Metaphor: Why It's Important, Why It's Challenging and How to Process It

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Agerri, R. Barnden *et al.* (2007). Default inferences in metaphor interpretation. In B. Kokinov *et al.* (Eds), *Modelling and Using Context: 6th International and Interdisciplinary Conference*. Lecture Notes in Artificial Intelligence, Vol. 4635, pp.1–14. Springer.

Barnden, J.A. (2001). Uncertainty and conflict handling in the ATT-Meta context-based system for metaphorical reasoning. In V. Akman *et al.* (Eds), *Modeling and Using Context: Third International and Interdisciplinary Conference*. Lecture Notes in Artificial Intelligence, Vol. 2116, pp.15–29. Springer.

Barnden, J.A. (2001). Uncertain reasoning about agents' beliefs and reasoning. *Artificial Intelligence and Law, 9* (2&3), pp.115–152.

Barnden, J.A. (2007). Metaphor, semantic preferences and context-sensitivity. In K. Ahmad *et al.* (Eds), *Words and Intelligence II: Essays in Honor of Yorick Wilks,* pp.39–62. Springer.

Barnden, J.A. (2008). Metaphor and artificial intelligence: Why they matter to each other. In R.W. Gibbs, Jr. (Ed.), *The Cambridge Handbook of Metaphor and Thought*, 311–338. Cambridge University Press.

Barnden, J.A. (2010). Metaphor and metonymy: Making their connections more slippery. *Cognitive Linguistics, 21*(1), pp.1–34.

Barnden, J.A. *et al.* (2004). Varieties and directions of inter-domain influence in metaphor. *Metaphor and Symbol, 19*(1), pp.1–30.

Barnden, J.A. & Wallington, A.M. (2010). Metaphor and its unparalleled meaning and truth. In A. Burkhardt & B. Nerlich (Eds), *Tropical Truth(s): The Epistemology of Metaphor and Other Tropes,* pp.85–121. De Gruyter.

Plan

- ▶ Metaphor and its importance

- ▶ Metaphorical mappings

- ▶ ATT-Meta approach to metaphor understanding —

  Theoretical approach and AI system partially implementing it:

  System: just reasoning, no natural-language front-end
  (but moves are afoot)

- ▶ Non-parallelism and metaphorization of the literal

- ▶ Additional comments and conclusion

Examples of Metaphor

"Japan is becoming the Britain of the Far East."

"I don't think strings are attached. If there are any they're made of nylon."

"From today, the entire polar ice-cap of Catholic sexual morality has started to melt."

"Juliet is the sun."

"In the far reaches of her mind, Anne believed that Kyle was unfaithful."

"Can you look at your own life, kind of on a continuum? Look down the road of that line and see what that's gonna do... in your life?"

"Part of Mary was insisting that Mike was adorable."

"The managers were getting cricks in their necks from talking up [to some people] and down [to others]."

Practical Importance of Metaphor in Ordinary Language

▶ Important in *mundane* and *specialized practical* discourse:

news/magazine articles, popular novels, classroom teaching, university lectures, popular science explanations, political statements, ordinary conversations, computer-mediated text chat, doctor/patient dialogue, therapist/patient dialogue, self-help books, workplace dialogue, bureaucratic dialogue, collaborative task-based dialogue, computer science, ...

▶ Metaphor is often the only economical, or the most economical, way of discussing something, especially when abstract

▶ Metaphor and emotional/evaluative expressions are mutually central

▶ Metaphor is important in summarization in extended discourse

▶ Metaphor is a tool for topic-change in conversations.

Role of Mappings in General, 1

- Of course, many words and phrases can have entrenched and hence lexicalized ("lexiconized") metaphorical meanings.

  Conventional metaphorical phrases, many idioms.

  But otherwise . . .

- Many theorists rely on the idea of "conceptual metaphors": ways that language users are familiar with for dealing with (thinking, talking, doing something, ...) about one subject matter in terms of another [goes back to Lakoff & Johnson 1980].

Role of Mappings in General, 2

Each conceptual metaphor is a bundle of *[individual] mappings* between aspects of the two subject matters
(the *target-side* and *source-side* subject matters or domains).

Example of a conceptual metaphor:

A LOVE RELATIONSHIP AS A JOURNEY

Some individual mappings for it:

the lovers ⟷ *two travellers*

their being lovers ⟷ *their travelling together*

the sequence of states ⟷ *the path journeyed on*

decision points ⟷ *intersections etc.*

Role of Mappings in ATT-Meta

- ATT-Meta is mapping-based, with already-known mappings for a range of *metaphorical views* (roughly, conceptual metaphors).

  A view: IDEAS AS PHYSICAL OBJECTS

  A mapping for it: *conscious mental usage* ⟷ *physical operation*

- Also: **View-Neutral Mapping Adjuncts** (VNMAs)
  e.g. for logical structure, event relationships, value judgments, . . .

- Novel mappings: not implemented in system, but compatible with the general approach.

Emphasis on Map-Transcending Metaphor:
resting on one or more known metaphorical views but going beyond their mappings

"In the far reaches of her mind, Anne believed that Kyle was unfaithful."

"Can you look at your own life, kind of on a continuum? Look down the road of that line and see what that's gonna do... in your life?"

"I don't think strings are attached. If there are any they're made of nylon."

"Part of Mary was insisting that Mike was adorable."

"The managers were getting cricks in their necks from talking up [to some people] and down [to others]."

Source/Target Non-Parallelism

"In the far reaches of her mind, Anne believed that Kyle was unfaithful."

- What's the overall meaning?

  Anne believes that Kyle was unfaithful, but it would be very difficult for Anne to use that idea in her conscious thinking.

- Claim: the far reaches are merely a mental tool towards that meaning via existing mappings such as:

  conscious mental usage $\longleftrightarrow$ *physical operation*.

- There is no need to, and it could be difficult to, find mappings for the far reaches.

More Examples of Non-Parallelism

Non-parallelism somewhat recognized in the idiom literature [notably by Langlotz, 2006], and perhaps implicit in Relevance Theory etc., but not so much in mainstream mapping-based accounts.

"I don't think strings are attached. If there are any they're made of nylon":

made-of-nylon, or *nylon* and *made-of* separately, don't need parallels.

"The managers were getting cricks in their necks from talking ['up' and 'down']":

cricks and *their necks* don't need parallels.

Inferential Connection: Map-Transcending to Mappings

"In the far reaches of her mind, Anne believed that Kyle was unfaithful."

- Instead: inference within a PRETENCE environment is used to infer

  Anne's conscious self has only a **very low degree** *of* **ability** *to OPERATE PHYSICALLY on the idea that Kyle was unfaithful.*

- Then mappings are used to infer the following in the REALITY environment:

  Anne has only a **very low degree** *of* **ability** *to CONSCIOUSLY MENTALLY USE the idea.*

Source-Elaboration Assumptions for Metaphorical Views

- Metaphorical views involve *source-elaboration assumptions* [or: *ancillary assumptions*] as well as mappings.

- For MIND AS PHYSICAL SPACE:

  (1) If a person's mind is being viewed as a physical space, then the person is also viewed as having a conscious self that is
    - itself a person
    - located within the main part of the mind-space.

  (2) If a person's believing something is viewed as being physically located in the person's mind, then the idea believed is viewed as physically located at the same place.

- NB: In the Anne/Kyle example, the physical locatedness of the idea is used to infer that the idea is a physical object.

Two Physical Knowledge Rules: Informal Expression

IF O is a physical object   AND   O is in a physical region RO
AND P is a person   AND   P is in a physical region RP
AND RO and RP are far apart

THEN {presumably}
NOT(O is physically accessible to P to at least degree *low*).

IF O is a physical object   AND   P is a person
AND NOT(O is accessible to P to at least degree Δ)

THEN {presumably}
NOT(P is able to physically operate on P to at least degree Δ).

A Physical Knowledge Rule: Prolog Form

```prolog
rule([not,
        to_degree(at_least(Degree),
            the_episode(agent_being_able,
                the_episode(physically_operating, P, O)))],

    [the_episode(being_physical_object, O),
     the_episode(being_person, P),

     [not,
       to_degree(at_least(Degree),
            the_episode(being_physically_accessible_to, O, P))
     ]
    ],

    presumed,    r_lack_phsyopabil_from_lack_physaccess)
```

The Main View-Specific Mapping Used

IF   [really] J is an idea
AND [pretendedly] J is a physical object

AND [really] P is a person
AND [pretendedly] P's conscious self is a person

THEN {presumably}

conscious-self-of(P) physically-operating-upon J [pretendedly]
    corresponds to
P consciously-mentally-using J [really].

Mapping Used: Prolog Form

```
rule(
  specific_m4mapping(
    the_episode(physly_operating, conscious_self_of(P),  J),
    the_episode(conscly_mentally_operating,  P,  J) ),

  [currently_within_metaphor_pretence,

   in_outer_space(the_episode(being_idea, J)),
   the_episode(being_physical_object, J),

   in_outer_space(the_episode(being_person,  P)),
   the_episode(being_person, conscious_self_of(P))
  ],

  presumed,      r_IAPO_MAPPING_physop_WITH_consc_op).
```
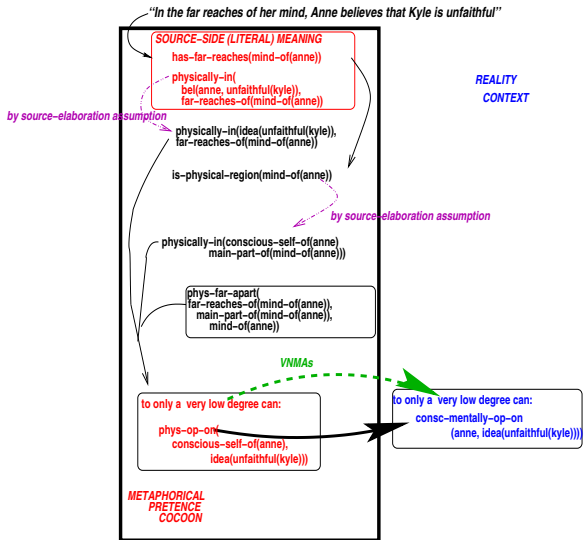
Some View-Neutral Mapping Adjuncts

IF [pretend] action-episode X <u>corresponds to</u> [real] action-episode Y
THEN {presumably}
[pretend] AGENT-ABLE(X) <u>corresponds to</u> [real] AGENT-ABLE(Y).

IF [pretend] episode X <u>corresponds to</u> [real] episode Y
THEN {presumably}
[pretend] COMPLEMENT-X <u>corresponds to</u> [real] COMPLEMENT-Y.

IF [pretend] episode X <u>corresponds to</u> [real] episode Y
THEN {presumably}
[pretend] X-TO-DEG $\geq \Delta$ <u>corresponds to</u> [real] Y-TO-DEG $\geq \Delta$.

More-Radical Non-Parallelism, 1

Adapted from Nick Hornby, *High Fidelity* (1995), + more sentence breaks:

> "I tried not to run down Phil too much - I felt bad enough as it was, what with screwing his girlfriend and all. But it became unavoidable, when Jackie expressed doubts about him. *I nurtured* those doubts as if they were *tiny, sickly kittens*. Eventually they became major, long-lasting grievances. *These cats had their own cat-flaps. This allowed them to wander in and out of* our conversation *at will*."

- The cat-flaps and at-willness don't themselves need target parallels.

- They just emphasize, via the source scenario, the non-deliberateness (on the part of the conversants) with which the grievances occurred in the conversations.

- Even the cat-ness in the source scenario has no target-side parallel. It just provides a framework.

More-Radical Non-Parallelism, 2

"These cats had their own cat-flaps."

- This sentence does not (need to) have its own target-side meaning.

- The appropriate level for metaphorical interpretation may be a multi-sentence chunk of discourse (or a chunk consisting of multiple metaphorical clauses). I.e.:

- Individual metaphorical units within the chunk are not necessarily all given separate interpretations. Rather, the whole chunk describes a source-side scenario, and it's from this that the target-side information is derived in a somewhat holistic way.

- No necessary sentence-by-sentence or clause-by-clause parallelism.

Metaphorization of the Literal, 1

- Literal elements of a discourse may best be translated into terms of the source side to engage with the scenario there: **metaphorization of the literal**—reverse of normal process assumed!

- It is intuitively natural to build in one's mind a scenario of the sickly kittens recovering and growing into (healthy kittens or) adult cats. But where is this biological recovery and growth implied?

- Answer: (partly) in the sentence
      "Eventually they became major, long-lasting grievances."

- Metaphorization of the info from this sentence is desirable, in order to *enrich and be integrated with the source-side scenario*.

- And if we claimed that *the integration should instead happen on the target side*, then there'd be more pressure to convert all sentences including "These cats had their own cat-flaps" into target terms.

Metaphorization of the Literal, 2

- Actually, Hornby's original wording was not
  "Eventually they became major, long-lasting grievances"
  but
  "Eventually they became sturdy, healthy grievances".

- But still, desirable to convert grievances into cats (and to convert abstract becoming into biological growth and recovery).

- Don't want (just) to get target-side info from the sentence taken all by itself.

Summary /Final Remarks

▶ Open-ended, map-transcending metaphor can often/usually be tackled by inferential means, without creation of new mappings. [Main related work: Hobbs, Martin, Narayanan.]

▶ A lot of power comes from view-*neutral* mapping adjuncts.

▶ Metaphorical aspects of an utterance often don't have, and are not intended to have, their own parallels on the target side.

▶ The point extends even to some whole metaphorical utterances.

▶ Suggests that

  ▶ discourse meaning is more messily and holistically connected to linguistic units than usually assumed.

  ▶ Also suggests that metaphorization (a type of reverse transfer) is sometimes desirable during understanding. Implemented in ATT-Meta.

Practical Importance of Metaphor, contd.

- Gesture is full of metaphor.

- Sign languages have crucial metaphorical aspects.

- Pictures, diagrams, etc. have crucial metaphorical aspects.

- Metaphor in advertisements and product design is a major current research area.

Metaphor Elsewhere

▶ Metaphor is important in music, dance, etc.

▶ Many theorists believe that in some sense metaphor occurs in thought, not just in language and other communication.

Variation of Metaphorical Idiom

- "in the recesses of X's mind"
  could conceivably be in a lexicon as a fixed phrase

- But productive variation is possible:

  in the dim recesses of X's mind

  in the deep recesses of X's mind

  in the distant recesses of X's mind

  in the unlit recesses of X's mind

- Such variation is often map-transcending.

Mental-State VNMA and Anne's Conscious Self

- There is a VNMA that maps an agent's believing X in the pretence to a corresponding agent's believing X' in reality

  where X corresponds to X' via prevailing mappings.

- So although we might infer, say, that Anne's conscious self in the pretence believes that it is physically operating on the idea that Kyle is unfaithful,

  this does not mean that Anne has *this* belief:

  instead Anne believes that *she* is *mentally using* the idea.