Discriminant Analysis of Pacing Behavior on Mass Start Speed Skating

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Abstract : The mass start speed skating (MSSS) is a new event for the 2018 PyeongChang Winter Olympics and will be an official race for the 2022 Beijing Winter Olympics. Considering that the event rankings were based on points gained on laps, it is worthwhile to investigate the pacing behavior on each lap that directly influences the ranking of the race. The aim of this study was to detect the pacing behavior and performance on MSSS regarding skaters' level (SL), competition stage (semi-final/final) (CS) and gender (G). All the men's and women's races in the World Cup and World Championships were analyzed in the 2018-2019 and 2019-2020 seasons. As a result, a total of 601 skaters from 36 games were observed. ANOVA for repeated measures was applied to compare the pacing behavior on each lap, and the three-way ANOVA for repeated measures was used to identify the influence of SL, CS, and G on pacing behavior and total time spent. In general, the results showed that the pacing behavior from fast to slow were cluster 1—laps 4, 8, 12, 15, 16, cluster 2—laps 5, 9, 13, 14, cluster 3—laps 3, 6, 7, 10, 11, and cluster 4—laps 1 and 2 (p=0.000). For CS, the total time spent in the final was less than the semi-final (p=0.000). For SL, top-level skaters spent less total time than the middle-level and low-level (p≤0.002), while there was no significant difference between the middle-level and low-level (p=0.214). For G, the men's skaters spent less total time than women on all laps (p≤0.048). This study could help to coach staff better understand the pacing behavior regarding SL, CS, and G, further providing references concerning promoting the pacing strategy and decision making before and during the race.

Keywords : performance analysis, pacing strategy, winning strategy, winter Olympics
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