



How can touch affect embodied thought?

Suvo Mitra
Nottingham Trent University, UK

"Touch is essential to maintain concentration and focus, gives muscle tone and fluency of movement and allows you to sort the thoughts."

"I have to repeat actions hundreds of times to learn them well enough for them to become automatic, without the need to think about them. I don't know why I don't need to do this with facilitation. I really believe that the touch is a trainer of complex cerebral systems."

"The facilitation touch allows me to collect and organise my thoughts and their flow becomes ordered.

My brain is like an infinite, frenetic Sufi dance and it stops gently with the friendly, solid touch."

What a beautiful, crisp morning in the company of my favourite people

HEARING

SMELL

VISION

TOUCH



Habby Khalil

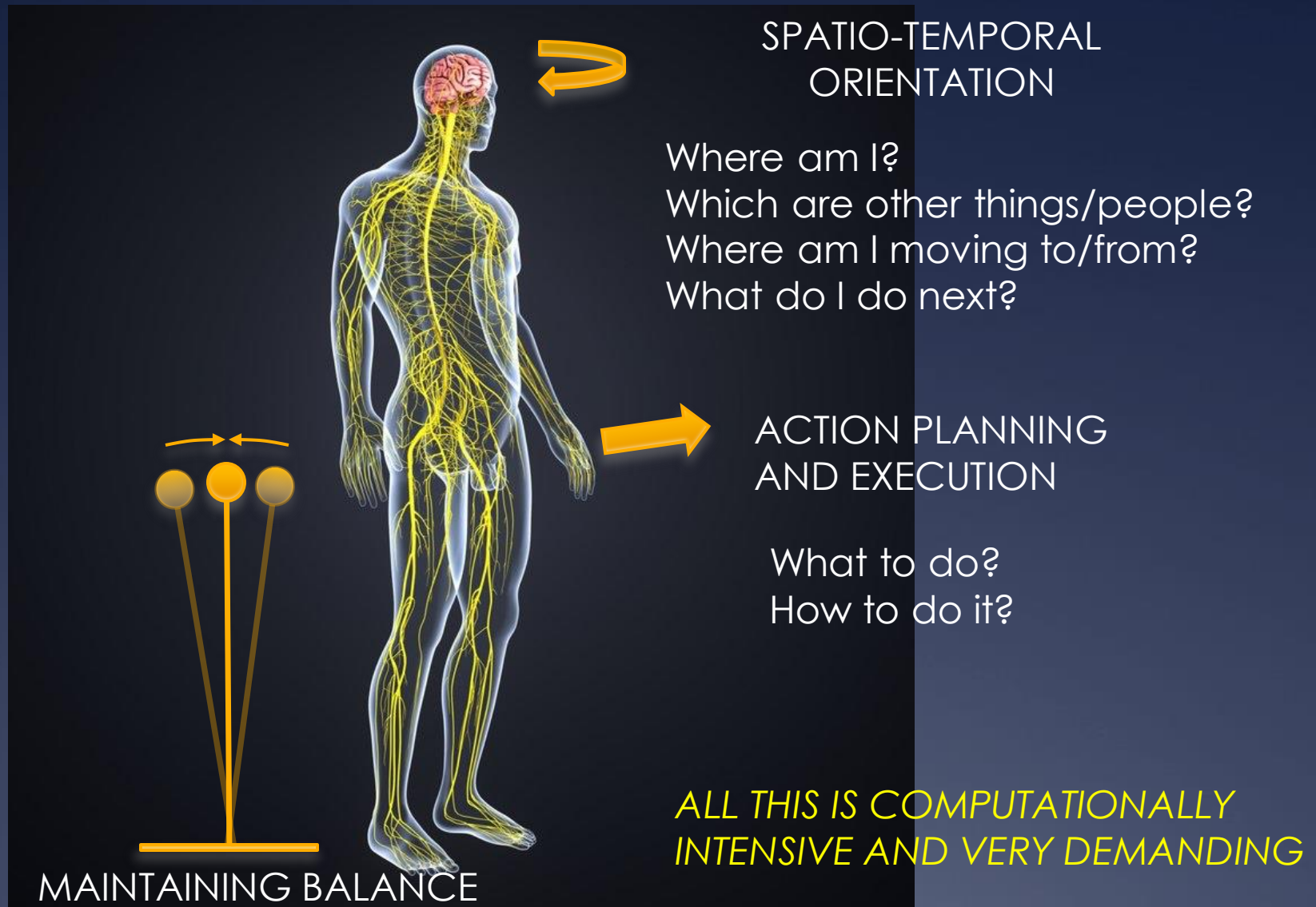
<https://www.thephoblographer.com/2016/04/08/life-as-pire-first-person-photo-series/>



WITHOUT THIS STABLE, COORDINATED AND RESPONSIVE 'SELF', OUR
EXPERIENCE WOULD BECOME DISORGANISED

SO WHAT DOES IT TAKE TO MAINTAIN THIS PHYSICAL 'SELF'?

MAINTAINING THE PHYSICAL 'SELF'



MAINTAINING THE PHYSICAL 'SELF'

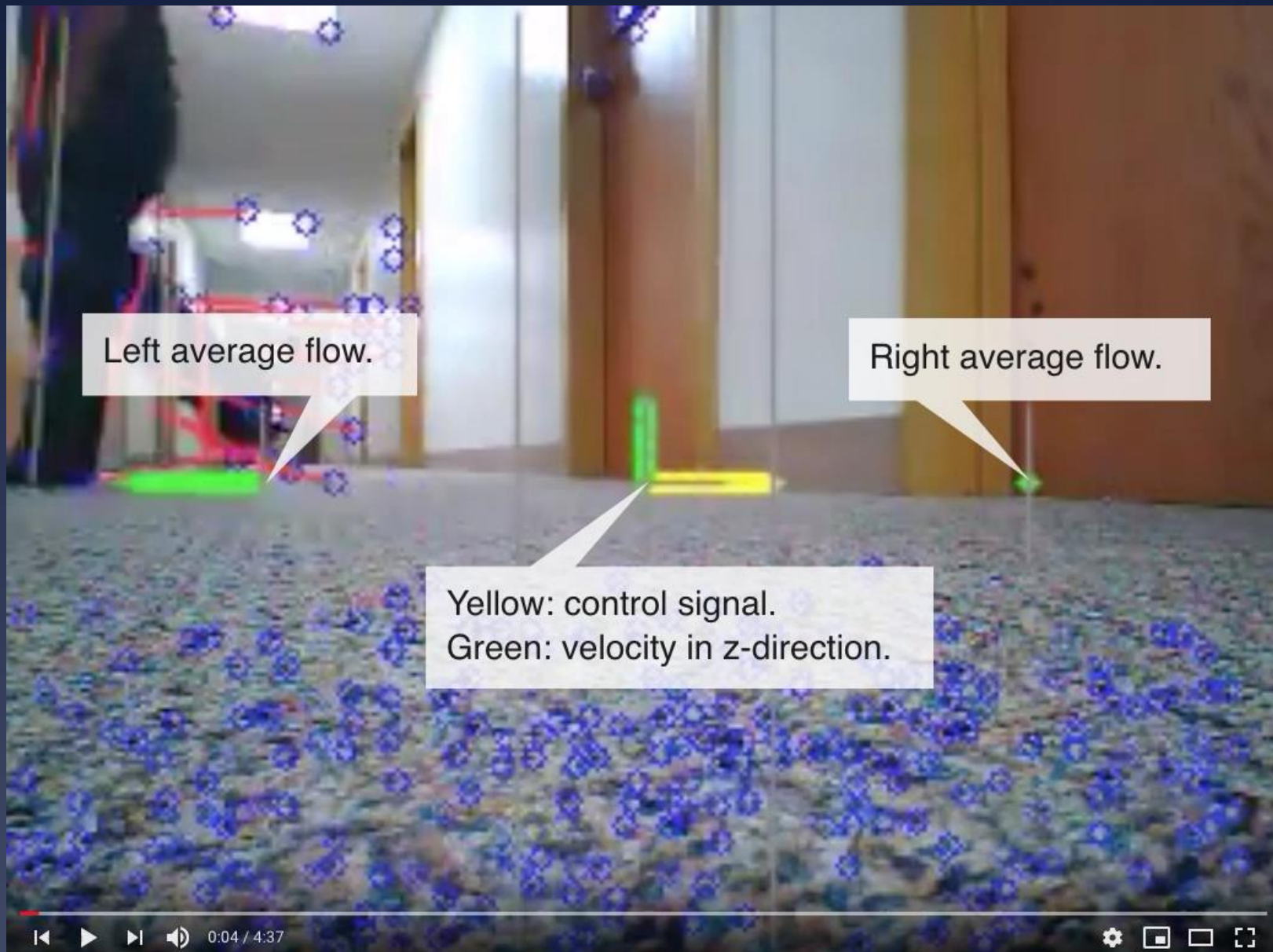


SPATIO-TEMPORAL
ORIENTATION

SEPARATE THE PERCEPTUAL
CONSEQUENCES OF SELF-MOTION
FROM THE PERCEPTUAL SIGNALS
THAT ARISE FROM MOTION IN THE
WORLD

LET US LOOK AT THIS FOR VISION





Yutaka Tsutano

https://www.youtube.com/watch?v=V4r2HXGA8jw&list=PLo1wvPF7fMxTSlaFoHgje__z4aAE2SFWL

MAINTAINING THE PHYSICAL 'SELF'



SPATIO-TEMPORAL
ORIENTATION

HOW CAN OUR SENSE OF TOUCH
HELP?

TOUCH AND BODY SENSE



MAINTAINING THE PHYSICAL 'SELF'

VISUAL

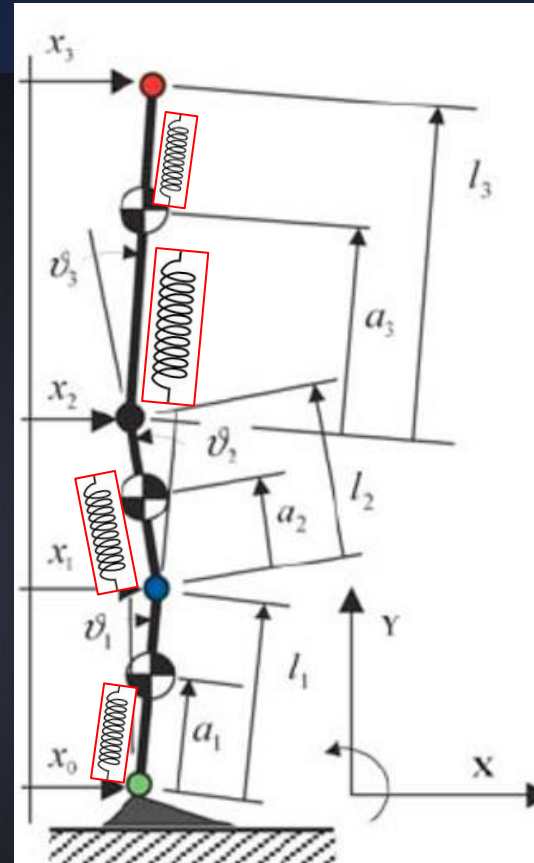
VESTIBULAR

PROPRIOCEPTIVE

- Muscles and joints
- Touch
 - Cutaneous
 - Dynamic



MAINTAINING BALANCE



Assemble and operate large-scale neuromuscular synergies

Continuously detect stability

Continuously make adjustments

HOW CAN CUTANEOUS TOUCH HELP?

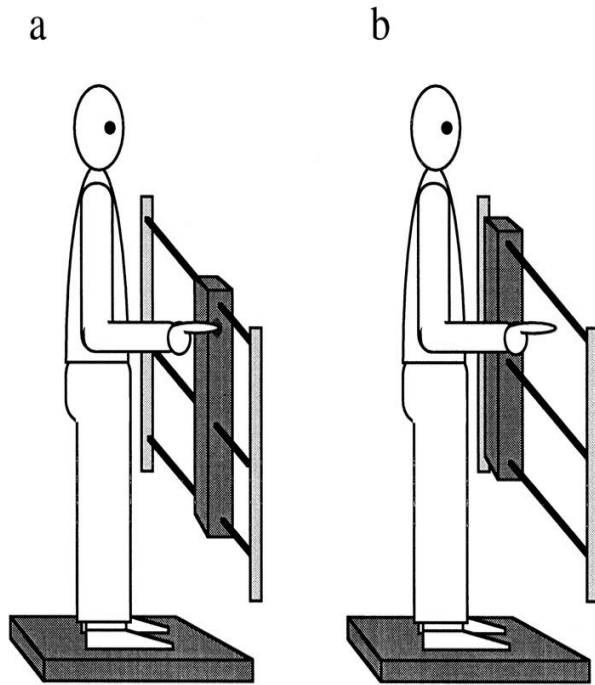
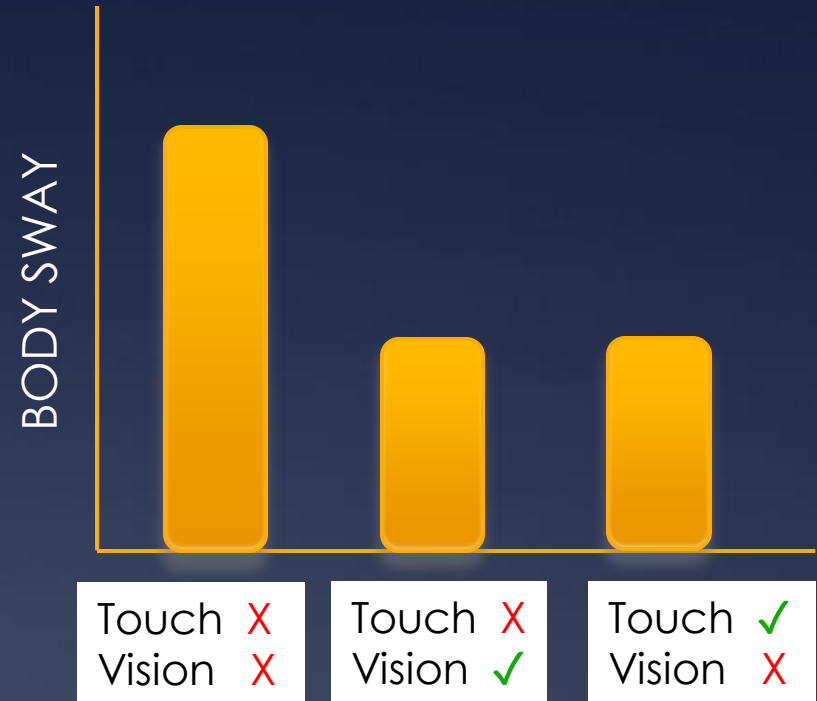


Fig. 1a, b Experimental apparatus. A foam block was mounted on horizontal dowels attached to supportive wooden end-pieces. Subjects stood with the forearm roughly parallel to the ground and touched the side of the foam with the right index finger (a). The foam could be slid along the dowels so as to be out of the way in no touch (but identical three-space fingertip coordinates) conditions without greatly altering the field of view (b)



LIGHT TOUCH WAS COMPARABLE TO VISION IN ITS STABILIZING EFFECT ON THE BODY

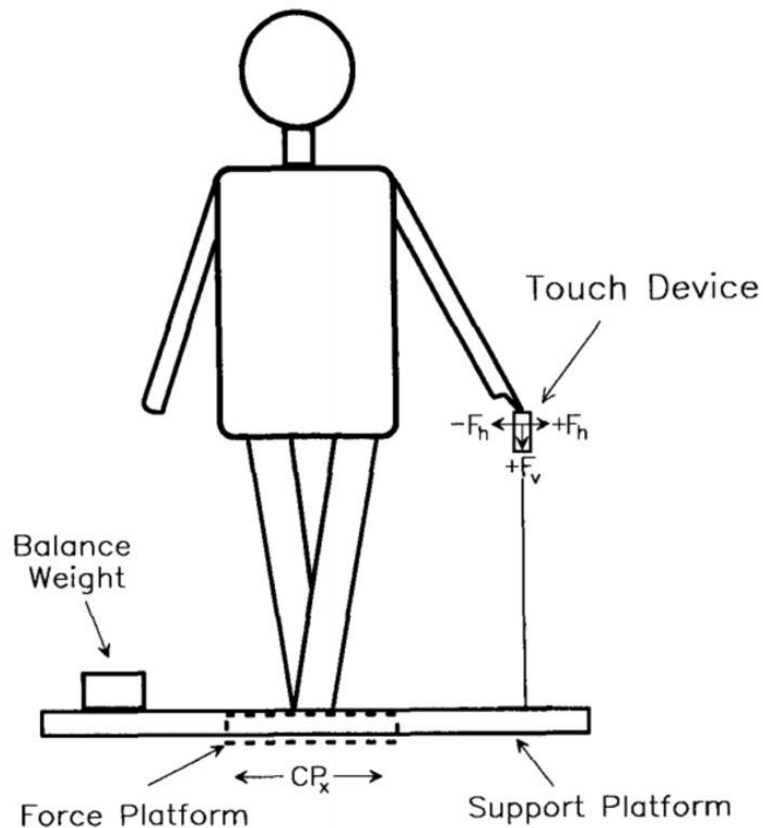


Fig. 1 Subject depicted in tandem Romberg posture on the force platform in the touch (VT, DT) and force (VF, DF) contact conditions with the right index fingertip on the touch bar. In the no contact (V, D) conditions, the subject's arms hung passively by his or her side

- Light touch ($<.98$ N) just as effective as forceful touch or vision in stabilizing body sway
- During forceful touch, the body swayed in phase with finger force:
 - Touch counteracted body sway
- During light touch, there were longer time delays between finger force and body sway:
 - Touch provided information to guide anticipatory muscle activation

MAINTAINING THE PHYSICAL 'SELF'

VISUAL

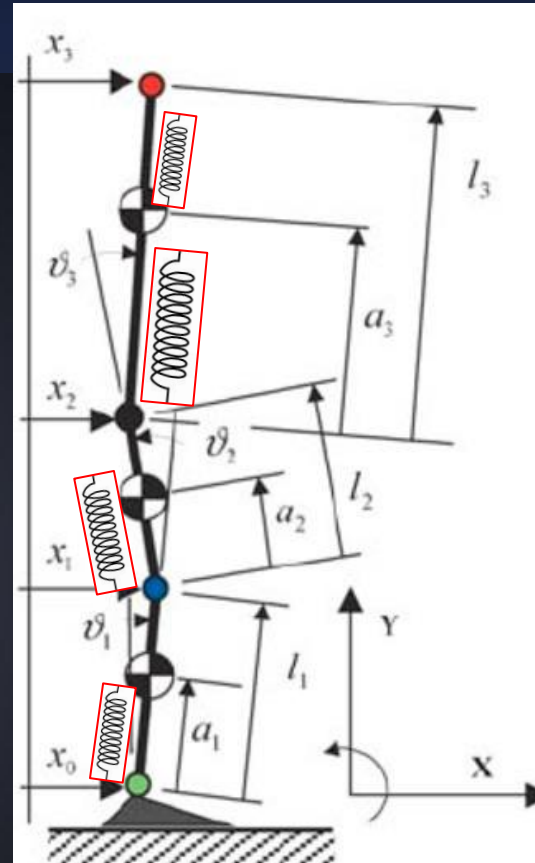
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ALL THIS PLACES A SIGNIFICANT LOAD ON THE NERVOUS SYSTEM AND INTERFERES WITH MENTAL TASKS

Posture control and cognition

Dual-task studies



* Reviews:

- * Fraizer & Mitra (2008)
- * Al-Yahya et al. (2011)

REMEMBER: STATIC BALANCE IS
THE EASIEST SCENARIO

DYNAMIC BALANCE



COMPUTE AND PERFORM
THE TASK

KEEP BALANCE AND SUPPORT
THE TASK

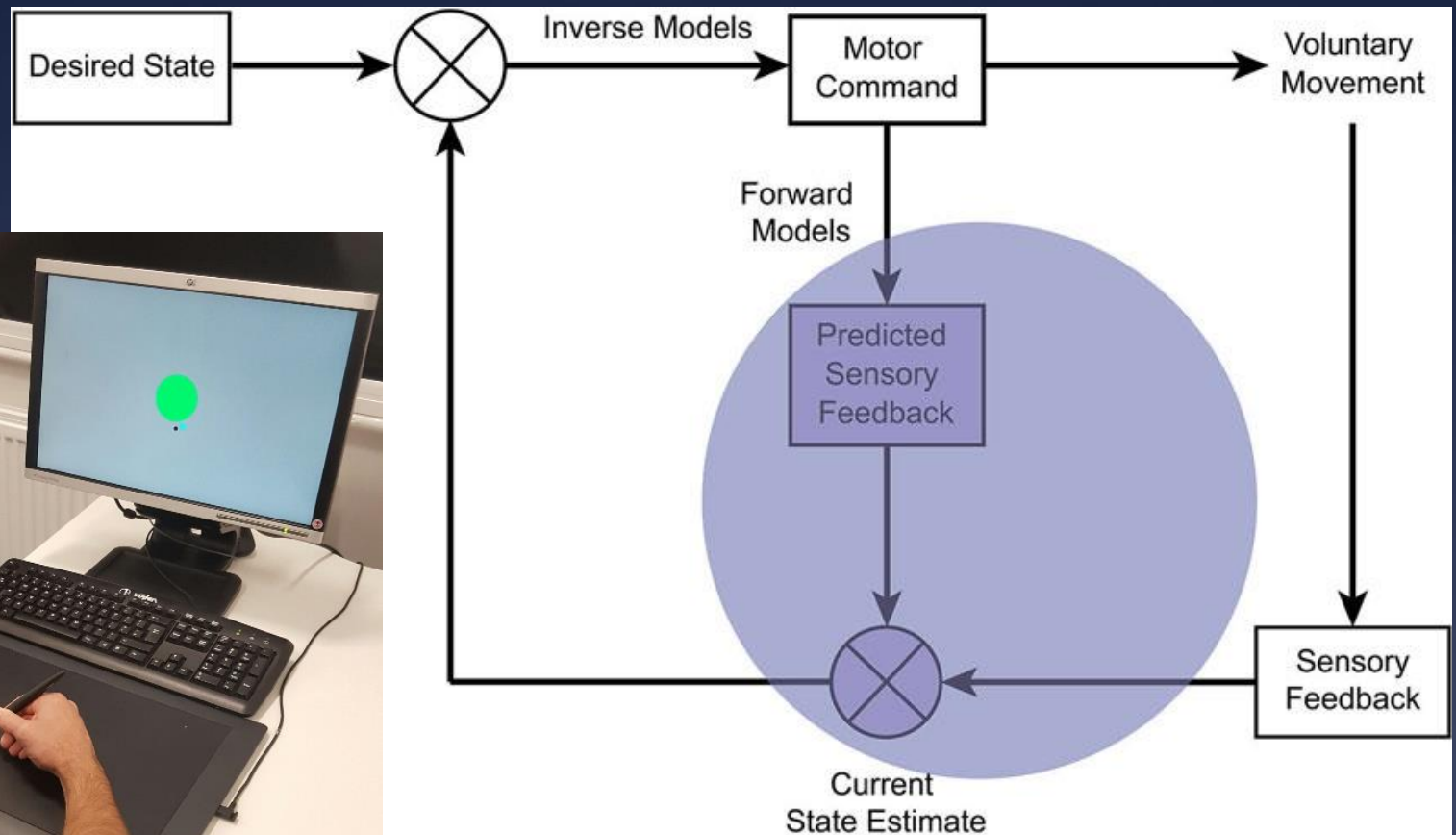
MAINTAINING THE PHYSICAL 'SELF'



ACTION PLANNING
AND EXECUTION

What to do?
How to do it?

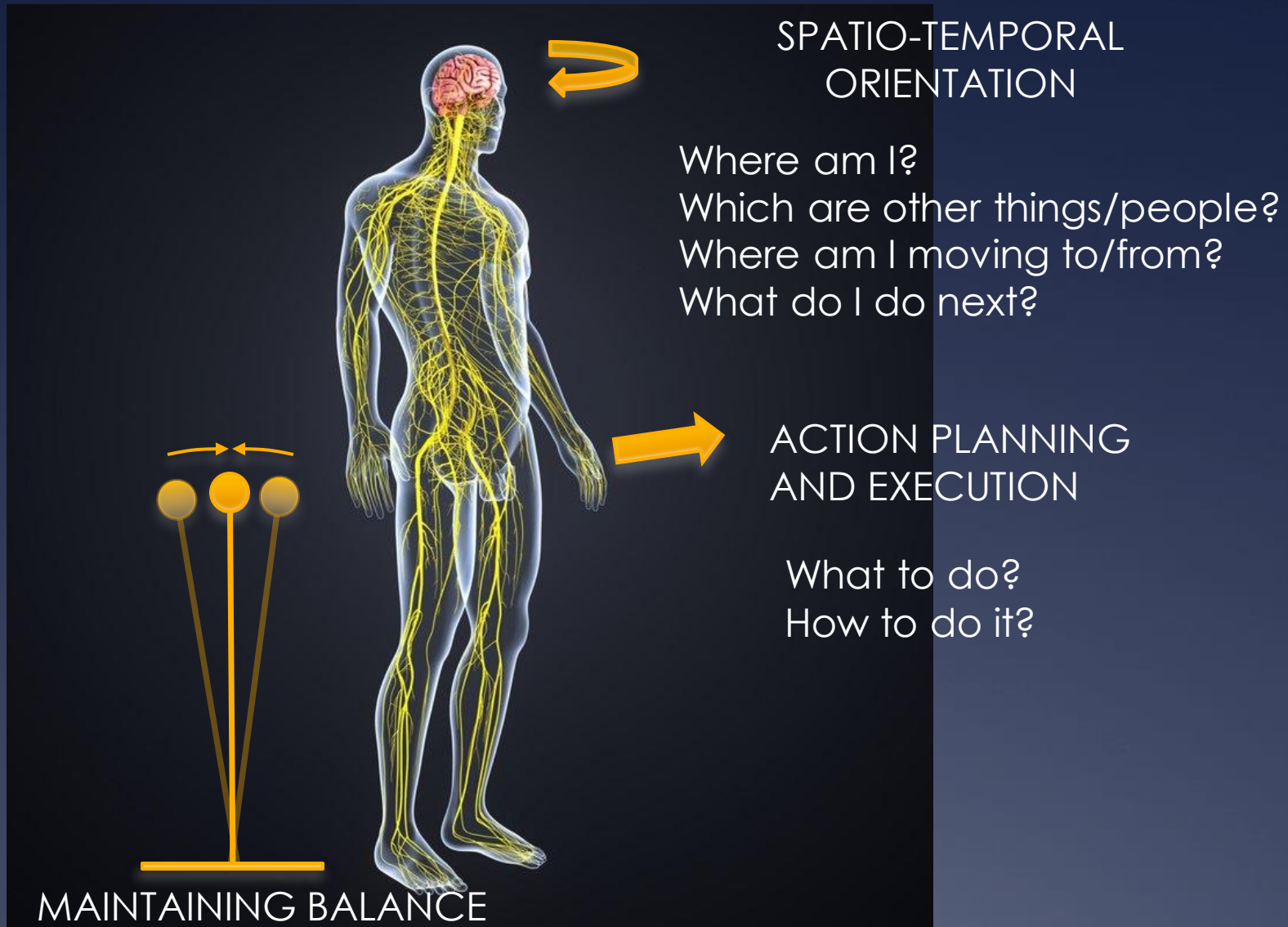
INTERNAL MODELS IN MOTOR CONTROL



Wolpe and Rowe, 2014



MAINTAINING THE PHYSICAL 'SELF'

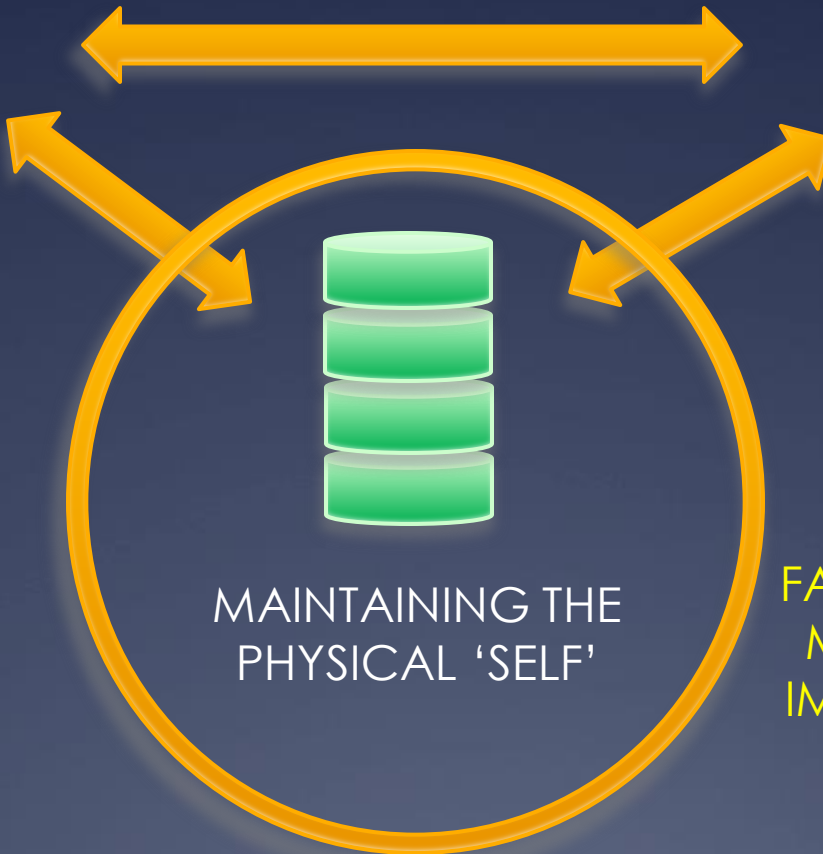


IN SUMMARY

PERCEPTION-ACTION



COGNITION AND
COMMUNICATION



MAINTAINING THE
PHYSICAL 'SELF'

FACILITATIVE TOUCH
MAY PLAY A VERY
IMPORTANT ROLE IN
THIS



Embedded cognition

- * POSTURAL SYNERGIES

- * Balance

- * Locomotion

Facilitate tasks

Maintain
Stability
And
Orientation

- * Cognition

- * Perception

- * Attention

- * Memory

- * Language

- * Problem-solving

- * Communication

movement -often conceived as separated and disconnected from cognition- can be our best ally to transform autism research, diagnoses, treatments and support. When the sensations from our ever changing physical motions emerge as a stable percept that we can reliably predict, we begin to anticipate the sensory consequences of our impending actions with remarkable certainty. We begin to gain confirmation of those anticipated consequences of the actions that we cause. We begin to understand cause and effect in the physical world that we interact with, a world that includes others in social motion as well. The understanding of our own actions through their sensations helps us scaffold social cognition by establishing first the sense of self as an anchor, and then the sense of others and their relative motions. We propose that it is through the sensations of our own movements and through those of the movements of others as we sense them kinaesthetically and visually that we learn to mentally navigate actions, to acquire a sense of agency and autonomy, and to eventually imagine, in a disembodied way, what it would be like to perform a physical action without actually having to do it.

Torres and Donnellan (2015)
Frontiers Research Topics
Autism: The movement perspective

INTERESTING INVESTIGATIONS OF WHAT HAPPENS DURING FC

- Can simply supporting body posture help participants think/communicate?
- Do facilitators need to know what participants are doing, or be able to anticipate their actions?
- Does facilitation primarily assist participants' cognition or their sensorimotor expression?
- Is facilitation generic – can it assist all humans, even if to a small degree?
- What does the facilitator do?
 - Provide postural support?
 - Guide movement?
 - Apply resistance against movement?