

# SELF-OPTIMIZATION OF STRIDE LENGTH AMONG EXPERIENCED AND INEXPERIENCED DISTANCE RUNNERS

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**Introduction.** Experienced runners appear to naturally select a stride length which is optimal for minimizing oxygen uptake. However, whether this ability is naturally built into the human body or whether it is learned through experience has not been previously tested.

**Purpose.** This study investigated whether inexperienced runners are as capable as experienced runners of self-optimizing stride length to minimize oxygen uptake.

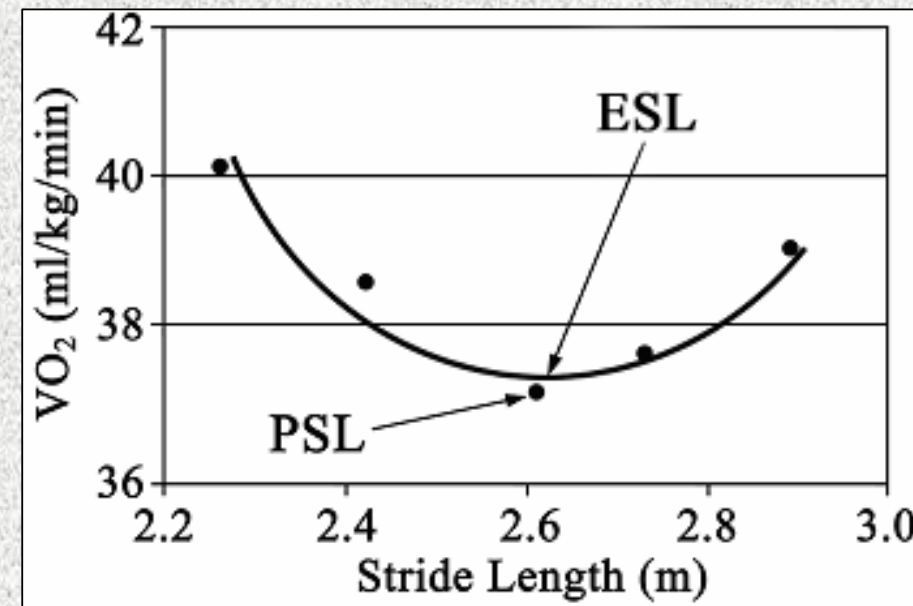


Figure 1-Calculation of preferred and economical stride length (PSL and ESL).

	Exp	Inexp	<i>p</i> -value
Increase in VO <sub>2</sub> (%) ± SD	1.2 ± 0.04	1.8 ± 0.06	0.47

Table 1-Increases in VO<sub>2</sub> due to deviation from economical stride length.

**Methods.** Thirty-three subjects (nineteen experienced and fourteen inexperienced) ran for twenty-minutes while preferred and economical stride lengths (PSL and ESL) were measured (see Figure 1). Following a five minute warm-up, runners completed five three minute segments of running at preferred and plus and minus eight and 16 percent of their preferred stride rate. Oxygen uptake was measured during the entire run and readings from the final two minutes of each segment were plotted as a function of stride length. A best-fit second-degree polynomial was placed through the data with the minimum value of the function matching with economical stride length. A paired *t*-test checked for differences between the experienced and inexperienced groups in the percent increase of oxygen uptake due to not running at the most economical stride length.

**Results.** No difference was found between groups with the increase in oxygen uptake due to not being optimized (*p*=0.47). The average percent increase in oxygen uptake above the most economical for inexperienced and experienced runners was 1.8% and 1.2% respectively.

**Conclusion.** Inexperienced and experienced runners are equally capable of matching preferred stride length to economical stride length.