



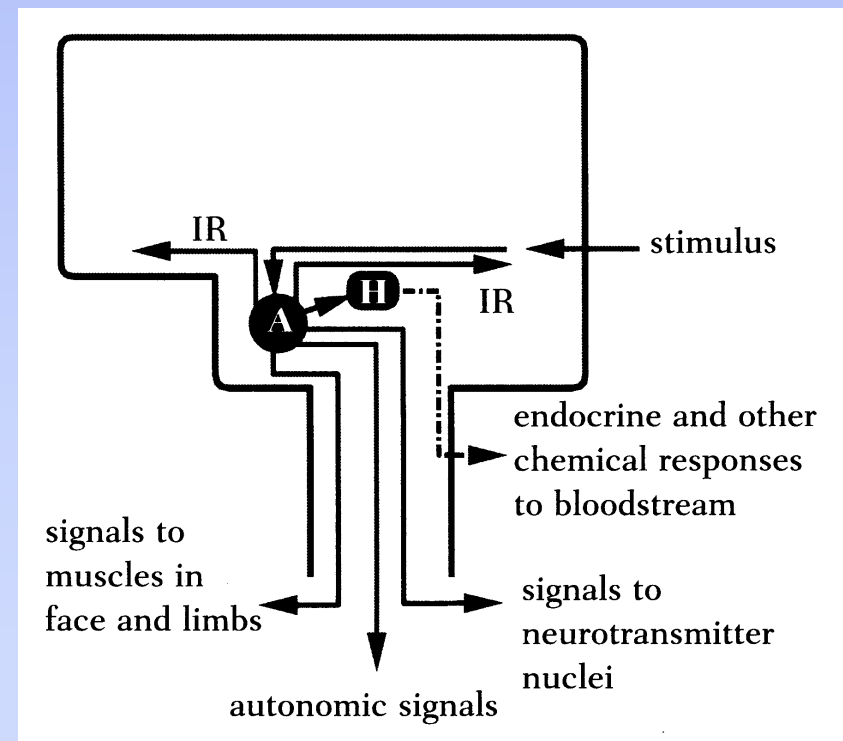
Modeling Primary and Secondary Emotions for a Believable Communication Agent

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Primary emotions (Damasio '94)

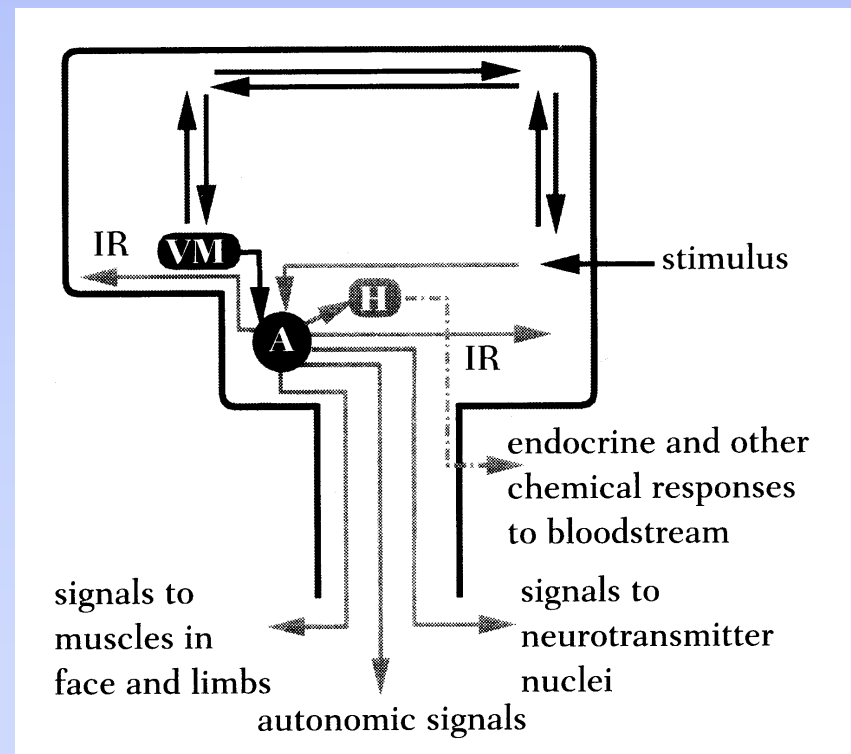
- ◆ “[..] we are wired to respond with an emotion, in preorganized fashion, when certain features of stimuli in the world or in our bodies are perceived, alone or in combination. Examples [..] include size (as in large animals); large span (as in flying eagles); types of motion (as in reptiles); certain sounds (such as growling); certain configurations of body state (as in the pain during a heart attack).” (p. 131)
- ◆ Stimulus activates amygdala (A)
- ◆ Various responses ensue:
 - Internal responses (IR)
 - Muscular responses
 - Visceral responses (autonomic signals)
 - Responses to neurotransmitter nuclei and hypothalamus (H)
 - Hypothalamus gives rise to endocrine & other chemical responses



Secondary emotions (Damasio '94)

◆ “[..] I believe that in terms of an individual’s development [primary emotions] are followed by *secondary emotions*, which occur once we begin experiencing feelings and forming *systematic connections between categories of objects and situations, on the one hand, and primary emotions, on the other.*” (p. 134)

- ◆ Stimulus activates amygdala (A)
- ◆ Stimulus is analyzed in the thought process
 - May activate ventromedial region of frontal cortices (VM)
 - VM acts via the amygdala (A)
- ◆ Secondary emotions utilize the machinery of primary emotions
- ◆ VM depends on A to express its activity



Affect & Proto-Affect (Ortony et al., 2005)

*information flow
and interrupts*



sensory inputs



motor outputs



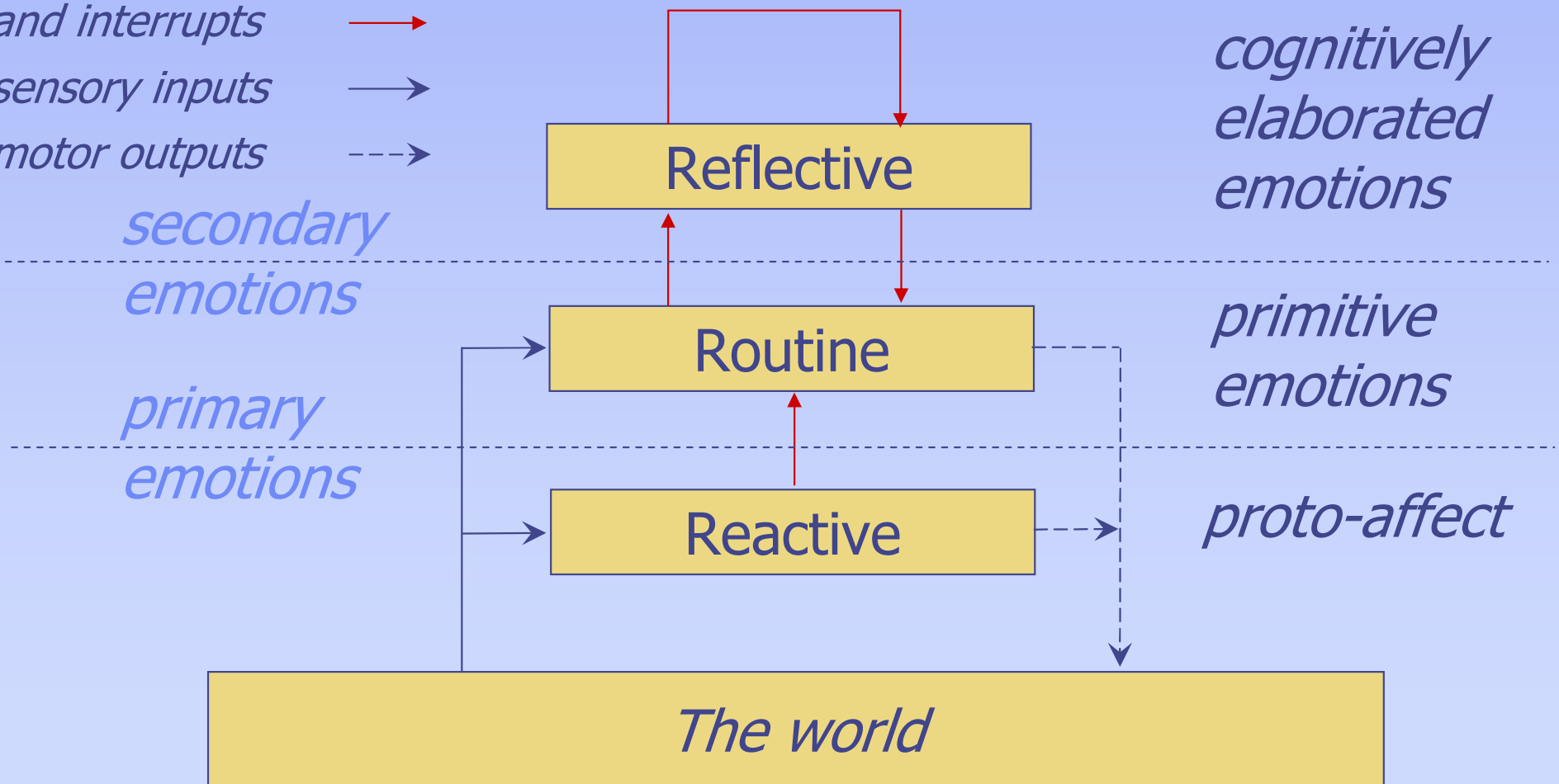
*cognitively
elaborated
emotions*

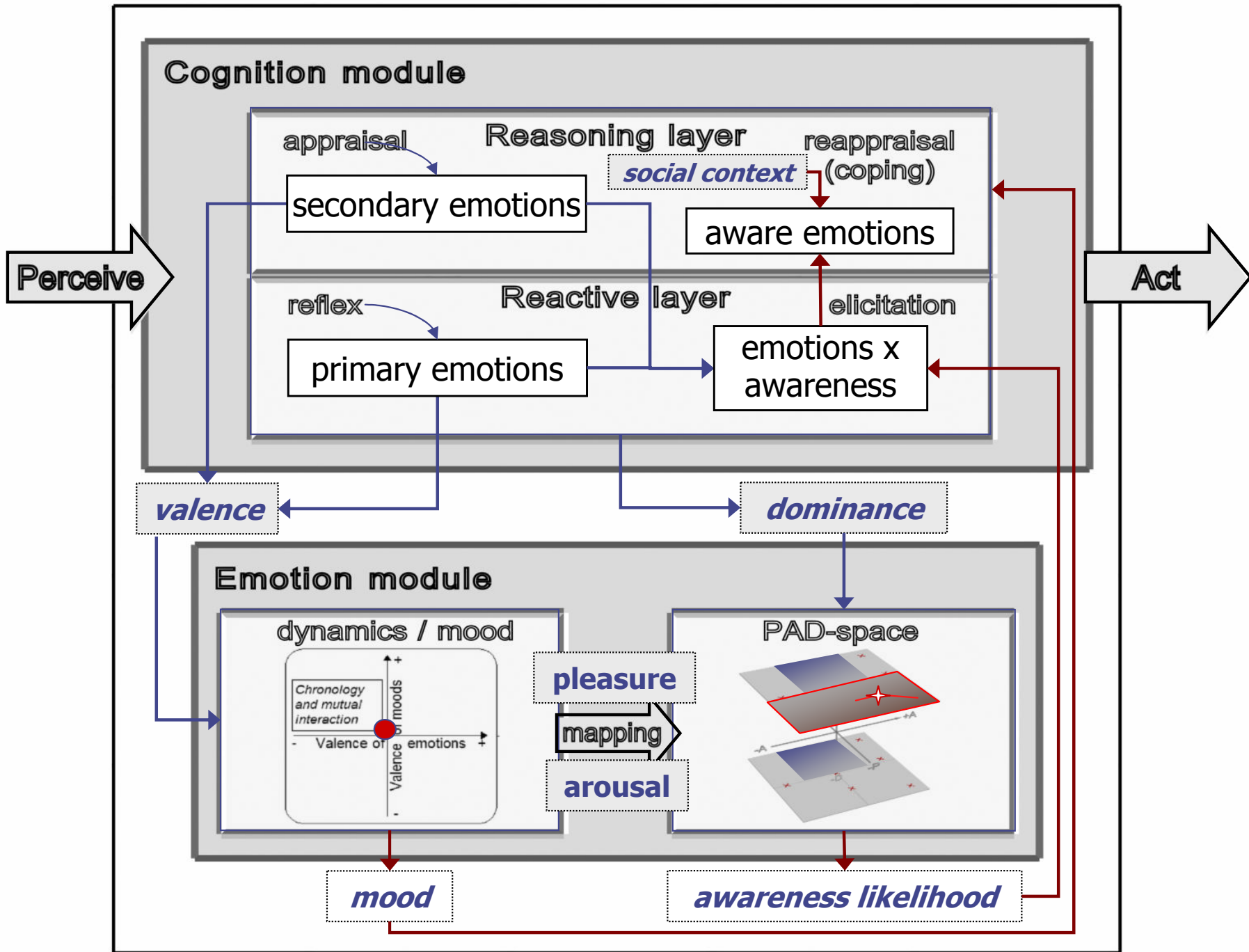
*secondary
emotions*

*primitive
emotions*

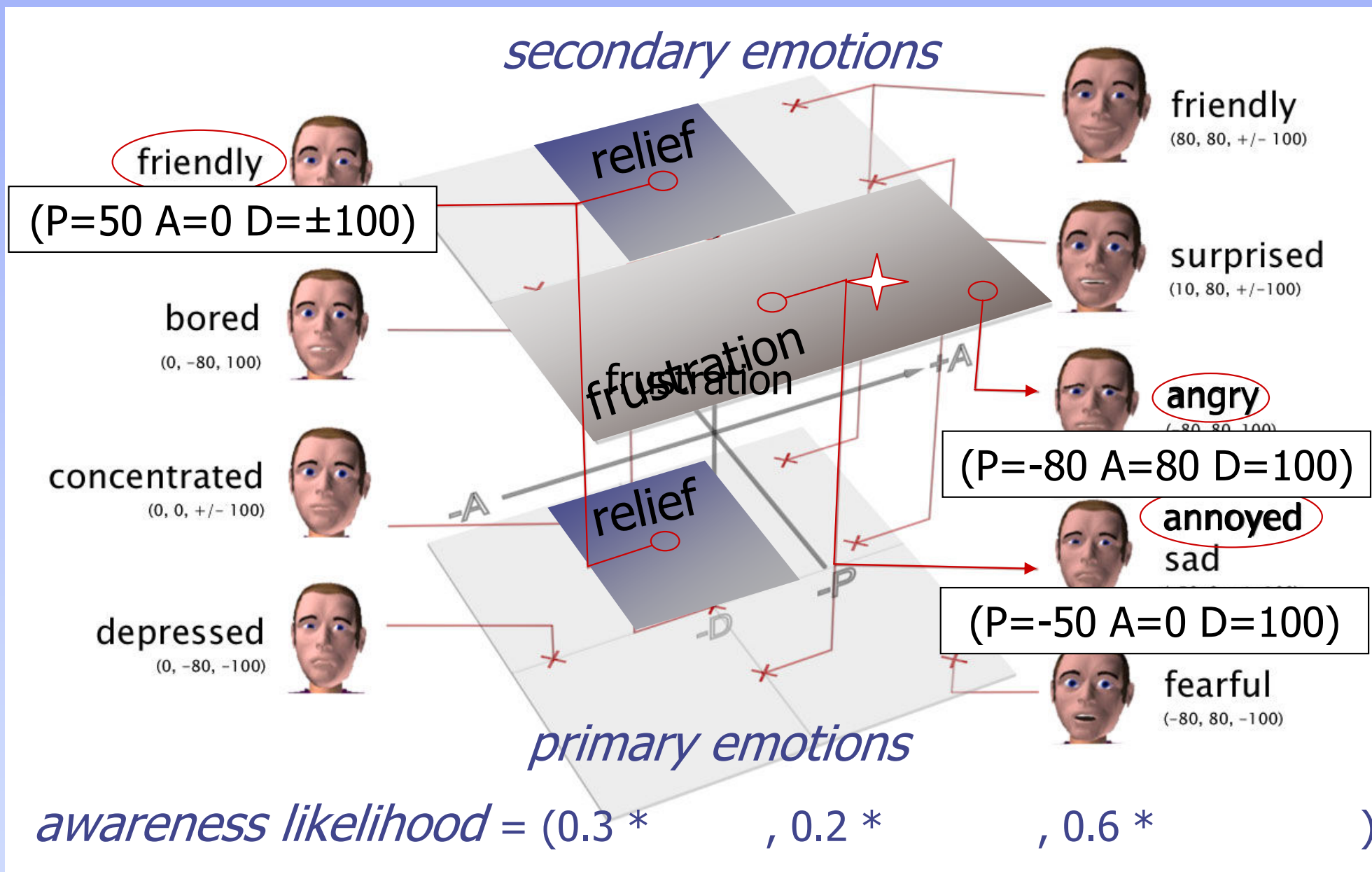
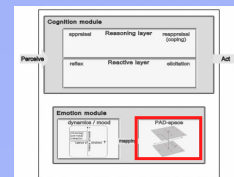
*primary
emotions*

proto-affect





PAD-space



Thank you very much!

