Modeling the Links Between Young Swimmers’ Performance: Energetic and Biomechanic Profiles

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The aim was to develop a path-flow analysis model for young swimmers’ performance based on biomechanical and energetic parameters, using structural equation modeling. Thirty-eight male young swimmers served as subjects. Performance was assessed by the 200-m freestyle event. For biomechanical assessment the stroke length, the stroke frequency and the swimming velocity were analyzed. Energetics assessment included the critical velocity, the stroke index and the propulsive efficiency. The confirmatory model explained 79% of swimming performance after deleting the stroke index-performance path, which was nonsignificant (SRMR = 0.06). As a conclusion, the model is appropriate to explain performance in young swimmers.

The goal of competitive swimming is to travel the race distance as fast as possible. The identification of the variables that predict swimming performance is one of the main aims of the swimming “science” community. Anthropometrics, hydrodynamics, psychology, pedagogy, medicine and traumatology are some of the main scientific approaches used to understand swimming performance (9). Even so, it is consensual that biomechanics and physiology/energetics are the most determinant areas to enhance performance and achieve high-standard levels in competitive swimming (5).