**College Swimmers’ Visual Timing Sensitivity**

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**Introduction:** The precision of visual timing can improve more through auditory training than through visual training. For example, musical training requires auditory sensory-motor synchronization (SMS), and musicians show finer visual timing sensitivity than do visual SMS experts (Matthews, Welch & Festa, 2018). College swimmers rely on auditory SMS to start each race. Diving into the pool before the starting beep automatically disqualifies a swimmer. Waiting too long after the starting beep puts swimmers at a competitive disadvantage, hence the swimmers' mantra "races are won or lost at the start". Successful swimmers minimize the asynchrony between the auditory sensation of the starting beep and their subsequent motor response. In principle, fine-tuning this auditory sensory motor asynchrony -an implicit temporal order judgment (TOJ)- might cross train the visual system, as it apparently does for musicians. This possibility motivated the present comparison between visual TOJs in college swimmers and age-matched controls.

**Method:** We bilaterally presented plaids that either radiated or rotated before changing direction. Thirty-seven college swimmers and 37 age-matched controls reported whether the direction changed first on the left or right – a visual TOJ. In the control condition, participants reported whether the left or right plaid contained wider bars – a spatial frequency (SF) discrimination.

**Results:** Swimmers exhibited significantly lower (better) temporal (TOJ) ranks than did controls (p=0.007; Z=2.714), yet these groups performed virtually identically on spatial (SF discrimination) ranks (p=0.897; Z=0.130). This significant task-by-group interaction disconfirms non-specific explanations (attention, motivation, motor errors) for the group difference.

**Conclusion:** Prior SMS studies indicate that college swimmers are better than other athletes at visual time estimation (Bove et al., 2017), and that this superiority is specific to swim-stroke-expertise (Tobin & Grondin, 2012). Our findings suggest that swimmers’ superior time estimation could reflect enhanced low-level visual timing sensitivity, presumably acquired through auditory SMS training.

**Word Count: 298**