CHIP-5
Concepts and history in psychology

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http://tiny.cc/CHIPdraper

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

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Discussion questions from the previous lecture

1. Is is irrational, or sensible, when scientists do not accept apparent disproofs of theory?

2. Can you think of cases of this in psychology?

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Recap

Last lecture, I was talking about Kuhn's idea, and whether there was an irrational and/or social aspect to when and whether scientists would abandon a theory as soon as contrary evidence appeared.

I then spent some time on the differences between pure and applied research: highly relevant to Psychology. And the observation that applied science often precedes the establishment of a theory: contrary to the belief of many people, especially pure researchers;
(and implying that Kuhn and Poppers' arguments, which apply to pure research about creating theories, might be missing a lot of actual (applied) science).

Argument structures

This set of slides is about argument structures (= "schemas", "formats").

There is not one single structure for scientific arguments;

Disciplines often focus on only one or two formats: but is this a weakness?
Can the convention holding sway in a given discipline at a given time obstruct or prevent progress?
What about psychology?

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Abstract argument schemas (0)

Four classes of inference (reasoning, argument types):

1. Deduction: Certain; usually from the general to the particular

2. Induction: from particular cases to a generalisation
              (never certain).

3. Abduction: to the best explanation: (Sherlock Holmes)

4. *Transcendental: necessary explanation. Arguing what must be true of all possible cases/worlds.*

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Deduction

Used in the Newtonian triad for prediction. Given a general law, what does it imply for specific cases?

All psychology students hate stats.   (a theory)

Carol is a psychologist   (a fact / observation)

=> Carol hates stats   (a prediction)

Induction

Emphasised by qualitative research in psychology: immerse the researcher in the participants' experience, aiming to uncover what the important factors are (not assume these are already known).

Ann is a psychologist and hates stats   (observation)
Ben is a psychologist and hates stats   (observation)
(John is a maths student and finds stats easy)   (observation)
⇒ **All psychology students hate stats**.   (hypothesis, theory)

See the example in the textbook of qualitative research on student procrastination (ch.11, pp.455-458).

Abduction

Used for explanation.

All psychology students hate stats.   (one theory)
Danny hates stats.   (observation)
⇒ Danny must be a psychology student   (inferred explanation)

Maths students despise stats (too applied, low level).   (theory)
Danny hates stats.   (observation)
=> Danny must be a maths student   (inferred explanation)

Reminder: the Newtonian triad

1) A theory

2) Prediction / calculation: generate testable consequences from the theory.

3) Observation, experiment

Some schemas:
- Falsifiability —> must be able to do 2, then 3
- Induction —> take existing 3 and generate 1.
- Similarly the method of examples and counterexamples uses existing 3 to check 1: allows tests of theories without new 3. E.g. my arguments about emotion.

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Scientific argument schemas (1)

Kuhn focussed on non-rational aspects of actual scientific research communities.

Disciplines often focus on only one or two formats for scientific arguments: but is this a weakness?
Can the convention holding sway in a given discipline at a given time obstruct or prevent progress?

Ted Nield pointed out (for geology) how a discipline at a particular time may only allow one of the possible argument types to be published, and this sometimes obstructs the publication of vital arguments. This kind of restriction is, say, semi-rational: a convention based on methodological problems but perhaps adhered to too rigidly.

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Nield on Geology's Argument schemas

Nield (2007) has a bit on the influence of argument schemas in Geology and its obstruction to accepting the theory of continental drift and plate tectonics.

The American geologists admired induction: real practical and objective fact gathering, from which generalisations might cautiously be made later; and despised grand European theorising from an armchair, which added no observations (no empirical content) and discarded evidence that didn't fit. (pp. 131-133)

Couldn't get US funding if the grant application said it was testing deductions from theories, only if it looked like induction / abduction: getting new information and discussing it against multiple theories. (pp. 143-145)

Argument schemas (2)

E.g. Darwin's book "Origin of species"
- Proposed one theory, discussed all the supporting evidence
- But surely it had no experimental support, testing?

- Later biologists do do some evolution-related experimental work e.g. given a hypothesis that urban moths are soot-coloured, they might artificially colour moths and look at differential predation.

- We need to recognise that some disciplines may publish more than one kind of argument schema. E.g. a grand theory, then experimental tests of its predictions.

- The importance of grand theories is that they look at large collections of evidence as a whole, and seek to find a single synthesis that accommodates it all.
  Paul Nurse's point that many "cranks" (e.g. climate change deniers) are essentially selecting just a few observations that suit their view. This is legitimate from the viewpoint of counterexample arguments; but not for judgements about the balance of evidence   12

Some argument schemas (3)

Obs = observation/dataset
th. = (general) theory
hyp = (specific) hypothesis / prediction
The new element being published is in red
=> shows the conclusion, if any, being asserted.

a) Propose one grand theory, discuss all the supporting evidence (Darwin) [1 th., <= N obs.] (Induction)
a2) Propose one hypothesis, discuss evidence for and against (Critical Thinking/Review) [1 hyp, <= N obs.]

b) Theory vs. theory (Popper). Decisive experiments. Two theories, one observation. [2 th., 1 obs. => 1 th.]

c) Report one set of observations, discuss multiple alternative theories to explain them. [N th. 1 obs.]

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Lecture theatre seating

Students were randomly assigned seating for a course (reversed at mid-semester)
Significant effect on eventual course grade of whether sitting in the front quarter vs. back quarter in the first half of term.
This is a case, rare in psych., of an observation with NO theory or hypothesis. The authors are physicists: perhaps with an appreciation of the difference between a fact and a theory.

Perkins,K.K. and Wieman,C.E. (2005) "The Surprising Impact of Seat Location on Student Performance" *The Physics Teacher* vol.43 January pp.30-33

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Lecture theatre seating: Course grades

Some argument schemas (4)

d) Publish observations without theory? You could say this is the Applied version of (a) above. Induction, may or may not have a hypothesis, but does not have a causal theory. [0 th. 1 obs.]
E.g. lecture theatre seating; epidemiology; Semmelweis.

e) Pure deduction (theory extension) (a lot of theoretical physics) e.g. Hawkins, black holes. [1 hyp. <= 1 th.]
? e.g. cognitive dissonance

f) Explanation of an old phenomenon (old puzzle), showing which deduction from an existing theory explains it. (Feynman, sprites, cosmic ray flashes) [1 obs, 1 hyp, 1 th.] (Abduction)

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Argument schemas (5)

Veyne suggests that History and (Weberian) Sociology are almost identical, but that:

• History centres on events, uses theories to explain the observations
[f] Take event (an obs.), select one theory, then explain (like Feynman)
[1obs, 1 hyp, 1 theory]
[b] Or perhaps contrast 2 theories, like Popper   [1 obs, 2 th.]

• [a] Sociology centres on a theory, uses /selects events to illustrate or prove it.
[cf. Darwin: 1 th. N obs.]

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Argument schemas (6)

What of psychology?
It tends to do theory in literature review articles [a]
It does do a few decisive experiments, choosing between 2 theories. [b]
It is bad at publishing unexplained phenomena [d]
(but: visual illusions; brain damage cases. "Anecdotes"?)

It doesn't do much of any of the schemas above. Instead ...
[x] It most often seems to publish lab reports: assert a theory, assert that the experiment tests it, assert that the results confirm the theory. [1 obs, 1 hyp, => 1 theory]

The most common weak point, it seems to me, is "prediction": establishing a reliable link between the theory and how it is operationalised (into a hypothesis) in the experiment. The giant leaps from the actual expt. manipulation to the theoretical description of what matters about the difference in the treatments.

Introduction: disciplinary neighbours

This topic

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

Why does this matter?

1. One way to understand how psychology operates, and to evaluate it, is to compare it to other disciplines.

2. It is important to consider how psychology often must interact with other disciplines, and collaborate in inter-disciplinary work.

## Dimensions for making a map of disciplines' similarities

What defines a discipline?

Disciplines vary in a number of ways e.g.

- Subject matter
- Research methods. Even what they think research is.
- Argument style: as in what argument formats are acceptable in published papers
- And hence the whole way its members think: as in how they characteristically approach problems of all kinds outside their disciplines.
- Teaching: how they go about teaching and learning

But first, we'll consider two ways they vary that might allow us to "map" out the space of different disciplines.

A map: where would psychology go?
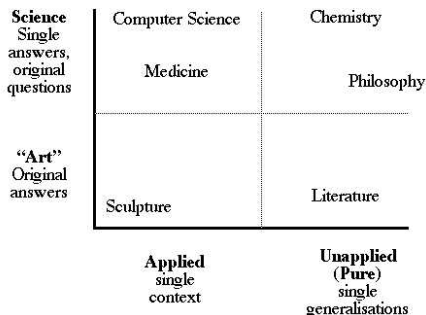
Dimensions (1)

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 .

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?)

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.

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

Pure vs. applied (2)

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

In science: Analysis (of nature); Synthesis (of artifacts)

In Humanities: Synthesis (of art objects, human events); Analysis (articulate something of what governs these).
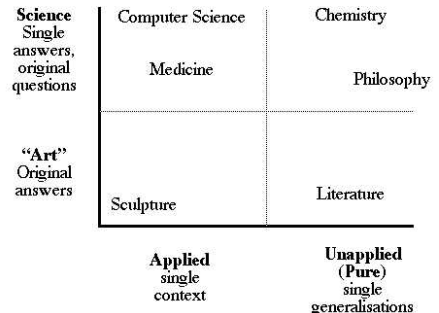
How would you classify these?

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

A map

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 their own discipline.

E.g. for psychology: how physiological psychology, Social psychology, visual perception, abnormal etc. relate to each other.
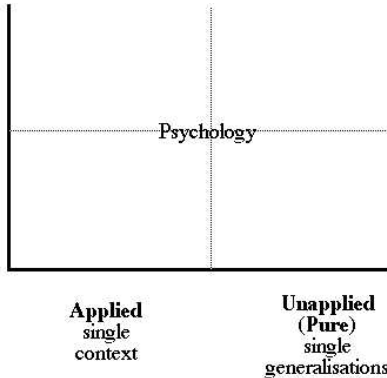
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Psychology's disciplinary neighbours

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Science
Single answers, original questions

"Art"
Original answers

Psychology

Applied
single context
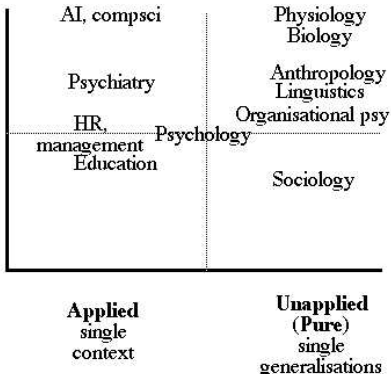
Unapplied (Pure)
single generalisations

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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Science
Single answers, original questions

"Art"
Original answers

AI, compsci

Psychiatry

HR, management   Psychology
Education

Physiology
Biology

Anthropology
Linguistics
Organisational psy

Sociology

Applied
single context

Unapplied (Pure)
single generalisations

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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."

_____

[Medicine, psychology, sociology?]

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

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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]
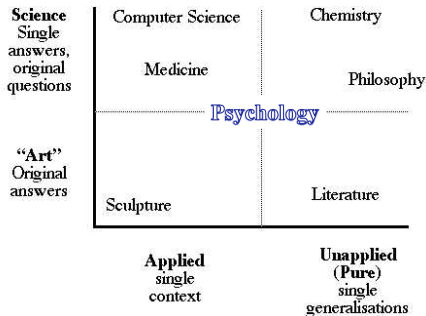
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Susan Stuart: Consciousness

- An example of interdisciplinarity

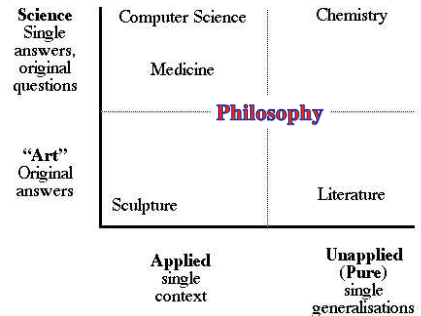- Comments on where philosophy sits in a map of all disciplines

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A map

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A map

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Discussion questions for homework

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Discussion questions for homework

1. Where / how would you classify Psychology as a discipline on any dimension, including Arts/Science and pure/applied?

2. Where would you classify Philosophy (on the 2D map of disciplines)?

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A place to stop

For the slides, handout etc. see:

http://tiny.cc/CHIPdraper

or:

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

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