

Language Tutorial
Polysemy, copredication and individuation
Day 1: Polysemy, Lexical Ambiguity and Coercion

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Topics for this tutorial

1. Polysemy and Copredication (focussing on common nouns)

- Differentiating polysemy from other phenomena

Question: Can we discriminate polysemy from other phenomena (e.g., lexical ambiguity, coercion, underspecification)?

2. Implications of polysemy and copredication in semantics

- Chomsky's Argument
 - Polysemy and copredication force an abandonment of (externalist) truth-conditional semantics
- Semantic accounts of polysemy

Question: What are the implications of polysemy and copredication for semantic theory?

3. Polysemy, copredication, and quantification

- Quantification and copredication over plural NPs
 - *three long misleading talks*

Question: What roles do modifiers and quantifiers play in restricting the individuation criteria of common nouns (semantics/pragmatics interface)?

Outline for day 1

Polysemy and Copredication (focussing on common nouns)

- Differentiating polysemy from other phenomena
 - Linguistic and cognitive reflexes of polysemy
 - Complications arising from trying to clearly separate polysemy out as a unique phenomenon
 - Restrictions on copredication for polysemous nouns

Chomsky's argument

- Why polysemy and copredication are alleged to provide a challenge to semantics
 - Originally an argument for internalism
 - Our focus: a phrasing of the argument as a direct challenge to semantics founded on the simply-typed λ -calculus

Lexical ambiguity

In English, *party* is lexically ambiguous

- One form – Many meanings
- But the sameness of form is, in some sense accidental

- (1) a. The party last night was wild. [celebration]
b. The party elected a new leader. [polit. org.]
c. The party set off at dawn. [travel group]

At least three forms in German:

- (2) a. Die Feier/Fete/Party letzte Nacht war wild. [celebration]
b. Die Partei hat eine neue Vorsitzende gewählt. [polit. org.]
c. Die Reisegruppe ist in der Morgendämmerung losgefahren. [travel group]

Zeugma

For expressions with multiple senses, evoking more than one often gives rise to Zeugma

- (3) a. ?This product is suitable for home freezing and vegans.
b. ?Alex and his nose ran.
- (4) a. ?Dieses Product ist für die Tiefkühltruhe und Veganer geeignet.
b. ?Alex und seine Nase sind gelaufen.

Copredication

Usually only defined for common nouns

- One instance of the noun
- Used of modifiers to evoke different senses of the noun
 - Verbs, VPs, and adverbials
 - Adjectives

Some examples (Ortega-Andrés and Vicente 2019):

- (5) The best university of the country has caught fire.
- (6) The beer Susan was drinking fell out of her hands.

Zeugma as a test for lexical ambiguity

Attempting copredication with lexically ambiguous expressions, gives rise to zeugmatic effects, e.g., Asher 2011

- (7) ?The party chose a new leader and left base camp in the morning.
- (8) ?The party lasted all night and left base camp in the morning.
- (9) ?The party lasted all night and chose a new leader.

Polysemy

In English, *lunch* is arguably polysemous

- One form – Many meanings (like lexical ambiguity)
- But the sameness of form is, in some sense **non**-accidental

- (10) a. Lunch was delicious. [food]
 b. Lunch lasted two hours. [eventuality]

- Something like describing two sides of the same coin

Other examples of nominal polysemy:

Noun	Senses include
<i>statement</i>	eventuality, informational content, physical object
<i>book</i>	informational content, physical object
<i>evidence</i>	eventuality, informational content, physical object
<i>city</i>	population, area, (local) government
<i>university</i>	buildings, institution, population
<i>beer?</i>	container, contents

Polysemy and copredication

No Zeugmatic effects with copredication e.g., (Pustejovsky, 1995; Asher, 2011)

- Seemingly yes

(5) The best university of the country has caught fire.

(6) The beer Susan was drinking fell out of her hands.

(Ortega-Andrés and Vicente 2019)

(10) Lunch was delicious and lasted for two hours.

(11) Lunch lasted for two hours and was delicious.

(Adapted from Asher and Pustejovsky 2006)

Predicates select for domains that are normally considered disjoint

- *lasted two hours*: domain = *Eventualities*
- *was delicious*: domain = *Physical objects* (esp. food)

Copredication beyond English

Extends to other languages

German:

- (12) Ein absoluter Geheimitipp für das schnelle aber
 a absolute secret.tip for the fast but
 qualitativ hochwertige Mittagessen.
 qualitatively high.value lunch

'An absolute insider's tip for a quick, but high-quality lunch'

Finnish:

- (13) ... nähtävyyksien uuvuttama matkustaja voi nauttia
 ... sight.PL.GEN exhaust.PRTCPL traveller can enjoy
 nopean ja herkullisen lounaan
 fast.ACC and delicious.ACC lunch.ACC

'... an exhausted sightseer can enjoy a fast and delicious lunch'

Polysemy versus Lexical ambiguity (Summary)

Lexical ambiguity: e.g., *party*_{political} vs. *party*_{group} vs.
*party*_{celebration}

- Non-related senses
- Accidental homophony: *Partei* vs. *Reisegruppe* vs. *Feier* (German)
- Zeugma with copredication

Polysemy: e.g., *statement*_{eventuality/information/physical object}

- Inter-related senses
- Non-accidental homophony
- No zeugma (at least in the cases we've looked at so far)

Coercion

Meanings that are not lexicalized, but expressed in context

- Normally requires a trigger
- E.g., semantic type clash (Pustejovsky, 1995)
- Arguably sometimes also syntactic (e.g., count-mass coercion)

Is (14) evidence that *book* has a sense that denotes an eventuality, namely that of reading or writing a book?

(14) Mary began the book. (Pustejovsky 1995)

Standard answer: No

- The eventuality reading is coerced
- Type clash: selectional restrictions of *began* and the type of a *book*

Comparison: count-mass coercion

Type clashes at the syntax-semantics interface

- Count-to-mass coercion (e.g., grinding)
- Mass-to-count coercion (e.g., packaging and sorting)

(15) All I had close to hand was a book that I didn't really want to spatter bits of cockroach all over. [Grinding]

(16) I ordered two fried rice(s) on the side. [Packaging]

(17) CONTEXT: three kinds of rice, Calmati, Texmati, and Kasmati
These three rices have basmati's viscosity and cooking style, but smaller individual grains. [Sorting]

Is coercion a unified phenomenon?

began the book

- coercion from one semantic type to another

two fried rices

- coercion from one syntactic category to another
- also a semantic type mismatch? (e.g. Rothstein 2017)
- semantic coercion, but not one of semantic type? I.e., presupposition accommodation (e.g., Sutton and Filip 2021)

Systematic vs. language user coercion? (Lauwers, Peter and Willems, Dominique, 2011)

- Systematic: Partee and Rooth (1983), Moens and Steedman (1988), Pustejovsky (1995)
- Language user: E.g., Goldberg (1995), Boas (2003), Traugott (2007),

Evidence for separating coercion from polysemy

Out of the blue contexts

- E.g., out-of-the-blue temporal modification for *book* is much less natural than the modifiers *thick* and *interesting*:

(18) War and Peace is a thick/interesting/?six-month book.

(19) ?That book is at least two months too long!

But context helps

(20) He has actually set it up to be read in 40 days (no comparison though to that other 40 day book) [enTenTen18]

(21) Context: A 24-hour RPG writing competition and national book writing month:
Follow your one day game with a one month [enTenTen21]
book.

Restrictions on count-mass coercion

Similarly, out-of-the-blue count/mass mismatches are highly marked

- Though often less so for sub-kind readings

- (22) ?How much cockroach was in your apartment?
(23) ?How many rice(s) did you have?
(24) How many rices are grown in India?

Count-mass dual life nouns and polysemy

Count-mass dual life nouns

- *rope/ropes, stone/stones*

Prima facie good candidates for polysemous nouns

- Both senses available in out-of-the-blue contexts
- Highly interrelated senses
- Crosslinguistically attested

Count-mass dual life nouns and copredication

Dual life nouns are very hard to fit into copredication environments

- Syntactic restrictions: singular definites, *no* (in English)

(25) ?The stone was one and a lot.

- Because we have to use the singular, there is anyway an overlap in meaning
 - One stone is stone and one rope is rope

Arguably better for abstract nouns:

(26) Alex formed this true belief months ago. (State, Info)

Coercion and copredication

Can coerced interpretations of expressions licence copredication across their coerced sense and their original senses?

- At least in some cases, yes
- (27): coordinated V requires a physical and eventuality interpretation, VP argument is also informational

(27) Cal picked up and began an interesting a book on morphology.

- (28): coordinated V requires an informational and eventuality interpretation, VP argument is also physical

(28) Cal was interested in and began the book on their desk.

Coercion and copredication cont.

However, not all cases of coercion allow for this:

(29) German (Schumacher, 2013)

#Tim trank das mundgeblasene und prickelnde Glas.
Tim drank the mouthblown and sparkling glass
'Tim drank the mouthblown and sparkling glass.'

Although this is example (and construction?) sensitive:

(30) German (Schumacher, 2013)

Tim trank noch ein Glas, weil es so schön prickelte.
Tim drank yet a glass because it so nice sparkled
'Tim drank yet another glass because it sparkled so nicely.'

Polysemy versus Coercion (Summary)

Polysemy: e.g., *statement*_{eventuality/information/physical object}

- Inter-related senses
- Doesn't require a trigger (lexicalized)
- Senses can be accessed by modifiers in out-of-the-blue contexts

Coercion: e.g., *begin the book*

- Requires a trigger (non-lexicalized)
- The coerced reading cannot always be accessed by modifiers in out-of-the-blue contexts
 - ?*two-week book*
- Arguably less unified than polysemy wrt different types of coercion
- At least sometimes seems to allow for copredication

Polysemy vs. Lexical Ambiguity and Coercion

Clearly not possible to completely demarcate these phenomena

- Polysemy and Lexical ambiguity
 - Vagueness in how inter-related senses are
- Polysemy and coercion
 - Highly routinised coercions arguably are in the process of being lexicalized as polysemy
 - *2 pints* (UK Eng) – measure, glasses of beer

Hopefully enough of a distinction between clear cases for now.

- Still an open question: Can we treat polysemy as (systematised) coercion?

A note on underspecification

Example: *cut* (see Recanati 2010, orig. discussed by Searle)

- can describe rather different actions, and arguably underspecifies how the cutting is to be done
 - *cut the grass* vs, *cut the cake*

Is this also polysemy?

- My answer: a tentative *no*
 - different perspectives on what can be the same situation (polysemy)
 - differences between different situations each of which witness the relevant expression (underspecification)
- E.g., we can look at a cake cutting and see it also as a cutting in the manner of cutting grass
- We can look at a lunch and see it both as an event and as food

A note on Colexification

Colexification

- A term mostly used in Computational Linguistics
- Any one to many form-to-meaning mapping
- Typically as retrievable from corpora
- Seems to subsume all of the phenomena so-far mentioned
 - Lexical ambiguity, polysemy, coercion, (underspecification)

Copredication re-cap

Single antecedent, applying multiple predicates that each draw on different readings/senses

- Polysemous nouns admit copredication

(31) Lunch lasted for two hours and was delicious

- Lexically ambiguous nouns do not:

(32) ?The party chose a new leader and left base camp in the morning.

- Copredication can be mixed with coercion:

(33) Cal picked up and began an interesting a book on morphology.

This picture is too simple

- There are also restrictions for coercion on polysemous nouns

Restrictions on co-predication

There can be restrictions on copredication for more than two-ways polysemous nouns, e.g., *statement* (Sutton, 2022)

- (34) a. The statement in the envelope is inaccurate. (Phys, Inf)
b. ?The statement in the envelope lasted half an hour. (Phys, Ev)
- (35) a. The inaccurate statement lasted half an hour. (Inf, Ev)
b. The inaccurate statement was sealed in an envelope. (Inf, Phys)
- (36) a. ?The half-hour statement was sealed in an envelope. (Ev, Phys)
b. The half-hour statement was inaccurate. (Ev, Inf)

Conclusion: Felicitous copredication entails that a noun is polysemous, but a failure of copredication does not entail that a noun is not polysemous.

Crosslinguistic support

These effects do not appear to be language specific (Sutton, 2022)

- (37) a. Die Stellungnahme in dem Umschlag ist sachlich.
the statement in the envelope is factual
'The statement in the envelope is factual.'
- b. ?Die Stellungnahme in dem Umschlag hat eine halbe
the statement in the envelope has a half
Stunde gedauert
hour lasted
'The statement in the envelope took half an hour.'

Restrictions on co-predication

Even 2-ways polysemous, do not always license copredication

Ortega-Andrés and Vicente 2019; Copestake and Briscoe 1995

- (38) ?The newspaper fired its editor and fell off the table.
- (39) ?That newspaper is owned by a trust and is covered with coffee.

The robustness of the restrictions

Some improvements in-context

- (40) a. Context: The police took verbal statements from witnesses, but all were simultaneously transcribed. The shorter transcriptions are on the desk.
- b. Every statement that took less than 5 minutes is on the desk

And choice of construction (e.g., relative clauses) (Ortega-Andrés and Vicente 2019)

- (41) John used to work for the newspaper that you are reading.

The nature of these restrictions

Open questions:

- What licenses/restricts copredication?
- The nature of the phenomenon: semantic, pragmatic, or a mixture?

The relevance of polysemy to semantics

To end for today:

- Arguments from Chomsky and others:
 - Polysemy and copredication force us to abandon extensional, truth-conditional semantics
- Overview: space of possible answers to the argument
 - Tomorrow: Some of the details

Chomsky's argument

(Chomsky, 2000; Collins, 2017; Pietroski, 2003, among others)

Most explicit version in Collins 2017: Polysemy and copredication force one to abandon externalist, truth-conditional semantics

- Nouns such as *book* are polysemous, not lexically ambiguous.
- However, some but not not all of the following uses of *book* evoke both senses:

(42) Collins 2017, p. 679

- a. Bill memorised the book
- b. Bill burnt the book
- c. Bill memorised and (then) burnt the book

If polysemous nouns had an invariant, truth-conditional meaning, then cases of copredication like (42c) would be anomalous, contrary to fact.

- Therefore, nouns like *book* do not have an invariant, truth-conditional meaning.

Historical note

As notice by e.g., Hogeweg and Vicente 2020

- Arguments put forward from 2000 onwards
- This seeming ignores much work done in the '90s
 - Not least Pustejovsky 1994, 1995

Formalising the argument

Extrapolating a bit, we can make the argument more acute wrt semantic theory

- (a) If non-ambiguous nouns (including polysemous nouns) denote functions e.g., from worlds/situations to sets of entities, and
 - (b) if informational entities, eventualities and physical entities etc. are of a different type, then
 - (c) there is no function expressible in the simply-typed λ -calculus that can characterise a set of entities that are, say physical and/or informational/eventualities
- Let's unpack (c) a little

Unpacking premise (c)

- (c) there is no function expressible in the simply-typed λ -calculus that can characterise a set of entities that are, say physical and/or informational/eventualities

(43) **Types.** (e.g., Carpenter 1997)

From a non-empty set **BasTyp** of basic types, the set **Typ** of types is the smallest set such that:

- a. **BasTyp** \subseteq **Typ**
- b. $\langle \sigma, \tau \rangle \in$ **Typ** if $\sigma, \tau \in$ **Typ** (functional types)

- Example: *lunch*

- Assumption: eventualities and physical stuff (food) are of different types (in disjoint domains)
- $\lambda w:s. \lambda x:\sigma. LUNCH_w(x) : \langle s, \langle \sigma, t \rangle \rangle$
- What type is σ ?
 - Can't be v or e (this would exclude some readings of *lunch*)
 - Can't be a functional type (wrong truth conditions)

Responding to the argument

- (a) non-ambiguous nouns (including polysemous nouns) denote functions e.g., from worlds/situations to sets of entities, and
- (b) if informational entities, eventualities and physical entities etc. are of a different type, then
- (c) there is no function expressible in the simply-typed λ -calculus that can characterise a set of entities that are, say physical and/or informational/eventualities

Options:

- The argument is valid, so we must deny at least one premise or explain away the severity of the conclusion

Line by line

- deny (a) – we'll mostly set this aside
- deny (b) – the *same type response*
- Shrug regarding (c) and use a richer type theory
 - Strong connection to richer (thicker) representations (see e.g., Hogeweg and Vicente 2020)

Tomorrow: exploring these options

Thank you!

References I

- Asher, N. (2011). *Lexical Meaning in Context: A Web of Words*. Cambridge University Press.
- Asher, N. and J. Pustejovsky (2006). A type composition logic for generative lexicon. *Journal of Cognitive Science*, 1–38. reprinted in *Advances in Generative Lexicon Theory*, Kluwer Academic Publishers, 2010.
doi:https://doi.org/10.1007/978-94-007-5189-7_310.1007/978-94-007-5189-7_3.
- Carpenter, B. (1997). *Type-Logical Semantics*. Mit Press.
- Chomsky, N. (2000). *New horizons in the study of language and mind*. Cambridge University Press.
- Collins, J. (2017). The copredication argument. *Inquiry* (7), 675–702.
- Copestake, A. and T. Briscoe (1995, 01). Semi-productive Polysemy and Sense Extension. *Journal of Semantics* 12(1), 15–67.
- Hogeweg, L. and A. Vicente (2020). On the nature of the lexicon: The status of rich lexical meanings. *Journal of Linguistics* 56(4), 865–891.
- Lauwers, Peter and Willems, Dominique (2011). Coercion: definition and challenges, current approaches, and new trends.
- Ortega-Andrés, M. and A. Vicente (2019). Polysemy and co-predication. *Glossa* (1), 1–23.

References II

- Pietroski, P. (2003). The Character of Natural Language Semantics. In A. Barber (Ed.), *Epistemology of Language*, pp. 217–256. Oxford University Press.
- Pustejovsky, J. (1994). Semantic typing and degrees of polymorphism. In C. Martin-Vide (Ed.), *Current issues in mathematical linguistics*, pp. 221–238. Elsevier.
- Pustejovsky, J. (1995). *The Generative Lexicon*. MIT Press.
- Recanati, F. (2010). *Truth-Conditional Pragmatics*. Oxford University Press.
- Rothstein, S. (2017). *Semantics for Counting and Measuring*. Cambridge University Press.
- Schumacher, P. (2013). When combinatorial processing results in reconceptualization: Towards a new approach of compositionality. *Frontiers in Psychology* 4.
- Sutton, P. R. (2022). Restrictions on copredication: a situation theoretic approach. *Semantics and Linguistic Theory (SALT)* 32, 335–355.
- Sutton, P. R. and H. Filip (2021). Container, portion, and measure interpretations of pseudo-partitive constructions. In T. Kiss, F. J. Pelletier, and H. Husić (Eds.), *Things and Stuff: The Semantics of the Count-Mass Distinction*, pp. 279–304. Cambridge University Press.