

## BODY OWNERSHIP ILLUSION ON ROBOT'S HANDS

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### ORIGINAL PAPER:

Humanlike robot hands controlled by brain activity  
arouse illusion of ownership in operators

### REFERENCE:

Alimardani, M., Nishio, S., & Ishiguro, H. (2013) Humanlike  
robot hands controlled by brain activity arouse illusion  
of ownership in operators. *Scientific Reports*, 3; 2396.

### PROJECT CREATED FOR THE CLASS:

Visual thinking & composition, winter, 2019.  
Tilburg University, department of communication and cognition

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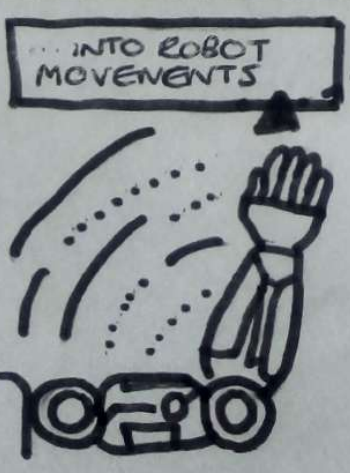
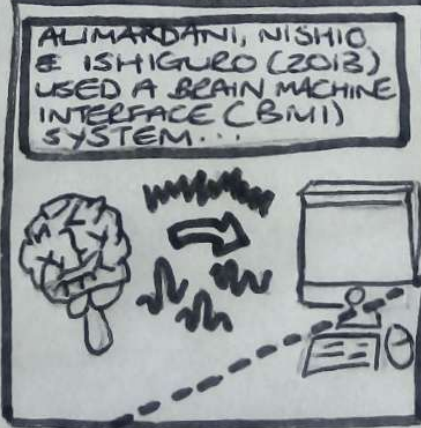
WHAT IS THE RELATIONSHIP BETWEEN BODY AND MIND?



HOW WE IDENTIFY OUR BODY...



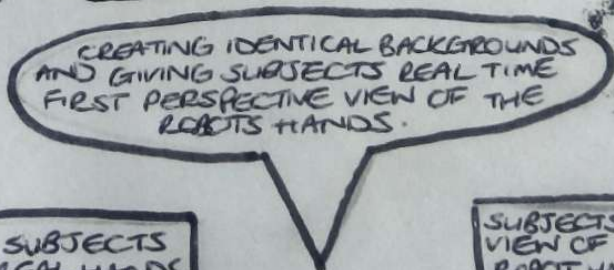
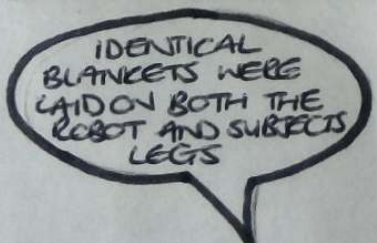
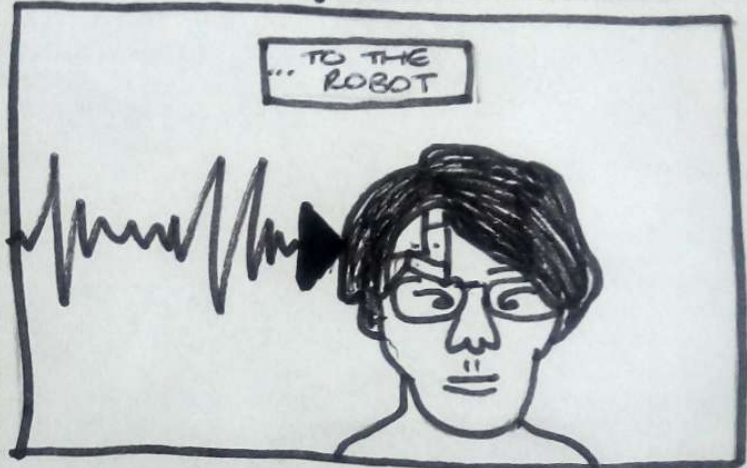
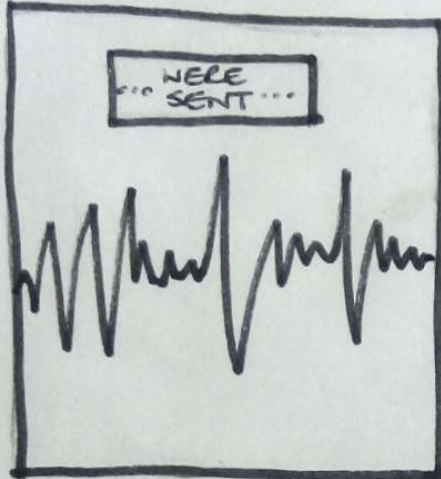
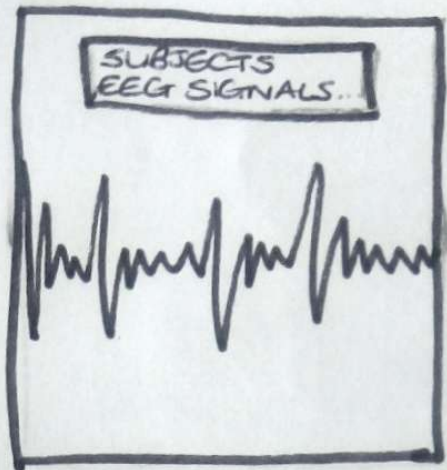
... IS AN ISSUE THAT HAS FASINATED MANY PHILOSOPHERS AND PSYCHOLOGISTS THROUGHOUT HISTORY.



SUBJECTS WERE EEG CAPS TO RECORD ELECTRICAL PATTERNS IN THE BRAIN









SUBJECTS WOULD IMAGINE GRASPING A BALL.



...BUT WOULD NOT MOVE THEIR OWN HANDS.



INSTEAD, SUBJECTS WOULD SEE THE ROBOTS HANDS PERFORMING THE MOVEMENTS THEY WERE IMAGINING.

HOWEVER, IN THE CONTROL CONDITION THE ROBOTS HANDS REMAINED STILL.



AT THE END OF EACH TEST A SYRINGE WAS INSERTED INTO THE ROBOT HAND



... WHICH SUBJECTS WITNESSED A FIRST PERSPECTIVE VIEW OF THROUGH THE HEAD MOUNTED DISPLAY.



AFTER THE EXPERIMENT SUBJECTS WERE ASKED TO ANSWER QUESTIONS ABOUT THEIR EXPERIENCE

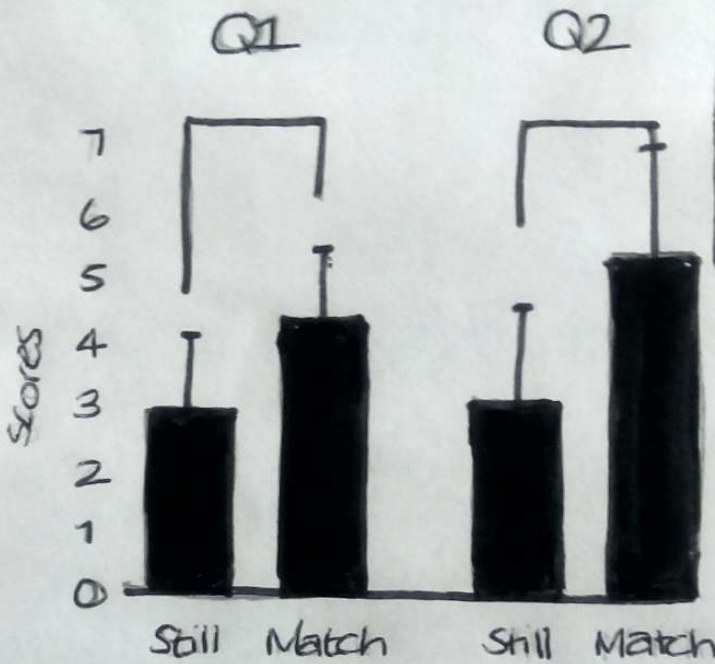




QUESTION 1:  
WHEN THE ROBOT'S HAND WAS INJECTED DID IT FEEL AS IF IT WAS YOUR OWN HAND RECEIVING THE INJECTION?



QUESTION 2:  
THROUGHOUT THE ENTIRE SESSION WHILE YOU WERE OPERATING THE ROBOT'S HAND DID YOU FEEL AS IF THEY WERE YOUR OWN HANDS?



RESULTS SHOW THAT SUBJECTS REACTIONS TO A PAINFUL STIMULUS WERE SIGNIFICANTLY STRONGER IN THE MATCH CONDITION IN WHICH THE ROBOT HANDS MOVED TO THOUGHTS



RESULTS INDICATE THAT BODY OWNERSHIP CAN BE TRANSFERRED TO ROBOT HANDS EXCLUSIVE OF PROPRIOCEPTIVE FEEDBACK FROM SUBJECTS ACTUAL MOVEMENTS



REFERENCES:

ALIMARDANI, M, NISHIO, S & ISHIGURO, H (2013) HUMAN-LIKE ROBOT HANDS CONTROLLED BY BRAIN ACTIVITY AROUSE ILLUSION OF OWNERSHIP IN OPERATORS SCIENTIFIC REPORTS, 3, 2396.

THESE ROBOT HANDS ARE MY HANDS I HAVE ROBOT HANDS. HMM... MAKES YOU THINK!

A COMIC BY TELI-LOUISE GRASSOW