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Information throughput in healthy individuals who are comparable in age and gender with persons with stroke.

Tifenn Fauviaux, Germain Faity, Denis Mottet

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Information throughput in healthy individuals who are comparable in age and gender with persons with stroke.

01 INTRODUCTION

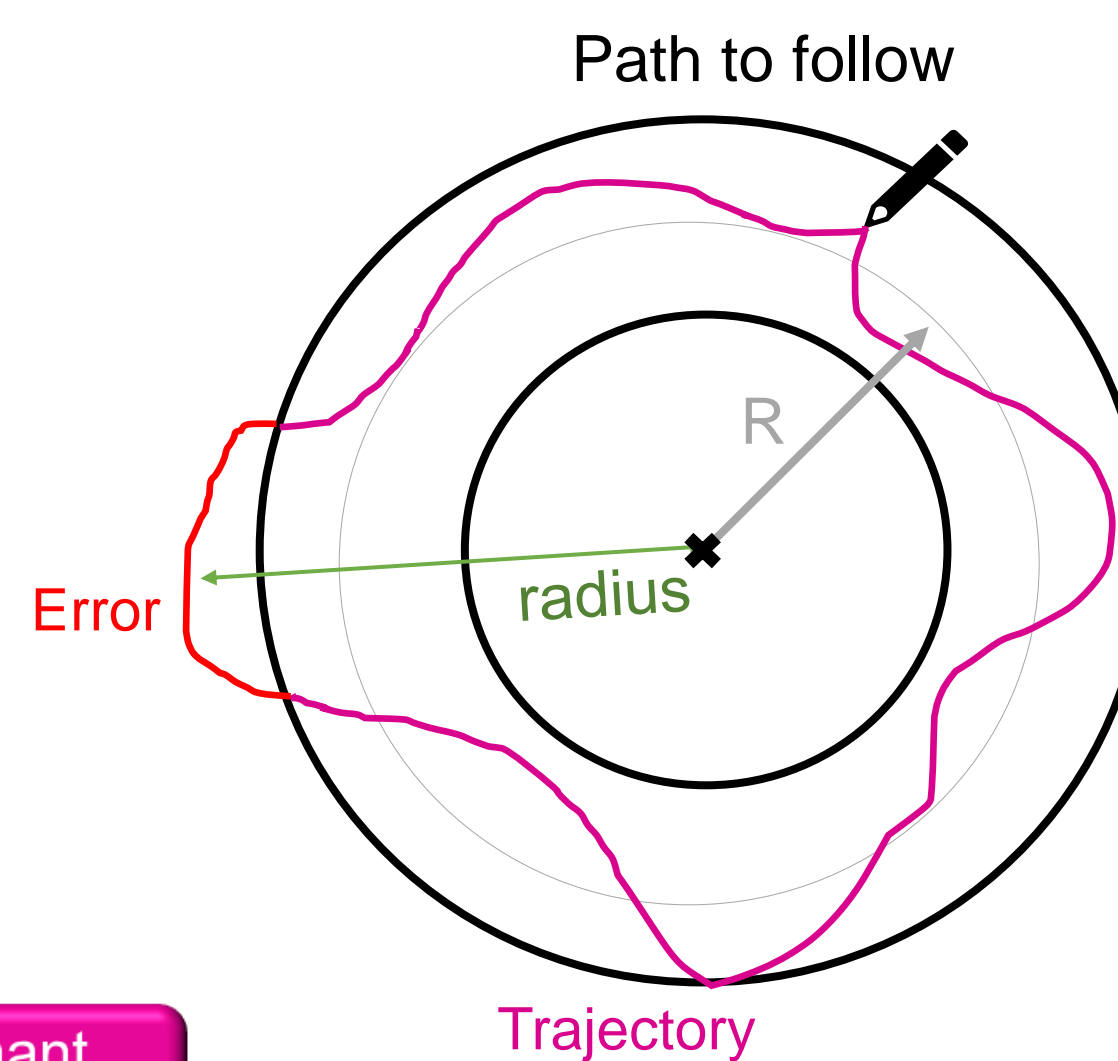
- ▶ Stroke limits the capacity of the central nervous system to integrate sensory inputs for the execution of specific voluntary movement in response to task demands. Functional limitations are usually quantified with clinical scales, but it is unclear how clinical scores relate to the integration of sensory feedback into motor control loops.
- ▶ We use a circular steering task to quantify the effectiveness of continuous visuomotor feedbacks in goal-oriented behaviors.

Objective : Provide baseline values in a population of healthy individuals who are comparable in age and gender with persons with stroke.

METHODS

19 Healthy volunteers were recruited into 2 groups: [>75 years old]; [≤ 75 years old].

Each participant had to follow a circular path as fast as possible with 2 to 6% of errors. They performed a total of 20 trials (20s each), organized into 2 blocks x 2 hands x 5 repetitions

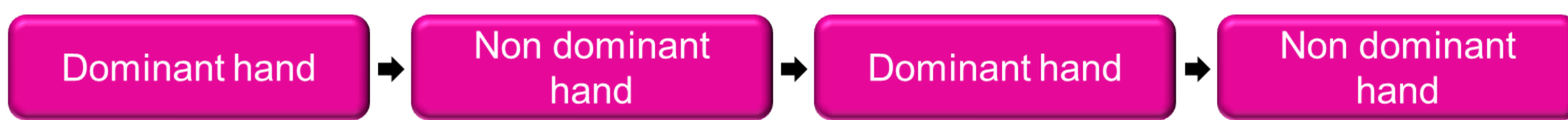


THE CIRCULAR STEERING TASK :

- ▶ We measured the **Index of Effective Performance** (I_{Pe}, in bit/s), which measure the effectiveness of visuomotor feedback.

$$I_{Pe} \text{ (bits/sec)} = \frac{\text{Index of Effective Difficulty (IDe)}}{\text{Movement Time (MT)}}$$

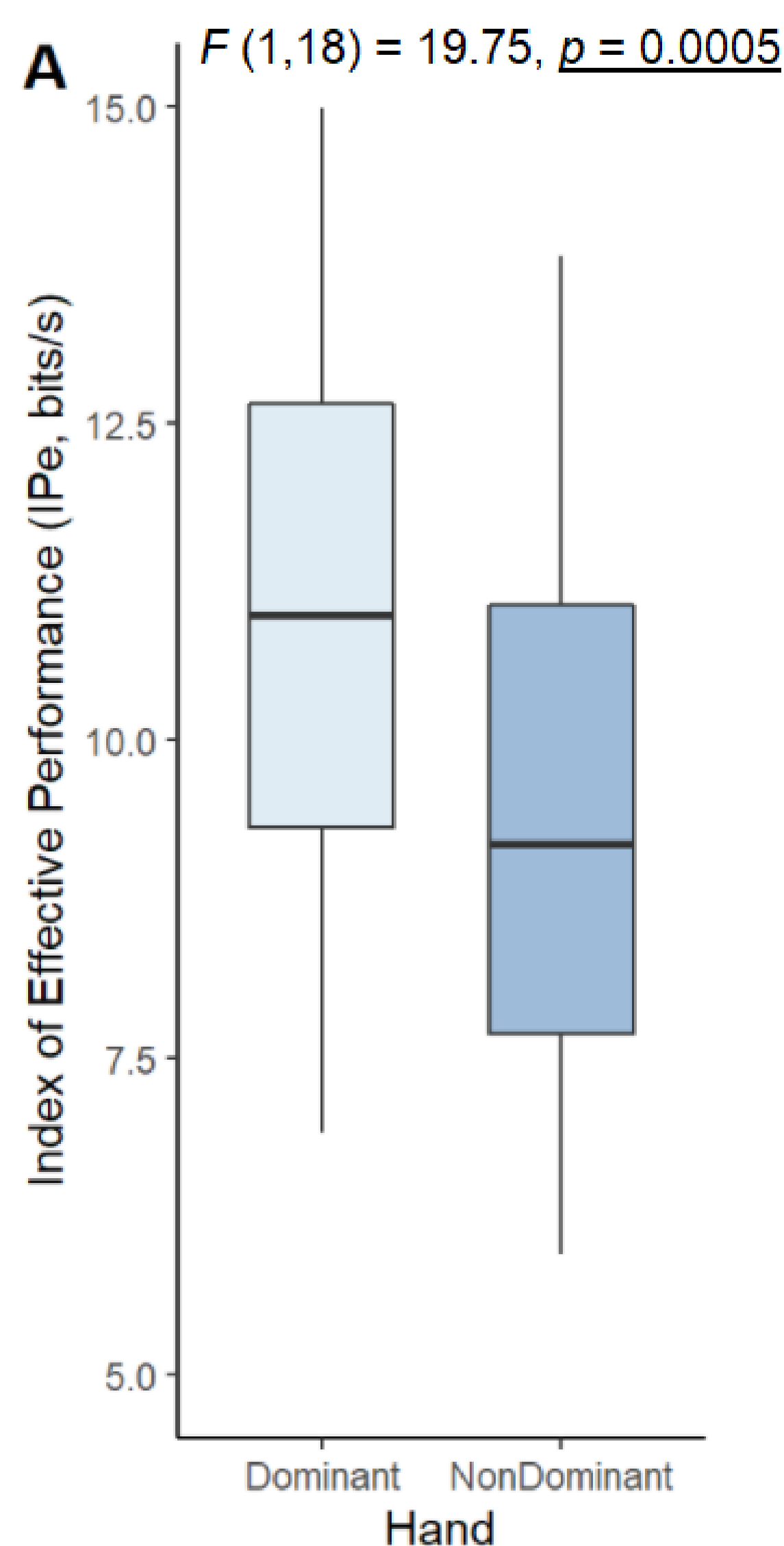
$$I_{De} \text{ (bits)} = \frac{2\pi * R}{\text{Standart Deviation of the radius}}$$



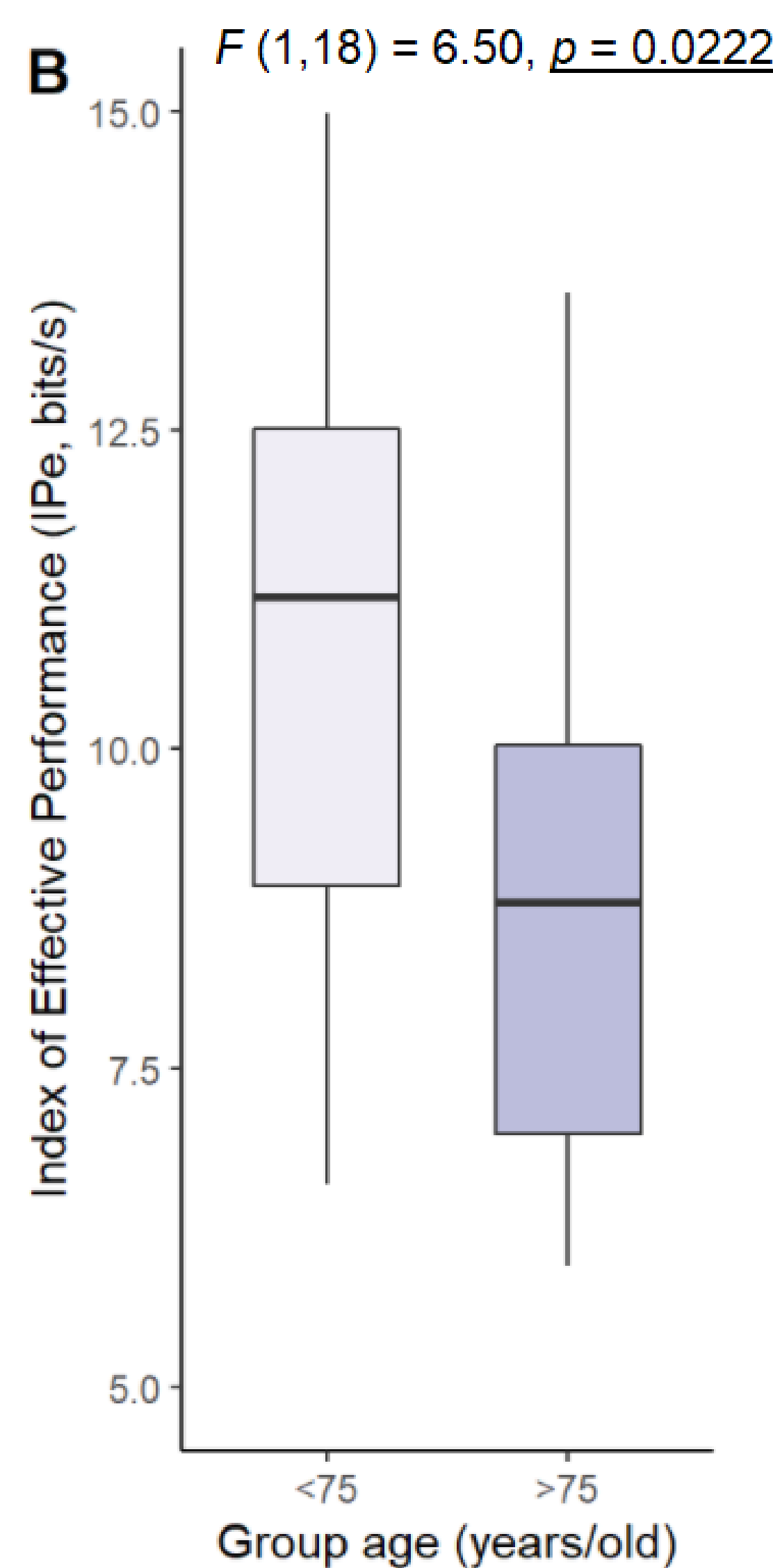
RESULTS

For the effectiveness of visuomotor feedbacks:

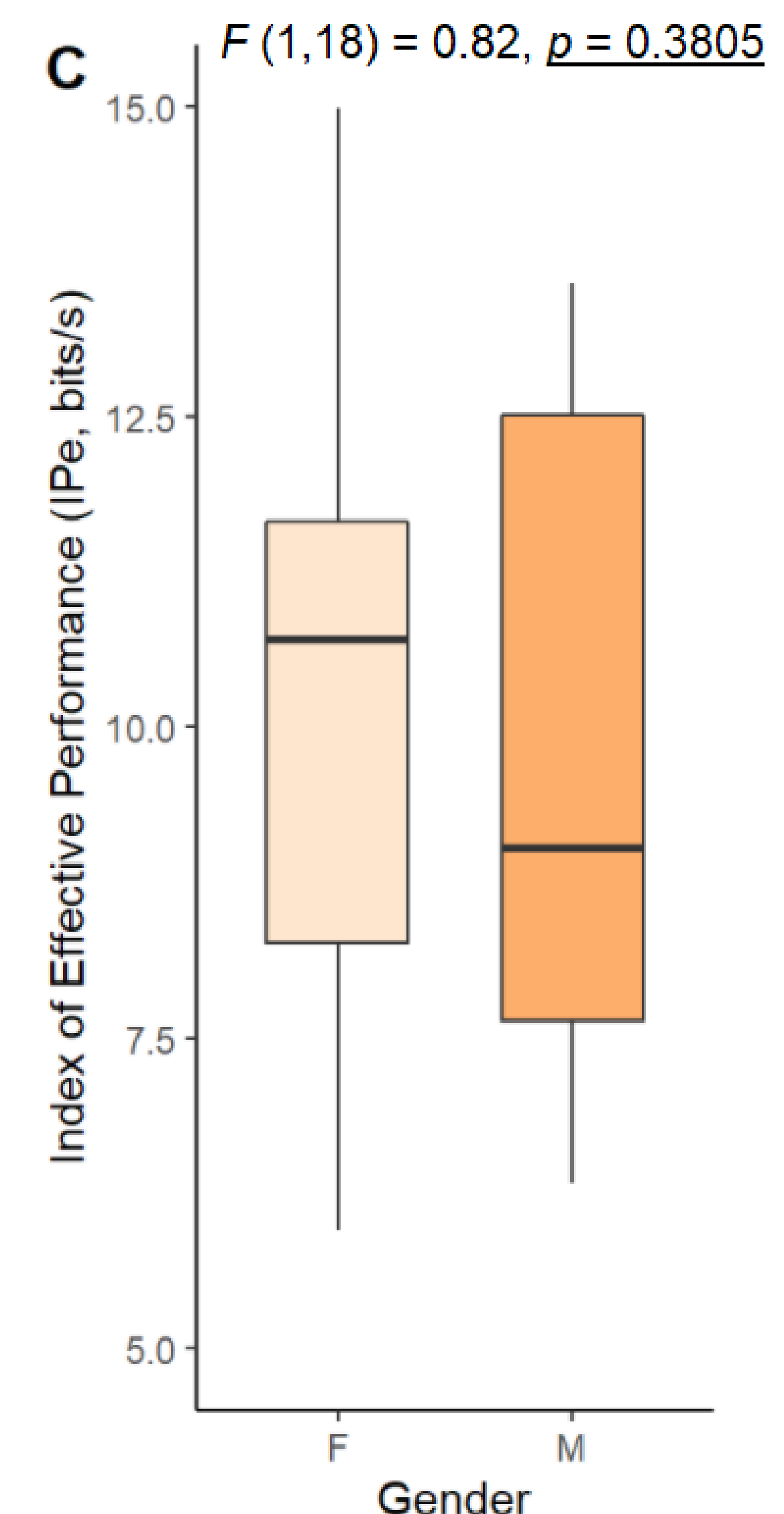
Hand side matters



Age matters



Gender does not matter



04 Discussion

These preliminary results need to be supplemented with a larger number of participants to define age- and gender-specific norms for comparison with individuals with stroke.

05 Conclusion

The index of effective performance in a circular steering task quantifies the information throughput, which is a probe into the effectiveness of visuomotor feedbacks.

Reference values in healthy people will help quantifying the possibilities of improvement for each patient, to guide therapists in the rehabilitation strategy of motor control of the upper limbs after stroke.

References

- Edwards, L. et al. *Front. Integr. Neurosci.* **2009**, 13,16
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Contact

- tifenn.fauviaux@etu.umontpellier.fr
 germain.faity@umontpellier.fr
 denis.mottet@umontpellier.fr

