PSYCHOLOGICAL PREDICTORS OF PERFORMANCE IN A 100-MILE ULTRAMARATHON RUN: AN EXPLORATORY STUDY

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Previous Research

- Research interest in ultramarathon running has grown over the past 25 years.
  - Demographic
  - Physiological
  - Biomechanical
  - Nutritional perspectives

  (e.g., Hoffman & Fogard, 2011; Hoffman & Wegelin, 2009; Khodaee & Ansari,2012; Nicolas et al., 2011; Noakes, 2006).
  - OR, has focused on shorter distances (e.g., marathons, 1500 meters), which may not generalize to ultramarathons.

Previous Research

- Motivation
  - Doppelmayr & Molkenthin, 2004; Hashimoto et al., 2006; Krouse et al., 2011; Weinberg, 1998
- Mood/Affect
  - Joesting, 1981; Kirkby, 1996; Lane & Wilson, 2011; Micklewright et al., 2009; Sacks et al., 1981; Tharion et al.,1988; Tharion et al., 1987; Tharion et al., 1989; Rauch et al., 1988
- Personality Characteristics
  - Folkins & Weiselberg-Bell, 1981; Lindstrom, 1990; McCutcheon & Yoakum, 1983; Sandlin, 1992

Previous Research

- Cognitive Profiles
  - Acevedo et al., 1992
- Qualitative Studies
  - Bull, 1989; Christensen et al., 2015; Hannold, 2010; Holt et al., 2014; Simpson et al., 2014
  - Mental Toughness
    - Jaeschke, 2012; Jaeschke & Sachs, 2012

Previous Research

- Predicting finishing status variables in ultramarathons has been explored previously.

- Tharion et al. (1989) examined differences between 50 mile and 100 mile ultrarunner “causalities” and “survivors.”
- Found that factors such as:
  - A positive attitude,
  - Having confidence in the ability to execute the run,
  - Goal-setting,
  - Breaking the race into small segments, and
  - Congratulating oneself upon completion of that segment of the race.

  were deemed as significant predictors of finishing status.

Foundation for Current Research

- The psychological components of ultrarunning performance have not been fully explored.
  - Particularly for how these components relate to running *performance*.

(Acevedo et al., 1992; Bull, 1989; Hoffman, 2010; Jaeschke, 2012).

Purpose of this Study

- *To examine the extent a series of demographic, physiological, and psychological factors would predict finishing times at the 2014 Western States Endurance Run.*

Methods

- Survey method; participants were recruited via email.
- In return for their time, runners were entered into a random drawing for four $50 gift certificates to the WS store.
- Approximately 15-20 minutes to complete.
  - An additional 45 surveys were completed on-site at the race.
- Multiple regression used to predict which variables influenced running performance.

Measures

- **Demographic Profile**
- **Sport Mental Toughness Questionnaire** (SMTQ; Sheard, Golby, & van Wersch, 2009)
- **Pain Catastrophizing Scale** (PCS; Sullivan, Bishop, & Pivik, 1995)
- **Cognitive Orientation Classification System** (COCS; Stevinson & Biddle, 1998)
- **State Mindfulness Scale** (SMS; Tanay & Bernstein, 2013)

- ***All assessed a "typical ultramarathon."***

SMTQ (Sheard, Golby, & van Wersch, 2009)

- 14-items; 3 subscales:
  - Confidence
  - Constancy
  - Control
- How true on a 4-point Likert scale from “not at all true” (1) to “very true” (4):
  - *I take responsibility for setting myself challenging targets*
  - *I give up in difficult situations*
- Significantly higher levels of mental toughness have been found in:
  - International and national-level performers,
  - Male athletes, and
  - Athletes in older age groups

PCS (Sullivan, Bishop, & Pivik, 1995)

- 13-items; 3 subscales:
  - Rumination
  - Magnification
  - Helplessness
- Assess catastrophic thinking about pain on a 5-point Likert scale from “not at all” (0) to “all the time” (4):
  - *I keep thinking about how badly I want the pain to stop.*
  - *There’s nothing I can do to reduce the intensity of the pain.*
- Higher scores on the PCS have been found to be significant predictors of the intensity of physical and emotional distress.

COCS (Stevinson & Biddle, 1998)

- Two dimensional classification system for thoughts based on “location” and relevancy to task.
- Used “100%” allotment

	Internal	External
Task-relevant (association)	fatigue, muscle soreness, breathing, perspiration, cramp, nausea, blisters **(Inward monitoring)**	conditions, route, strategy drinks stations, split times, distance markers **(Outward monitoring)**
Task-irrelevant (dissociation)	daydreams, fantasies, maths puzzles, imagining music, poetry, philosophy, **(Inward distraction)**	scenery, environment, spectators, other runners, fancy dress, chatting **(Outward distraction)**

People think about a variety of things while running an ultramarathon. These thoughts can be one of four types, which are described below in the categories. Using the scale below, please give each of the four categories a rating from 0 to 100 to indicate the extent to which you would engage in these types of thoughts during a typical ultramarathon race.

The TOTAL of your scores over the FOUR categories must equal 100.

(0) 10 20 30 40 (50) 60 70 80 90 (100)
No time at all — About half the time — All the time

Inward Monitoring*
attention is focused inwardly on how your body feels while running—for example, breathing, muscle soreness, thirst, fatigue, perspiration, blisters, nausea

Inward Distraction*
attention is focused inwardly on anything irrelevant to the task—for example, daydreams, imagining music, math puzzles, philosophy, religion

Outward Monitoring*
attention is focused outwardly on things important to performing the task—for example, strategy, mile markers, water stations, split times, route, conditions

Outward Distraction*
attention is focused outwardly on things unimportant to task performance—for example, scenery, spectators, other runners, environment

Please make sure that the sum of the above numbers equals 100 exactly. ***
Enter the sum of the above numbers in the box. For example, 40 + 25 + 30 + 5 = 100, therefore you would enter "100" in the box below.

SMS (Tanay & Bernstein, 2013)

- 21-item measure; 2 sub-scales:
  - SMS-Body
  - SMS-Mind
- Asked how well the items describe their experience on a scale from “not at all” (1) to “very well” (5)
  - *I felt aware of what was happening inside me.*
  - *I noticed thoughts come and go.*
- Improvements SMS scores have predicted the development of “dispositional mindfulness” during a 6-week mindfulness program.

Hypotheses

- Faster WS runners would:
  - Be more mentally tough (***higher*** SMTQ total scores),
  - Think less catastrophically about pain (***lower*** PCS scores),
  - Have a more internal attentional foci (classify their thoughts as more ***internally related***), and
  - Adopt a more mindful approach to ultramarathon running (***higher*** SMS-total scores)

Procedure

- 2014 WS runners receive an email that included a brief description of the study approximately one month before the race.
- Email contained link to survey and informed consent information.
- Total time fill out the questionnaire was approximately 15-20 minutes.

Procedure

- Used Google Forms to collect data.
- *n* = 189
  - (approximately 51% of the total WS runners)
- Data transferred to SPSS 19.
  - Factors were entered in a statistical model to determine if they significantly contributed to predicting finish times.

Data Analysis: Participants

- *n* = 189 total participants
- *n* = 152 finishers
  - **Mean finishing time:** 23:44:20
  - **Mean age:** 41.5 years
  - **Mostly male:** m = 126, f = 26
  - **Mean 100-mile runs completed prior to WS:** 4.8
  - **Mean weekly mileage in the 3 months prior to WS:** 61.84 miles
  - **Mean longest run completed during the 3 months prior to WS:** 91.97 miles

Data Analysis: Regression Model

- Dependent variable:
  - Finishing time
- Predictor variables:
  - demographic information (sex and age)
  - training variables (100-mile races *completed*, average weekly mileage over the three months prior to WS, and the longest run completed over the three months prior to WS)
  - psychological variables (total scores for SMTQ, PCS, and SMS) ***TRAIT***
  - attentional variables (COCS scores) ***STATE***

Demographic Variables

- Sex and age did not contribute significantly to predicting finish times.

Training Variables

- Did not significantly predict finish time:
  - Number of completed previous 100 mile race(s)
  - Length of the longest run completed during the 3 months prior to WS
- Average weekly mileage over the 3 months prior to WS was the best predictor of finish time.

Psychological Variables

- ***TRAIT VARIABLES***
- Total scores for SMTQ, PCS, and SMS were not related to WSER finish times.

Attentional Variables

- ***STATE VARIABLES***
- COCS scores were significant predictors of finish times.
  - Specifically, more *internal monitoring*, *outward monitoring*, and *outward distraction* attention tended to have faster finish times.

Conclusions

- Both training and attentional factors were related to finish times.

- It is possible that enduring personality characteristics such as one's ability to be mentally tough or cope with pain during an ultramarathon may not be as indicative of finish times as one's ability to effectively manage the ultramarathon experience *while it is happening*.

Limitations

- The findings of this research were based on one ultramarathon race with a select group of runners.
- Limited by sample size and “elite” sample.
- More research is needed!
  - With different runners
  - With different races
  - Looking at different variables

Concurrent Research & Future Avenues

- Pilot study
  - Summer 2013
- TARC 2014
  - Afternoon presentation on in-task assessment
- TARC 2015
  - This October

Questions & Discussion

The secret isn't in your legs,

but in your strength of mind.

-*Killian Jornet, Run or Die*

Thank you!

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