

I thank to the authors for taking time to address my questions. Here are some of the authors' responses that I found that would need further attention. All the others were clear enough.

L37-39: Regarding long course events, according to table 2, this seem to be true only in OG long course events. Please explain me the rationale or rephrase.

Response: The Table 2 displays a row in long course events for both the FINA World Championships and Olympic Games, and of course there are no events in short course events for Olympic Games (for obvious reasons).

Response: I'm sorry because my comment had a mistake ad because of that I haven't made myself clear. Let me rephrase: In lines 31-34, the authors state that breaststroke ($\beta = -0.191; p < 0.000$) and backstroke ($\beta = -330.185; p < 0.000$) had a bigger effect on IM performance. However in table 2 this is only true in World Championships. Readers can note that in OG breaststroke was not retained in the model. Thus the sentence in L33-39 could be misleading. In the new version, the authors have rephrased the Results paragraph so now seems more adequate.

L68-69: Isn't there any literature on this topic earlier than 2012? This is because the present study focus on >2012 but this rationale is from <2012.

Response: To our knowledge (and following a search of the relevant literature) there is no specific literature about individual medley swimmers on this topic before the article of Saavedra et al.

Response: I'm sorry again for a mistake of mine. What I meant to say was, since Saavedra's study focus on 2012 and older, isn't there any literature you can cite whis is more recent? (Line 77 now)

L145: Given the differences between WC and OG, between short- and long-course events, between 200m and 400m IM and between sexes, what is the rationale behind an analysis controlling for only one out of 4 variables? E.g. One tree controlling for 50 m pool but pooling both WC and OG, both 200 m and 400 m IM and both sexes. Wouldn't the analyses be more accurate if there were trees for every condition? Or another statistical analysis that granted the lack of difference between conditions so all variables could be pooled safely? Please explain further.

Response: Indeed, the analysis we are conducting involves two significant factors: the type of competition (World Championships and Olympic Games) and the type of pool

(25 m and 50 m), which encompass the other two variables (distance and gender). To fully explore the interactions of these four variables, a larger sample size would be necessary. However, your observation is valid and would certainly be of interest if we had a more substantial dataset to work with.

Response: Thank you for your response. Please address this issue as a limitation (as well as the one explained in the comment about L157-159) in the last paragraph before the "Conclusion" section.

L148-150: Please explain further. There could be errors in the model? Please explain how these errors were identified and handled.

Response: These are classification models, and the errors mainly involve swimmers being categorized as finalists when they are actually medallists, or vice versa, among other possibilities. Nonetheless, the accuracy rate for all the decision trees hovers around 80%, which is considered acceptably high. It's worth noting that this accuracy could have been even higher if we had access to physiological variables of the swimmers, as well as data related to their training regimens.

Response: Ok. Please add this information in the last paragraph of "Materials and Methods", something like "... only models with accuracy rate above 80% were retained". If not, please consider moving the frase from L164-167 (former L148-150) to the end of the manuscript as a limitation.

L262-264: Please explain this rationale.

Response: It is well known that male swimmers (athletes) typically exhibit higher lactate values than female swimmers. See <https://pubmed.ncbi.nlm.nih.gov/25635608/>

Response: Thank you for your response. Please cite the rationale then (L266-267 in the new version).

L281-283: Why this differences between Saavedra's study and the present study (namely the years and competitions) affect the results? Please explain further.

Response: As we mentioned to the reviewer 1: "Obviously, the evolution and development of swimming in the 2000- 2011(Saavedra's study) is different to 2012-2021 (this research). Also, we acknowledge that specific spots such the prohibition of the specific swimsuit in 2009, or the pandemic lock down in 2020 could also affect the results. However, our study period commenced after the 2009 high-tech swimsuit period. Even, the different statistical analysis carried out and the use of Z-score, instead of a Two-way analysis of variance may influence other results."

Response: Thank you for your clarification. Please include it in the manuscript “as is” or in a way the authors find more suitable to improve the understanding of the results and the hypothesis put forward by the authors for such differences.

L293-296: When reading, it seems that the authors are trying to warn coaches about the difference in differences in speed between short and long course. However, this sentence seems to be about a new topic, namely periodization, such as the next paragraph. Please consider beginning the paragraph here (L293) instead of in line 298.

Response: It is not a matter of ‘warning coaches’ but a statement contextualizing the outcomes of the current analysis into season planning. We think this is a reasonable point to make for journal readers.

Response: Thank you for your response. I agree with the authors. I was just pointing out that, from my point of view, this last sentence would fit better in the beginning of the next paragraph as the topic is the same.

L299-303 The authors say the times differ. However, not only time but also the determinant strokes differ. Please care to give a possible explanation for this phenomenon.

Reference: Can you check this carefully – clearly different strokes will have different times.

Response: I’m sorry but I wasn’t able to understand your response. Authors state that Olympic events have best lap times. Furthermore, you cared to put forward a possible explanation to that (more athletes, pinnacle of an athlete’s career, etc.). My question is: according to your results, also the determinant strokes differ from long course events on WC (breaststroke and backstroke) and OG (butterfly, crawl and backstroke). Please care to give a possible explanation for this phenomenon.