Disease as an example of non-Aristotelian categories

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What is non-Aristotelian?

Aristotelian principles

- All statements must be either true or false.

- No statements can be true AND false at the same time.

- There is nothing in between true and false.

Fuzzy logic is often mentioned as non-Aristotelian

- In fuzzy logic there are truth values between the absolute true (1) and absolute false (0).
  E.g. "I am a talented man"

- But fuzzy statements can be converted into two valued logic using membership functions:

"Is it true, that my membership function in 'talented man' is 0,2?" (Yes or No answer)

Non-Aristotelian categories lack common exclusive properties

- Bio-medical categories often non-Aristotelian (there is nothing that is true for all and only instances of the given category)

- Disease is a typical example (some are painful, but not all painful conditions are diseases, etc.)

What is 'Disease'

- Without having a common exclusive property, people can agree for the most part what is a disease and what isn't.

- This means that sometimes they disagree.

- The level of agreement depends on the similarity of the social/cultural background of people.

Socio-cultural dependence

- Example of homo-sexuality: sin, disease, normal variation; corresponds to punishment, treatment, tolerance.

- Being something a disease depends on reaction of the society.

- Possible main reaction types to disease: separation, treatment
(consider leprosy in ancient times)

Proposed definition

Anything is a disease that in a given society has the potential to provoke some specific (health) action against itself.
- The action not necessarily happens in each case
- This is not an intrinsic property.

Disease as hybrid class

- What 'conditions' can satisfy the definitions?
  - Continuants (Endurants)?
  - Occurrents (Perdurants)?

- Diseases can be seen as 'hybrid' categories. (Process and morphology dominated diseases)

- No single disease is thought to be an occurrent AND a continuant at the same time

Alignment with top level ontologies

- BFO and DOLCE were tested

- Endurants and Perdurants are disjoint

- 'Quality' in DOLCE is neither endurant nor perdurant.

- Disease must be represented as a union of E-disease and P-disease

Limitation of description logic

To represent social dependency requires first order logic:

provokes (disease, action, society)

Conclusions

- There is no common exclusive property for disease.

- Conditions used to be regarded as disease are ontologically heterogeneous.

- If social dependency has to be represented, DL is insufficient, FOL is required.

Thank you for attention !

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