



ARTS-L0112

Philosophy of Science

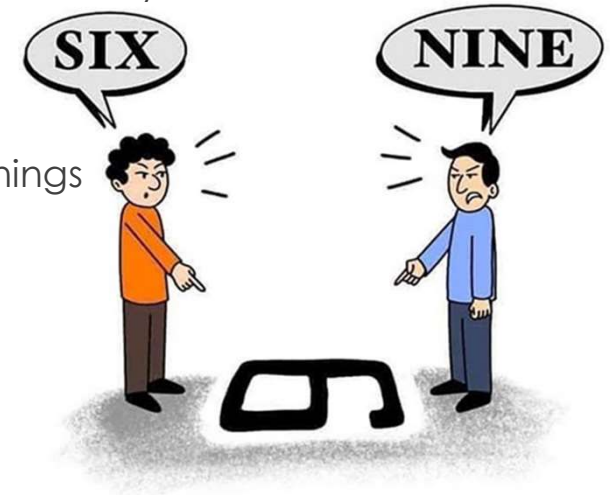
12. Interdisciplinarity & Transdisciplinarity

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The Two Academic Cultures

- ▶ Natural sciences vs. Humanities and Social Sciences
 - ▶ Methodologically different? (e.g. explanation vs. understanding)
 - ▶ Methods develop for the needs of the research, the basic ideas are shared
 - ▶ The differences come from the different objects: nature vs. human reality
- ▶ The different paradigms of different fields (in general)
 - ▶ Shared background beliefs, practices and epistemic attitudes
 - ▶ Disciplinary identity, prejudices against different ways of doing things
 - ▶ Problems in understanding each other

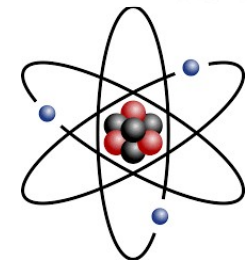
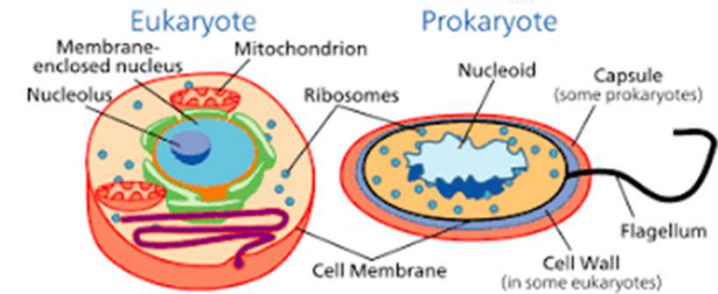


Ontological relations between disciplines



Social phenomena
Culture
Individual behaviour
Brain processes
Biological processes
Chemical processes
Physical reality

Social sciences
Humanities
Behavioural sciences
Neuroscience
Bio-sciences
Chemistry
Physics



The institutional structure of science

The institutional structure of science is conventional

- ▶ History, administrative needs
- ▶ "Basic sciences" are based on old ideas of the structure of reality

There are objects "between" disciplines, sometimes creating new ones

- ▶ Vertical: biochemistry, molecular biology, neuropsychology, psychiatry, cultural psychology, behavioural economics
- ▶ Horizontally: different fields in human sciences, different fields in biosciences

Practical use – applied science, technology

- ▶ Often require combination of knowledge
- ▶ Problems: the incommensurability of theories, lack of shared language, different beliefs about the object

An Example: Gender

- ▶ The everyday understanding of gender:
 - ▶ Two unambiguously distinct genders
 - ▶ Essentialism: the gender differences are explainable by the gender
 - ▶ The "naturalization" of the differences (they are "natural", hence unavoidable)
 - ▶ Chromosomes interpreted as "essence barers"

Biological SEX

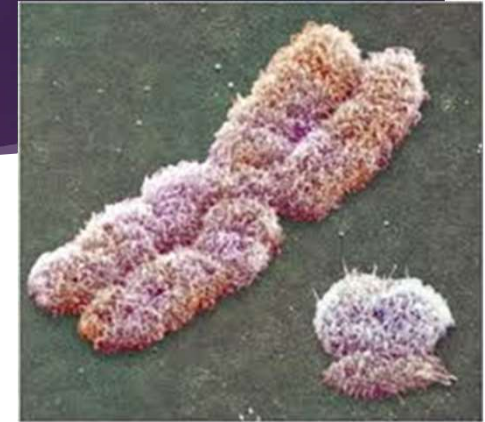
- ▶ The object for biology and medicine

Socio-cultural GENDER

- ▶ The object of gener studies, humanities, and social sciences
- ▶ The social construction of gender: the cultural presentation, the mechanisms behind it, and the social and cultural consequences

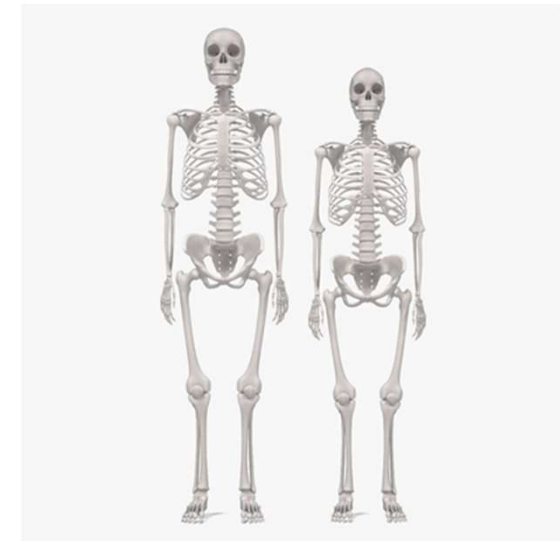
Biological gender / sex

- ▶ Not a uniform concept
- ▶ The most common definition: the type of the sex cells (egg, sperm)
 - ▶ Male / female / no sex
- ▶ Genetic sex? (chromosomes)
 - ▶ The presence of Y-chromosome triggers the male developmental channel (but not always: sometimes XX is male and XY female, and there are other combinations)
 - ▶ All phenotypic characteristics are guided by shared genes – hormones activate a network of genes, which may vary between stages of development
- ▶ Gonadic sex: two testicles, two ovaries, or one of both



Biological gender / sex

- ▶ Somatic sex
 - ▶ Primary sex characteristics (Intersex: 1½ – 2½ % of population)
 - ▶ Secondary sex characteristics: vast individual variation
- ▶ The different notions: different aspects of biological sex
- ▶ Gendered brain?
 - ▶ There are not two types, but there are clusters of characteristics that correlate on population level – the significance is an open question
 - ▶ The gendered identification of one's own body? (seems to have a neural basis)



Socio-cultural gender

- ▶ Gender roles as cultural constructions
 - ▶ Cultural representation: stereotypes
 - ▶ Social and normative expectations related to behaviour
 - ▶ Performance: how to present one's gender
- ▶ Gendering the social reality
 - ▶ Plays, professions, types of social interaction
 - ▶ The created differences in the environment (esp. in childhood)
- ▶ Gendered individual development
 - ▶ Interaction between biology and the environment
 - ▶ Looping effect: identification as man/boy or woman/girl guides behaviour and the objects of interest, and therefore the skills acquired, and the self-image



How do the different concepts meet?

- ▶ What are we searching for?
 - ▶ The general difference between biology and humanities: are we looking for universality (and explanations for it) or differences (and explanations for them)?
 - ▶ E.g. evolutionary psychology vs. cultural anthropology
 - ▶ All scientific disciplines study fragments, not the whole picture
- ▶ What creates individual differences?
 - ▶ Biology, upbringing, what else?
 - ▶ Complicated question, cannot be answered by one discipline
- ▶ What creates societal differences?
 - ▶ For example, the differences in salaries
 - ▶ Not the same question



How do the different concepts meet?

- ▶ Gender is not a unified phenomenon – our normative conceptions may be
 - ▶ Different biological concepts, social gender, gender identity
 - ▶ How are the different aspects connected?
- ▶ What is transgender?
 - ▶ Gendered experience of body and identification are real psychological phenomena
 - ▶ Gendered socio-cultural identification
 - ▶ How to integrate subjective experience, facts about the biological body, and the surrounding socio-cultural reality? (a note: the sex correction is a genuine biological transformation)
 - ▶ Is there a biological foundation for transgender?
 - ▶ Other genders – identification outside the socio-cultural gender norms?

Gender outside science

- ▶ The subjective experience
 - ▶ Science can only research possible biological correlates, the socio-cultural frameworks, and consequences of the identity
 - ▶ Art and artistic research?
- ▶ Public discourse
 - ▶ Protoscientific ideas vs. scientific conceptions vs. ideologies: values play a role
 - ▶ The debate is not only academic
 - ▶ Social norms about gender: binary, normative (unlike with other animals)
 - ▶ Is there a cultural break in the concept of gender and/or the phenomenon of socio-cultural gender?

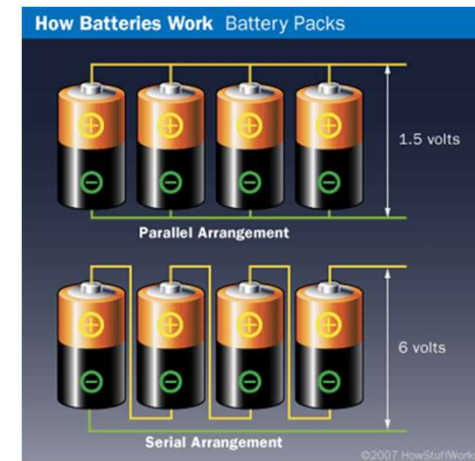
Interdisciplinarity: the epistemic promise

- ▶ Integrating different perspective: fuller picture
- ▶ Methodological harmonization: more reliable knowledge
 - ▶ Triangulation: different kinds of evidence from the same phenomenon
 - ▶ For example: chemical archeology
- ▶ Studying the phenomena "in between"
- ▶ Practical applications
 - ▶ For example: deploying technology successfully involves knowledge about psychology, practices, and the context of the deployment



Interdisciplinarity: the pragmatic challenges

- ▶ How to overcome the differences between paradigms?
 - ▶ The incommensurability of theories and concepts
 - ▶ Cf. the lecture on Kuhn
 - ▶ The inability to evaluate the evidence across the border
- ▶ "Fundamentality" does not help
 - ▶ E.g. how old is Sphinx?
 - ▶ Rain water erosion + the climate history: much older than thought?
 - ▶ Or: are there other causes for what looks like rain water erosion?
 - ▶ Emergence: "higher levels" may have properties not discovered yet by disciplines studying the "lower levels"
- ▶ How the research questions are related?
 - ▶ How to compare the answers given to them?



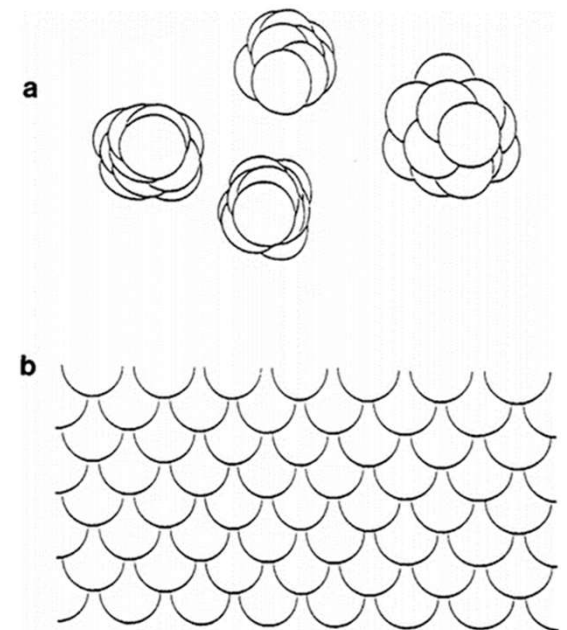
Unification, Integration, and Pluralism

- ▶ Unification: the goal of unified science
 - ▶ The reality is one: shouldn't science be too?
 - ▶ Theoretical testing of theories themselves: are they compatible?
 - ▶ Can this principle guide research?
 - ▶ Problems: often impossible in practice, and it can only be what the final science looks like (if even that)
- ▶ Pluralism
 - ▶ Different disciplines give different perspectives that are all just fragments – but knowledge nevertheless (Heleln Longino, upper)
 - ▶ Integratiive pluralism: different fragments interact locally: integration may be possible case by case (Sandra Mitchell, lower)



The Fish Scale Model

- ▶ Donald T. Campbell (1916–1996)
- ▶ The real "units" of science are even smaller than disciplines
 - ▶ The fields of specialization cover smaller areas that jointly cover the area the discipline is studying
 - ▶ There are areas not studied in between disciplines
 - ▶ We need a model that covers everything and doesn't depend on the disciplinary structure
 - ▶ Integration = the scales are overlapping, the relevant information flows in between
- ▶ The practical problem: the institutional disciplinary structure
 - ▶ Departments, educational programs, journals, careers



Transdisciplinarity

- ▶ The different x-disciplinarity
 - ▶ Multidisciplinarity: joint work between several disciplines
 - ▶ Interdisciplinarity: integrated work, combining theories and methods
 - ▶ Transdisciplinarity: transcending disciplinary borders, aiming at holistic view of the phenomenon, may include non-scientific approaches
- ▶ Examples:
 - ▶ Medical science: integration and collaboration between different roles
 - ▶ Integrating folk knowledge (e.g. agriculture, pain relief practices)
- ▶ A wider understanding of the problem by integrating non-academic perspectives

Transdisciplinarity and artistic research

- ▶ In art research:
 - ▶ The academic perspective + the artistic perspective
- ▶ In studying a subjective phenomenon:
 - ▶ Science “around” the phenomenon + artistic expression of the phenomenon
- ▶ Educational purposes:
 - ▶ Communication of the scientific contents or methods
- ▶ Mutual inspirational purposes
 - ▶ New perspectives
- ▶ What else?

The Essay

- ▶ What is the relationship between art and science? Possible perspectives:
 - ▶ Art as an object of research – and what is the role of artistic research in this?
 - ▶ What art can tell that science cannot? Or the other way around?
 - ▶ How can art and science collaborate?
 - ▶ What is the “scientific status” of artistic research?
 - ▶ Are there analogies between doing science and creating art?
 - ▶ Are there some key differences between science and artistic research?