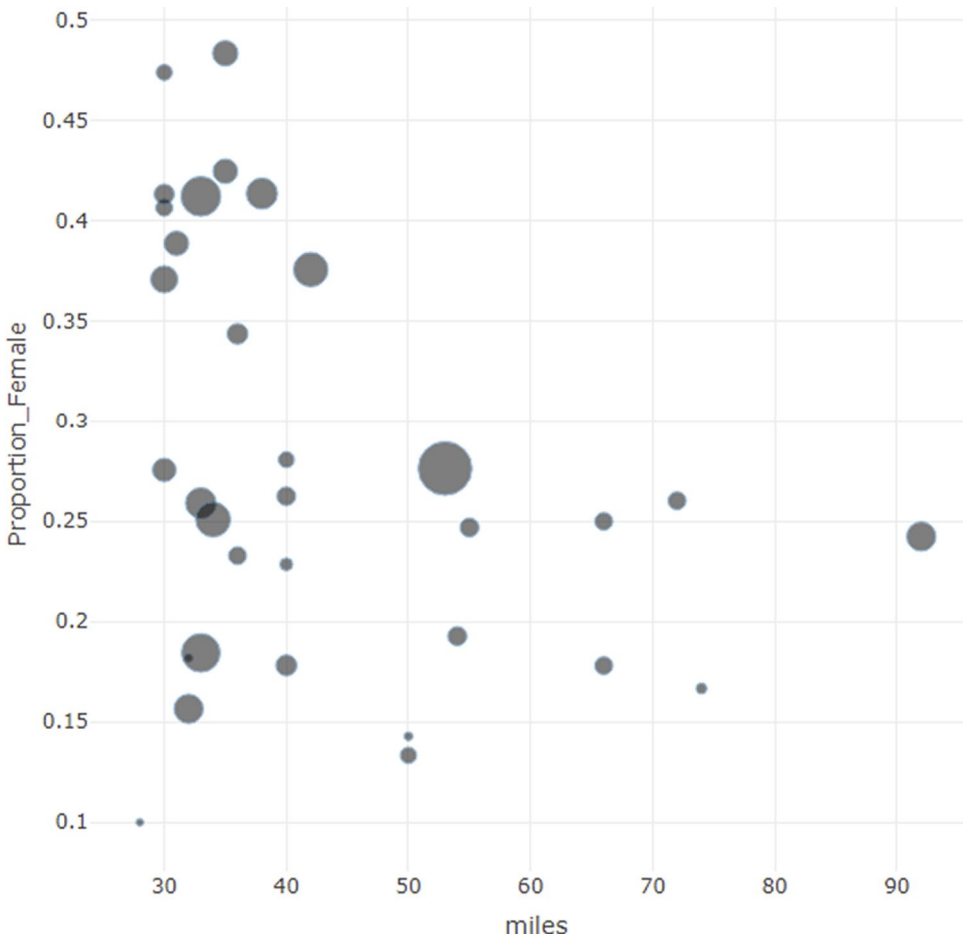


Figure 5. Proportion of female runners from finishers of 40 ultra-running events in Scotland in 2018 by distance (time-format events not included). The greater the number of runners in a race, the greater the size of the bubble.

frequently linked to the outdoor environment, and sense of achievement appeared closely related to the concept of challenge.

2010–2018 Scottish ultra events

Female participation rates in the 193 Scottish ultra-running events from 2010 to 2018 are presented by time in [Figure 4](#) and by race distance in [Figure 5](#).

Discussion

This study explored barriers and enablers to ultra-running experienced by males and females from two Scottish ultra-running events (the HFR and J3P), and evaluated female participation rates across a range of Scottish ultra-running events since 2000. We found female participation made up around one third of the HFR entrants although this was higher for the J3P at approximately 50% female. This is in-keeping with what is anecdotally reported, as the HFR is the longer and arguably more challenging race of the two events (53 vs 38 miles). This percentage of female participation however is higher than those reported in previous studies in ultra-runners (e.g. da Fonseca-Engelhardt et al. 2013; Hoffman, Ong, and Wang 2010), although those studies were on races of greater distances which are anecdotally thought to have lower female participation rates. This is in agreement with the trend of female participation rates in the 193 Scottish ultra-running events from 2010 to 2018 presented here, where although the proportion of female runners showed an increasing trend with time, female participation was generally lower in races of greater distances. Of those 193 Scottish ultra events, the proportion of female participants was greater than male participants in only 4 events (2%), and interestingly all of those 4 events were 12-hour events (The Glenmore 12 in 2011, 2014 and 2018, and the 12 hrs Edinburgh 2018). It is not clear why the only category with greater female participation was the 12-hr race format. This is also in contrast to Sehovic et al. (2013) which in an analysis of 12-hr ultra-marathons across the world showed that female participation was fairly constant at 16–22% for each decade from 1981 to 2010. Perhaps these differences are due to geographical location (Scotland-specific rather than world-wide), and the difference in years included (pre-2010 or post-2010). The reasons for the stark contrast in female participation rates in the 12-hr format compared to the distance format would warrant further evaluation.

Mean age across the HFR and J3P races for both genders spanned 41.8 to 44.9 years, which is similar to other studies on ultra-runners (Hoffman and Fogard 2012; Hoffman and Krishnan 2014, 2013; Hoffman and Krouse 2018; Hoffman and Wegelin 2009). Furthermore, males were older than females in both races and although this was only statistically significant for the HFR, this trend is similar to findings from other research on ultra-runner demographics (Hoffman and Wegelin 2009). From the questionnaire responses, increasing age could function as either an enabler or a barrier to taking part in ultra-running and this did not appear to be influenced by gender. Some responses related to engaging in ultra-running to avoid changes associated with ageing, whereas others became more cautious in training due to their age, in particular in relation to picking up injuries. Running injuries are extremely common across runners training for any distance, with lower limb injury rates ranging from 19.4% to 79.3% (van Gent et al. 2007), yet the vast majority of

runners continue to run despite their injury (Linton and Valentin 2018). Therefore, it was not surprising that both males and females frequently reported injury as a barrier to training and taking part in ultra-running events. Moreover, there did not appear to be a difference between genders in how they dealt with injury as a barrier to ultra-running, with both genders reporting a pro-active approach to managing and preventing injury including strength and conditioning, yoga, and seeing a physiotherapist.

Hoffman and Krouse (2018) previously reported on ultra-runner characteristics such as marital status and number of children, however these data were not separated by gender and the study was conducted with ultra-runners in North America. In the present Scotland-based study, the proportion of males with dependents was similar for the two races (around 60%), whereas for females this was lower at 50% for the HFR and even lower for the J3P race at 38%. A similar trend has also been found in half-marathon and marathon runners taking part in an event in the Southeastern United States in 2012, with 48.4% of males living with a partner and children, whereas this figure was lower at 35.5% for females (Wegner et al. 2015). In that study, the majority of women were single without children (38.0%), whereas that category was lower for males at 26.4%. This suggests that similar trends exist in the difference in proportion of males and females with dependents across endurance events of a range of distances (half-marathon, marathon and ultra), although this is based on a small sample of races thus this would warrant further assessment across a greater range of events.

Previous work has observed that conflicts between family time and time to train is common in long-distance runners (Goodsell and Harris 2011). In the present study, effective time management seemed imperative to plan training sessions in and around work and family commitments, suggesting evidence of negotiation-efficacy. Higher levels of motivation to engage in an activity has positive effects on negotiation and finding strategies to overcome barriers, whilst reducing the perception of constraints experienced (White 2008). However, an inherent reduced sense of entitlement to leisure is thought to exist in females with caring responsibilities due to traditional family roles, thereby leading to constraints in leisure time (Maume 2008). This may be an insight into why previously fewer females took part in ultra-running, particularly at the greater distances as these events take even greater amounts of time to train. Roles and responsibilities of males and females in the family have seen considerable changes in the last several decades, with men and women increasingly contributing equally to caring for children as more women are in employment (Goldscheider, Bernhardt, and Lappegård 2015). Hamilton and White (2010) have argued that when domestic duties are shared between partners, overall physical activity participation is increased and enhanced, particularly for women; yet women still struggle to negotiate leisure and sport access in an environment where discourses of 'good motherhood' continue to denote women as the primary caregivers. This became apparent in the present study, where even though both males and females expressed negotiation efficacy to find time to train, some females still reported having delayed training due to caring responsibilities for young children. Although this was not directly expressed, social expectations are often internalized and it may be that females are less confident to negotiate time that is required for training. This lack of confidence presents as a complex mix of internal interpersonal, intrapersonal and structural constraints, and this warrants further in-depth investigation within a constraints model.

Although a study on half-marathon runners rather than ultra-marathon runners, Nilson et al. (2019) showed females made up 52% of runners in the 21–30 age bracket of the Gothenburg half-marathon in 2017, but that this percentage steadily decreased across the age categories, with only 25% of runners in the 51–60 age category being female. It may be that lower female participation with increasing age is a ‘hangover’ from more traditional family roles seen previously. With the rise of egalitarianism in family roles amongst males and females (Knight and Brinton 2017), the gender imbalance in participation in endurance events may well self-regulate with time.

This study also identified several instances where negotiation efficacy in ultra-running training was framed as a family focussed event, e.g. something done with the family or with a partner, which is a key finding here and deserves further exploration in future work. At present the majority of studies have focussed more on how mothers negotiate their own ‘athlete identities’ and access to their sport, rather than how family units negotiate this collectively (McGannon, McMahon, and Gonsalves 2018). This is similar to Goodsell and Harris (2011), who found that cooperation strategies were often used where one or both partners were marathon runners. In the present study, no data was collected on whether respondents had a partner who was also a long-distance runner, therefore how negotiation-efficacy and cooperation perhaps differed when both parents were ultra-runners would warrant further evaluation.

Although respondents often doubted their own abilities or whether this ‘extreme’ race environment was ‘for them’, they nevertheless found it to be a welcoming, supportive space. There were many similarities in what brought people to and kept them in ultra-running; the friendliness and comradery of the sport was overwhelmingly voiced by both males and females. This was similar to a study by Kazimierczak et al. (2019), who identified social interactions with other runners and the friendships that develop as a strong motive to take part in ultra-running. Furthermore, that study highlighted how those social interactions created a sense of belonging, which was thought important for the process of developing and maintaining a social identity as an ultra-runner. A stronger sense of social identity is thought to be linked with increased motivation to engage in sport (Stevens et al. 2017). Whether social identity of ultra-runners differed between males and females was not evaluated by Kazimierczak et al. (2019). Although a marathon event, a reduced sense of ‘runner identity’ was observed in females compared to male entrants to a marathon in South-East China where females made up 30% of runners to that race (Qiu et al. 2020). Thus, further work should explore ultra-runner identity and whether this differs between males and females.

This study identified and compared the enablers and barriers to ultra-running in males and females which has been relatively unexplored. Therefore, this study provides new insights into participation by gender in ultra-running. However, the following study limitations should be considered. This study was exploratory and only included qualitative data from runners entered in two ultra-running events in Scotland, therefore future work should identify whether similar findings exist in other countries and cultures. In this study, the number of interviews made up a relatively small proportion of those which engaged with the questionnaires; although the authors are satisfied saturation was reached and the interviews served to supplement the richness of information that was gained from the questionnaires, future studies exploring a diverse range of events (e.g. levels of navigation or challenging terrain and environmental conditions, or perhaps corporate events rather

than run club or not-for-profit events) might benefit from incorporating a wider range of responses using an interview or focus group format. Lastly, in this study, long-distance runners who had already taken part in an ultra-running event or who had signed up for their first ultra-running event were included, therefore barriers and motivations discussed here are from those already engaged with the sport. Further research could identify whether endurance runners currently not engaged in the ultra-running sport express the same barriers and motivations for ultra-running, and how this may be experienced differently between males and females.

Nuanced differences in negotiation-efficacy is likely a key reason for divergent participation rates between males and females in the ultra-running sport. Future work should explore this in greater depth by evaluating negotiation-efficacy within a constraints model in both male and female ultra-runners across a larger number of races and geographical locations. In particular, the role of the family/partners as an enabler into the sport should be evaluated going forwards. Furthermore, due to the decrease in female participation in ultra-running with increasing event distance, future work should also identify how negotiation-efficacy is influenced across the types of ultra-running events.

Conclusion

The findings from this study suggest that barriers and enablers to ultra-running are largely similar for males and females. The ultra-running community appears to be inclusive and no overt male-bias was identified; only a very small number of female participants mentioned they perceived the environment to be somewhat masculine and that they would like to see more women in the sport. However, finding the time to train was the most common barrier experienced by both males and females and the strategies participants employed to deal with this were varied, but were not strictly demarcated by gender. Both male and female participants noted that negotiating time for running with family and work commitments required considerable planning and prioritizing, and that sometimes this process of negotiation efficacy was a family or team effort. Yet, from the participants in this study, more males had dependents compared to the female participants yet female participation was lower, suggesting more nuanced differences in negotiation-efficacy may be present. Despite gradual shifts towards egalitarian family roles in society, more restrictive traditional gender roles persist, and these may still influence the negotiating-efficacy of female ultra-runners more than males, thereby potentially reducing availability of female training time. However, as female participation in Scottish ultra-races appears to be increasing with time, the historical influence of traditional gender roles which could have limited female participation previously, may be diminishing.

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