



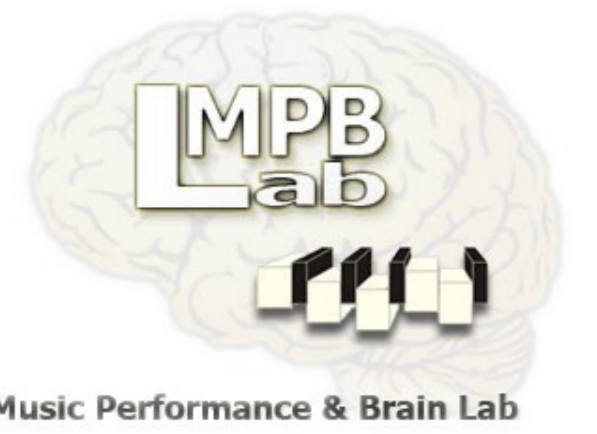
Timing abilities in a child drummer prodigy (IF)

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Introduction

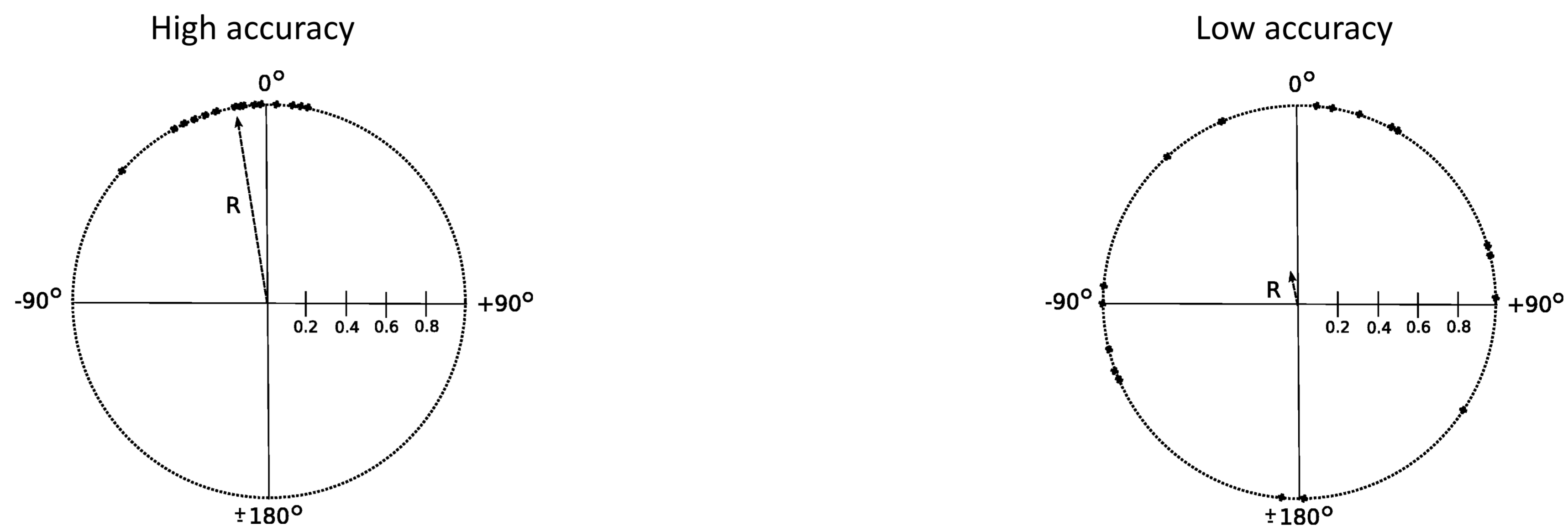
A considerable number of studies has been devoted to time perception (e.g., interval timing), and production (e.g., in sensorimotor synchronization) in average musicians and non-musicians (Repp, 2005, 2006; Snyder & Krumhansl, 2001). Much less, however, is known about timing in individuals exhibiting outstanding musical abilities, and their development with age.

Goal

To describe time perception and production abilities in IF, a 5-year-old drummer prodigy.

Circular statistics

Synchronization data were analyzed using circular statistics. \bar{R} (vector length, from 0 to 1) is an indicator of synchronization accuracy (e.g., see Kirschner & Tomasello, 2009).



Participants

IF - 5-year-old drummer, showing very precocious and outstanding musical abilities.

5 age-matched controls

20 university students (3 males, 17 females) without musical education, aged between 19 and 41 years (Mean = 23 years).

Tasks

Sensorimotor synchronization

Participants were asked to tap with a drumstick on a MIDI percussion pad, synchronizing with different pacing stimuli:

Music: computer-generated excerpts of instrumental versions of „Sex Machine” (333 beats, IOI = 545 ms), „Living in America” (328 beats, IOI = 500 ms), „I feel good” (370 beats, IOI = 408 ms) by James Brown, and „Everybody Needs Somebody to Love” (285 musical beats, IOI = 615 ms) by Solomon Burke.

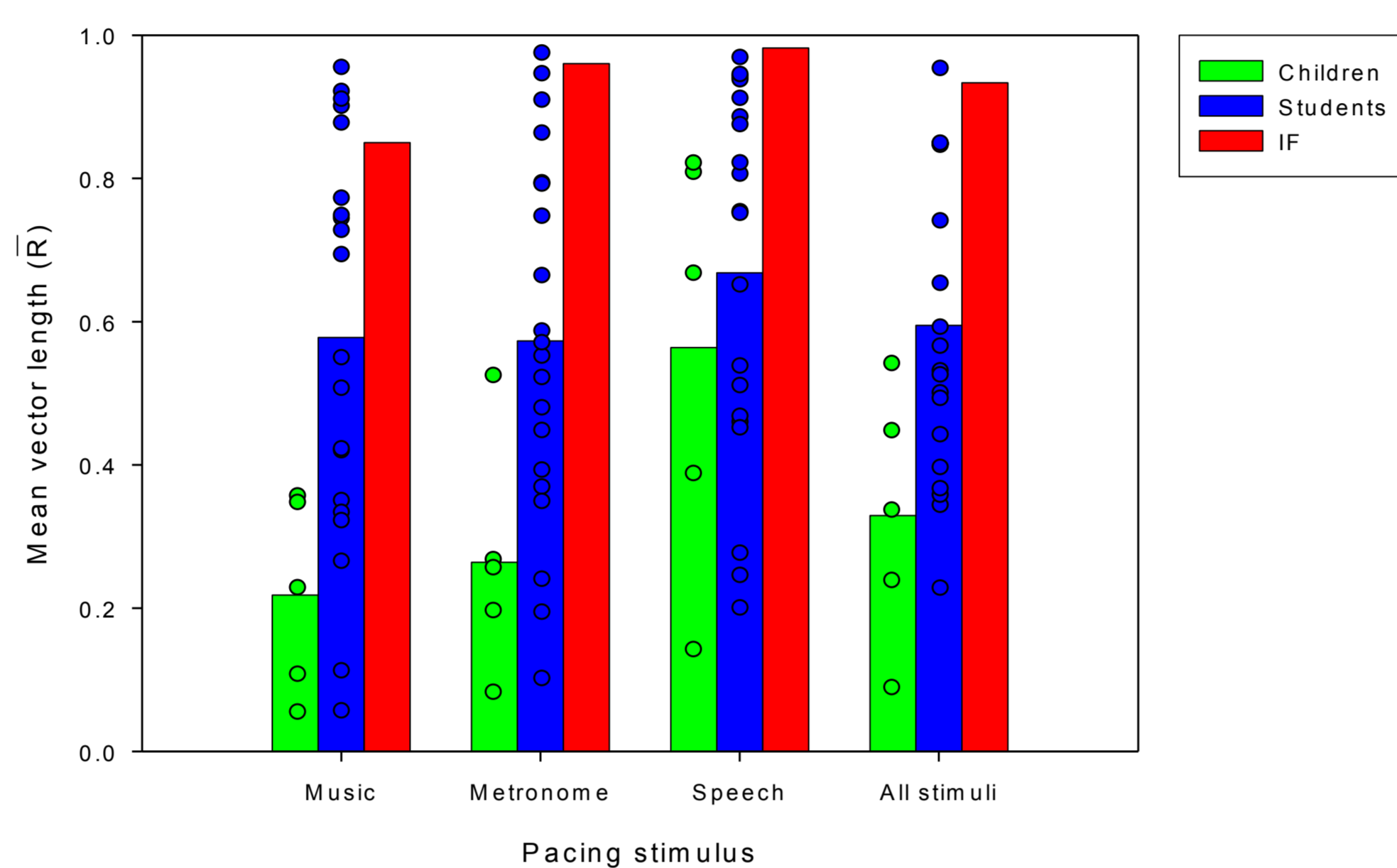
Metronome: sequences formed by 50 isochronously presented tones (IOIs = 200, 250, 300, 450, 600, 750, and 900 ms).

Speech: fragments of excerpts of Polish children poetry from „Na straganie” (32 stresses, IOI = 600 ms) by Jan Brzechwa, „Pstryk!” (28 stresses, IOI = 600 ms) and „Lokomotywa” (28 stresses, IOI = 600 ms) by Julian Tuwim. Inter-stress-intervals were manipulated to achieve perfect isochrony.

Anisochrony detection

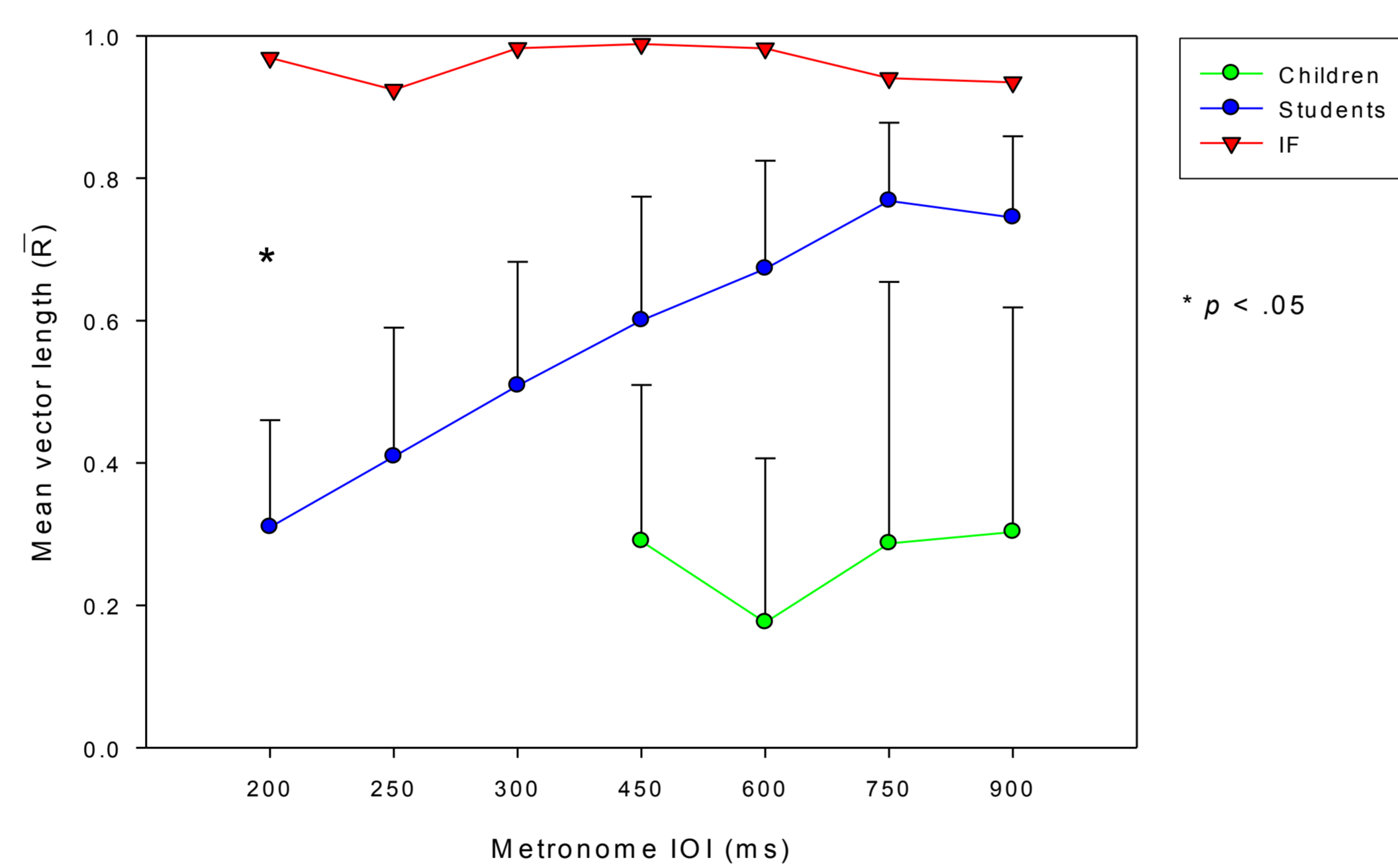
5-tone stimuli (IOIs = 300, 600, 900 ms) were presented. The fourth stimulus was shifted in time (anisochrony). Participants judged whether the sequence was regular or not (i.e., with the time shift). The size of the time shift was manipulated using an adaptive procedure (see Ehrle & Samson, 2005).

Results: Sensorimotor synchronization



- IF synchronized more accurately than matched controls in all tasks ($p < .05$).
- IF performed better than the student controls (see average of all stimuli, $p < .05$). When the pacing stimuli were considered separately, IF synchronized significantly better than student controls only with the metronome ($p < .05$).

Results: Metronome



- IF synchronized better than matched controls at all tempos ($p < .05$).
- IF performed more accurately as compared to the students' average synchronization accuracy. Yet, only the difference with 200-ms IOI attained significance ($p < .05$).

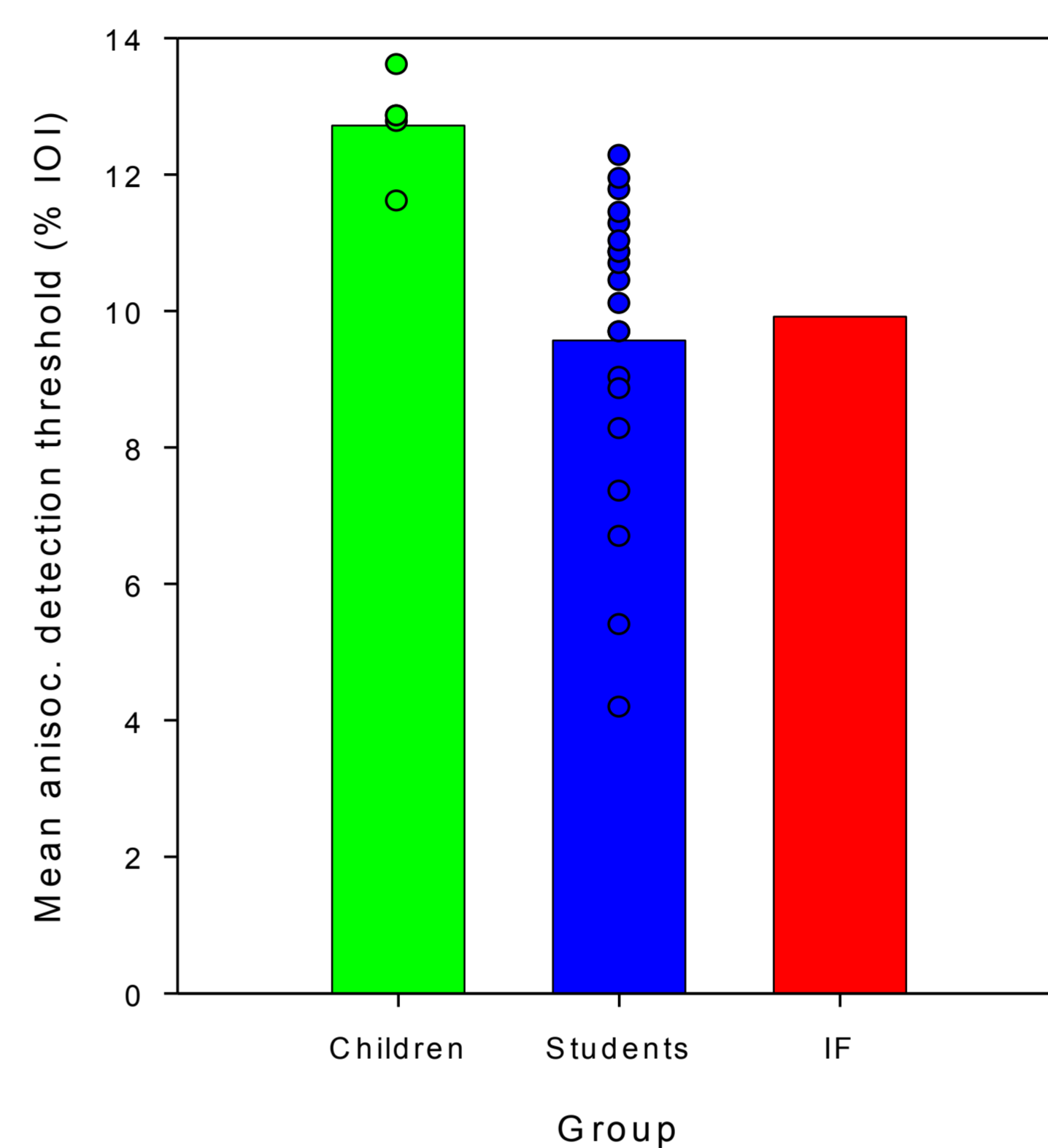
Conclusions

IF exhibited higher accuracy in sensorimotor synchronization tasks with respect to matched controls. Moreover, his performance with different pacing stimuli was either comparable or more accurate than the performance of adult controls.

IF's sensitivity to anisochronies was higher (i.e., the detection threshold was lower) as compared to matched controls. However, his performance in the anisochrony detection task was comparable to the threshold shown by adult non-musicians.

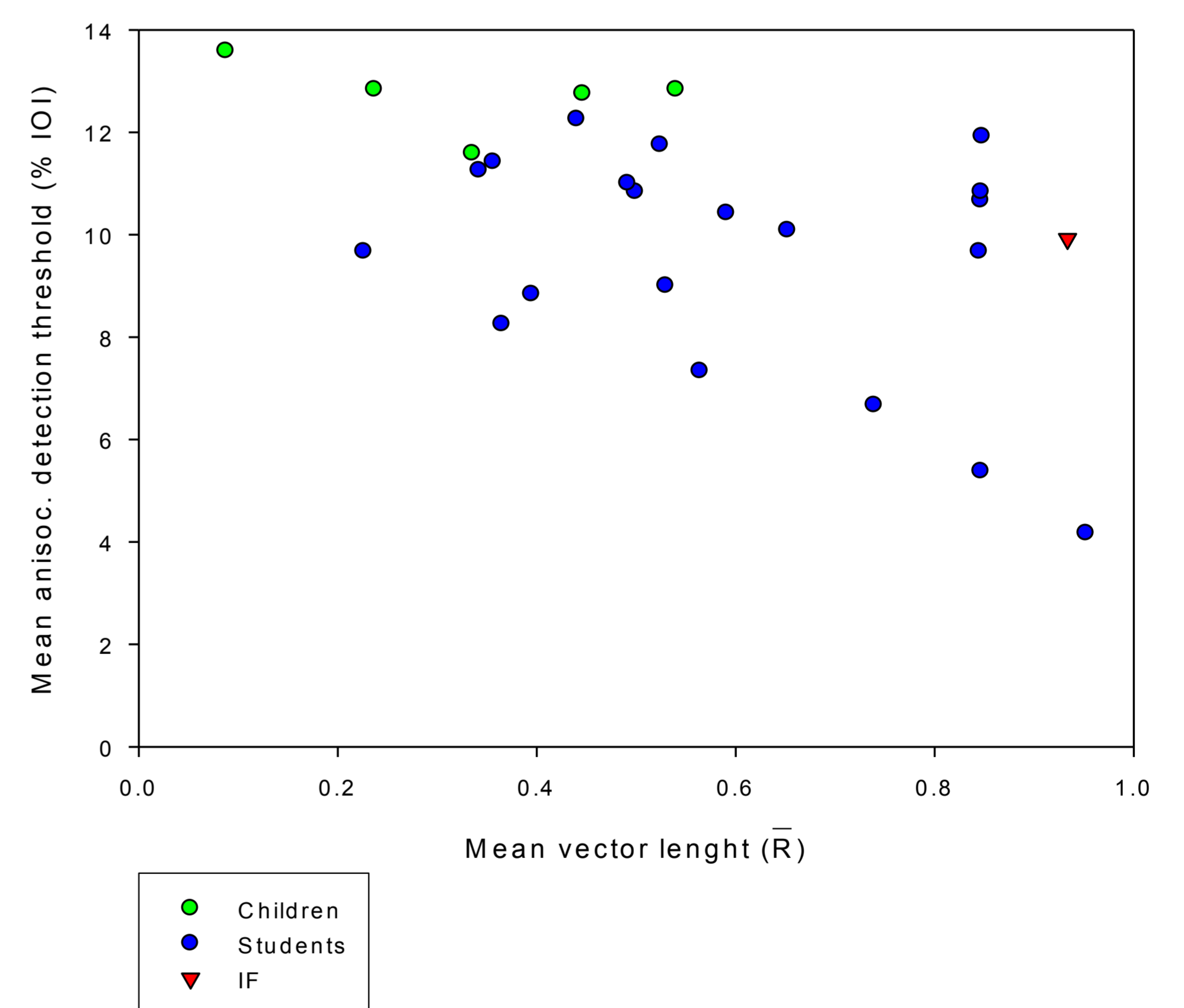
IF's advantage in synchronization cannot be fully ascribed to his ability to perceive anisochronies.

Results: Anisochrony detection



- IF's detection threshold was lower as compared to matched controls ($p < .05$).
- Still, IF's detection threshold was comparable to the threshold exhibited by student controls.

Results: Synchronization (all stimuli) vs. anisochrony detection



References

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