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A new model of performance classification to standardize the research results in swimming

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Abstract

The level of expertise must be defined for the sample studied when report research in sport. Concretely in swimming, apart from the participants' background, the competitive status is based on the level that swimmers participate. Thus, the International Swimming Federation (FINA) points are added to improve the sample level characterization. The aim of this study was two-fold: 1) to assess whether national and regional swimmers from different countries differ in their performance level (based on FINA points), and 2) to propose a model that allows standardizing the research results in swimming. The FINA points of 5876

participants (males = 2962 and females = 2914) in 100 m butterfly, backstroke, breaststroke, and freestyle were retrieved from nationals (n = 21) and regionals (n = 44) swimming competitions. One-way analysis of variance was conducted to test the difference in FINA points between swimmers of different countries. Significant disparities (100 to 350 FINA points; p<0.001) were observed in national and regional competitions for male and female swimmers among the different countries analyzed. This could lead to misleading conclusions when comparing studies with national or regional swimmers from different countries. In this regard, a new model of performance classification based on national and regional worldwide competition is proposed. This might be used to standardized the swimming research results.

Keywords: Experience, expertise, FINA points,

Highlights

- The current classification of swimmers' status could lead to misleading conclusion when comparing studies from different countries using national or regional swimmers.
- The proposed model will allow to better standardize the research results in swimming, aiding to draw more accurate conclusion when comparing results from different studies.

Keywords: Experience, expertise, FINA points, comparison.

Introduction

Swimming, as an Olympic sport from the beginning of the modern Olympic Games in 1896, is one of the most popular sports worldwide due to its effect on health and wellbeing (Howells & Jarman, 2016; Swim England's Swimming and Health, 2017); however, the aquatic environment complicates its research. One of the first attempts to explain the swimming techniques and training procedures based on empirical data was the textbook "The science of swimming", first released in 1968 (Counsilman & Counsilman, 1968). From that moment on, a solid and large scientific community has emerged to investigate competitive swimming (Barbosa, Costa, & Marinho, 2013).

As a result of that work, it may be concluded that the success in swimming performance depends on several aspects such as biomechanical, physiological, or anthropometrical factors (Barbosa et al., 2013). Hence, researchers have tried to understand which are the ones that make top swimmers to excel over the rest of the swimmers (Barbosa et al., 2010). This fact is indeed observed in the amount of studies comparing elite

with non-elite swimmers (Arellano, Pardillo, & Gavilan, 2003; Arellano, Pardillo, & Gavilán, 2002; Jones, Pyne, Haff, & Newton, 2017), or among the aspects that differentiate the finalists from the non-finalists (Sánchez, Arellano, & Cuenca-Fernández, 2021)

Contrary to other sports, such as cycling, where guidelines to classify the research subjects have been established (De Pauw et al., 2013; Decroix, De Pauw, Foster, & Meeusen, 2016), the criteria used to define the level of the sample in swimming studies are not clearly described. When reporting the research results, the skill level of the swimmers is important; however, there is an inconsistency among researchers that makes it difficult to draw conclusions when comparing the results from different studies (Swann, Moran, & Piggott, 2015). For instance, the term "elite" or "expert" have been used from the "ten years rule" or to describe athletes with two years of accumulated practice (Hayes, Chipman, Segal, & Glaser, 1985). Whereas, the level of participants in swimming research has also been reported as a function of the level of competition that swimmers reach (Morais, Barbosa, et al., 2020), such as: international (Arellano et al., 2002), national (Connaboy et al., 2016), regional (Ruiz-Navarro, Morouço, & Arellano, 2020) or age group swimmers (Ruiz-Navarro et al., 2021). Hence, it is possible that national swimmers from different countries might differ significantly in their skill level due to the size and popularity of the sport within the country (Swann et al., 2015) or the qualification criteria established by the corresponding swimming federation.

Together with these terms, the swimmer's personal best time (Costa et al., 2009), the percentage to the world record (Ruiz-Navarro et al., 2020), or the most commonly observed in the literature, the International Swimming Federation (FINA) points (i.e., a value of the swimmer's best mark relative to the world best mark) (Morais, Forte, Nevill, Barbosa, & Marinho, 2020), are often also reported. These terms are indeed easy to understand and aid to objectively compare results between studies. However, it seems to be no other standards to classify swimmers' status rather than the level of competition that swimmers participate. Therefore, the aim of this study was two-fold: 1) to assess whether national and regional swimmers from different countries differ in their performance level, and 2) to propose a new model that allows standardizing the research results based on FINA points.

Material and methods

Participants

A total of 8320 competitor records (65 competitions \times 16 swimmers [finalists and semifinalists] \times 2 sexes \times 4 events [100 m butterfly, backstroke, breaststroke, and freestyle]), were retrieved from (n = 21) nationals and (n = 44) regionals swimming events in long course (i.e., 50 m swimming pool) celebrated during 2019. The number of swimmers analyzed was 5876 (2962 males and 2914 females), as some of them participated in more than one race (e.g., butterfly and freestyle) or event (e.g., national and regional competition). Since it is not the aim of the current study to compare which country have higher or lower swimming performance level, the anonymity of the results will be kept throughout the rest of the manuscript.

Data collection

All the FINA points were retrieved from publicly accessible database 'swimrankings.net'. The database lists are the results of registered races which are in accordance with the official FINA rules (FINA, 2019c), including electronical time keeping and limits to in-pool current (Born et al., 2020). The data were retrieved by two of the authors, entered manually into an Excel spread sheet file, and double-checked by a third author. The FINA points, which are calculated as 1000×(World Record time (s) / swim time (s))³) are assigned every year based on the World Record time for each event (FINA, 2011). In this study, the 2019 FINA points reference values were used.

It was intended to include a representation of countries with some international success, thus only those that had achieved at least a medal in one of the last four main international competition were included (n = 30) (i.e., London 2012 and Rio 2016 Olympic Games; Budapest 2017 and Gwangju 2019 Long Course World Championships). There was no available information regarding any national or regional competition for some of the countries previously determined to inclusion, leading to a total of 21 countries analyzed. One national championship and different regional championships were analyzed in the 21 countries.

The regional events were competition of at least two days' duration that were qualifiers for national events. When possible, at least three different regionals competitions were analyzed and averaged to use a representation of different regions within the country. In Table S1, the competitions analyzed are shown. From the 21 national and 44 regional competitions analyzed, the FINA points obtained by the 16 best national swimmers (finalists and semifinalists) in 100 m butterfly, backstroke, breaststroke, and freestyle events for both male and female swimmers were obtained. To ensure the representation of swimmers from the countries analyzed, only national swimmers of the country where the championship was held were assessed, and therefore foreign swimmers were not included. The FINA points for the A and B standard qualification time, of the events analyzed, for the Tokyo Olympic Games (FINA, 2019d) and Gwangju World Championships (FINA, 2018) were obtained. These FINA points were computed using the FINA point scoring 2019 for either males and females (FINA, 2019b, 2019a) and the mean of the FINA points of these two major championships was calculated and used as international events.

Statistical analysis

Shapiro-wilk test and visual inspection of histogram was used to test the normality of the sample. Although some variables did not exhibit a normal distribution, for analytical purposes these variables were not transformed. One-way analyses of variance (ANOVA) was used to test differences in FINA points between countries for national and regional competitions. Analyses were replicated with the non-parametric Kruskal–Wallis test. Since the results were similar between the parametric and non-parametric test, only one-way ANOVA results are reported. Bonferroni corrections were used for post-hoc comparisons. To accomplish the second aim of this study, the mean of the lowest FINA points obtained in each event were also calculated. The significance level was set at 0.05 and the analyses were conducted using the Statistical Package for Social Sciences (SPSS, v. 24.0, IBM SPSS Statistics, IBM Corporation, Chicago, IL, USA).

Results

The mean \pm standard deviation (SD) values of the FINA points obtained in the national and regional competitions analyzed and the lowest FINA points obtained in each competition are presented in Table 1 and 2, respectively. The A standard qualification time for the international events showed a mean of 875 ± 14 (males: 881 ± 12 , females: 868 ± 13) and the B standard qualification time for the international events showed a mean of 795 ± 16 (males: 800 ± 14 , females: 789 ± 17).

One-way ANOVA revealed differences for 100 m butterfly (males, F: 12.70, p<0.001; females, F: 24.65, p<0.001), backstroke (males, F: 14.49, p<0.001; females, F: 25.08, p<0.001), breaststroke (males, F: 13.18, p<0.001; females, F: 16.71, p<0.001), and freestyle events (males, F: 11.73, p<0.001; females, F: 28.60, p<0.001) in national championships. Also, differences were found for 100 m butterfly (males, F: 12.30, p<0.001; females, F: 17.02, p<0.001), backstroke (males, F: 13.12, p<0.001; females, F: 11.52, p<0.001), breaststroke (males, F: 8.42, p<0.001; females, F: 9.36, p<0.001), and freestyle (males, F: 10.61, p<0.001; females, F: 10.32, p<0.001) events in regional competitions.

When comparing national competitions, significant differences were observed between countries after posthoc Bonferroni corrections in every event, for male (Figure 1) and female swimmers (Figure 2). Those disparities ranged between 100 to 350 FINA points (Table 1). In regional competitions, significant differences were also observed after post-hoc Bonferroni corrections in every event, for male (Figure 3) and female swimmers (Figure 4). The disparities between countries ranged between 100 to 225 FINA points (Table 2).

Five swimming performance levels were proposed based on the FINA point results obtained (Figure 5) using the following criteria:

i) The first level is based on the A qualifying standards set to participate at the international events, which correspond to \geq 875 FINA points.

ii) The second level is based on the B qualifying standards set to participate at the international events, which correspond to 800 FINA points (Note that the mean was 794, but to facilitate its uses 800 is proposed).

iii) The third threshold is established at 650 FINA points, since it is the mean of the lowest FINA points obtained in national championship (Table 1) (Note that the mean was 654, but to facilitate its uses 650 is proposed).

iv) The fourth threshold is set at 450 FINA points, as the mean of the lowest FINA points obtained in regional competitions (Table 1)(Note that the mean was 467, but to facilitate its uses 450 is proposed).

y) The fifth threshold would involve all the performances below 449 FINA points.

Discussion

The aim of this study was two-fold: 1) to assess whether national and regional swimmers from different countries differ in their performance level, and 2) to propose a new model that allows standardizing the research results based on FINA points. The results demonstrated that the best 16 national swimmers are

significantly different in FINA points, and therefore in skill level in 100 m butterfly, backstroke, breaststroke, and freestyle events among countries. This also happened with the regionals. Therefore, we proposed a five-level system of classification to standardize the research results in swimming (Figure 5).

In sport research is very important to define the level of expertise of the sample studied (Hodges, Starkes, & MacMahon, 2006). This definition must be based on the athletes' highest standard of performance (Swann et al., 2015); however, the standards around the world are different between each other. For example, two swimmers achieving international participation could still be differentiated by a mere participation (around ~800 FINA points), or by a participation with options to achieve a medal or a new world record (> 950 FINA points). For national and regional swimmers of different countries, our results showed differences in performance level in the four strokes in males (Figure 1 and 3) and females (Figure 2 and 4). These differences in performance level are related to biomechanical, physiological, or anthropometric differences (Arellano et al., 2002; Leblanc, Seifert, Baudry, & Chollet, 2005; Takagi, Sugimoto, & Wilson, 2004; Wells, Schneiderman-walker, & Plyley, 2006). For instance, in female 100 m backstroke there was a difference of more than 200 FINA points between countries, and still, both could be considered as national (Figure 2). On the other hand, the regional level of one country could be even higher than the national level of other country (e.g., see *country 14*). Therefore, this could not only lead readers to draw misleading conclusions when comparing national swimmers from different studies, but also confuse the researchers themselves in explaining and making sense of their own results.

The FINA points have been criticized, because some of the scores used are still based on the polyurethane swimsuit era (Bernhardt, 2014). Therefore, the athletes' competitive experience in years or the training time and/or frequency are often reported instead. Although these facts provide valuable information of the athletes' investment in swimming, they do not provide any indication of performance level (Swann et al., 2015). Hence, two samples with the same training experience might be considered similar if the FINA points were not complementarily reported.

It is worth noting that the mean performance of some countries (Table 1), were above the B standard qualification times for 2021 Tokyo Olympic Games (i.e., around 800 FINA points). However, as only two swimmers are allowed to compete in the Olympic Games per event and country (FINA, 2019d), the rest of the swimmers would be considered as nationals swimmers, while in other countries they might be considered as internationals. As an extreme illustration, swimmers performing one minute over the World Record would be considered as international level if taken part in the Olympic Games (Nauright &

Magdalinski, 2003). Hence, although the swimmers' status should be based on their skill level, it is perceived a current way of reporting the swimmers' status highly influenced by the popularity of the sport within the country and the size of the country (Swann et al., 2015).

Previously, national and regional swimmers were defined as those reaching between 700-900 and between 500-700 FINA points, respectively (Veiga, Cala, Frutos, & Navarro, 2014). However, this categorization was highly influenced by the popularity of the sport within the country and the size of the country (Swann et al., 2015). In fact, the mean of the national swimmers in some countries did not reach those standards in spite of swimmers participated in national and regional competitions (see Table 1 and 2). More recently, swimmers performance level was divided in four groups: top-elite, elite, sub-elite and high-competitive, and this differentiation was based on swimmers' best season time relative to the world record (Post, Koning, Visscher, & Elferink-Gemser, 2020). Although the differentiation is well argued and clearly defined, the study was focused on those who reached top-elite, without mentioning lower-level swimmers. Indeed, the model proposed in the current study differentiated five groups, and this categorization also included swimmers with a lower performance level than those presented by Post et al. (2020).

We acknowledge a potential limitation, individual medley as well as middle and longer-distance events, were not analyzed. Nevertheless, scientific literature usually reports the performance level based on 100 m events and therefore we thought that the inclusion of middle and longer-distance events would not add relevant information to the aim of this manuscript. Future studies could benefit from the easy method of categorizing competitive level reported in this study.

Conclusion

The current classification of swimmers' status could lead to misleading conclusion when comparing studies from different countries using national or regional swimmers. Together with the background status, FINA points should be always included, since athletes' competitive experience in years or the training time/frequency do not provide indication of performance level. Based on national and regional competition of all over the world, we have proposed a new model of performance classification that might be used to standardize the swimming research results. The proposed model is neither influenced by the popularity of the sport within the country nor the size of the country and this will allow to draw more accurate conclusion when comparing results from different studies.

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Table 1. The mean \pm standard deviation (SD) values of the International Swimming Federation (FINA)points obtained in the national competitions analyzed and the lowest FINA points obtained in eachcompetition.

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		М	ale			Fei	nale	6	\bigcirc
	Butterf ly	Backstro ke	Breaststro ke	Freesty le	Butterf ly	Backstro ke	Breaststro ke	Freesty le	DE P
Count ry 1	819 ± 32	788 ± 42	793 ± 60	839 ± 50	831 ± 56	870 ± 50	812 ± 62	833 ± 37	75 9 ±3 8
Count ry 2	779 ± 59	752 ± 79	705 ± 49	795 ± 67	740 ± 58	742 ± 62	704 ± 52	737 ± 48	66 8 ± 22
Count ry 3	773 ± 64	799 ± 62	750 ± 85	819 ± 59	770 ± 65	788 ± 65	747 ± 75	832 ± 72	68 9 ± 35
Count ry 4	781 ± 58	808 ± 36	799 ± 73	822 ± 43	786 ± 49	819 ± 32	798 ± 45	781 ± 48	73 7 ± 27
Count ry 5	770 ± 40	766 ± 52	746 ± 45	807 ± 40	734 ± 51	734 ± 64	743 ± 57	$738 \pm \\ 30$	69 2 ± 33
Count ry 6	797 ± 69	831 ± 63	780 ± 74	836 ± 76	752 ± 54	790 ± 69	768 ± 84	795 ± 39	68 9 ± 33
Count ry 7	786 ± 58	802 ± 37	756 ± 36	832 ± 44	747 ± 62	766 ± 53	723 ± 39	811 ± 49	72 4 ± 32
Count ry 8	703 ± 45	662 ± 52	671 ± 39	747 ±37	680 ± 80	676 ± 60	697 ± 56	696 ± 34	61 9 ± 39
Count ry 9	667 ± 69	661 ± 66	690 ± 47	728 ± 42	665 ± 64	697 ± 76	659 ± 57	711 ± 47	59 4 ± 35
Count ry 10	768 ± 43	787 ± 47	738 ± 43	810 ± 42	787 ± 57	842 ± 67	778 ± 53	816± 45	73 3 ± 28
Count ry 11	742 ± 31	735 ± 38	720 ± 36	778 ± 33	703 ± 41	751 ± 33	688 ± 46	729 ± 30	68 3 ± 34
Count ry 12	765 ± 45	763 ± 47	763 ± 52	778 ± 43	728 ± 55	765 ± 57	736 ± 46	765 ± 40	70 1 ± 22
Count ry 13	715 ± 35	687 ± 41	680 ± 68	755 ± 41	715 ± 63	714 ± 59	702 ± 53	745 ± 55	65 5 ± 27

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Count ry 14	657 ± 80	627 ± 80	594 ± 105	707 ± 58	469 ± 74	512 ± 69	556 ± 116	574 ± 34	49 6 ± 90	
Count ry 15	725 ± 71	687 ± 80	654 ± 84	758 ± 49	637 ± 107	662 ± 83	604 ± 82	686 ± 57	59 1 ± 54	
Count ry 16	725 ± 64	707 ± 50	685 ± 53	764 ± 42	635 ± 58	664 ± 70	630 ± 54	672 ± 57	60 7 ± 49	
Count ry 17	709 ± 51	726 ± 78	667 ± 49	766 ± 52	663 ± 74	657 ± 73	658 ± 58	700 ± 42	61 2 ± 40	\mathbb{Q}
Count ry 18	654 ± 47	628 ± 63	617 ± 64	694 ± 49	654 ± 54	630 ± 82	657 ± 61	673 ± 44	58 1 ± 38	\searrow
Count ry 19	665 ± 60	680 ± 70	676 ± 68	733 ± 41	642 ± 50	705 ± 70	653 ± 66	700 ± 57	60 5 ± 38	
Count ry 20	775 ± 58	768 ± 55	738 ± 32	800 ± 40	714 ± 46	749 ± 57	711±53	748 ± 46	69 2 ± 29	
Count ry 21	720 ± 35	741 ± 76	661 ± 71	753 ± 50	655 ± 57	734 ± 64	648 ± 60	694 ± 54	62 0± 54	
Total	738 ± 71	700 ± 96	733 ± 83	727 ± 99	709 ± 81	699 ± 88	777 ± 63	735 ± 77	65 4 ± 64	

LFP: lowest FINA points.

Table 2. The mean \pm standard deviation (SD) values of the International Swimming Federation (FINA)points obtained in the regional competitions analyzed and lowest FINA points obtained in each competition.

		М	ale			Fei	nale		
	Butterf ly	Backstro ke	Breaststro ke	Freesty le	Butterf ly	Backstro ke	Breaststro ke	Freesty le	LF P
Count ry 1	627 ± 46	614 ± 59	601 ± 47	661 ± 45	638 ± 49	648 ± 57	591 ± 39	658 ± 44	55 7 ± 85
Count ry 2	575 ± 79	514 ± 68	535 ± 100	650 ± 62	584 ± 53	579 ± 70	545 ± 70	612 ± 50	48 6± 74
Count ry 3	-	-	-	-	-	-	-	-	-
Count ry 4	554 ± 74	493 ± 96	473 ± 90	598 ± 50	532 ± 69	562 ± 71	497 ± 97	588 ± 46	42 4 ± 76
Count ry 5	532 ± 63	515 ± 51	501 ± 42	583 ± 37	552 ± 47	576 ± 51	494 ± 50	602 ± 47	48 3± 56

г											I
	Count ry 6	-	-	-	-	-	-	-	-	-	
	Count ry 7	575 ± 55	573 ± 79	534 ± 60	647 ± 47	559 ± 69	529 ± 61	537 ± 65	625 ± 58	50 0 ± 56	
	Count ry 8	569 ± 36	524 ± 56	512 ± 47	615 ± 59	564 ± 51	564 ± 50	573 ± 41	602 ± 36	$50 \\ 0 \pm 46$	\square
	Count ry 9	457 ± 65	422 ± 48	469 ± 79	540 ± 66	399 ± 82	467 ± 56	395 ± 92	536 ± 52	37 7 ± 58	\mathcal{R}
	Count ry 10	571 ± 45	564 ± 32	520 ± 38	610 ± 40	588 ± 43	615 ± 51	560 ± 42	629 ± 44	52 6 ± 63	
	Count ry 11	592 ± 44	579 ± 31	557 ± 36	642 ± 40	551 ± 51	585 ± 51	539 ± 49	610 ± 39	51 5± 51	
	Count ry 12	500 ± 25	499 ± 45	361 ± 74	547 ± 32	503 ± 38	366 ± 52	522±33	501 ± 38	43 8 ± 68	
	Count ry 13	526 ± 47	480 ± 49	471 ± 59	589 ± 40	532 ± 65	521 ± 45	521 ± 45	590 ± 45	44 4 ± 63	
	Count ry 14	530 ± 64	567 ± 70	521 ± 73	628 ± 39	393 ± 125	473 ± 73	505 ± 87	544 ± 41	$42 \\ 4 \pm \\ 11 \\ 5$	
	Count ry 15	-	-	-		Ph	-	-	-	-	
	Count ry 16	-	-			-	-	-	-	-	
	Count ry 17	629 ± 42	600 ± 58	603 ± 52	655 ± 36	592 ± 49	577 ± 43	580 ± 46	618 ± 43	54 9 ± 64	
	Count ry 18	490 ± 59	445 ± 64	460 ± 60	558 ± 37	527 ± 69	500 ± 55	508 ± 51	562 ± 35	43 5 ± 96	
	Count ry 19	478 ± 71	447 ± 70	444 ± 68	548 ± 46	458 ± 54	485 ± 48	457 ± 56	529 ± 38	38 1 ± 71	
	Count ry 20	608 ± 42	586 ± 77	552 ± 54	654 ± 52	579 ± 50	598 ± 61	534 ± 51	618 ± 45	49 2 ± 86	
(Count ry 21	511 ± 72	513 ± 74	505 ± 66	579 ± 64	543 ± 49	540 ± 92	529 ± 55	578 ± 35	42 5 ± 87	
	Total	548 ± 74	526 ± 82	507 ± 84	606 ± 62	535 ± 88	540 ± 88	523 ± 74	591 ± 55	46 7 ± 54	

LFP, lowest FINA points; -, no information found

Figure 1. The male national swimmers' differences in the FINA points between countries. Post hoc significant differences are represented by numbers written in white. The number included in each square shows the difference in the FINA points between the countries, being the darker the square the higher the difference. Panel A) 100 m butterfly, Panel B) 100 m backstroke, Panel C) 100 m breaststroke, Panel D) 100 m freestyle.

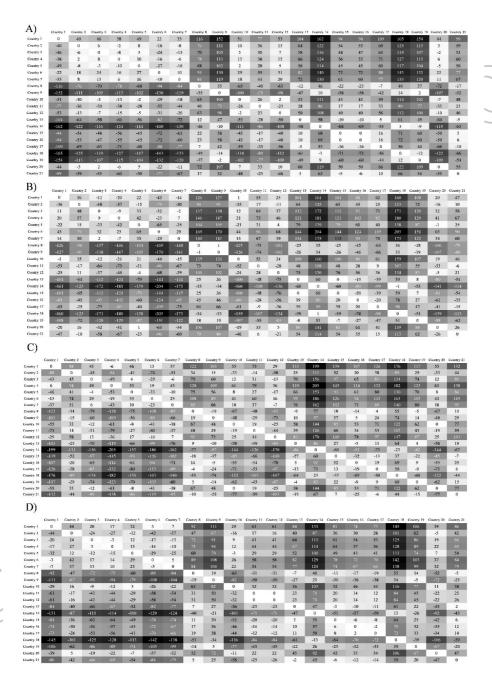


Figure 2. The female national swimmers' differences in the FINA points. Post hoc significant differences are represented by numbers written in white. The number included in each square shows the difference in

the FINA points between the countries, being the darker the square the higher the difference. Panel A) 100
m butterfly, Panel B) 100 m backstroke, Panel C) 100 m breaststroke, Panel D) 100 m freestyle.

A) Country 1 Country 2 Country 3 Country 4 Country 4 Country 4 Country 6 Country 7 Country 7 Country 7 Country 10 Country 10 Country 10 Country 11 Country 12 Country 12 Country 13 Country 16 Country 10 Country 11 Country 10 Country 11 Country 10 Country 11 Country 10 Country	County 1 0 -91 -61 -63 -78 -79 -84 -151 -166 -44 -128 -103 -106 -165 -194 -177 -189 -177 -176	Country 2 91 0 300 46 -6 12 8 60 -75 47 -75 47 -12 -24 -102 -102 -102 -07 -25 -26 -25	Country 3 61 -30 0 16 -36 -18 -22 -90 -104 17 -67 -42 -55 -010 -133 -135 -116 -128 -56 -115	County 4 46 -46 -16 0 -52 -34 -34 -38 -105 -120 1 -83 -58 -70 -317 -148 -150 -122 -143 -72 -130	County 5 6 36 52 0 18 14 -54 -68 53 -30 -6 -18 -265 -265 -265 -265 -276 -20 -20 -279	County 6 79 -12 18 34 -18 0 -5 -72 -35 -49 -24 -37 -283 -115 -117 -38 -109 -38 -109 -38 -35	Country 7 %4 -8 22 38 -14 5 0 -68 -45 -20 -32 -279 -110 -112 -34 -05 -34 -05	Country 8 151 60 90 105 54 72 68 0 -15 107 23 48 36 -211 -43 -45 -17 -26 -38 34 -25	County 9 166 75 10 420 68 82 85 0 122 0 122 38 63 50 -28 -30 -28 -30 -28 -11 -23 49 -10	Country 14 44 -47 -17 -1 -53 -35 -40 -107 -122 0 -84 -59 -72 -318 -150 -152 -152 -152 -145 -733 -152	Country 11 128 37 67 83 30 49 45 -23 -38 -44 0 0 25 12 -234 -66 -68 -49 -60 111 -48	Country 12 103 12 42 58 6 24 20 -48 -63 59 -25 0 -12 -25 0 -12 -25 0 -12 -25 -74 -35 -14 -73	Country 11 110 244 55 70 18 37 32 -36 -50 72 -12 12 0 -247 -78 -80 -53 -61 -73 -1 -60	County 14 362 271 301 317 265 283 279 211 196 318 259 247 0 168 167 194 185 174 245 186	Country 15 194 102 133 148 96 115 116 43 28 150 66 66 66 66 78 8 -168 0 -2 26 0 -2 26 17 5 77 18	Country 16 196 104 135 150 98 117 415 30 152 68 92 80 0 -167 2 0 45 30 152 6 7 2 0 7 7 9 20	Country 17 168 77 107 123 70 89 87 17 2 124 40 40 40 40 40 40 40 40 40 4	Country 18 177 x6 116 132 80 x8 94 61 11 133 49 74 61 -17 -19 9 0 -12 60 0	County 19 189 97 128 143 91 105 105 105 105 38 23 145 38 23 145 38 23 145 38 23 145 145 145 145 145 145 145 145	Country 20 1112 26 56 72 20 38 34 -34 -49 73 -49 73 -11 14 14 1 -245 -77 -79 -59 -59	Conary 21 176 85 115 115 115 25 10 0 77 25 10 10 152 48 73 60 -186 -186 -188 0 158 0 -13 59 0
B) Country 1 Country 2 Country 3 Country 4 Country 5 Country 5 Country 7 Country 8 Country 7 Country 8 Country 10 Country 11 Country 11 Country 12 Country 12 Country 13 Country 14 Country 15 Country 15 Country 15 Country 15 Country 15 Country 15 Country 15 Country 16 Country 17 Country 18 Country 19 Country 14 Country 18 Country 28 Country	Country 1 0 -127 -82 -50 -136 -136 -104 -103 -103 -103 -103 -128 -199 -105 -212 -240 -210 -105 -120 -135	Causity 2 127 0 46 77 -9 48 23 -66 -45 -00 9 22 -29 -230 -81 -78 -38 6 -8	Country 3 82 -46 0 31 -54 2 -22 -112 -40 54 -37 -37 -37 -37 -276 -127 -124 -130 -158 -83 -39 -54	Country 4 50 -77 -31 0 -30 -54 -143 -22 -68 -55 -106 -307 -158 -155 -162 -155 -162 -115 -71 -85	Caunity 5 136 9 54 36 32 -57 105 17 105 17 -00 -222 -70 -76 -00 -101 -29 15 1	Country 6 80 -42 -2 300 -56 0 -24 -114 -133 52 -39 -278 -135 -126 -132 -132 -132 -132 -132 -132 -132 -132	Creating 7 1(c4 -23 22 54 -32 24 0 -40 -69 76 -15 -1 -15 -15 -15 -15 -15 -15	Country 8 193 66 112 143 57 114 0 21 165 75 37 -164 -15 -12 -19 -46 29 72 58	Cruatry 9 173 45 (%) 122 37 05 69 -21 0 145 54 68 -33 -40 -67 8 52 37	Consulty 19 28 -99 -54 -22 -108 -52 -76 -165 -145 -145 -0 -77 -128 -330 -180 -178 -184 -212 -137 -337 -107	Country 11 119 -9 37 68 -17 39 15 -75 -54 -0 0 15 -75 -54 -0 0 14 -38 -239 -37 -34 -38 -239 -37 -34 -17 -46 -17 -17 -34 -17 -34 -17 -34 -17 -34 -17 -34 -37 -34 -37 -34 -37 -34 -37 -34 -37 -34 -37 -34 -37 -34 -37 -34 -37 -34 -37 -38 -239 -37 -38 -239 -37 -38 -239 -37 -38 -239 -37 -38 -239 -37 -38 -239 -37 -38 -239 -37 -34 -38 -239 -37 -34 -37 -38 -239 -37 -34 -38 -37 -34 -38 -46 -38 -46 -46 -38 -46 -46 -46 -46 -46 -46 -47 -46 -46 -46 -46 -47 -46 -47 -46 -47 -47 -47 -47 -47 -47 -47 -47	Country 12 (05 -22 23 55 -31 -35 -10 -35 -10 -51 -253 -103 -103 -107 -145 -60 -16 -30	Country: 13 156 29 75 105 20 76 52 -37 76 52 -37 76 52 -37 16 128 38 51 10 -201 -56 -83 9 -35 21	Country 14 358 253 276 307 272 278 254 185 330 259 253 201 0 149 155 118 193 237 222	Country 15 208 81 127 158 72 128 104 15 36 180 90 103 52 -149 0 3 -4 -31 43 87 73	Country 16 206 78 1.24 1.55 70 102 12 102 12 102 12 33 178 87 101 49 -152 -3 0 -7 -34 41 85 70	Cruanity 17 212 85 130 162 76 152 108 19 40 184 94 107 56 -145 4 7 0 -27 47 01 77	Country 18 240 112 158 189 104 160 136 46 67 212 120 135 83 -118 31 34 27 0 75 119 104	Country 19 165 38 83 115 29 45 61 -29 -29 -35 61 -29 -35 61 -29 -45 -41 -47 -47 -75 0 44 30	Country 20 120 -6 39 71 -15 41 17 -72 -52 -97 2 16 -35 -237 -44 0 -14	County 21 15 8 55 55 55 31 167 17 30 -21 -21 -221 -23 -73 -70 -77 -77 -70 14 0 0
Country 1 Crossity 2 Crossity 2 Crossity 4 Country 4 Country 5 Country 5 Country 7 Country 7 Country 9 Country 10 Country 10 Country 13 Country 15 Country 16 Country 17 Country 16 Country 17 Country 17 Country 19 Country 20		Creativy 2 108 0 43 94 39 64 18 -45 74 -17 32 -3 -148 -100 -75 -46 -47 -55 6 -56	Country 3 65 -43 0 51 -5 21 -25 -51 -25 -31 -60 -111 -143 -5 -118 -39 -00 5 -37 -99	Country 4 14 -94 -51 0 -55 -30 -755 -101 -139 -20 -111 -139 -20 -111 -111 -168 -140 -144 -145 -87 -150	Centrity 5 1 69 -39 5 5 5 0 25 -20 -46 -84 -85 -7 -13 -187 -139 -113 -85 -80 -90 -32 -95	Caurity 6 1 44 -64 -21 30 -25 0 -45 -71 -109 10 -81 -32 -109 10 -81 -32 -109 -10 -110 -113 -115 -57 -57 -120	Country 7 809 -18 25 75 20 45 0 -26 45 0 -26 -56 -56 -33 13 -64 -56 -33 -21 -167 -118 -97 -65 -66 -65 -66 -75 -75 -75 -75 -75 -75 -75 -75	Country 8 115 5 1 5 1 101 46 0 7 11 26 0 -38 82 -9 30 5 -141 -92 5 -67 -39 -39 -44 14 -48	Country 9 153 45 39 149 84 109 64 38 0 120 29 77 73 -103 -55 -29 -1 -2 -6 52 -11	Courty 10 34 -74 -31 20 -36 -10 -56 -82 -120 0 -91 -91 -222 -174 -120 -120 -120 -120 -120 -120 -120 -120 -120 -68 -130 -13 -10 -10 -56 -10 -56 -10 -56 -82 -82 -82 -82 -82 -82 -82 -82	Country 11 125 16 60 111 55 81 35 9 91 0 49 114 -132 -83 -29 -30 -35 23 -39	Country 12 76 -32 111 62 -33 -33 -33 -33 -77 42 -49 0 -34 -180 -34 -180 -34 -180 -34 -180 -34 -78 -79 -83 -25 -88	Creatives 13 110 3 46 96 41 66 21 -5 -43 77 -14 34 0 -146 -97 -72 -44 -44 -49 9 -53	Country 14 256 148 191 242 187 212 167 141 103 222 180 146 0 48 74 102 101 97 155 92	Constry 15 208 100 143 194 139 164 118 92 55 174 83 132 97 -48 0 97 -48 0 26 54 53 49 106 44	Country 16 182 75 118 168 113 178 93 67 29 149 58 105 72 -74 -26 0 28 27 23 81 19	Ceanity 17 154 46 39 140 85 110 65 39 1 120 29 78 44 -102 -54 53 -10	Country 18 155 477 90 141 86 39 2 121 30 79 79 44 -101 -53 -27 1 0 -4 54 -9	Country 19 159 52 95 145 90 115 70 44 6 126 35 83 49 -07 -49 9 -23 5 4 0 58 45 58 -5	Crucitry 20 1-01 -6 37 87 32 57 12 -14 -52 68 -23 25 -9 -155 -106 -81 -53 -54 -54 -6 -6 -6 -6 -6 -6 -6 -6 -6 -6	County 21 164 36 99 180 99 180 99 120 74 48 11 150 39 88 53 39 -27 -44 -19 10 9 5 62 0
D) Country 1 Country 2 Country 3 Country 3 Country 3 Country 5 Country 5 Country 5 Country 5 Country 5 Country 5 Country 10 Country 10 Country 10 Country 11 Country 12 Country 12 Country 13 Country 13 Country 14 Country 17 Country 18 Country 18 Country 18 Country 18 Country 19 Country 10 Country 19 Country 10 Country	0 -9%. -1 -52 -04 -37 -22 -137 -122 -122 -127 -104 -4% -88 -259 -147 -161 -133 -159 -133 -153 -133 -88	96 0 95 44 2 59 74 -41 -26 -26 70 -8 28 8 -28 -8 28 8 -163 -51 -63 -51 -65 -37 -65 -37 11	Country 3 1 -95 0 -51 -33 -34 -131 -136 -101 -101 -101 -101 -101 -101 -101 -101 -132 -132 -139	Country 4 52 -44 51 0 -43 14 30 -43 14 30 -74 35 -53 -53 -10 -10 -36 -109 -31 -109 -31 -33 -33 -33 -33 -33	94 -2 93 0 57 57 -3 -28 -28 -28 -27 -10 27 6 -165 -53 -45 -39 10	Country 6 37 -59 36 -14 -57 0 16 -100 -6 -100 -51 -222 -110 -124 -95 -124 -95 -47 -103	22 -74 21 -30 -25 -16 0 -116 0 -100 5 -42 -46 -66 -63 -237 -125 -139 -111 -138 -111 -138	Cauntry 8 137 41 136 86 43 100 116 0 15 120 33 70 49 -122 -10 -24 5 -22 4 53 -3	Constity 9 122 26 121 21 21 28 85 100 -15 0 105 18 34 -155 -39 -11 38 -39 -11 38 -38 -11 38 -11	Chustry 16 17 -79 16 -35 -20 -5 -120 -105 -0 -65 0 -87 -51 -71 -242 -130 -144 -116 -444 -116 -488 -123	104 8 103 53 10 67 80 -33 -18 87 0 36 16 16 16 16 -155 -43 -57 -29 20	Constity 12 63 -28 67 16 -27 30 46 -30 -54 51 -36 0 -20 -191 -395 -45 -95 -45 -95 -45 -95 -45 -17 -72	Country 13 88 -8 87 36 -6 51 (6) -49 -34 71 -16 20 0 -171 -59 -77 -45 4 -52	County 14 259 163 258 207 5 222 237 122 137 242 155 191 171 0 112 98 126 109 126 174 119	Constry 15 147 51 146 96 53 110 125 130 43 79 59 -112 0 -14 15 -12 14 63 7	Country 16 161 465 160 109 67 124 130 24 39 144 57 93 73 -98 14 0 28 2 28 73 21	Country 17 133 37 132 81 38 95 111 -5 111 116 29 (5 45 -126 -15 -28 0 -27 0 48 -7	Country 18 159 65 158 108 65 122 138 22 37 142 37 142 55 92 21 -100 12 -2 27 0 12 27 0 26 75 20 26 27 27 27 27 27 27 27 27 27 27	Cmentry 19 133 37 132 81 39 96 111 -4 116 29 65 -126 -14 -28 0 -26 0 48 -7	Country 20 85 -11 83 -10 47 63 -38 68 -20 17 -4 -174 -174 -177 -4 8 -35 -38 0 17 -4 8 -0 -75	Constry 21 140 44 139 88 46 103 118 13 13 13 13 13 36 21 23 19 7 7 -21 7 7 -20 7 7 55 0



Figure 3. The male regional swimmers' differences in the FINA points. Post hoc significant differences are represented by numbers written in white. The number included in each square shows the difference in the FINA points between the countries, being the darker the square the higher the difference. Panel A) 100 m butterfly, Panel B) 100 m backstroke, Panel C) 100 m breaststroke, Panel D) 100 m freestyle.

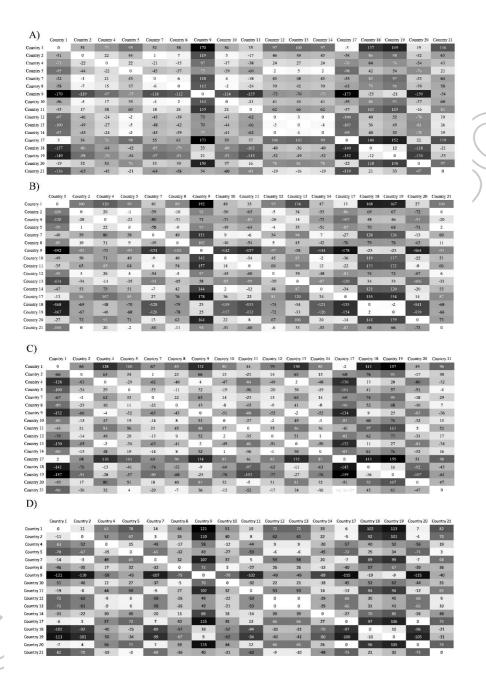
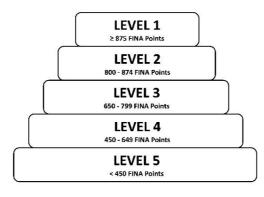


Figure 4. The female regional swimmers' differences in the FINA points. Post hoc significant differences are represented by numbers written in white. The number included in each square shows the difference in

the FINA points between the countries, being the darker the square the higher the difference. Panel A) 100 m butterfly, Panel B) 100 m backstroke, Panel C) 100 m breaststroke, Panel D) 100 m freestyle.

A)	Country 1	Country 2	Country 4	Country 5	Country 7	Country 8	Country 9	Country 10	Country 11	Country 12	Country 13	Country 14	Country 17	Country 18	Country 19	Country 20	Country 21
Country 1 Country 2	-54	54 0	105 52	80 32	79 25	74 20	239 185	49 -4	33	124 70	105 52	245 191	45 -8	110 57	180	59 5	95 41
Country 4	-105	-52	0	-19	-26	-32	134	-56	-18	19	1	140	-60	5	74	-47	-11
Country 5		-32	19	0	-7	-13	153	-37	1	38	20		-41	24		-28	9
Country 7 Country 8	-79	-25 -20	26 32	7	0	-6 0	160 165	-30	8	45	27 32	166	-34 -28	31		-21	16 21
Country 8 Country 9	-239	-185	-134	-153	-160	-165	0	-190	-152	-115	-133	172	-194	-129	-59	-13	-144
Country 10	-49	4	56	37	30	24	190	0	38	75	56	196	-4	61	130	9	45
Country 11	-87	-33	18	-1	-8	-14	152	-38	0	37	19	1.58	-42	23		-29	8
Country 12 Country 13	-124 -105	-70 -52	-19	-38 -20	-45 -27	-51 -32		-75 -56	-37 -19	0 18	-18 0		-79 -60	-14	55 74	-66 -47	-29 -11
Country 14	-245	-191	-140	-159	-166	-172	-6	-196	-158	-120	-139	0	-200	-135	-65	-186	-150
Country 17	-45	8	60	41	34	28	194	4	42	79	60	200	0	65	134	13	49
Country 18 Country 19	-110	-57 -126	-5	-24	-31	-37 -106	129	-61	-23	-55	-5	13.5	-65	-69	69 0	-52	-16
Country 20	-59	-5	47	28	21	15	180	-9	29	66	47	186	-13	52	121	0	36
Country 21	-95	-41	11	-9	-16	-21	144	-45	-8	29	11	150	-49	16	85	-36	0
B)																	
D)	Country 1	Country 2	Country 4	Country 5	Country 7	Country 8	Country 9	Country 10	Country 11	Country 12	Country 13	Country 14	Country 17	Country 18	Country 19	Country 20	Country 21
Country 1	0	69	86	72	119	84	181	33	63	93	127	175	71	148	163	50	107
Country 2 Country 4	-69	0	18	4	50	15 -2	113	-36	-6	24	58	106	2	79		-19	39
Country 4 Country 5	-86	-18 -4	0	-14	32 46	-2 12		-53 -39	-23 -9	7 21	40 54	89	-16 -2	61 75		-36 -22	21
Country 7	-119	-50	-32	-46	0	-35	63	-85	-56	-26	8	56	-48	29	45	-68	-11
Country 8	-84	-15	2	-12	35	0	97	-51	-21	9	43	90	-13	64	79	-34	24
Country 9 Country 10	-181	-113 36	-95 53	-108 39	-63 85	-97 51	0	-148 0	-118 30	-88 60	-55 01	-6 142	-110 38	-34 114	-18 130	-131 17	-74 74
Country 11	-63	6	23	9	56	21	118	-30	0	30	64	112	8	85	100	-13	45
Country 12	-93	-24	-7	-21	26	-9	88	-60	-30	0	34	82	-22	55	70	-43	15
Country 13 Country 14	-127 -175	-58 -106	-40	-54 -102	-8 -56	-43	55	-93 -142	-64 -112	-34	0 -48	48	-56 -104	21	37	-76 -125	-19 -67
Country 17	-71	-2	16	2	48	13	110	-38	-8	22	56	104	0	77	92	-21	37
Country 18	-148	-79	-61	-75	-29	-64	34	-114	-85	-55	-21	27	-77	0	16	-97	-40
Country 19 Country 20	-163 -50	-94 19	-77 36	-90 22	-45 68	.79 34	18 131	-130 -17	-100 13	-70 43	-37	12	-92 21	-16	0	-113 0	-56 57
Country 21	-107	-39	-21	-35	11	-24	74	-17	-45	-15	19	67	-37	97 40	56	-57	0
									1000		202.4		3.552			10000	
C)	Country 1	Country 2	Country 4	Country 5	Country 7	Country 8	Country 9	Country 10	Country 11	Country 12		Country 14	Country 17	Country 18	Country 15		Country 21
Country 1	0	46	94	98	Country 7 54	Country 8	Country 9	Country 10 32	Country 11 52	Country 12 63	Country 13 70	Country 14	Country 17	Country 18		Country 20	62
Country 1 Country 2	0	45 0	94 48	98 52	Country 7 54 8	Country 8 18 -28	Country 9 195 150	Country 10 32 -14	Country 11 52 6	Country 12 63 17	Country 13 70 24	Country 14 86 40	Country 17	Country 18 83 37	Country 15 134 88	Country 20	62 16
Country 1 Country 2 Country 4	0 -46 -94	46 0 -48	94	98	Country 7 54 8 -40	Country 8	Country 9	Country 10 32	Country 11 52	Country 12 63 17 -31	Country 13 70 24 -24	Country 14 85 40 -8	Country 17	Country 18	Country 15	Country 20	62 16 -32
Country 1 Country 2	0 -46 -94 -98 -54	46 0 -48 -52 -8	94 48 0 -4 40	98 52 4	Country 7 54 8	Country 8 18 -28 -75 79 -36	Country 9 195 150 102 98 142	Country 10 32 -14 -62 -66 -23	Country 11 52 6 -42 -45 -2	Country 12 63 17 -31 -34 9	Country 13 70 24 -24 -27 16	Country 14 85 40 -8 -11 32	Country 17 12 -34 -82 -85 -43	Country 18 83 37 -11 -14 29	Country 15 134 88 40 37 80	Country 20 57 11 -37 -40 3	62 16 -32 -35 8
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Country 1 Country 2 Country 4 Country 5 Country 7	0 -46 -94 -98 -54 -18 -196	46 0 -48 -52 -8	94 48 0 -4 40	98 52 4 0	Country 7 54 8 -40 -43 0	Country 8 18 -28 -75 79 -36	Country 9 195 150 102 98 142	Country 10 32 -14 -62 -66 -23	Country 11 52 6 -42 -45 -2	Country 12 63 17 -31 -34 9	Country 13 70 24 -24 -27 16	Country 14 85 40 -8 -11 32	Country 17 12 -34 -82 -85 -43	Country 18 83 37 -11 -14 29	Country 15 134 88 40 37 80	Country 20 57 11 -37 -40 3	62 16 -32 -35 8
Country 1 Country 2 Country 4 Country 5 Country 7 Country 8 Country 10 Country 11	0 -46 -94 -98 -54 -18 -195 -32 -32 -52	46 0 -48 -52 -8 28 -150 14 -6	94 48 0 -4 40 75 -102 62 62 42	98 52 4 0 43 79 -98 66 46	Country 7 54 8 -40 -43 0 36 -142 23 2	Country 8 18 -28 -75 -79 -36 0 -177 -13 -33	Country 9 195 150 102 98 142 177 0 164 144	Country 10 32 -14 -62 -66 -23 13 -164 0 -20	Country 11 52 6 -42 46 -2 33 -144 20 0	Country 12 63 17 -31 -34 9 45 -133 32 11	Country 13 70 24 -24 -27 16 52 -126	Country 14 86 40 -8 -11 32 68 -109 55 35	Country 17 12 -34 -82 -86 -43 -7 -184 -20 -40	Country 18 33 37 -11 -14 29 65 -113 52 31	Country 15 134 88 40 37 80 116 -62 102 82	Country 20 57 11 -37 -40 3 39 -139 26 5	62 16 -32 -35 8 44 -134
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Figure 5. New model of swimmers' performance level classification in swimming. FINA: International Swimming Federation



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	National		Regional		Regional	(Regiona	1
Country	Competition	Da te	Competition	Da te	Competition	Da te	Competit ion	Da te
						\langle		
Australi a	Australian Championshi ps	7- 12 Ap r	-	-		- ()	-	-
Belarus	Belarus Championshi ps	17- 20 Ap r	-	$\langle \rangle$	UN	-	-	-
Canada	Canadian Swimming Trials	3-7 Ab r	Eastern Ontario Regional Championships	1-3 Fe b	Grand Prix	18- 19 Jan	MAC Winter Invitation al	10- 13 Jan
Denmar k	Danish Open og DMJ-L	5-9 Ap r	VAT Copenhagen Open	10- 12 Ma y	Arena Lyngby Open 2019 Stadion	18- 20 Jan	Kronborg Open	1-3 Ma r
France	Championnat s de France Elite	21 Ap r	Championnats Regionaux Ete	29- 1 Jul	10e Meeting National des Hortillons	18- 20 Jan	Champio nnat Regional Hiver	22- 24 Fe b
GB	British Championshi ps	16- 21 Ap r	Leander Spring Reg Qu	30- 31 Ma r	-	-	-	-
German y	German Championshi ps	1-4 Ag 0	Sparkassen – Pokalschwimmen	6-7 Ap r	Swim Meeting	10- 12 Ma y	Cup	23- 24 Ma y
Greece	Greek Championshi ps	2-5 Au g	Tropaio Nirea Agonistika	25- 27 Jan	Heimerinoi Agones E-N P-K	22- 24 Fe b	Panellini oi Heimerin oi Agones Andron Gynaiko n	1-3 Ma r
Hungar y	CXXI. Hungarian swimming championship	27- 30 Ma r	Championship open	26- 29 Ju n	JAKED-HOD International Swimming	23- 24 Fe b	50. Csik Ferenc Memoria 1	11- 12 Ma y
	Australi a Belarus Canada Denmar k France GB German y Greece Hungar	CountryCompetitionAustralia aAustralian Championshi psBelarusBelarus Championshi psBelarusCanadian Swimming TrialsDenmar kDanish Open og DMJ-LFranceChampionnat s de France EliteGBBritish Championshi psGerman yGerman Championshi psGreeceGreek Championshi psGreeceCrace Crace Championshi psGreeceCrace Crace Championshi psGreeceCrace Cr	CountryCompetitionDa teAustrali aAustralian Championshi ps7- 12 Ap rAustrali aAustralian Championshi ps7- 12 Ap rBelarusBelarus Championshi ps17- 20 Ap rCanadaCanadian Swimming Trials3-7 Ab rDenmar kDanish Open og DMJ-L5-9 Ap rDenmar kDanish Open og DMJ-L5-9 Ap rGerman yChampionnat s de France Elite16- 21 Ap rGerman yGerman ps1-4 Ag oGerman yGerek ps2-5 Au gGreeceGreek Championshi ps2-5 Au gHungar yCXXI. Hungarian swimming27- Mu Ma	CountryCompetitionDa teCompetitionAustrali aAustralian Championshi ps7- 12 Ap r-Australi aAustralian Championshi ps7- r-BelarusBelarus Championshi ps17- 20 Ap r-CanadaCanadian Swimming Trials3-7 Ab rEastern Ontario Regional ChampionshipsDenmar kDanish Open og DMJ-L5-9 rVAT Copenhagen OpenDenmar kDanish Open og DMJ-L16- 21 rChampionnats Regional Copenhagen OpenFranceChampionnat s de France Elite16- 21 rChampionnats Regionaux EteGBBritish Championshi ps16- 21 Ap rLeander Spring Reg QuGerman yGerman ps1-4 Ag gSparkassen - PokalschwimmenGreeceGreek Championshi ps2-5 Au gTropaio Nirea AgonistikaHungar yCXXI. Hungarian swimming27- 30 MaChampionship open	CountryCompetitionDa teCompetitionDa teAustrali aAustralian Championshi ps7- 12 Ap rAustrali aAustralian Championshi ps7- 12 Ap rBelarusBelarus Championshi ps17- 20 Ap rCanadaCanadian Swimming Trials3-7 Ab rEastern Ontario Regional Championships1-3 FeDenmar kDanish Open og DMJ-L5-9 rVAT r10- 12 Ma Open10- 12 Ma yFranceChampionnat s de France Elite5-9 rVAT Copenhagen r10- 12 Ma yGerman yChampionshi ps16- 21 Ap r29- Regionaux Ete30- 1 JulGerman yGerman Championshi ps16- 21 Ap rLeander Spring Reg Qu r30- Ap rGerman yGereek Championshi ps2-5 Au gTropaio Nirea Ap r25- 27 JanHungar yCXXI. swimming27- 30 Ma26- 2026- 27 Jan	CountryCompetitionDa teCompetitionDa teCompetitionAustralia aAustralian Championshi ps7- rAustrali aAustralian ps7- rBelarus Championshi ps17- r20 Ap rCanadaCanadian Swimming Trials3-7 rEastern Ontario Championshish r1-3 Regional Denmar k10- 12 Open 2019-Denmar kDanish Open og DMJ-L5-9 rVAT r10- 12 Ma OpenArena Lyngby Open 2019 StadionDenmar kChampionnat s de France Elite16- r rChampionnats r29- 10e Meeting National des HortillonsGBGerman Championshi ps16- r rLeander Spring Reg Qu r30- rGerman yGerman ps1-4 a gSparkassen - Pokalschwimmen6-7 Ap rSwim Meeting rGereceGreek Championshi ps2-5 a aTropaio Nirea Agonistika25- 27 JanHeimerinoi Agones E-N P-KHungari yCXXI. Swimming Ma g27- Championship 29JAKED-HOD International Swimming Ma g	CountryCompetitionDa teCompetitionDa teCompetitionDa teAustralia aAustralian Championshi ps7- 12 Ap rAustralia aAustralian Championshi ps7- rBelarus Championshi psBelarus r17- 20 Ap rCanada Swimming TrialsCanadian Ab r7- Regional Copenhagen Open1-3 Fe yGrand Prix18- 19 JanDenmar kDanish Open og DMJ-L5-9 Ap rVAT Copenhagen Open10- 12 Ma yArena Lyngby Open 2019 Stadion18- 20 JanDenmar kDanish Open og DMJ-L16- 21 21 Ap rChampionnats Regionaux Ete r29- 10e Meeting National des 10- 120 Ma Ma Ma18- 20- 2019 20 2019 31 3210- 30- 31 31 31 31 31 31 31 31 31 31 31 31 3210- 31 3210- 30- 31 31 31 31 31 31 31 31 31 31 31 32 32 31 31 31 31 31 31 32 32 <br< td=""><td>CountryCompetitionDa teCompetitionDa teCompetitionDa teAustrali aAustralian Championshi ps7- 12 rAustrali aAustralian Championshi ps7- r12 rBelarus Championshi psBelarus r17- r20 rCanada CanadaCanadian Swimming Trials3-7 rEastern Ontario Regional Championships1-3 FeGrand Prix18- 19 JanMAC Winter Invitation alDenmar kDanish Open og DMJ-L5-9 Ap PVAT Copenhagen Open10- 12 Open 201 Ma Stadion18- 20 JanKronborg Open JanFranceChampionnat s de France Elife r16- 211 Ap PChampionnats Regionaux Ete29- Jul10e Meeting Hortillons18- 20 JanChampio nnat Regional HiverGerman yGerman Ps1-4 o gSparkassen - Pokalschwimmen30- r30- 31 rGerek Greek Greek2-5 Au gTropaio Nirea Agonistika25- 27 AgonistikaSwim Meeting r10- r22- Swim Meeting doi Agones E-N P-K23- Fe AgonesPanellini oi oi Agones E-N P-KHungar yCXXI. Ps27- Agonistika26- 27 Agonistika26- 27 Agones E-N P-K23- Fe Ma50- Csik<b< td=""></b<></td></br<>	CountryCompetitionDa teCompetitionDa teCompetitionDa teAustrali aAustralian Championshi ps7- 12 rAustrali aAustralian Championshi ps7- r12 rBelarus Championshi psBelarus r17- r20 rCanada CanadaCanadian Swimming Trials3-7 rEastern Ontario Regional Championships1-3 FeGrand Prix18- 19 JanMAC Winter Invitation alDenmar kDanish Open og DMJ-L5-9 Ap PVAT Copenhagen Open10- 12 Open 201 Ma Stadion18- 20 JanKronborg Open JanFranceChampionnat s de France Elife r16- 211 Ap PChampionnats Regionaux Ete29- Jul10e Meeting Hortillons18- 20 JanChampio nnat Regional HiverGerman yGerman Ps1-4 o gSparkassen - Pokalschwimmen30- r30- 31 rGerek Greek Greek2-5 Au gTropaio Nirea Agonistika25- 27 AgonistikaSwim Meeting r10- r22- Swim Meeting doi Agones E-N P-K23- Fe AgonesPanellini oi oi Agones E-N P-KHungar yCXXI. Ps27- Agonistika26- 27 Agonistika26- 27 Agones E-N P-K23- Fe Ma50- Csik <b< td=""></b<>

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Italy	Italian Championshi ps	1-4 Au g	II prova qualificazione Campionato Regionale vasca lunga	12- 13 Ju n	Trofeo Citta Longobarda	15- 16 Ju n	Prova ASSOLU TI	27- 28 Ap r	
Lithuani a	Atviras Lietuvos plaukimo cempionatas	25- 27 Ap r	Atviras Kauno miesto plaukimo cempionatas	15- 16 Ma r	Lithuanian winter championships	1-2 Ma r	Dzukija Cup	5-6 Ap r	
Netherla nds	Open Nederlandse Kampioensch appen lange baan	21- 23 Ju n	Voorjaarslimietw edstrijd	23- 24 Fe b	-	-			
New Zealand	New Zealand Open Championshi ps	17- 21 Ju n	-	-	-	- (C) [×]	\sim	
Norway	Norwegian Championshi ps	4-7 Jul	Marienlyst Open	3-5 Ma y	Skagerrak Swim	25- 27 Jan	SSK Kvaliken	27- 29 Se p	
Poland	Mistrzostwa Polski W Plywaniu Seniorow I Mlodziezowc ow	15- 19 Ma y	Arena Grand Prix Puchar Polski	23- 24 Ma r	Arena Grand Prix Puchar Polski	27- 28 Ap r	Arena Grand Prix Puchar Polski	6-7 Ap r	
Russia	Russian Championshi ps	8- 12 Ap r		-	<u> </u>	-	-	-	
Spain	Cto. España Absoluto Y Junior De Verano	3-7 Au g	Cto Andalucia Absoluto Junior Verano	12- 14 Jul	Autonomico Junior y Absoluto de Verano	13- 14 Jul	Cto. Galego Natacion Absoluto Júnior Infantil Ver	4-7 Jul	
Sweden	SM/Para- SM/JSM	28- 2 Jul	Ullbergstrofen	26- 28 Ap r	Arena Sprint Meet	2-3 Fe b	Meet Vaesteras	30- 31 Ma r	
Switzerl and	Swiss Long Course Championshi p	20- 24 Ma r	16e Meeting Lemanique	9- 10 Ma r	RZO: Regionale Sommermeisters chaften	22- 23 Ju n	48eme Meeting Renens- Jeunesse	25- 26 Ma y	
Ukraine	Ukrainian Championshi ps	23- 26 Ap r	-	-	-	-	-	-	
USA	US National Championshi p	4-7 De c	CA SCS Senior Challenge	15- 17 Fe b	Southern Zone South Sectional	7- 10 Ma r	Speedo Grand Challeng e	24- 26 Ma y	