Performance Enhancing Strategies Used by Elite Track and Field Athletes

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Introduction

- At the elite level of sport there are diminishing returns in training.
- Therefore, athletes should maximize the use performance enhancing strategies during training and competition to improve.
- Strategies identified from the research that are utilized by athletes were classified into four main areas of:
  1. Training strategies including periodization, tapering, altitude training, weather acclimatization, and monitoring of training. Whilst a number of training principles apply, a key component of any training program involves the manipulation of frequency, intensity, duration, and type of training to give an overall training load. [1]
  2. Recovery strategies such as massage, compression, cold water immersion, and stretching. Regenerative strategies are designed to reduce muscle damage, inflammation, delayed onset muscle soreness (DOMS), and fatigue following exercise which can impair performance. [2]
  3. Psychological strategies including using routines, relaxation techniques, positive self talk, and goal setting. Desired qualities for a well prepared high performance athlete are being confident, optimistic, calm under pressure, mentally focused in the present, and determined. An athlete is able to improve these qualities by using psychological techniques .[3]
  4. Nutrition strategies incorporating supplementation, hydration, and meal timing. Diet and nutritional strategies are important to allow athletes' to train and compete optimally by providing the best fuel for the demands of exercise and competition events, enhancing recovery, improving overall health and wellness of the athlete, and reducing the risk of injury and illness.[4]
- For an athlete to peak for their performance, all of these components must function near optimal levels on the day of competition. [1]
- The most successful Olympic performances were based on a holistic, well-rounded perspective. [5]
- Whilst an integrated and holistic approach is vital to achieve optimal athletic performance, few studies have addressed the combination of these factors.

***Purpose*:**

- To identify the strategies utilized by elite track and field athletes and determine their impact on performance at the 2019 Oceania Athletics Championships.

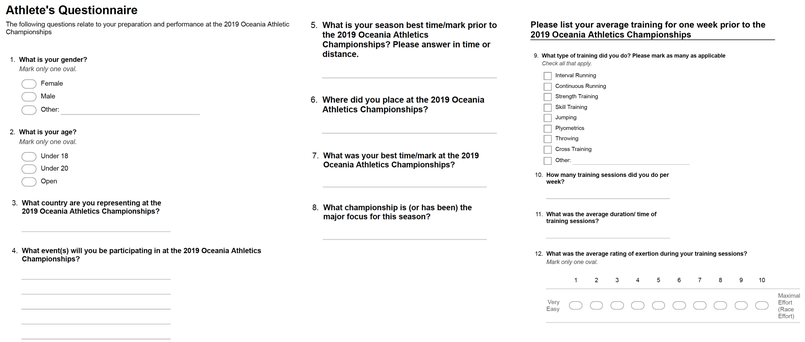
***Hypotheses*:**

- The more training strategies an athlete implements in preparation for and during a major competition, the better the performance. Secondly, Australian athletes' will incorporate more strategies than other Oceania countries, and hence they will have better performances. Finally, it is predicted athletes' with a higher training load will have better performances.

METHODS

Study Design:

- To ascertain strategies used by elite track and field athletes, a questionnaire was designed and distributed to athletes competing in the Oceania Athletics Championships in Townsville, Australia, from the 25th to the 28th of June 2019.



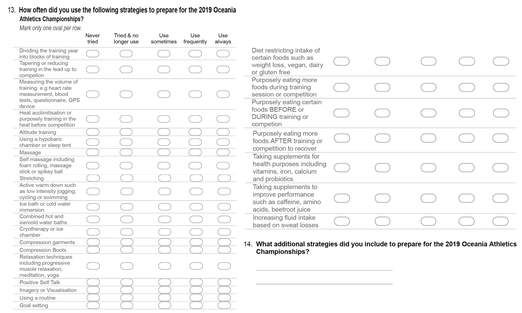
Athlete's Questionnaire

The following questions relate to your preparation and performance at the 2019 Oceania Athletic Championships

1. **What is your gender?** *Mark only one oval.* Female / Male / Other: _____
2. **What is your age?** *Mark only one oval.* Under 18 / Under 20 / Open
3. **What country are you representing at the 2019 Oceania Athletics Championships?** _____
4. **What event(s) will you be participating in at the 2019 Oceania Athletics Championships?** _____
5. **What is your season best time/mark prior to the 2019 Oceania Athletics Championships? Please answer in time or distance.** _____
6. **Where did you place at the 2019 Oceania Athletics Championships?** _____
7. **What was your best time/mark at the 2019 Oceania Athletics Championships?** _____
8. **What championship is (or has been) the major focus for this season?** _____

Please list your average training for one week prior to the 2019 Oceania Athletics Championships

9. **What type of training did you do? Please mark as many as applicable** *Check all that apply.* Interval Running / Continuous Running / Strength Training / Skill Training / Jumping / Plyometrics / Throwing / Cross Training / Other: _____
10. **How many training sessions did you do per week?** _____
11. **What was the average duration/ time of training sessions?** _____
12. **What was the average rating of exertion during your training sessions?** *Mark only one oval.* 1 2 3 4 5 6 7 8 9 10 (Very Easy … Maximal Effort (Race Effort))



13. **How often did you use the following strategies to prepare for the 2019 Oceania Athletics Championships?** *Mark only one oval per row.*

	Never tried	Tried & no longer use	Use sometimes	Use frequently	Use always
Dividing the training year into blocks of training					
Tapering or reducing training in the lead up to competition					
Measuring the volume of training, e.g heart rate measurement, blood tests, questionnaire, GPS device					
Heat acclimitisation or purposely training in the heat before competition					
Altitude training					
Using a hypobaric chamber or sleep tent					
Massage					
Self massage including foam rolling, massage stick or spikey ball					
Stretching					
Active warm down such as low intensity jogging, cycling or swimming					
Ice bath or cold water immersion					
Alternate hot and cold water baths					
Cryotherapy or ice chamber					
Compression garments					
Compression Boots					
Relaxation techniques including progressive muscle relaxation, meditation, yoga					
Positive Self Talk					
Imagery or Visualisation					
Using a routine					
Goal setting					
Diet restricting intake of certain foods such as weight loss, vegan, dairy or gluten free					
Purposely eating more foods during training session or competition					
Purposely eating certain foods BEFORE or DURING training or competition					
Purposely eating more foods AFTER training or competition to recover					
Taking supplements for health purposes including vitamins, iron, calcium and probiotics					
Taking supplements to improve performance such as caffeine, amino acids, beetroot juice					
Increasing fluid intake based on sweat losses					

14. **What additional strategies did you include to prepare for the 2019 Oceania Athletics Championships?** _____

***Participants*:**

- Elite athletes in this study were considered those who had been selected to represent their country to participate in the 2019 Oceania Athletics Championships.
- A total of 55 athletes completed the study, comprising 60% male (n=33) and 40% female (n=22) athletes.
- 43.6% were Under 18 (n=24), 18.2% Under 20 (n = 12), and 34.5% were Open (n= 19) athletes.

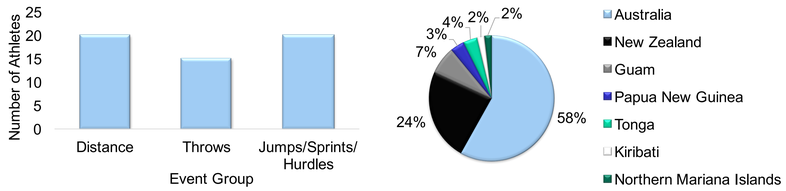


Figure 1: A) Proportion of Athletes in each Event Group and B) Representative Country of Athletes.

***Data Analysis*:**

- Firstly, using the Likert scale where 0="never tried", 1="tried and no longer use", 2="use sometimes", 3="use frequently", and 4="use always", the scores for each athlete were summated to give a Total Strategy Score (TSS).
- Secondly, the strategies most utilized by athletes ("use frequently" and "use always") and those least utilized by athletes ("never tried" and "tried and no longer use") were determined.
- Finally, the amount of training by each athlete was quantified to give a Training Load (TL), which was calculated by multiplying the duration of training (in minutes) by the Rating of Perceived Exertion (RPE) and training frequency (number of sessions per week).[6]

RESULTS

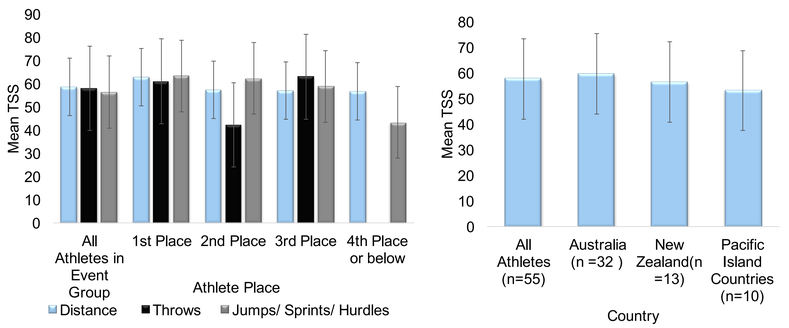


Figure 2: A) Mean Total Strategy Score (TSS) Across Placings and B) Mean Total Strategy Score (TSS) Between Countries

- The strategies that were most utilized by all elite athletes were stretching (n=45/85.5%), tapering (n=45/81.2%), goal setting (n=44/80%), using routine (n=41/74.5%), self-massage (n=41/74.5%), and active warm down (n=41/74.5%).
- The least frequently used strategies were using a hypobaric or sleep chamber tent (n=49/11%), cryotherapy or ice chamber (n= 48 or 12.7%), compression boots for recovery (n= 43/21.2%), altitude training (n=39/29.1%), and using supplements to improve performance (n=29/47.3%).

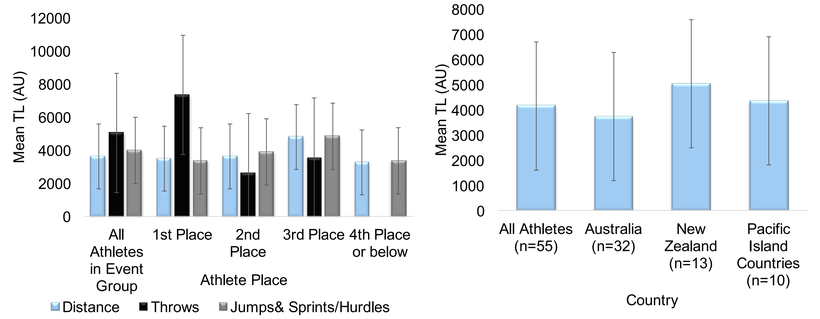


Figure 3: A) Mean Training Load (TL) Across Placings and B) Mean Training Load (TL) Between Countries

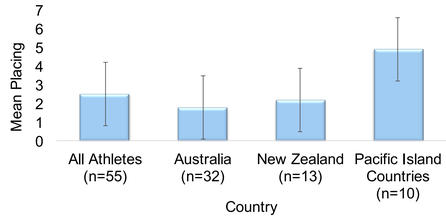


Figure 4: Mean Placing Across Countries

DISCUSSION

- The majority of event groups (distance and sprints/jumps/hurdles) in which athletes placed first had a higher mean total strategy score (TSS) than all other athletes and placings.
- The results imply Australian athletes integrated the most strategies, followed by New Zealand, and finally the Pacific Island athletes.
- Australia appeared to have had the lowest mean placing whereas the Pacific Island Countries had the highest mean placing.
- No clear relationship seemed to exist between a higher training load (TL) and better results as the majority of event groups (distance and sprints/jumps/hurdles) who placed first had a lower mean TL than all athletes in their respective groups.
- New Zealand athletes had the highest mean TL, followed by Pacific Island Countries, and lastly Australia.

Implications:

- Rather than prioritizing training load, coaches should instead place greater emphasis on a holistic approach by implementing an array of training strategies.
- Oceania Athletics Association scholarships are warranted for Pacific Island athletes to attend the High Performance Training Center under tutelage of coaches, sport scientists, and medical experts in order to enhance their exposure to high performance strategies.

Limitations:

- Extraneous factors such as injury, environmental factors (i.e. wind and tactics), as well as genetics and talent were not able to be controlled, which were likely to have a major impact on results.
- The sample size was relatively small (n=55) so results cannot be generalized to all track and field athletes.
- The sample was based on a convenience method. Hence the subjects were not randomly selected and the sample was biased, with the majority of participants earning a medal.
- Not all events were evenly represented. Due to the lack of sprinters, the sprints and hurdles athletes were combined with jumps athletes for the purpose of the study.

References

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