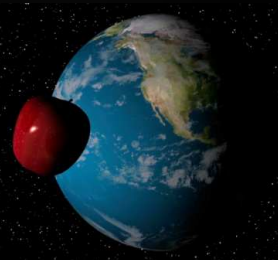


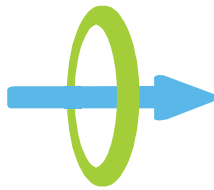
Does vision always supply for somatosensory loss in the perception of spatial orientation?

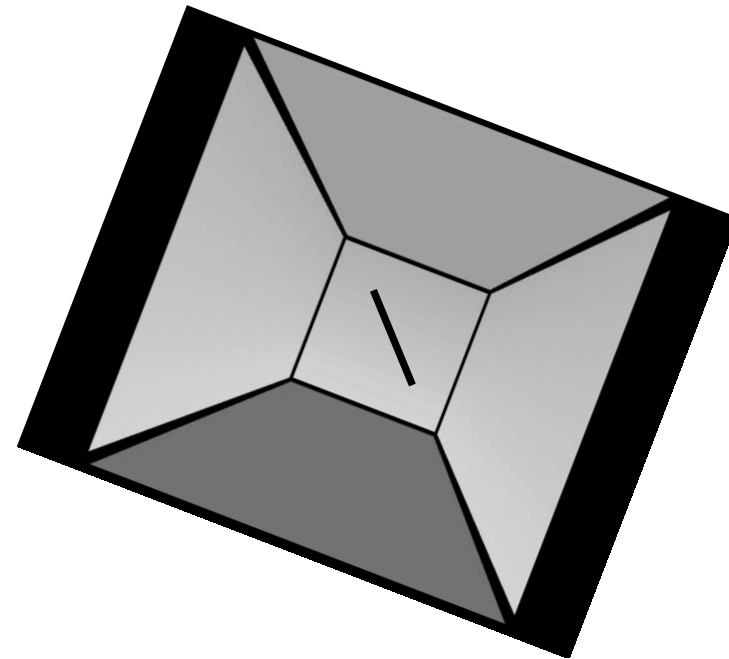
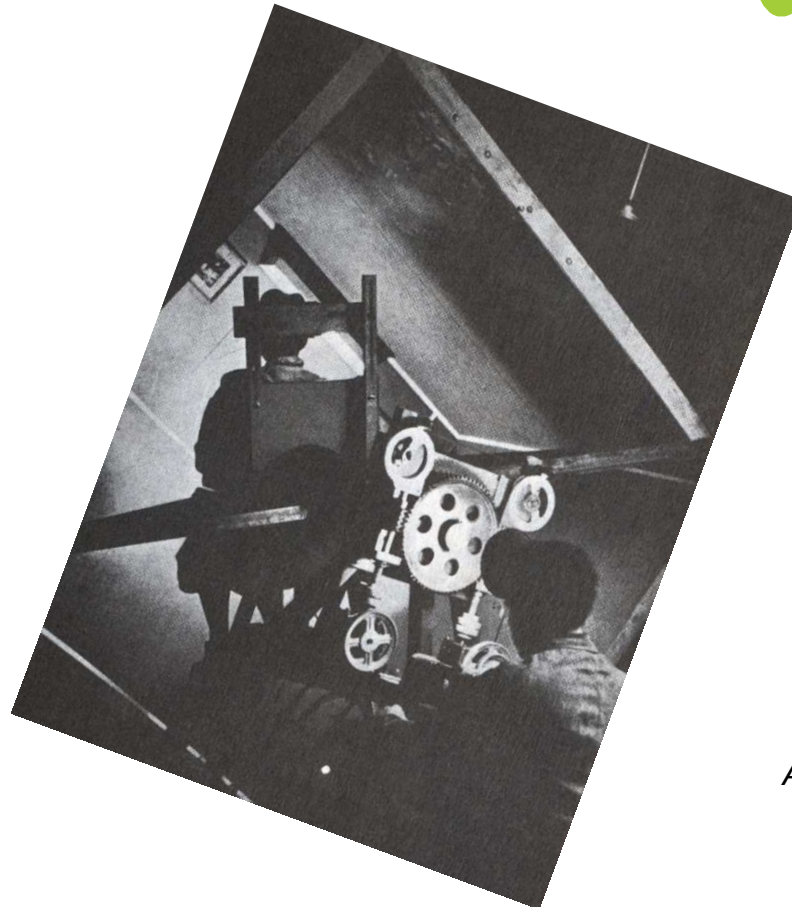
L. Bringoux, C. Scotto Di Cesare, T. Macaluso, F. Sarlegna



Institute of Movement Sciences
Aix-Marseille University / CNRS

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Visual influences  Spatial orientation

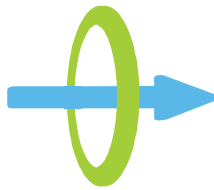


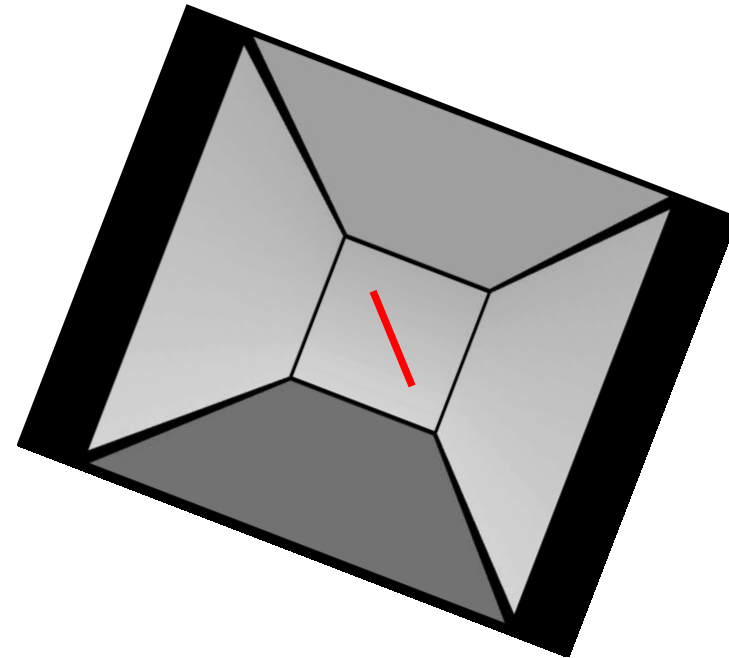
Ash & Witkin (1948) : Visual field dependence

FD

VS

FI

Visual influences  Spatial orientation

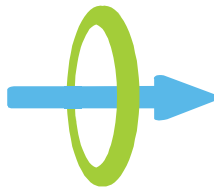


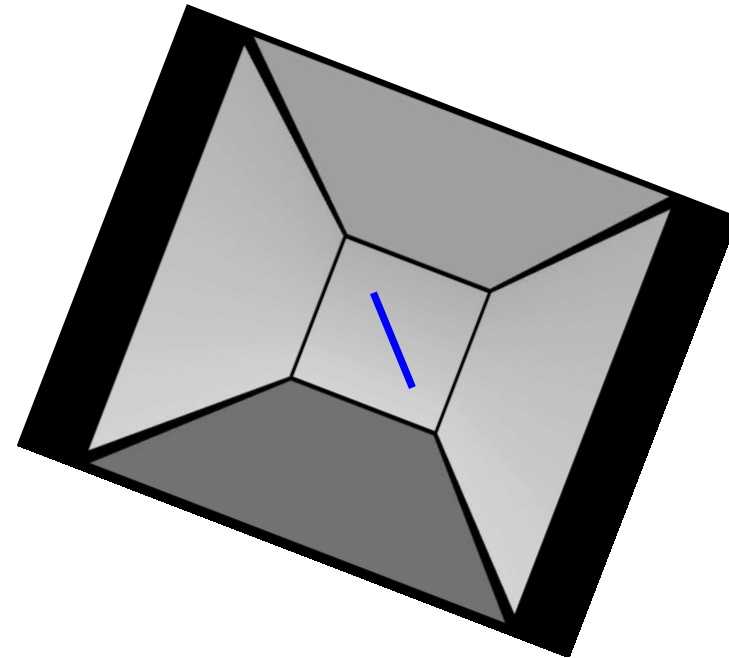
Ash & Witkin (1948) : Visual field dependence:

FD


VS

FI

Visual influences  Spatial orientation



Ash & Witkin (1948) : Visual field dependence:

 Rod and Frame Test [RFT; Olman (1968)]
FD vs FI

Visual influences → Spatial orientation



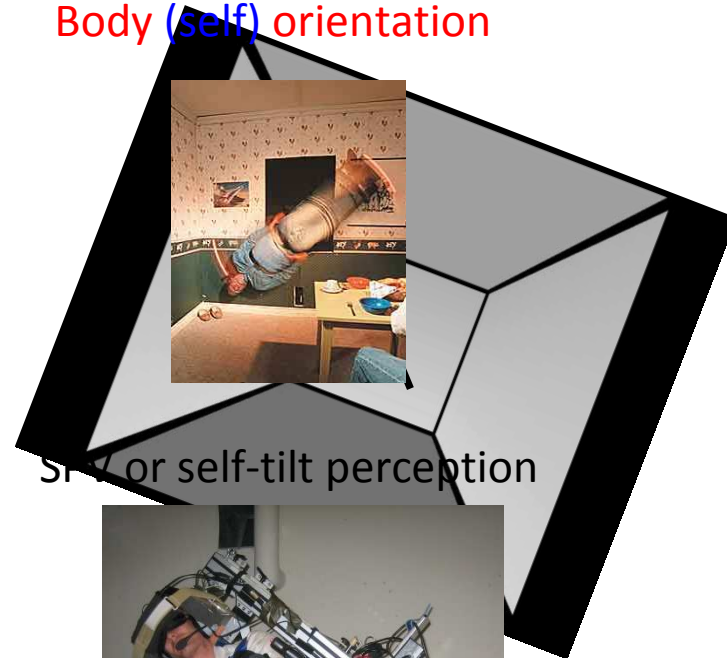
Objects (external) orientation

VS

Body (self) orientation



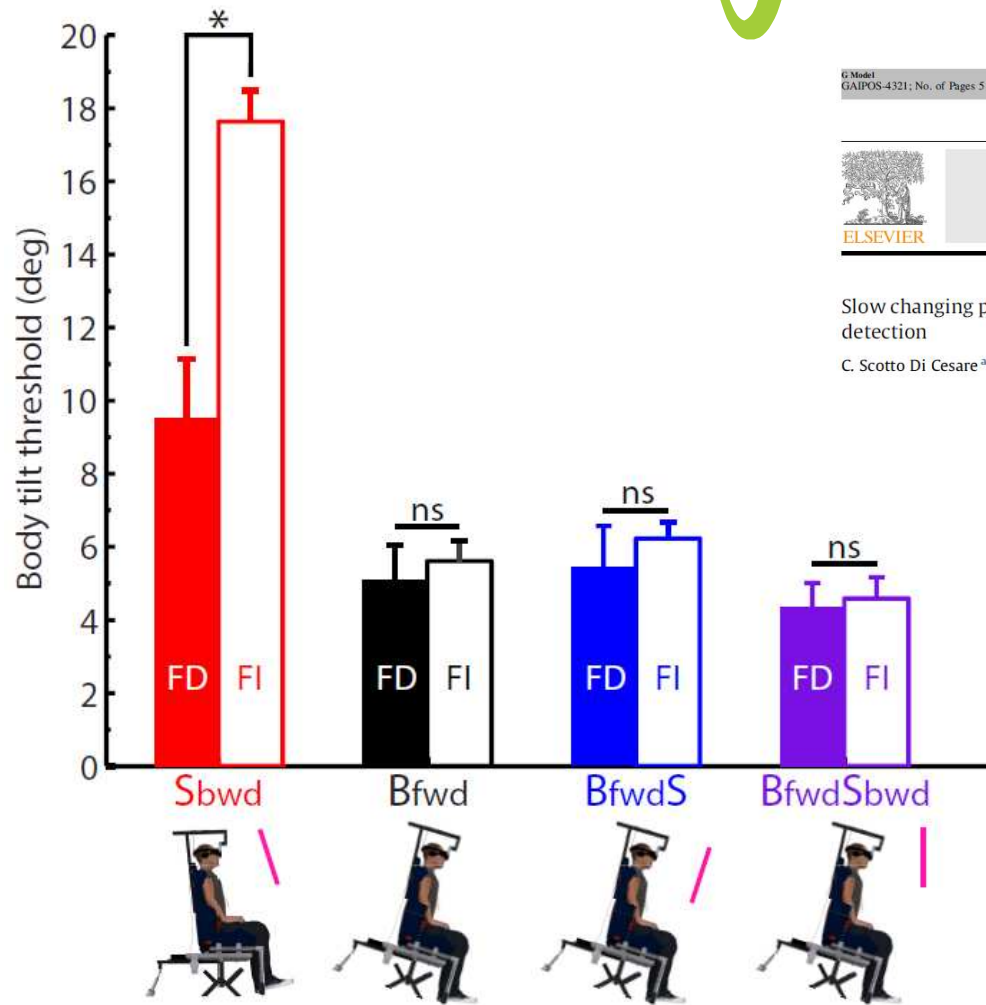
SVV



STP or self-tilt perception



Visual influences → Spatial orientation



G Model
GAIPOS-4321; No. of Pages 5

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Slow changing postural cues cancel visual field dependence on self-tilt detection

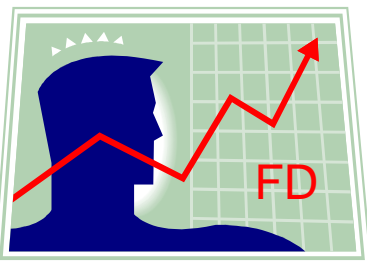

C. Scotto Di Cesare ^{a,b,*}, T. Macaluso ^a, D.R. Mestre ^a, L. Bringoux ^a

Sensory impairment → Spatial orientation

Objects (external) orientation vs Body (self) orientation

Visual dependence



<p>Vestibular defect (Bilateral)</p>	 <p>Guerraz et al (2001) Lopez et al (2007)</p>	 <p>Ito and Gresty (1996; 1997)</p>
<p>Somatosensory defect</p>	<p>???</p>	<p>???</p>

Visual influences in spatial orientation perception without proprioception

Is GL highly Field-Dependent ? ...



... Whatever the spatial orientation judgement task ?



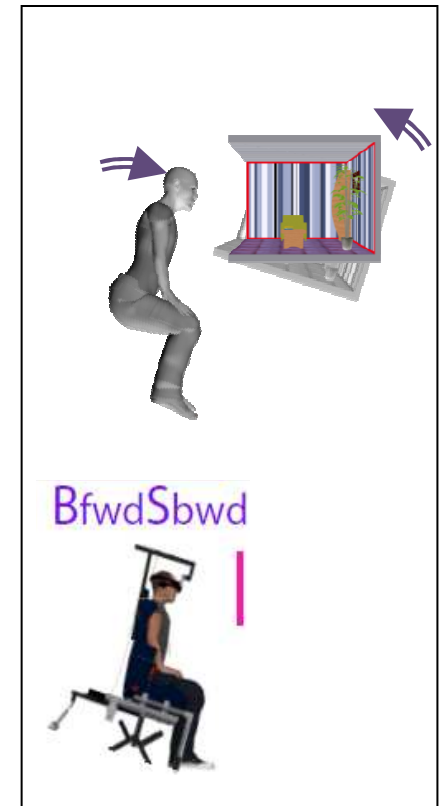
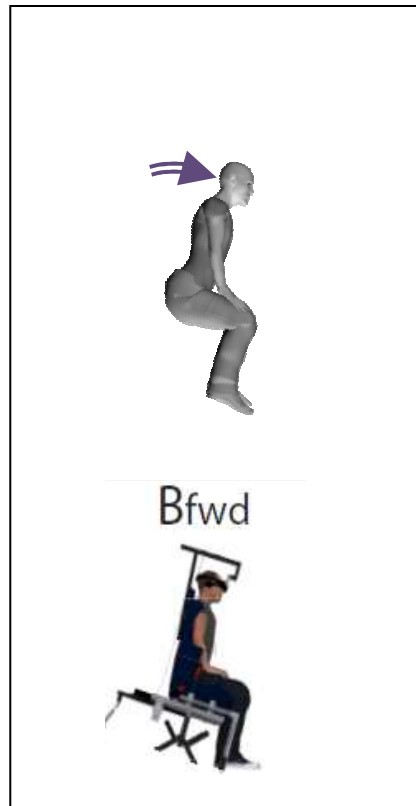
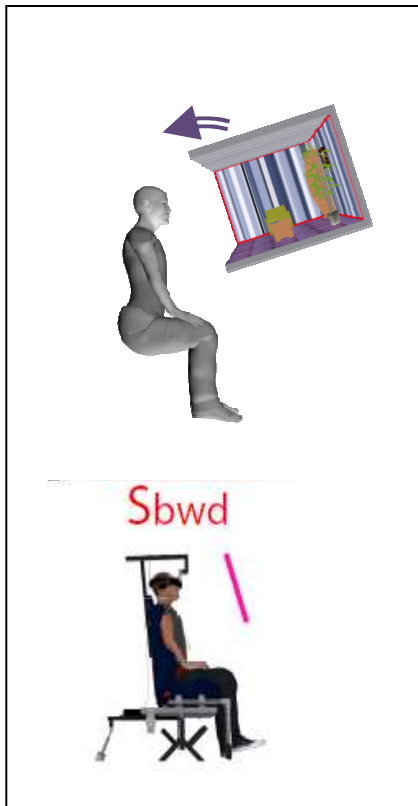
SVV



Self-tilt detection



Self-tilt detection

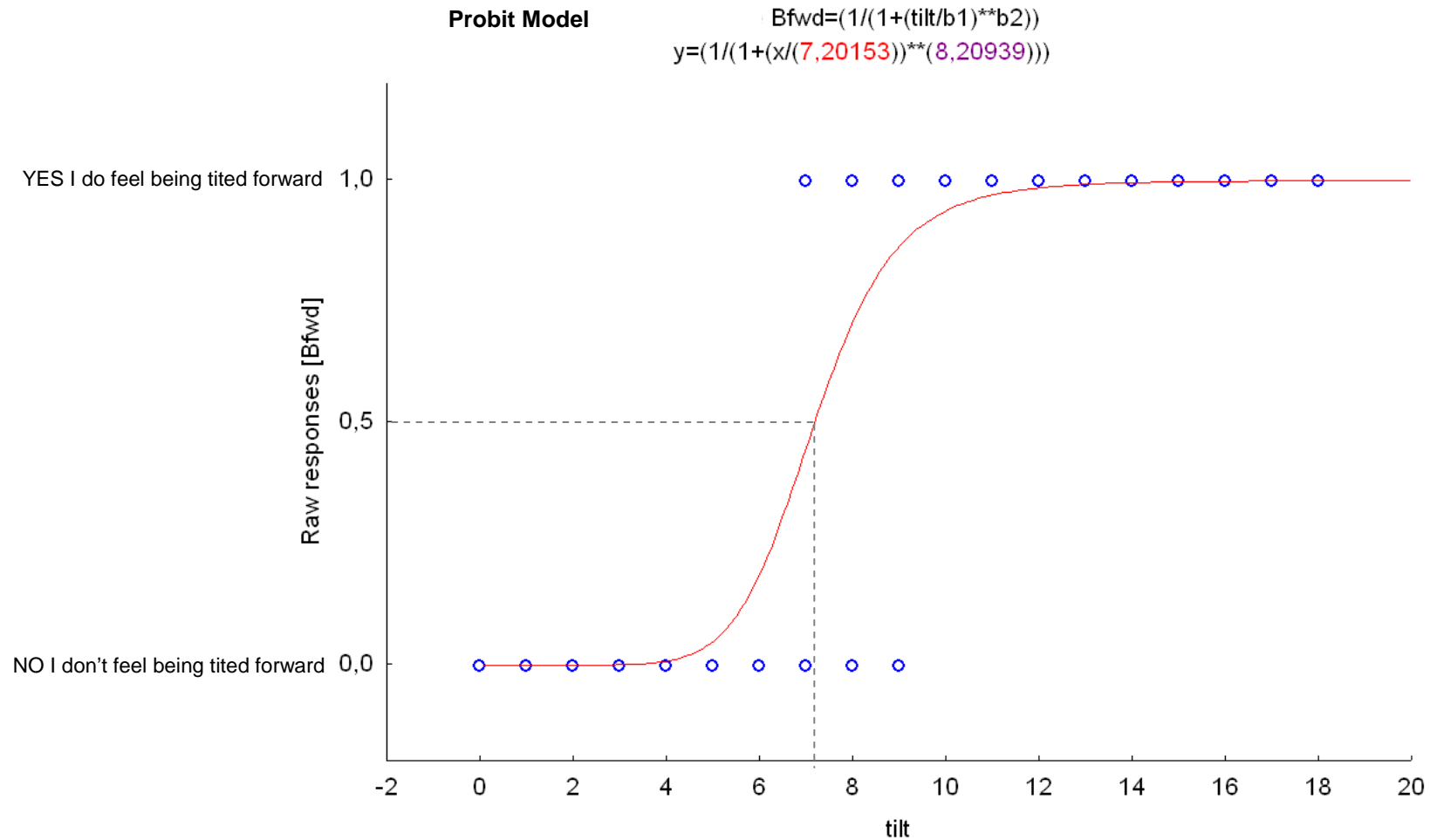


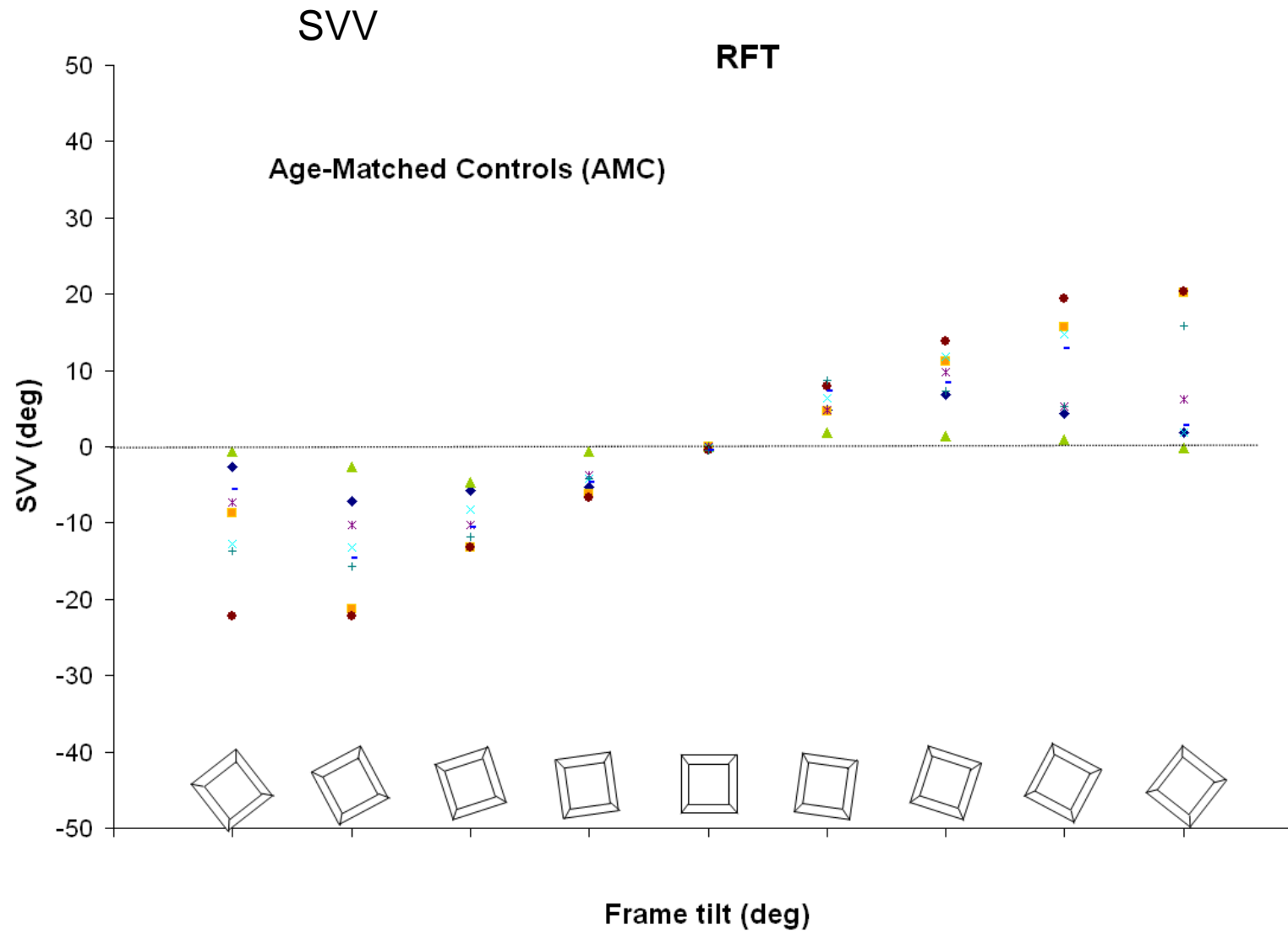
☀ Do I feel being tilted forward ?

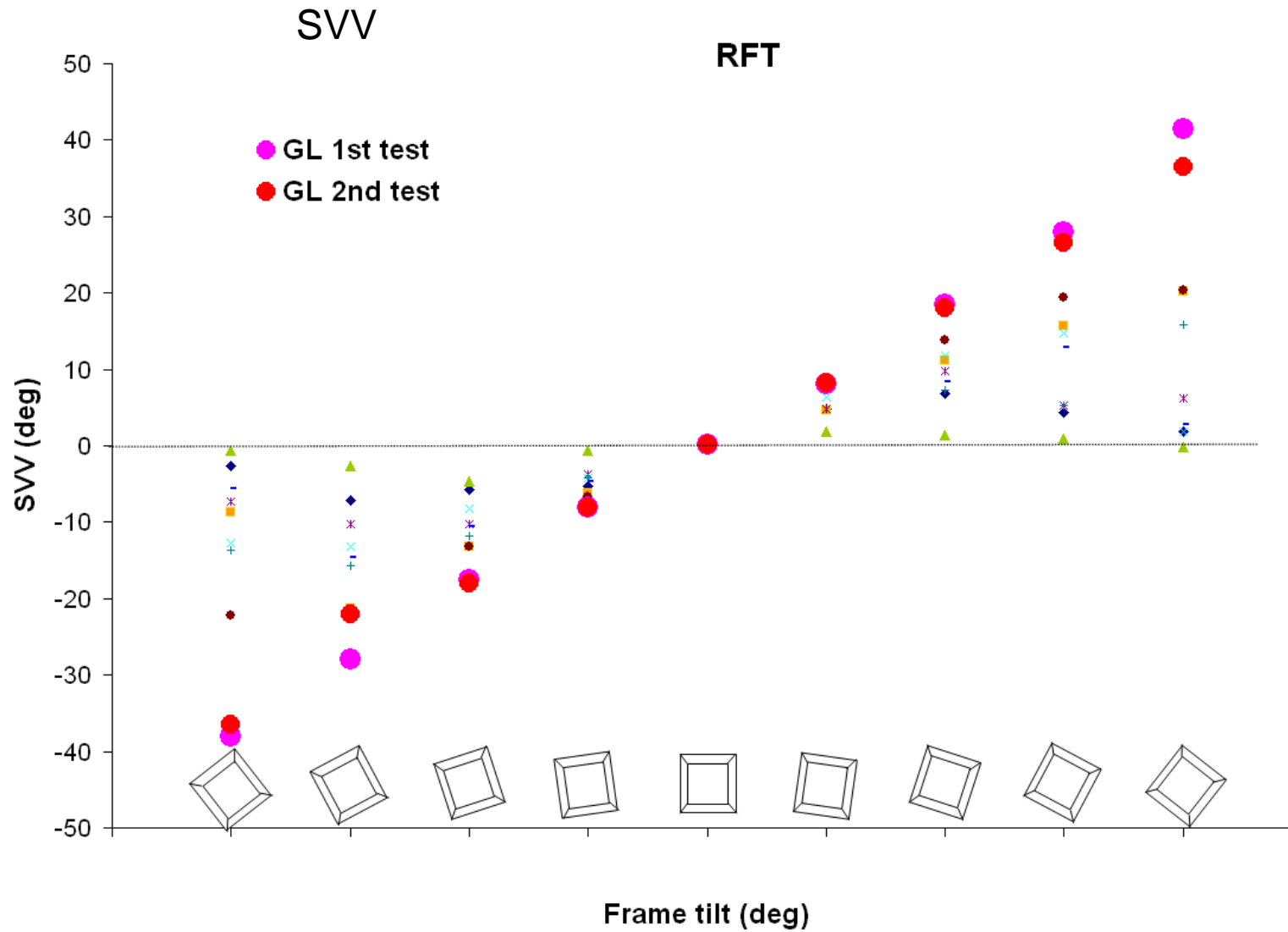
Yes

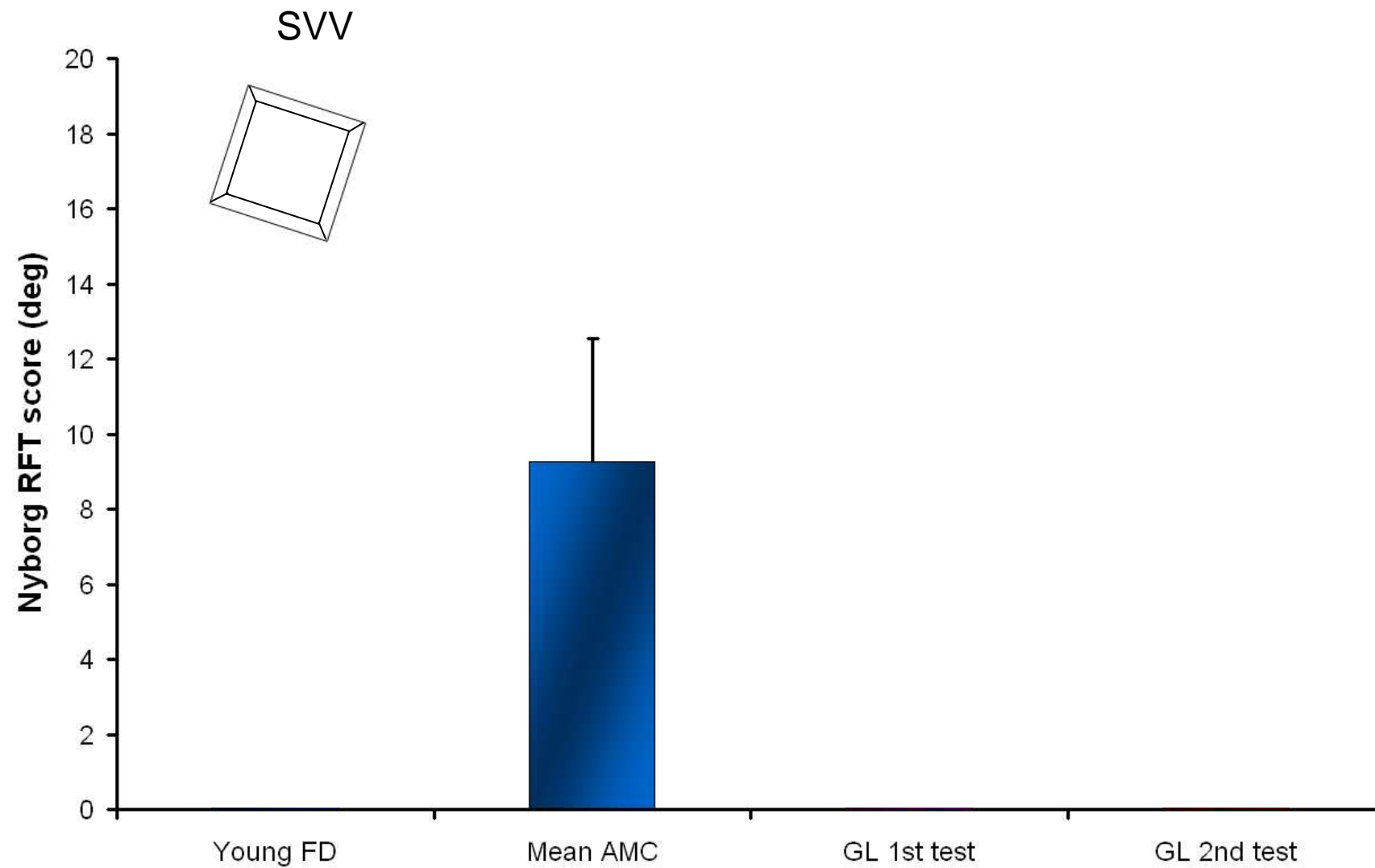
No

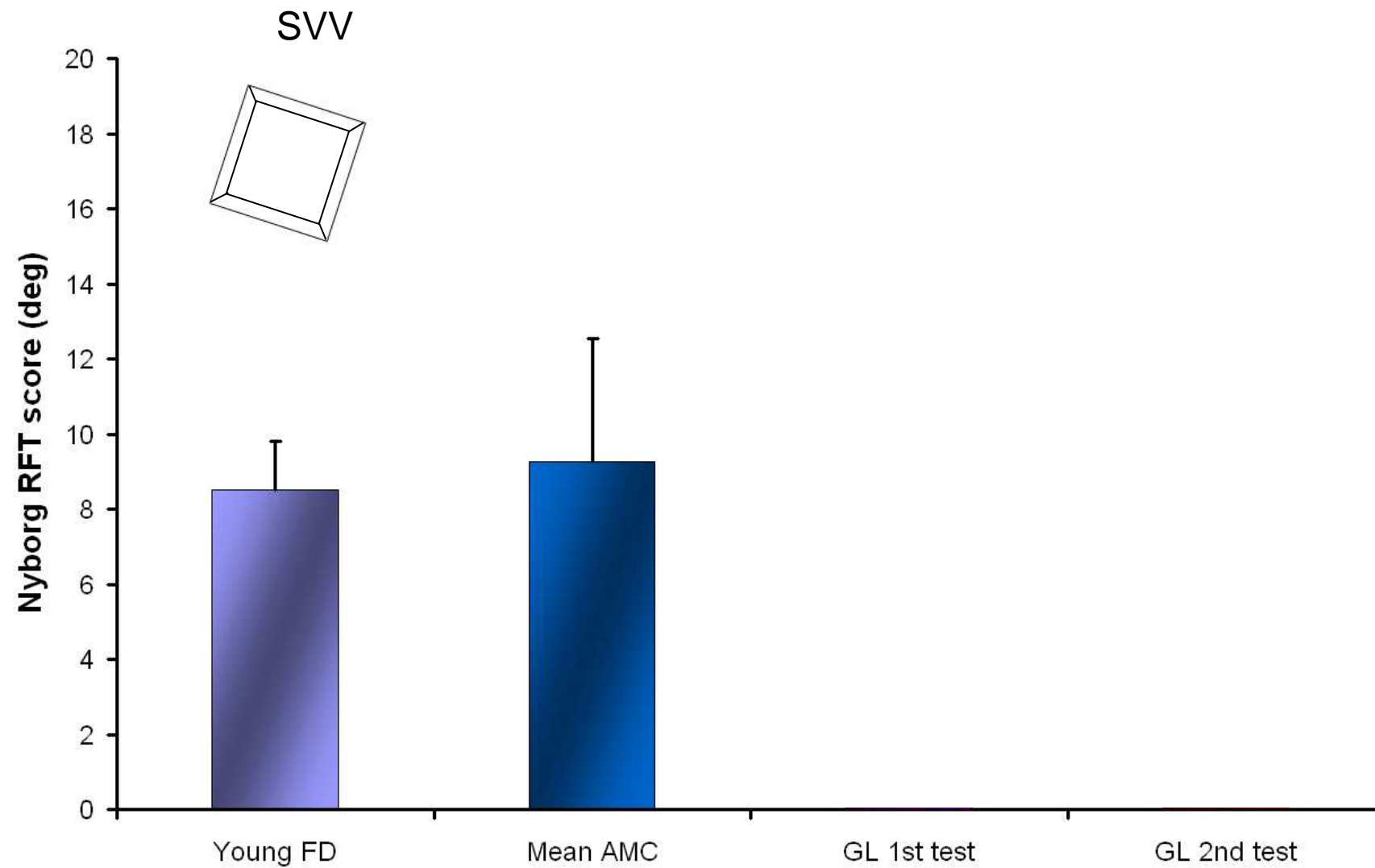
Self-tilt detection

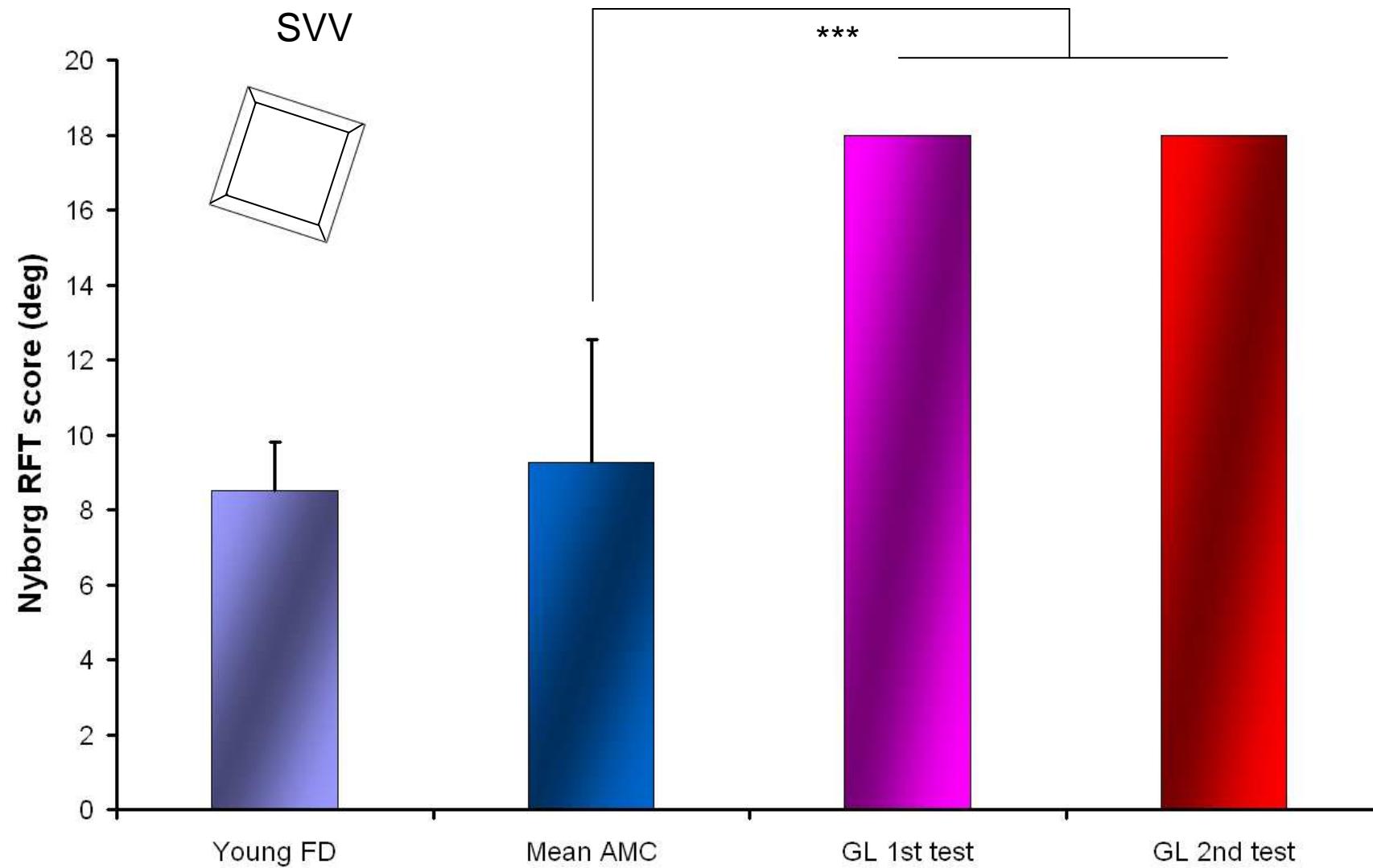


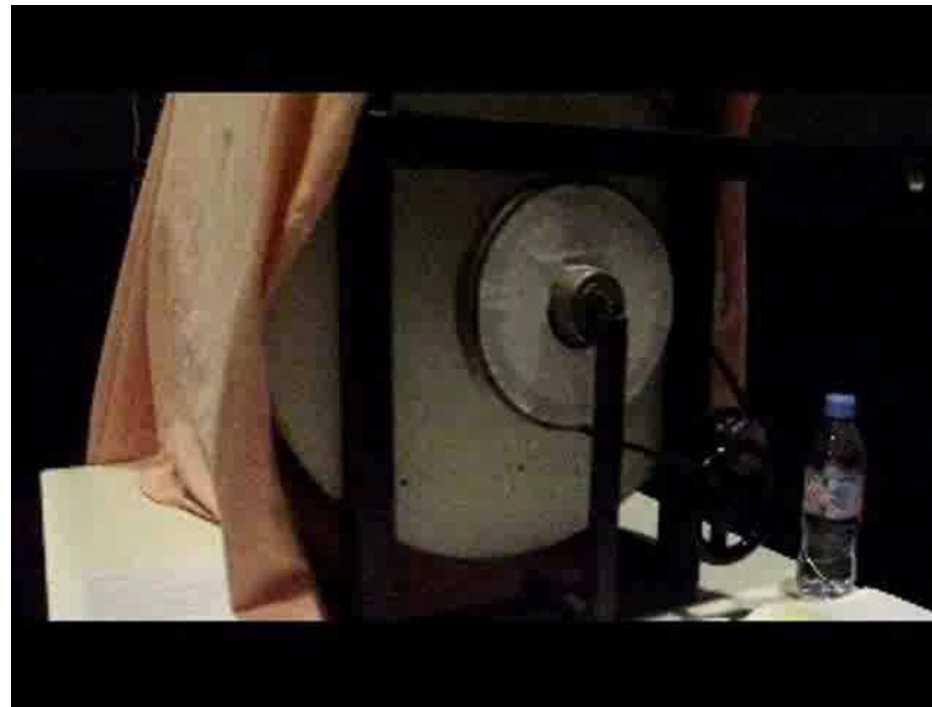




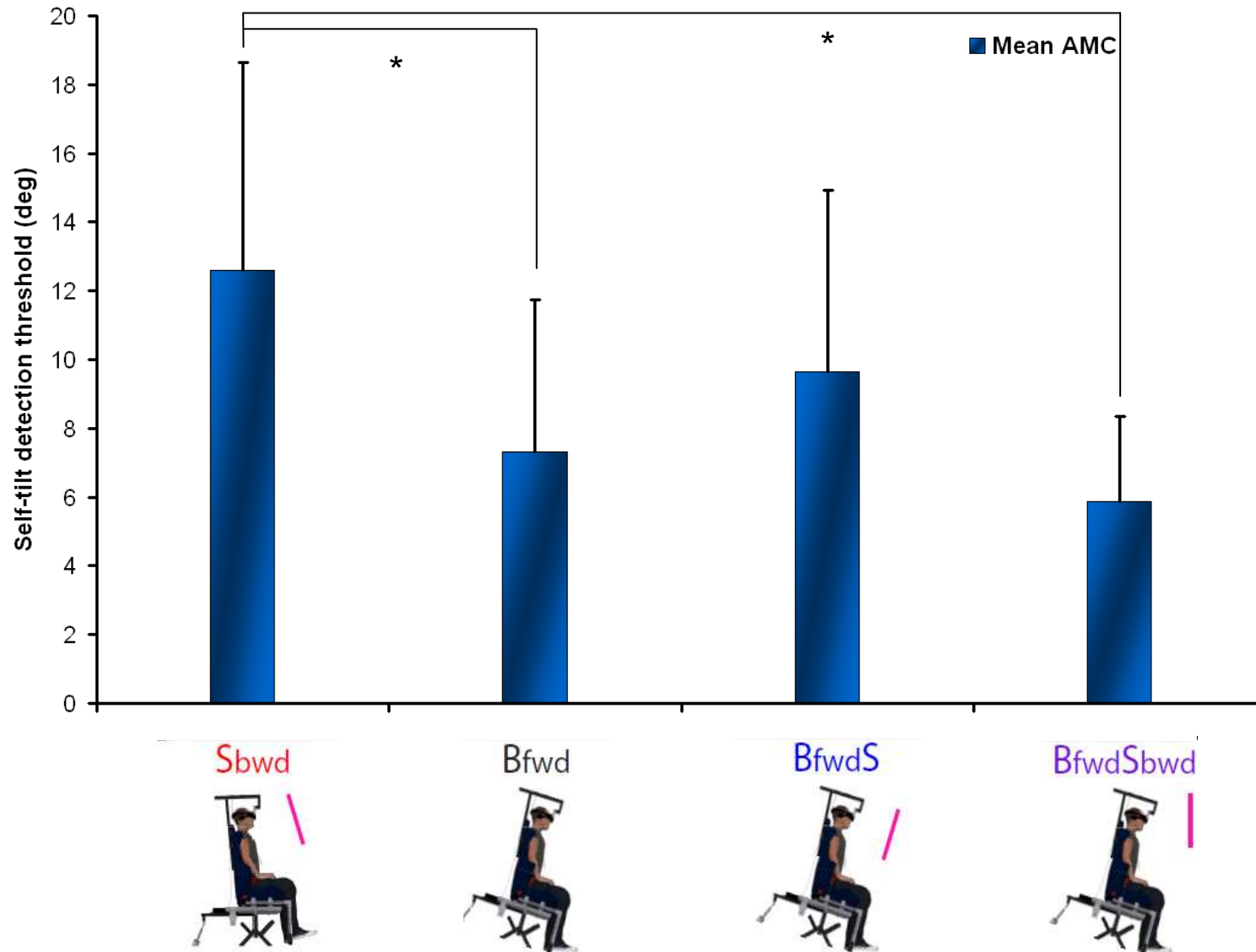




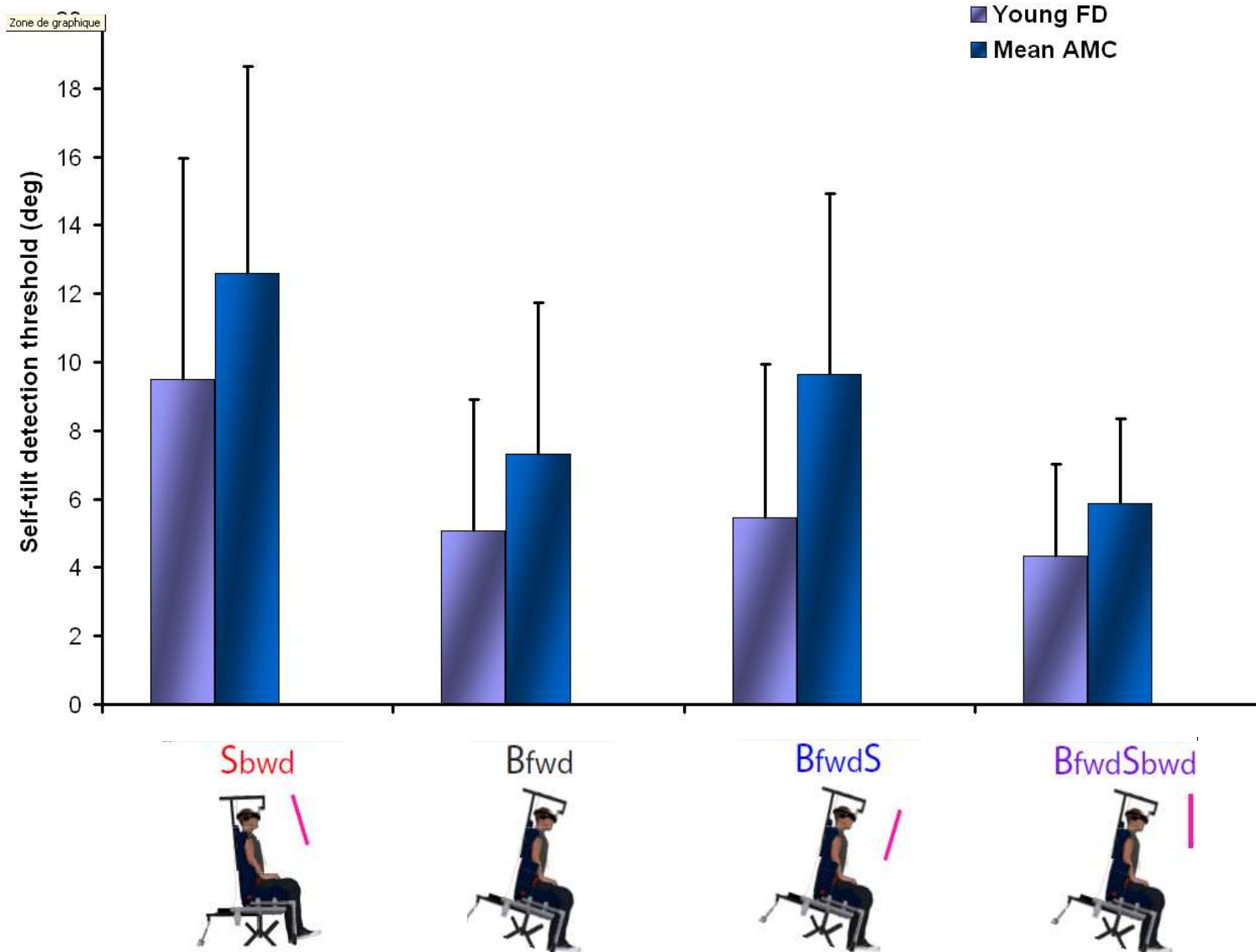




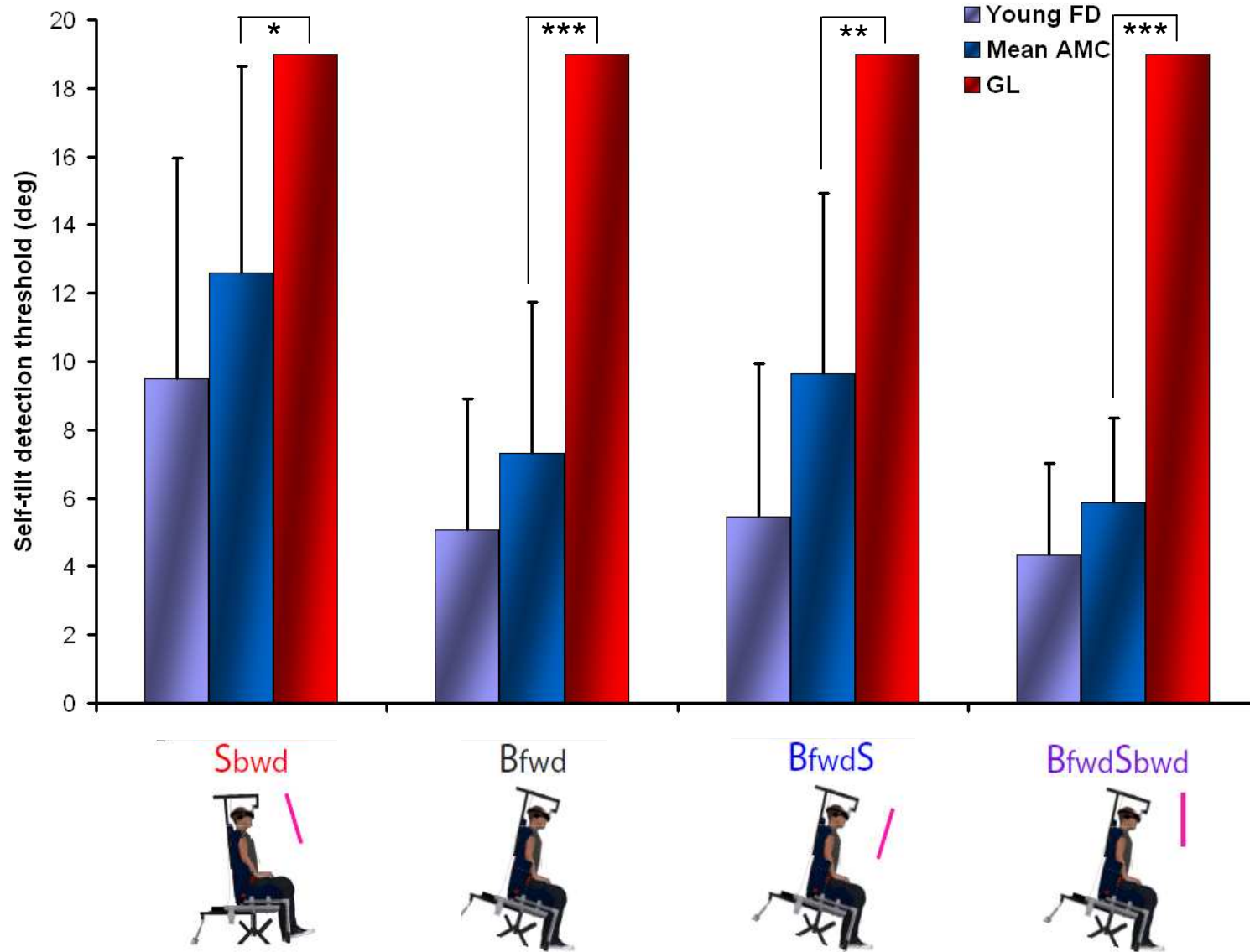
Self-tilt detection



Self-tilt detection



Self-tilt detection





Sensory substitution?

- ✚ Visual capture... Not in any case!
- ✚ Graviceptive role of unrefreshed otolith inputs? (*Bringoux et al., 2003*)

Reference frame selection?

- ✚ Distinction between the perception of **objects** vs **body** orientation (*Bronstein, 1999*)
- ✚ Allocentric vs (**idiotropic?**) spatial reference frames (*Blouin et al., 1993*)
 - ↑ (*Mittelstaedt, 1986*)
 - Prior for upright orientation* (*De Vrijer et al., 2008; MacNeilage, et al., 2008*)

Thank you for your attention!

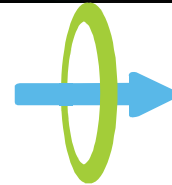


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EXTRA SLIDES



Sensory impairment



Spatial orientation

without visual frame

Objects (external) orientation

VS








Body (self) orientation

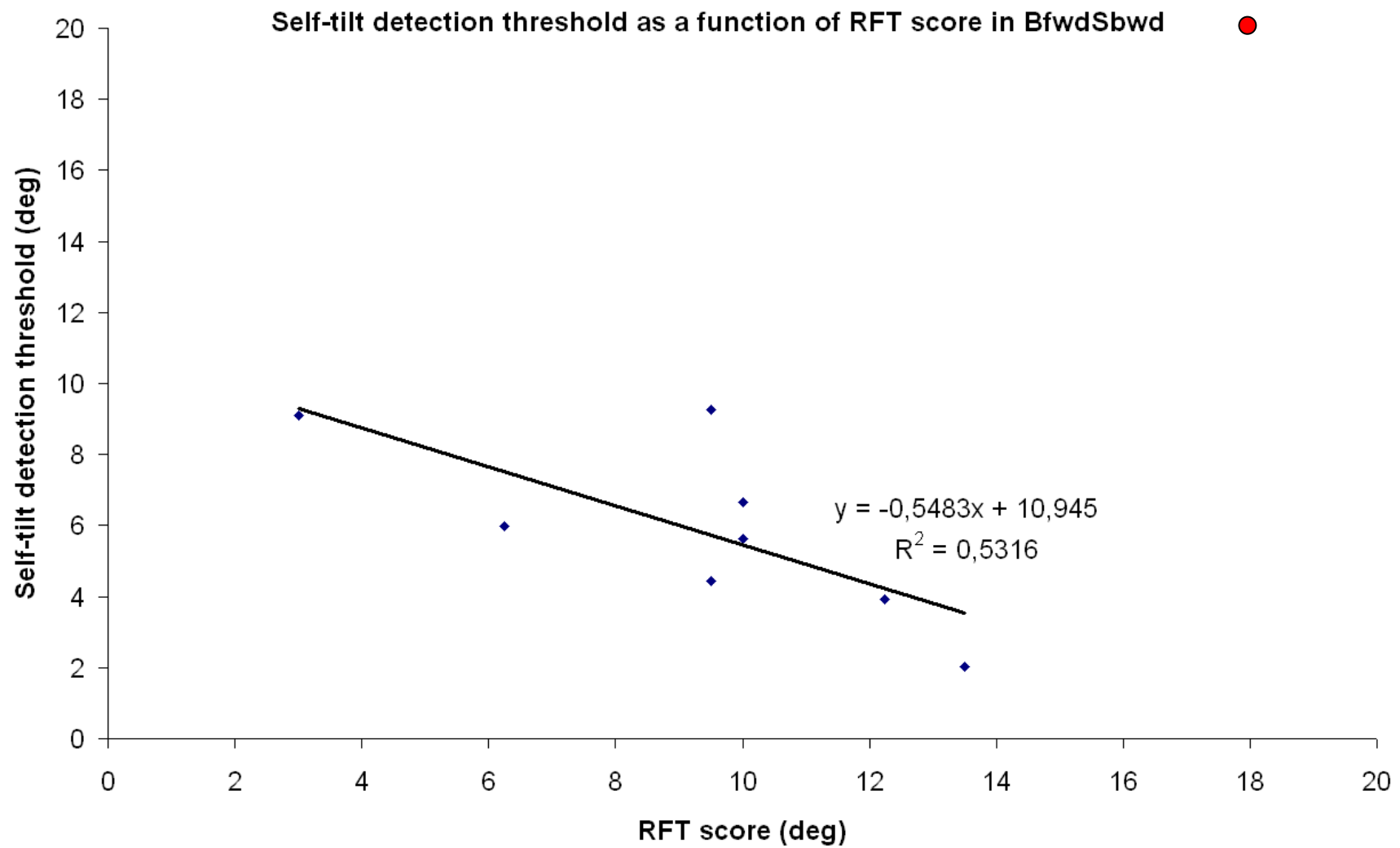


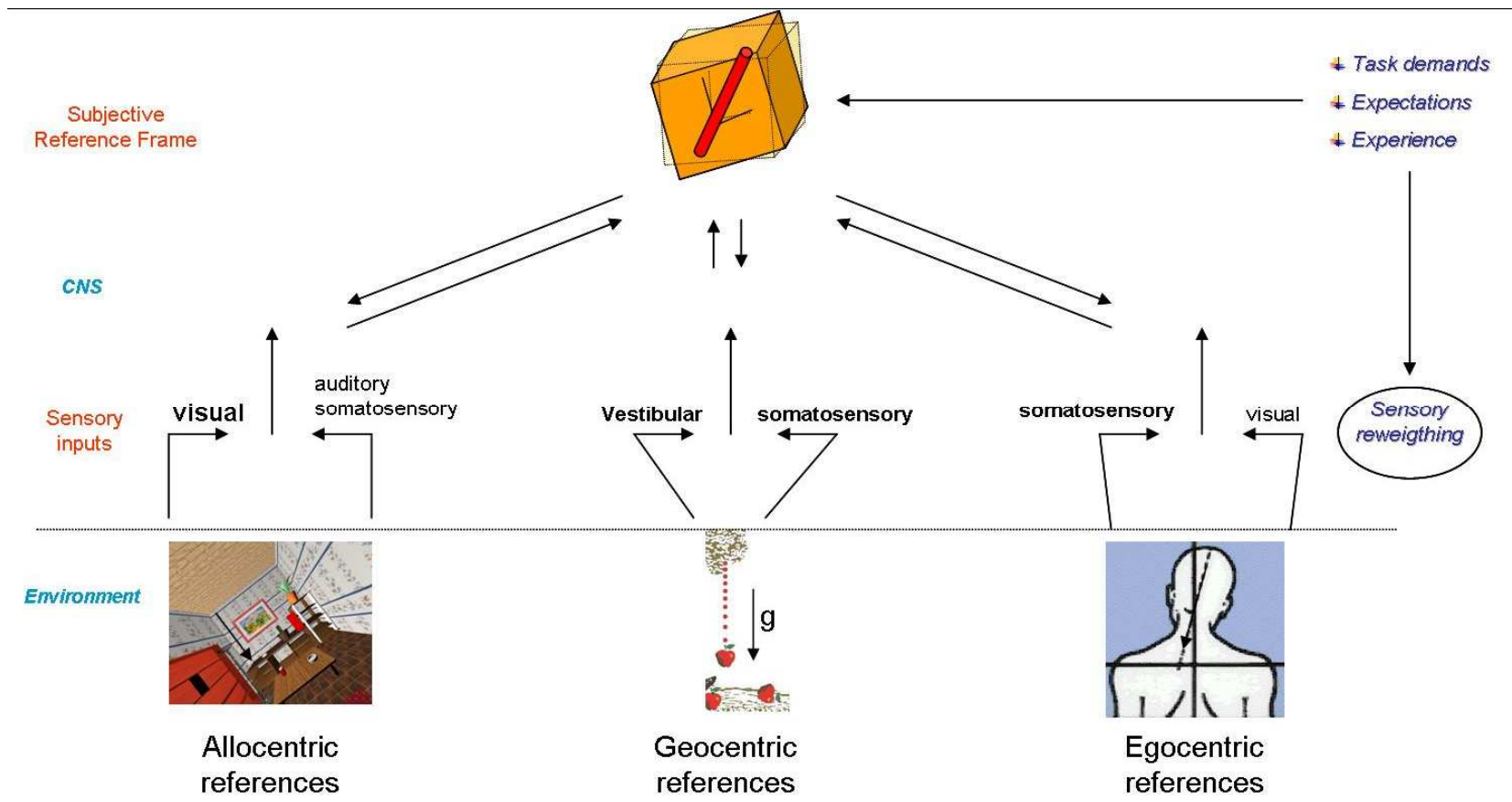
SVV



SPV

<p>Vestibular defect</p> <p><i>Unilateral</i></p> <p><i>Bilateral</i></p>	<p> <i>Tabak et al (1997)</i></p> <p> <i>Tabak et al (1997)</i></p>	<p> <i>Bisdorff et al. (1996)</i></p> <p> <i>Bisdorff et al. (1996)</i></p>
<p>Somatosensory defect</p> <p><i>Hemihypoesthesia</i></p> <p><i>Stroke (unilateral)</i></p>	<p> <i>Saeys et al (2012)</i></p>	<p> <i>Anastasopoulos et al. (1999)... but...</i></p> <p> <i>Saeys et al (2012)</i></p>





Somatosensory loss Perceptual consequences

Pending questions...

- ✚ Sensory substitution / recalibration?
- ✚ Perceptual / cognitive strategies?
- ✚ An insight into "normal" functioning?

Adapted behaviour

VS

Impaired behaviour

Specific role of
somatosensory
inputs?



