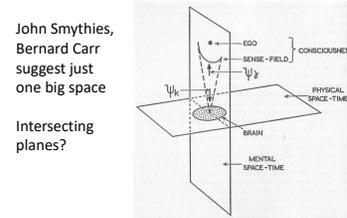# Theory of Multiple Planes
and their Connections.
For Visual Object Recognition

Ian J. Thompson
Livermore, CA
www.ianthompson.org
SSE-PA2 Conference

I use terms planes / levels / degrees interchangeably

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There are many levels of reality
Source > Spirit > Mind > Body

- These planes/levels must be systematically connected together.
- Looks like many dimensions.
- But question: Are the levels part of a big space, or are many spaces?

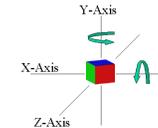John Smythies, Bernard Carr suggest just one big space

Intersecting planes?

But:

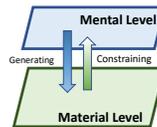Einstein's general relativity allows no special significance to direction or ordering of dimensional coordinates

As rotations continuously transform between dimensions but dynamics is unchanged

No such thing here as a 'higher dimension'

2

Need Multiple Levels
Each with their Own Discrete Space

- But still need interconnections, even if no intersections !
- These must depend on downward causality: 'top down' energizing.
- Downward: generation / production / energizing
- Upward: selection / constraint

- So all levels are needed to live in any of them:
  - Upper levels supply motive/love, intelligence
  - Lower levels supply outer permanence like a container built from past actions
- Each level has its own space, its own substances and its own dynamics
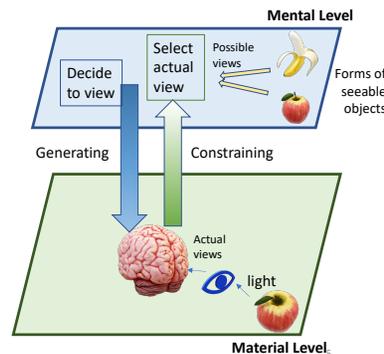- Now there are higher dimensions

3

Application to Visual Object Recognition

- The problem
  - Humans and animals quickly recognize visible objects
  - Do this despite varying distance, rotation, lighting, movement, etc.
  - Do this within 1/10 second: only ~ 100 neural steps possible.
- Single-plane attempted solution with Predictive Processing (Friston)
  - Predicted scenes are quickly adjusted so they agrees with view from the eyes.
- There might be enough neurons in the brain,
  but: difficult to get them to coordinate quickly enough

4

Two-Level method for Object Recognition

- 1 material level: objects, eyes, brain
- 2 mental level: possible forms of conceivable objects
- Different spaces and substances
- Quantum processes in both
- Quantum measurement in brain simultaneously constrain both
- So what is seen by eyes rapidly constrains both the sensory sheet and ideas of objects actually seen.

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Summary

- Fruitful to consider multiple planes/levels,
  each with its own dimensions, metrics, substances and dynamics
  - Mental objects behave very differently from physical objects
  - But still linked by
    joint generation of events (downward) and joint constraints (upward)
- Visual objects recognition: how two such levels could work together
- Multiple levels have a kind of dualism between them.
  - But we solve Descartes' interaction problem
  - Have interactions that can be tested experimentally in science.
  - Dualisms are not forbidden in science !!
- My ideas are derived from discrete degrees of Emanuel Swedenborg

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