Intention and Consciousness in Neurofeedback

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Importance of Intent

Philosophical
Physical/Metaphysical
Neurophysiological
Jurisprudence
Role of Intention in NF

Motivation
Element of Belief
Parental/Peer Influence
Transference to daily life
Prerequisites for Intent

Belief in Possibility  
Motivation, Drive  
Neurophysiological Substrate  
World must support belief & change
Reasons for Considering Intent

Rationale for NF design
Understanding of NF effects
Motivation for new methods
What is Intent?

Subjective Expectation
Recognition of Outcome
Contiguity of Outcome
Earnestness
Mechanism of Intent

Neural Precursors
Connection of Events
Neural Binding - PRS
Backwards Reference in Time
Aspects of Intent

Discretionary – choose to produce - sounds, points, graphics, etc.

Nondiscretionary – intrinsically desirable - food, pleasant sensations, novelty, etc.
Paradoxes of Intent

ALL brain functions are automatic
Need to “release” for NF
(A. Einstein, B. Russell)
Intent follows initiation of action (Libet)
Intent in NF
(Sterman)

Begins with “intent not to move”
Brain undertakes dynamic reorganization
Cortical changes follow – SMR is epiphenomenon
PRS - reward, relaxation, relief
Sequence, timing are critical
Intent in Action
(Libet)

Intent preconfigures brain
Brain initiates action
Subjective Intent follows
Backward Referencing “explains”
Dynamics of Intent

High-level guide
“Colors” experience
Labels external events
Reorganizes past into present
Leads to learning, change
What is NF?

Attempt to create an artificial information & control reality

Manipulate causality

Provide brain with rules for learning
Mechanisms of Learning

Synaptic Plasticity
Hysteresis
Modification of Neural Substrate
Lasting change
“All the same thing”
“Everything I know is in the now”
Options for NF Design

“Classical” volitional
Contingent nonvolitional
Noncontingent nonvolitional
Classical Volitional NF

Brain says:

When I do X, Y is forthcoming
I want Y to occur
I can learn to produce X
Contingent Nonvolitional NF

Brain says:

When I do X, Y happens
Y is intentionally neutral
I will adjust to this new world
Noncontingent Nonvolitional NF

Brain says:

Something is happening to me
It has some distribution in time & space
I will adjust to this new world
Origins of NF signals

“Just because it looks like an alpha wave, does not mean that it is an alpha wave”

There is no such thing as “driven alpha”
Mechanism of Learning

It’s not the SMR or alpha that’s doing the work

It’s the Intention that’s doing the work
Summary of Intention in NF

Part and Parcel to Learning
Implies desire, ability to change/act
Contingency of reward (outcome)
Brain spontaneously takes care of details
NF Design Issues

Keep feedback “pure.”
Ensure contingencies honored.
Interim feedback reinforces belief, understanding, strategy.
Integrity, contiguity of events.
Allow enfolding in time.
Avoid extraneous feedback.