

Table 1: Glossary: Embodiment terms and their definitions

Term	Definition	Citation
Active inference	Inferring the state of the environment, i.e. perception, is not a passive response to sensory stimuli but an active process. Animals perceive by making predictions based on internal models (i.e., ‘hypotheses’ or ‘expectations’) and resolving the resulting prediction error. This resolution can be through changing predictions or changing the sensations that are sampled. Inference is thus embodied: an active process of inferring the causes of sensations, which are selected by action.	Hobson, Friston 2014 <sup>22</sup>
Bayesian belief updating	The working mechanism of $\uparrow$ Active inference: while executing a motor plan, prior beliefs and incoming sensory data – solicited by executing the plan – are continuously combined. In case of discrepancies, the actions (or predictions) may be adapted in order to minimize discrepancies (e.g. prediction error).	Pezzulo, Rigoli, Friston 2015 <sup>30</sup>
Bayesian statistics	An approach to inference that enables one to evaluate the probability of a hypothesis H, given some evidence D. The <i>posterior probability</i> that H is true, given data D, depends on the <i>prior probability</i> , i.e. the probability of H before we see D, and on the <i>likelihood</i> , i.e. the probability of observing D given that H is true. In $\uparrow$ Bayesian belief updating, posteriors can be used as priors – for new data – to accumulate evidence for one’s hypotheses.	
Embodiment	A concept emphasizing the reciprocal (bidirectional) relationship between mind (cognition, emotion) and body (motor behavior, nonverbal behavior, physiological processes).	Tschacher, Bergomi 2014 <sup>37</sup>
Enactivism	Enactivism claims that cognition and perception result from an active engagement with environmental constraints (‘affordances’), rather than from the representation of the environment – a position closely related to $\uparrow$ Active inference. The enactive approach views mind, body and environment as highly interdependent elements of an (ecological) system.	Thompson, Varela 2001 <sup>9</sup>
Interoceptive inference	The notion of $\uparrow$ Active inference can be generalized to interoception, i.e. to perception and regulation of inner, physiological and visceral processes. Interoceptive inference describes the (homeostatic) regulation of inner (autonomic) processes in the context of emotion and self-awareness.	Seth 2013 <sup>27</sup> Gu, FitzGerald 2014 <sup>28</sup>
Mirror neuron system	Neuronal networks in the brain often have multiple functions: the same neurons may be active when executing an action and when perceiving the same action of another. Thus, action and action observation recruit the same neuronal (active inference) processes. This may be a neuronal correlate of empathy and mentalising.	Rizzolatti, Craighero 2004 <sup>17</sup>
Nonverbal synchrony	In the interaction of A and B, nonverbal behavior of A tends to resonate with the nonverbal behavior of B, commonly without the intention to imitate or mimic. Synchrony (of motor behavior, physiological arousal, prosody) signals sensorimotor coupling – and is a bodily expression of prosocial emotions.	Chartrand, Bargh 1999 <sup>41</sup>
Optimal motor control	A formulation of motor control that rests on forward (and inverse) models of sensorimotor coupling. This usually involves generating an efference copy that is used to predict the sensory consequences of action. Discrepancies between the predicted and proprioceptive input are then used to adapt and fine-tune execution.	Wolpert, Ghahramani, Jordan 1995 <sup>19</sup>
Predictive coding	Predictive coding is a $\uparrow$ Bayesian belief updating scheme for estimating the causes of (sensory) data by minimizing prediction error. It is a popular metaphor for (neuronal) message passing in the brain. This recurrent message passing takes place at different hierarchical levels of the cortex; where top-down processes generate predictions, and bottom-up signals report prediction errors.	Friston 2005 <sup>20</sup>