

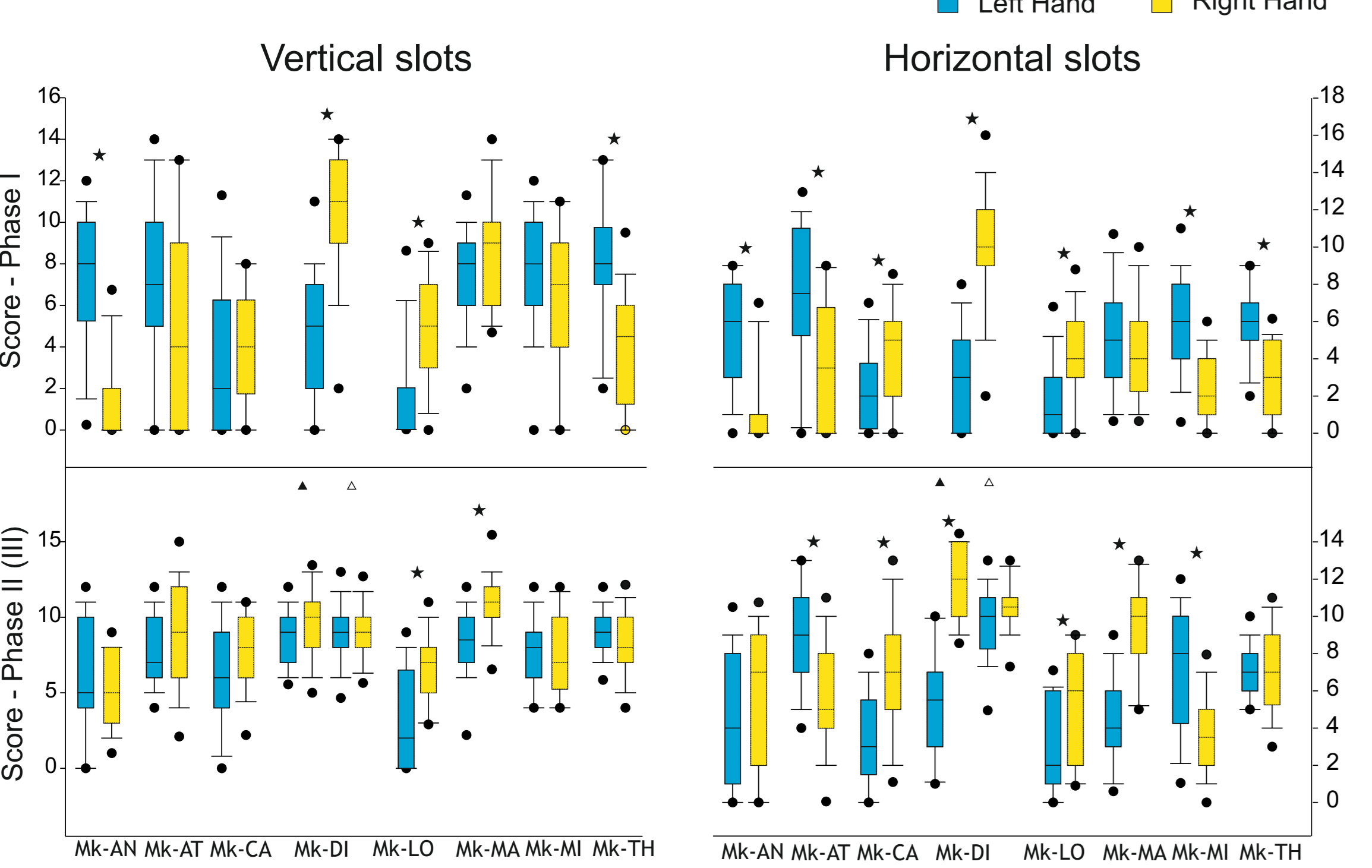
INTRODUCTION

About 90% of human beings are right-handers and have a left hemisphere specialization for manual function.

The goal of the present study was to investigate handedness in macaque monkeys, an animal model exhibiting manual dexterity comparable to humans (see Lemon, 2008). How does handedness in macaques compare to humans for comparable motor tasks? A further aim was to refine the concept of handedness.

We chose for this study to distinguish two attributes of handedness: 1) the **hand dominance**, which reflects the manual dexterity, namely the hand with the best efficacy to do a particular motor task; 2) the **hand preference**, defined as the hand with which the subject prefers to work on a specific task.

RESULTS 2



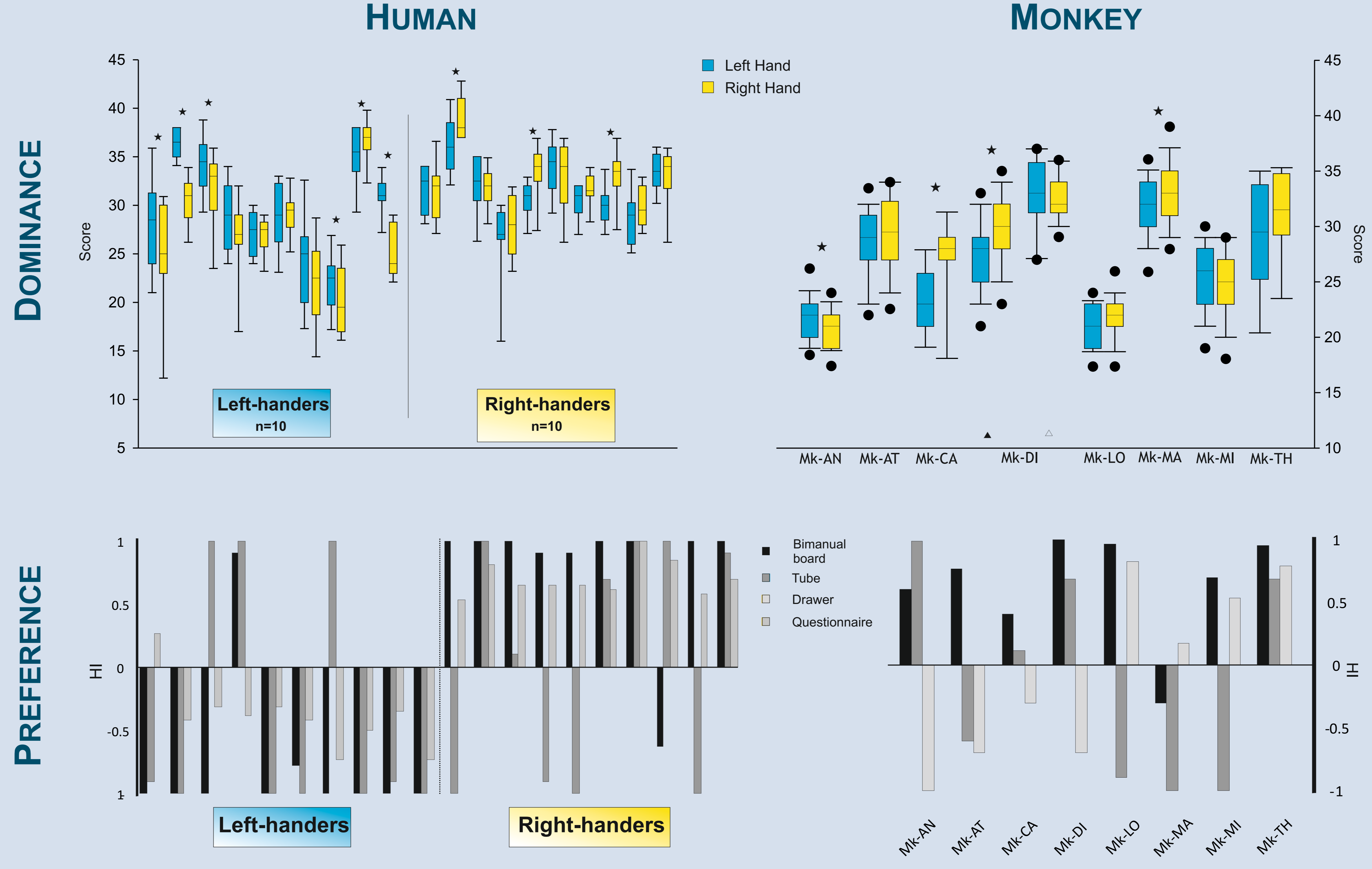
Supplementary results related to hand preference in monkeys: score in the modified Brinkman board task when both hands were free.

Different phases correspond to different strategies at different time points.

First Phase: statistically significant difference for the score in four monkeys for the vertical slots and in seven monkeys for the horizontal slots.

Second (third) phase: two monkeys showed a hand preference for the vertical slots, whereas the majority of monkeys had a significant preference for one particular hand in the horizontal slots.

RESULTS 1

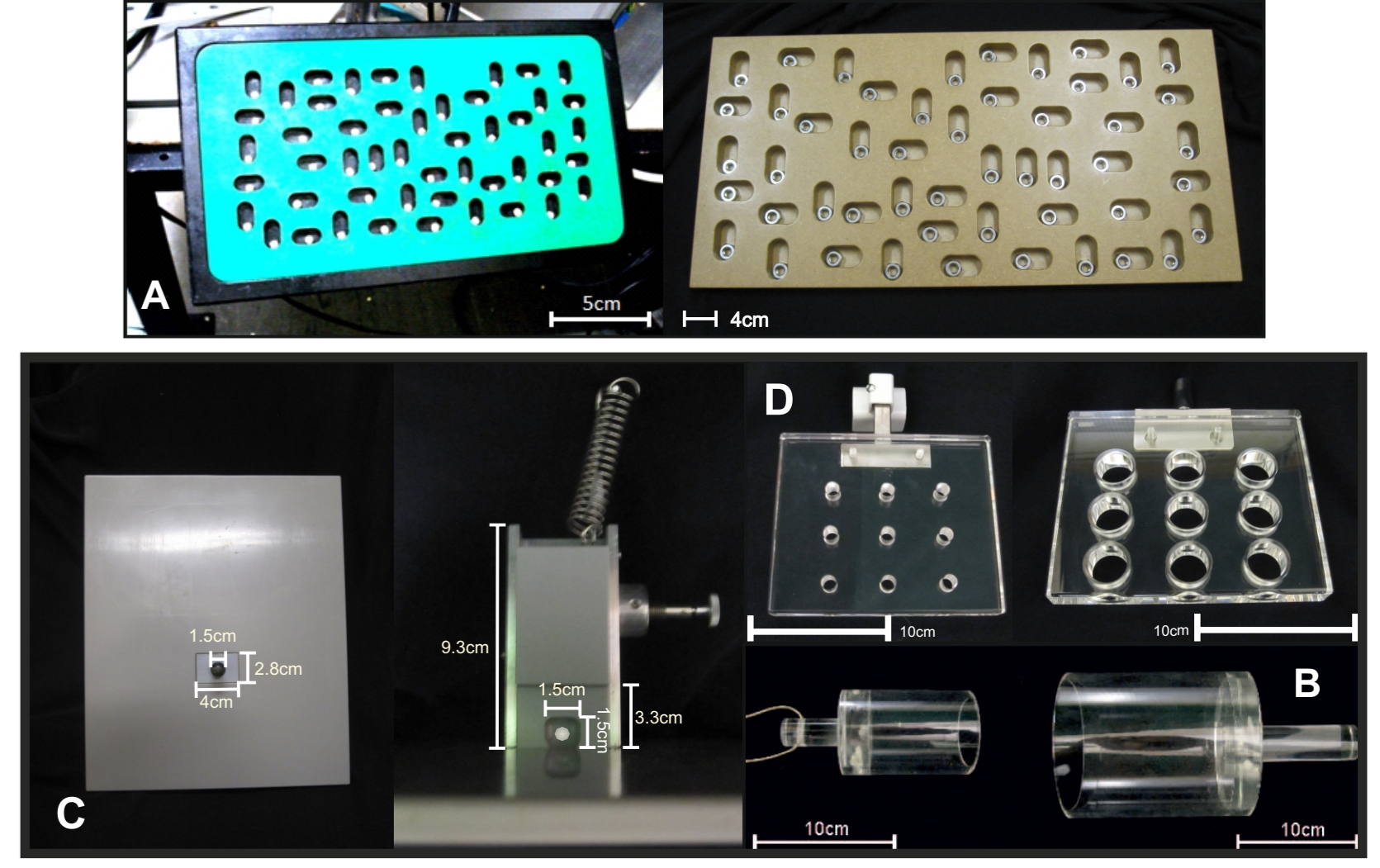


Hand dominance
Nine human subjects (6 left-handed and 3 right-handed) exhibited a hand dominance, as they showed a better score in the modified Brinkman board task with one hand (* $p < 0.05$, mainly consistent with their self-assessed handedness), when the choice of the hand used was imposed.
In comparison, a hand dominance (* $p < 0.05$) was found in four monkeys out of eight animals. Generally, human subjects and monkeys have comparable manual dexterity and, as shown here, comparable hand dominance.

Hand preference
The results in human subjects are very consistent with their self-assessment. Indeed, for most of the subjects ($n = 17$) the preferred hand for the different tests corresponded to the hand they use to write (exceptions with the tube tasks).
Contrary to human subjects, the results for the hand preference in monkeys were very disparate. There was no systematic hand preference among all the tasks performed for each monkey, except one, Mk-TH. Despite this disparity, almost each monkey showed an individual hand preference for each task (clear bias for one hand except for Mk-CA, the tube task).

METHODS

- Human: 20 Subjects (10 left-handers/ 10 right-handers)
Monkeys: 8 Macaque monkeys (*M. fascicularis*)
Tasks:
A. Modified Brinkman board task (**score established for each hand during 30 sec.**)
B. Tube task
C. Reach and grasp drawer task (monkeys only)
D. Bimanual board task
Questionnaire (human only)



DISCUSSION

Hand dominance
Comparable results in both species; comparable manual dexterity.

Hand preference
Human being: results are largely coherent with the self-estimation, though with exceptions for the tube task.
Macaque monkeys: individual-level (no cohort bias), linked to each different task.

Question
Is the tube task an adequate test to determine hand preference? Our results do not allow to respond to this for the moment. As this task shows such disparate results, more subjects (human and non-human) are needed.

Limits of our experiment
We compare for the first time handedness in human subjects and in non-human primates for the same tasks directly, but these manual tasks may not be the most relevant in both species.

CONCLUSION

The present study provides preliminary evidence that despite a relative similar hand dominance, hand preference is substantially different between macaques and human subjects, with a large disparity in the former and more consistency in the latter.