

**CHIP 5-6**  
 Concepts and history in psychology

Disciplinary neighbours

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<http://www.psy.gla.ac.uk/~steve/courses/chip.html>

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**Introduction: disciplinary neighbours**

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**This lecture topic**

This lecture is about disciplinary differences, and relationships between disciplines.

Why does this matter?  
 One way to understand how psychology operates, and to evaluate it, is to compare it to other disciplines.

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**The WHO definition of health is inter-disciplinary (1946)**

"Health is a state of complete

- physical,
- mental, and
- social well-being;

and not merely the absence of disease or infirmity."

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[Medicine, psychology, sociology?]

<http://www.who.int/about/definition/en/print.html>

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**Psychology's neighbours**

Philosophy  
 Sociology  
 Anthropology  
 Physiology, neurology  
 Biology, (evolutionary psy)  
 Computer science, artificial intelligence  
 (Education) IQ, testing (psychometrics), learning  
 Psychiatry, medicine  
 Personnel management (HR); management  
 Linguistics, psycholinguistics,

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**A map: where would psychology go?**

	Computer Science	Chemistry
Science Single answers, original questions	Medicine	Philosophy
"Art" Original answers	Sculpture	Literature
	<b>Applied</b> single context	<b>Unapplied (Pure)</b> single generalisations

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## Disciplines and their idiosyncratic nature

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## Disciplines (0)

Not necessarily very permanent ...

Vision science

Botany vs. Zoology

Immunology

Biochemistry

Languages → cultural studies, the fragmentation of language depts.

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## Disciplines (1)

Disciplines really do shape a person's mind. They think differently about things depending on the discipline(s) they've been trained within.

What do you think disciplines are defined by?

(subject matter, research approach, teaching method, ...)

Take a few minutes solo, and write down what you think. Only then, discuss/debate your answer with a neighbour.

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## Disciplines (2)

Disciplines really do shape a person's mind. They think differently about things depending on the discipline(s) they've been trained within.

⇒ So one possible way to define them is as a way of thinking, a characteristic approach to problems. [compSci, ...]

Subject matter [but: physics vs. mechanical engineering; nursing vs. being a doctor]

Even the meaning of "research" differs. (It's a science word, not normally used by Humanities scholars.)

Teaching ("signature pedagogies")

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## Disciplines (3): CDC (1)

There is a real sense that the central learning aim of a history degree is to learn to write a history essay.

In psychology, to write a psychology essay.

In physics, to demonstrate analysis, reasoning and calculation like a physicist (not like an accountant, or mathematician, or logician)

I.e. a different way to **define** what a **discipline** is, is in terms of the **kind of thinking** about any new problem which it displays. And this is revealed in the way they teach the discipline over a degree programme in terms of the "core disciplinary criteria" which they use for marking across assignments.

## Core disciplinary assessment criteria (2)

So on this account, the key question for each discipline is: What is the assessment criterion that is closest to meaning: "Display thinking like a scholar in this discipline"?

Many disciplines in HE already have much of their assessment organised around a single standard format that exhibits this thinking style e.g. essays for most Arts and Social Science subjects (but actually, quite different essay types depending on the discipline), "problem solving" involving calculation i.e. inferential maths in most science and engineering.

Focussing feedback to students on grasping the core criteria is often key.

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### CDC 3: Psychology honours design

For the students responding to NSS 2009, the design had been:

Level 3:

9 modules, class exam with some formative feedback on 4

Level 4:

6 modules, no related coursework

BUT

Level 3:

2 CRs (critical reviews), 2 miniprojects with tutorial groups of 5-6

Level 4:

1 CR, 1 project each with a personal tutor

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### CDC 4: Psychology honours design (2)

So the programme design could be redescribed as investing 100% of its tutor time in focussing on equipping the students with the ability to display critical thinking (of the kind a psychologist values). It invented a type of coursework ("critical review") that announces to students what the main point is; it requires them to produce 3 month long pieces of work focussed on it; but also marks their exams with this requirement applied.

It is the hardest thing they must learn; the most important thing; almost all our teaching investment is put into it; and in the 2009 NSS, students rated us 5 out of 107 in the UK.

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### Dimensions for making a map of disciplines' similarities

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### Dimensions (1)

Can we find a system for classifying, mapping the set of existing disciplines? Are there just a few underlying ways in which they vary from each other?

Many (not all) studies come up with 2 dimensions.

Different authors describe these differently, but my version is:

- 1) Pure vs. applied
- 2) Humanities vs. science . "Arts" vs. science .

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### Humanities vs. science

Art vs. science // objective vs. subjective // abstract, concrete // soft, hard // public, private

Science studies what nature has; inanimate effects.

The Humanities study what humans have done or created; human agency.

So Humanities address intentionality, perspectives, feelings

So are likely to require uncertainty, perspectives, relativity.

You might say they are reflection on past human action, and look for (almost always multiple) perspectives.

Often (not always) this is grounded on human subjective judgments (– what other standard is relevant?)

These in turn lead to characteristic modes of thought: unresolved questions, seeking to problematise not problem-solve.

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### N.B. "Problem solving"

Employers frequently say they want graduates to do this. But really there are 3 contrasting component skills:

- a) Problematising: taking what others are letting slide by as OK, and flagging it up as something that needs treating as a problem. Every time a big fraud in a firm emerges, it is because people (auditors, ...) let it by. In fact employers need problem-spotters, although not all realise this.
- b) Redefining an identified but ill-specified problem into something specific that can be addressed. [anx. Malaria]
- c) Solving it: pushing through to an actionable decision and conclusion. Generally speaking, the Sciences drill their graduates on this all the time, and the Humanities do not; (or perhaps the applied disciplines do but the pure ones do not.)

### Humanities vs. science (2)

*Art vs. science // objective vs. subjective // abstract, concrete // soft, hard // public, private*

*Science studies what nature has; inanimate effects.  
The Humanities study what humans have done or created; human agency.  
These in turn lead to characteristic modes of thought: unresolved questions, seeking to problematise not problem-solve.*

In art itself, it's often about having a perception but not being able to articulate it. The artists specialise in producing these perceptions in others; the academic disciplines in attempting to articulate them.

And often in deliberately evoking multiple interpretations or perspectives on one thing.

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### Pure vs. applied

"Pure" focusses on a single cause and all its effects  
"Applied" on (achieving) a single effect and all its causes (necessary and sufficient conditions)

E.g. of one science-related spectrum from pure to applied:  
Theoretical physics - experimental physics - applied physics - mechanical engineering - engineers (building machines) - garage mechanic.

In Humanities this sequence may look more like a circle:  
Painting - history of art, theory of aesthetics - craft - interior décor  
Prime minister takes power - theory of politics - advisors to parties

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### Pure vs. applied (2)

So pure vs. applied may play differently in (interact with) the humanities vs. science dimension.

In science: First analysis (of nature); then synthesis (of artifacts)

In Humanities: First synthesis (of art objects, human events); then analysis (articulate something of what governs these).

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### How would you classify these?

First solo for a few minutes, then in pairs: how would you classify each of these disciplines on the 2 dimensions?

- Chemistry
- Medicine
- Literary studies
- Sculpture
- Psychology

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### A map

<b>Science</b> Single answers, original questions	Computer Science	Chemistry
	Medicine	Philosophy
<b>"Art"</b> Original answers	Sculpture	Literature
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### Psychology?

When I attempted to get some data on how to map the disciplines by asking academics to classify their own discipline, the first thing I found was that those in a discipline always see it as near the centre (of the world);

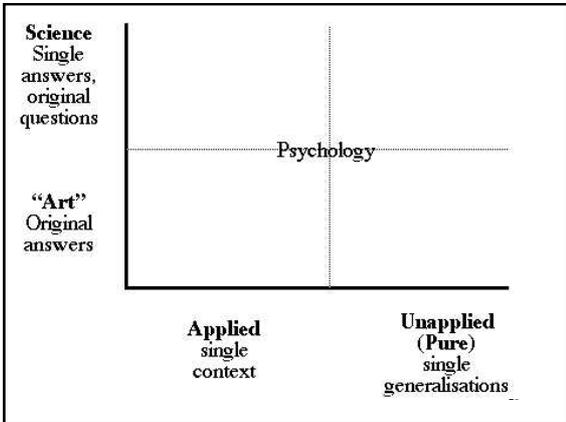
And that the dimensions were useful to them mostly for understanding the relationships between different bits of the discipline.

E.g. for psychology: how physiological psychology, Social psychology, visual perception, abnormal etc. relate to each other.

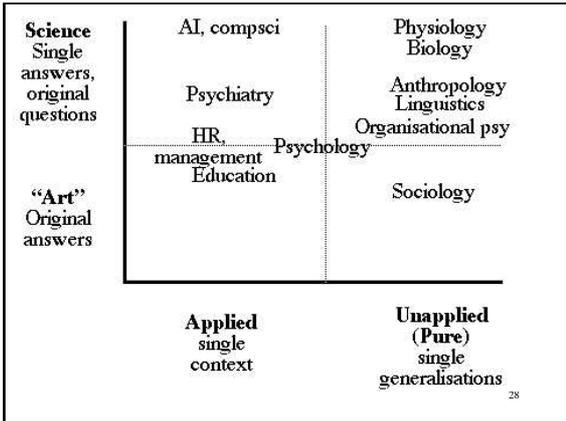
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## Psychology's disciplinary neighbours

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- ### Psychology's neighbours
- Philosophy
  - Sociology
  - Anthropology
  - Physiology, neurology
  - Biology, (evolutionary psy)
  - Computer science, artificial intelligence
  - (Education) IQ, testing (psychometrics), learning
  - Psychiatry, medicine
  - Personnel management (HR); management
  - Linguistics, psycholinguistics,
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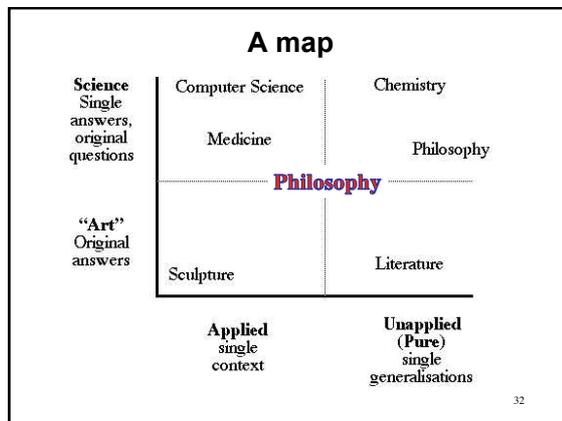
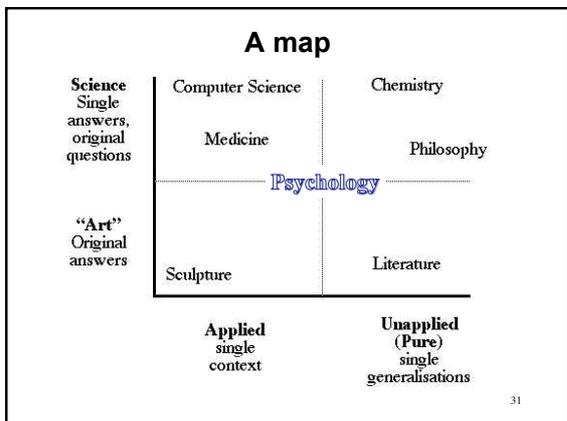


- ### Examples of cross-boundary topics
- Migraine: physiological or psychological? [Sacks (1992)]
  - Pain: physiology or psychology? [Wall (1999)]
  - Public Health: medicine, psychology, sociology? [WHO]
  - Solo - Social perspectives; in education, and in psychology generally.
  - J.J.Gibson on perception: psychology, optics (physics), awareness ... Not representation but information, lawful relationships of object and properties in the light. [reductionism]
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### Susan Stuart: Consciousness

- An example of interdisciplinarity
- Comments on where philosophy sits in a map of all disciplines

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## Systems and levels of explanation

### (Reductionism)

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### The feeling of explanation

Humans seem to like the feeling that something is explained. However there is reason to think we are poor judges of the quality of an explanation (Kieras & Bovair, 1984)

Generally speaking, explanations are deductions, where some general rule is used to deduce (post hoc) some specific (observed) case.

One kind is a set of axioms e.g. in geometry; or the rules of chess.

Such examples show how a very small number of simple rules can give rise to complexities that can occupy clever people for generations.

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### Types of (deductive) explanation

A. Axioms or game rules: explanation in a closed system, at one level.

B. Reduction: explaining one level by a lower level that implements it e.g. atoms explain molecules, which are all made up of combinations of atoms; DNA “explains” genes, which are all expressed and transmitted in DNA code.

C. The pure → applied cascade of research.  
 The notion is that if we have the theory, then we can deduce applications, which are particular uses of the theory in particular cases. The cascade is logical, but often not how it happened historically.  
     Logic = a justification of the idea.  
     Logic ≠ Causation of the idea in a person or scientific field.

A,B,C all use and exalt deduction, though they use it differently.

### Examples of levels, hierarchies

Reductionism requires the existence of a hierarchy of levels. E.g.

Disciplines: Politics → Sociology → **Psychology** → Neurology → Biology → Chemistry → Physics

Biological groups: Population → Clan or group → **Organism** → Cells → Organelles ....

Psychological systems: All humans → Nation state → Groups of acquaintance → Family → Dyad interacting → **Individual** → Parts of one person’s mind? ....

Evolution: Natural selection → Genes → DNA

Matter: Materials → Phases of matter (solid, gas, ...) → Molecules → Atoms → Particles (e.g. protons) → Quarks ...

### Reductionism

Many feel instinctively that reductionism (type B above) is the best kind of explanation. This is not a rational feeling because:

- Each level of explanation can be independent, with its own rules (just like chess is).
- A level can sometimes be reduced to more than one alternative lower level e.g. the wave equation (physics) explains sound waves, light, ocean waves, the jet stream (a special kind of waves keep it intact), and quantum mechanics.
- Some levels just do NOT reduce to another e.g. especially when they have self-correcting mechanisms (homeostasis).
- Above all: whether as individuals or societies, we are born into the middle of things. We can't wait until a theory for a lower level arrives.

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### Reductionism (2)

Some things that currently (2012) don't seem to fit into levels very well:

- Lamarckian inheritance, "epigenetic" factors. [cf. start address]
- Prions. Is infection a phenomenon independent of organisms as infectious agents?
- Migraine [Sacks]. Physiology doesn't precede "psychological" / psychosomatic causes in any clean way.
- Genes and learning as causes of behaviour [Hailman]

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### Behaviour as an independent subject?

Genes do not directly control behaviour: they control only proteins and RNA molecules: they don't even control sugars or bones directly. Behaviour is, and must be, shaped mainly by other mechanisms.

So one view of psychology is that it is a level of explanation with a logic mainly independent of the mechanism of natural selection (and genes, and DNA). And probably in the end that is why brains evolved: to get that independence.

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### Evolutionary psychology: A contradiction in terms?

Thinking about scope again: one might almost say that psychology is defined as exactly those aspects of being human that are NOT controlled by evolution.

The whole point of perception and learning is so an organism can adapt its behaviour faster than the genome can.

Human behaviour is not inherited, at least not through genes. And that is, presumably, precisely its adaptive evolutionary advantage.

[Jack Hailman]

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### Reductionism (3)

We individually as critical thinkers, or a discipline as a whole, has to consider whether and when a reductionist approach is useful and can be made to work. And whether it adds anything. Most often, a discipline is defined by looking at a particular level because the lower levels do not seem likely to help in detail.

In psychology, there are some impulses to try to reduce the 3 types of data to each other e.g. explain behaviour by physiology, the social by individual attitudes. This may work in some cases, but in general the job is to relate them. This probably means finding how the causal links run in both directions, not just in one.

More work on this is probably a good heuristic;

As is looking for self-stabilising systems / feedback loops that make a level relatively self-contained.

E.g. Brain plasticity vs. fixed, determined brain areas

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### Psychology ?

Where does Psy fit in the levels of explanation?

Why is it a separate autonomous level?

Politics →

Sociology →

**Psychology** →

Neurology →

Biology →

Chemistry →

Physics

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### **Reductionism**

*Reductionism in general is the irrational belief that explanations of mechanism are more real than explanations of relationships at one level.*

*Newton and action at a distance.*

*Is chemistry just physics?*

*Is biology just chemistry?*

*Is psychology just biology?*

*⇒ Psychology is just physics*

*⇒ Study physics for the real explanations.*

*Evolution → genes → DNA*

*Brain plasticity vs. fixed, determined brain areas*

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### **What is my real point about reductionism?**

- We each need a reason for seeing psychology as a discipline, not some lower level as holding the real explanations.
- Appreciation of rules at one level, not just reductively
- Keller: even at one level: emergent systems thinking, self-organising systems show patterns that produce patterns and complexity spontaneously. Getting away from thinking that there is just one cause that "explains".

Emergent phenomena.

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### **Critical thinking tip**

Are the (3) major types of data being used reductively to explain each other, or collaboratively?

Look for self-stabilising systems / feedback loops that make a level relatively self-contained.

Test for whether causation runs in both directions?

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### **A place to stop**

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