

**Interoception**  
Perception of one's own internal  
physical state

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**Interoception**

- "Sense of the physiological condition of the entire body" (Craig 2002)
- Monitoring integrity of internal body state:
  - temperature
  - pain
  - itch
  - tickle
  - sensual touch
  - muscular and visceral sensations
  - vasomotor flush
  - hunger
  - thirst
  - air hunger and others



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**Interoception includes  
proprioception and visceroreception**

- Proprioception – signals from
  - skin
  - musculoskeletal - joints, tendons, muscles
- Visceroreception
  - the inner organs - mechano, chemo, thermo, and osmoreceptors

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### Key Features of Interoception

- Two important aspect of interoceptive processing
  - Strong incentive motivational component (urges, e.g., blinking, thirst, sneezing)
  - Relative preference assessment – what feels good depends on how you feel inside (e.g., a well heated room in the winter vs. summer)

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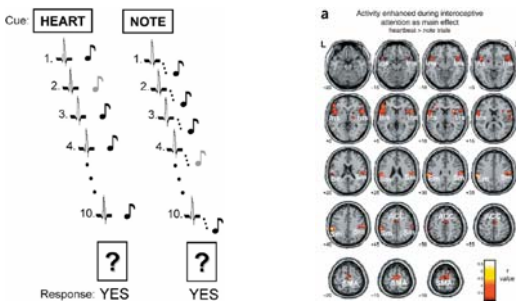
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### Neural systems underlying interoception

Critchley et al., 2004, Nat Neurosci



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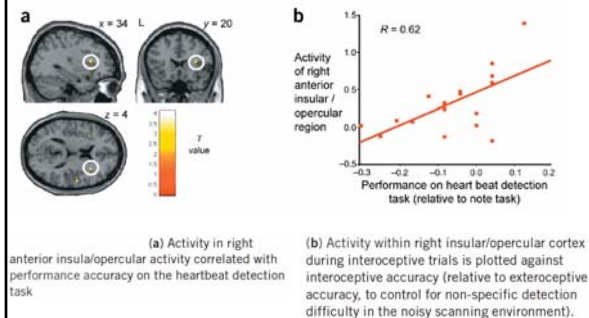
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### Interoceptive ability: accuracy differences

Critchley et al., 2004, Nat Neurosci



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# Interoception

### Neural systems underlying interoception

The thalamus send projections to the

- insula (posterior part)
- anterior Cingulate Cortex (ACC)
- somatosensory cortex

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### Anatomy of the Insula

- Major macroscopic divisions:
  - Posterior – SII, topographic organization of interoceptive afferents
  - Anterior – re-representation and multi-modal integration of interoceptive afferents
- Microscopic divisions:
  - Granular
  - Dysgranular
  - Agranular

Anatomical structure of the insular cortex and associated columnar organization (Ig = granular insula, Id = dysgranular, Ia = agranular).

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### The Insula and Addiction

Smokers who acquire insula damage are very likely to

- quit smoking and remain abstinent
- no longer to experience conscious urges to smoke after quitting

Naqvi et al., 2007, Science

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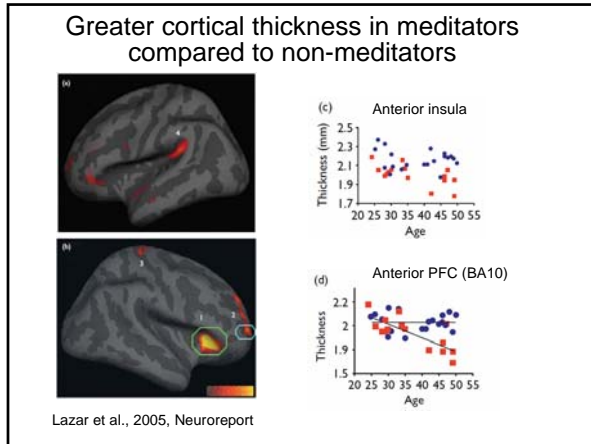
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