

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

(Stermann)

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 unfolding in time.

Avoid extraneous feedback.