The Confluence

Volume 1 | Issue 1 Article 5

August 2021

The Effects of Mental Pacing on the Mile Run

Athena Viers
Lindnewood University, amv725@lindenwood.edu

Maycee White
Lindenwood University, MW401@lindenwood.edu

Scott Richmond
Lindenwood University, srichmond@lindenwood.edu

Follow this and additional works at: https://digitalcommons.lindenwood.edu/theconfluence

Part of the Medicine and Health Sciences Commons

Recommended Citation
Viers, Athena; White, Maycee; and Richmond, Scott (2021) "The Effects of Mental Pacing on the Mile Run," *The Confluence*: Vol. 1 : Iss. 1 , Article 5.
Available at: https://digitalcommons.lindenwood.edu/theconfluence/vol1/iss1/5

This Article is brought to you for free and open access by the Journals at Digital Commons@Lindenwood University. It has been accepted for inclusion in The Confluence by an authorized editor of Digital Commons@Lindenwood University. For more information, please contact phuffman@lindenwood.edu.

Abstract

Success in cardio-based physical activity is often related to the ability to pace oneself. Pacing allows the athlete to decide how and when to invest the most and least amount of energy into their performances. **PURPOSE:** The purpose of this study was to determine if college students and faculty can mentally pace themselves on a one-mile run. **METHODS:** Twenty-five apparently healthy females (n=11) and males (n=14) participated. All subjects were capable of either walking or running a one mile, and all testing was completed in a single session using a 150m indoor track. Participants were asked to remove from their body any headphones, watches, phones, or any other devices that could pace them.. Following a brief warm-up, participants provided their predicted mile time. Participants then began running or walking at their predicted pace until completing approximately 11 laps around the track. Observers were not allowed to cheer or talk to participants, unless it was to inform them about being on their last lap. Once the participants finished the 11 laps, the overall time was recorded and compared to the predicted time. An independent t-test was used to compare the predicted times versus the actual time to completion. **RESULTS:** As a group, the participants significantly ($p<0.05$) overestimated the time to completion by about 30sec (predicted = 484.9 ± 154.77sec vs actual = 459.7 ± 138.3sec). **CONCLUSION:** The results of this study show that participants tend to overpredict their actual times while completing the activity at a faster pace. Most people can complete a one-mile walk/jog/run faster than they expect to.

Introduction

An essential part of performance in endurance-based physical activity involves one's pacing abilities. By incorporating pacing, it allows athletes to determine how and when they need to invest certain amounts of energy into their performance [1]. When performing endurance-based exercises, coaches and trainers typically incorporate some form of pacing into the training protocols. Therefore, individuals can accurately reflect, plan, monitor and evaluate their performances to understand if they are on track with their goals. This type of structure helps stimulate athletes to build performance templates and find ways to improve their performance[1].

In a study conducted by Liverako et al. (2018), the goal was to test an individual's ability to continue running at the same velocity for 60 minutes[2]. During the experiment, researchers believed that a critical velocity test would help predict the average velocity that a runner can endure for the 60-minute period. They found that males completed the race in a shorter mean time than the females, but both were in their respective prediction windows[2]. Robinson et al. (2018) also explored pacing strategies, only this time using cyclists [3]. The goal was for participants to ride at 80% of their average maximal performance for three minutes riding, based off feel, and then supply feedback about their pacing abilities. This study also explored the difference between dissociative and associative focus and how it affects pacing. It was found that participants rode closest to their goal when then they received full feedback. Meanwhile, they rode at 82% when they were riding based off feel, 79% when they were in the associative condition, and 70% in the dissociative condition [3]. Pepper et al. (1992) used a 1.5 mile run time to predict a soldier's performance on an eight-mile loaded march. The researchers developed a statistical model to predict the eight-mile performance and find the difference of characteristics in males and females. In 20% of the cases, the critical velocity test overestimated the running velocity, while 80% of the critical velocity test subjects were able to maintain the running pace for 60 minutes[4].

In addition to prior knowledge of performance, Corquat et al. (2010) discovered that the prediction of one's performance could be influenced by the motivation of an athlete [5]. For instance, an athlete that runs cross country or track may be motivated to meet their predicted times successfully. Meanwhile, an individual that competes in a sport that does not involve times, like volleyball, may have less motivation to meet the times. Based on Corquat and Berlanga's studies, motivation can play a role in the desire to put forth an effort, to satisfy one's individual goals [6]. The predicted times that each athlete decides on will determine the level of motivation they have to perform the cardio test successfully. The internal motivation one develops during the test will also determine the performance level that the athletes will reach during the test. In other words, motivation to be successful has been assumed to be related to persistence during the study[7].

The earlier studies mentioned that motivation can play a role in the performance of individuals. Therefore, in this study, participants were able to decide their predicted goal times, so they could develop more motivation to reach the goal that they set for themselves. The goal of this study was to compare the accuracy of predicted times to the actual times for the mile run.

Methods

Experimental approach

The hypothesis of this study was that participants can accurately predict (within one minute) their mile run pace. This was tested by using a single bout, convenience sampling. Participants for this study volunteered, and there was no biased selection based on gender, age, ability, or any other factors. All the participants had their weight and height taken before participating in the study. Subjects were only tested once for the mile run.

Subjects

A total of twenty-five (n=25) healthy individuals participated in the study. There were 11 males (n = 11, age = 20.6 ± 2.9yrs, height = 179.6 ± 6.1cm, weight = 76.6 ± 9.3kg) and 14 females (n = 14, age = 20.2 ± 1.7yrs, height = 168.9 ± 5.6cm, weight = 65.3 ± 9.6kg). All subjects were capable of either walking or running one mile.

Procedure

The participants were instructed to meet at the Evans Common's indoor track (around 150-meters in length) at Lindenwood University, where they would complete their single running session for the study. All participants were required to review and complete an IRB-approved (Lindenwood University IRB-20-55, Initial approval date: 10/23/2019), written informed consent document. Once consent was given, participants were asked to step on a weight scale (Health o meter professional Model 349 KLX), where their body weight was recorded. Afterwards, their height was recorded by a tape measure (Kobalt 100-ft Long Tape Model KB6611HV). Once the height, weight and age data were collected, the participants began a light warm-up. This consisted of a dynamic warm-up where the participants performed each stretch for ten meters. After every ten meters, a new stretch was performed. The warm-up consisted of toe walks, knee hugs, quadriceps pulls, figure four, forward lunge, hamstring scoops, Frankenstein'skicks, a-skips, high knees, and butt kicks.

Once the warm-up was completed, participants were told to run 11 laps around the 150-meter indoor track, equaling one mile. Observers were not allowed to cheer or talk to participants, unless it was to inform them about being on their last lap. Participants were asked to remove any headphones, watches, phones, or any other devices from their bodies that could pace them.. No music or any other form of pacers were allowed. Once the study was explained, participants started at the furthest pole eastwards, which acted as the start and finish line. Before beginning the run, participants supplied their predicted mile time. Participants would then attempt to run or walk at their predicted pace. The time was recorded on a built-in timer app on an iPhone (Model XR, Model Number: MT3X2LL/A). Participants were informed on lap 11 that it was their last lap. Once the participants finished the 11 laps, the overall time was recorded and compared to the predicted time. Afterwards, the participant could grab a drink of water and walk a cool down lap, if desired.

Statistical Analysis

Time to completion was compared against the predicted time for the group as a whole. An independent t-test was used to discover the difference between the predicted and actual times for the mile run.

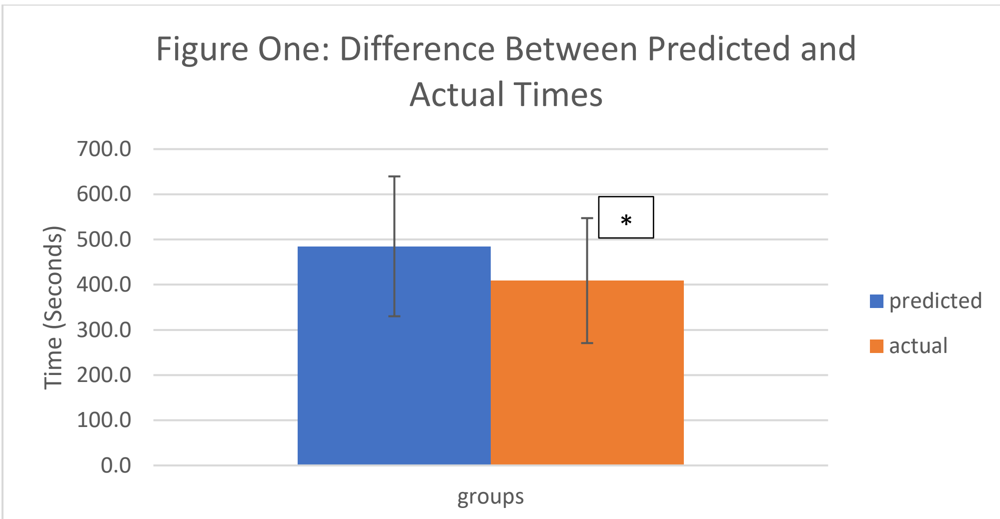
Results

Table 1: Average age, height, weight, and times for the mile run.

Group	Age (years)	Height (cm)	Weight (kg)	Predicted Run Time (total secs)	Actual Run Time (total secs)
All (n=25)	20.4 ± 2.3	173.6 ± 7.9	70.3 ± 10.9	484.9 ± 154.8*	459.7 ± 138.3

Data is presented as mean ± SD. SD= standard deviation, cm=centimeters, kg=kilograms, mins= minutes, secs=seconds, * stands for significant difference (p<0.05).

Across all predictions of how fast one could run one mile, the average prediction was significantly greater than the actual time ($p<0.05$, predicted = 484.9 ± 154.77sec vs actual = 459.7 ± 138.3sec) Figure 1 displays an overview of how relatively similar the predicted time and actual time for the mile run was in minutes.



*=significant difference ($p<0.05$)

Discussion

The current study shows that participants tend to overpredict their actual times while they complete the physical activity at a faster pace. The current findings were was similar to Liverako's study, where runners were able to accurately predict their times for the Alloa Half Marathon[2]. If the runners were off in their predicted times, they most likely overestimated their time. The current study found similar results, where the participants either overpredicted or were relatively close their times.

Pepper et al. (1992) compared the difference between running on an indoor treadmill and outdoor track where participants were asked to predict their times for both running trials[4]. They showed that running on the track had people overestimate their times by around 15%, compared to treadmill based running. These results are similar to the current findings, as the predictions were fairly close to the actual performance but both displayed that people overestimate their predicted times.

Coquart et al. (2010) found that the difference between actual and predicted performances were consistently lower for 3,000m, 5,000m, and 10,000m distances[5]. While the current study did show some differences in prediction accuracy, the distance covered (one mile in the current study) was different than what was used by Coquart et al. (2010).

One limitation to the current study was the age of the participants. While this narrow age range limits variability, it also hinders the ability to generalize results to other ages. Also, participants were not separated by training experience, which could have impacted results. Chowdhury et al. (2019) showed that training experience could influence ability to accurately predict performance[9]. Most of the participants in this study were young (20.4 ± 2.3y) and therefore had a relatively short training age. Therefore, a greater training age may allow individuals to more accurately predict their time to completion. Another limitation was the inability to control background music provided by the location of the study. All attempts were made to minimize outside influence, but there was no ability to control music being played throughout the entire facility. In addition, a larger group of participants may have resulted in less outliers and allow for the averages to become more accurate.

In conclusion, predicting a one mile run and trying to mentally pace oneself has the possibility of being able to estimate one's performance. In general, about half of the participants were fairly accurate in the predictions.,while the remaining participants tended to over-estimate the time required to complete one mile.

References

1. Elferink-Gemser M, Hettinga F. Pacing and Self-regulation: Important Skills for Talent Development in Endurance Sports. *International Journal of Sports Physiology and Performance.* 2017; 12(6): 831-835.
2. Liverakos K, Mcintosh K, Moulin C, O'Connor A. How accurate are runners' prospective predictions of their race times? PLOS ONE. 2018; 13(8): e0200744.
3. Robinson D, Cloak R, Lahart I, Lane A. Do I focus on the process of cycling or try to put my mind elsewhere? A comparison of concentration strategies for use in pacing by novice runners. *Progress in Brain Research*. 2018; (240): 127-140.
4. Pepper M, Housh T, Johnson G. The Accuracy of the Critical Velocity Test for Predicting Time to Exhaustion during Treadmill Running. *International Journal of Sports Medicine.* 1992; 13(2): 121-12.
5. Coquart JBJ, Bosquet L. Precision in the Prediction of Middle Distance-Running Performances Using Either a Nomogram or the Modeling of the Distance-Time Relationship. Journal of Strength & Conditioning Research. 2010;24(11):2920-2926.

6. Berlanga LA, Palomino Devia C, Ruiz-Juan F. Prediction Level of Motivation through Physical and Sport Activities according to Goal Orientation, Success Perceived and Satisfaction Rate. *Un análisis transcultural*. 2018;17(1):1.
7. Vollmeyer R, Rheinberg F. Does motivation affect performance via persistence? *Learning and Instruction.* 2000; 10(4): 293-309.
8. Coakley S, Myers S, Walker E, Hale B, Jackson S, Greeves J, Roberts R, Blacker S. 1.5 mile run time and body mass predict 8-mile loaded march performance, irrespective of sex. *Journal of Science and Medicine in Sport*. 2019; 22(2) 217-221.
9. Chowdhury AK, Tjondronegoro D, Chandran V, Zhang J, Trost SG. Prediction of Relative Physical Activity Intensity Using Multimodal Sensing of Physiological Data. Sensors (14248220). 2019;19(20):4509.

Figures