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**Truthmaker Semantics of Embedded Sentences based on an Ontology of Modal and Attitudinal objects**

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1. **Introduction**

Overal aim of the talk

Outline of a truthmaker semantics of attitude reports and modal sentences based on a novel ontology of attitudinal objects.

Focus of the talk:

* Motivate and elaborate the ontology
* Show the connection of the ontology to truthmaker semantics

What are attitudinal objects?

Intuitively, things we refer to as claims, requests, thoughts, assumptions, beliefs, judgments, desires, intentions, decisions, hopes, impressions, guesses.

What are modal objects?

Things we refer to as to as needs, obligations, permissions, dispositions, possibilities.

Things philosophers have postulated for particular modal notions: essences (Aristotle, Fine), potentialities (Vetter), …

The standard view

Propositional attitudes (beliefs, hopes, desires) are relations between agents and propositions, abstract, shareable truth bearers that are also the meanings of sentences (sets of worlds, structured propositions)

The new view

Attitudinal objects take on the role of propositions, but in somewhat different ways.

The nature of the novel ontology:

* well-reflected in natural language: overtly in DPs, but also in syntactic constructions
* cognitively realistic ontology: attitudinal objects play a central role in our mental life and in communication

The new category of objects, characterized by properties of concreteness and three types of content-related properties, comprises:

* attitudinal objects (semantics of attitude reports)
* modal objects (semantics of modals)
* intensional objects (for intensional transitive verbs): searches, debts, perceptions

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1. **The standard view of the semantics of attitude reports**

The standard view about the ontology involved in attitude reports

Two sorts of objects associated with propositional attitudes:

[1] Mental acts or states and illocutionary acts

[2] Propositions as the objects/contents of mental attitudes or illocutionary acts

Ad [1]:

* Illocutionary acts form the subject matter of speech act theory.
* Events in current formal semantics are generally taken to be implicit, Davidsonian arguments of verbs

Ad [2]:

* Propositions are abstract objects that are truthbearers, sharable contents, and meanings of sentences.
* Different conceptions of propositions: sets of worlds or situations, structured propositions

The Relational Analysis of attitude reports

(1) a. John thinks that Mary is happy.

 b. think(John, [*that Mary is happy*])

 c. ∃e(think(e, John, [*that Mary is happy*])

Apparent support for the Relational Analysis

1. ‘Special’ quantifiers and pronouns in sentential position:

(2) a. John thinks that Mary is happy.

 John thinks *something.*

2. Reports of sharing:

(2) b. Mary believes *what* Bill believes.

 Bill believes that it is raining.

 Mary believes that it is raining.

Difficulties for the Relational Analysis

Conceptual problems

1. Propositions are treated as the objects of attitude, not the contentsof attitudinal objects.

2. How can abstract objects be true or false and have the particular truth conditions they are meant to have?

3. We never refer to propositions explicitly in natural language, except with uses of technical terms (the noun *proposition*).

Empirical problems

1. The substitution problem and the objectivization effect

(3) a. \* John thought the proposition that S.

 b. ?? John fears the proposition that S.

2. Special quantifiers and pronouns do not stand for propositions:

(4) a. John claimed *something* shocking.

 b. ??? John claimed what Bill expects, that it will rain.

3. The choice of modals and mood may depend on the embedding verb (Kratzer, Portner, Safir)

4. Syntactic arguments that *that*-clauses are not (generally) referential: relative clauses?

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1. **Attitude reports with attitudinal objects**

The view

Attitudinal objects, not propositions, play a central role in the semantics of attitude reports

**3.1. What are attitudinal objects?**

Intuitively, the things we refer to with nominalizations of attitude verbs and related nouns:

claims, requests, beliefs, judgments, assumptions, intentions, decisions, fears, hopes, assumptions, desires, impressions. hypotheses, guesses

Distinctions among attitudinal objects

 [1] Act-related attitudinal objects:

- cognitive and illocutionary products*:* assumptions, decisions, claims, requests, promises

- results: conclusions, recognitions, persuasions

[2] State-related attitudinal objects:

- beliefs, desires, hopes, fears, intentions

Standard view

Nouns are polysemous, denoting either events or propositions.

The present view

Nouns have a single meaning, they stand for a third category of object that are neither events nor states: attitudinal objects

Some evidence

Predicates (or predicate readings) that are inapplicable to events and propositions, but applicable to attitudinal objects:

- predicates of correctness:

(5) a. John’s claim / belief / guess was correct. (correctness = truth)

 b. John’s speech act / belief state / guessing was correct.

 (correctness = action-guiding norm).

 c. ??? The proposition that it is raining is correct.

- predicates of satisfaction:

(6) a. Mary’s request / desire was fulfilled.

 b. ?? Mary’s speech act / mental state / requesting was fulfilled.

 c. ?? The proposition that Mary should be invited was fulfilled.

Twardowski’s (1911) distinction between actions and products

claiming – claim, requesting – request, deciding – decision, believing - belief

Attitudinal objects are non-enduring, nonphysical ‘products’.

What are products?

Twardowski:

Are different aspects of the same act, share spatio-temporal location with the act

Same distinction for physical acts and their non-enduring products:

walking – walk, shouting - shout

Better:

The relevant distinction is that between an act and the non-material artifact it is meant to produce.

Non-material or non-physical artifacts may endure past the act that created them, e.g. laws, musical compositions etc.

Action-product distinction not to be applied to physical acts and their products.

Importance of attitudinal objects

[1] Crosslinguistic generalizations:

Nouns that correspond to attitudinal predicates generally stand for attitudinal objects, not propositions or events.

[2] Cognitive role of attitudinal objects:

Attitudinal objects, not propositions, play roles in our mental life.

We remember thoughts, desires, experiences, not propositions.

Desires, intentions, decisions play a causal role, not propositions.

**3.2. The properties of attitudinal objects**

Three content-related properties that together distinguish attitudinal objects from both propositions and events (acts, states):

[1] Truth- and satisfaction conditions

(7) a. John’s claim that S is true.

 b. ?? John’s claiming that S is true.

 c. ?? John’s speech act (of claiming) is true.

(8) a. The request was fulfilled / ?? was true .

 b. The offer was accepted / ??? was fulfilled.

 c. ??? The act of requesting / offering was fulfilled / accepted.

(9) a. John carried out the decision.

 b. ?? John carried out the act of deciding.

 c. ?? John carried out the proposition that S.

[2] Similarity relations based on sameness of type and shared content only

(10) a. John’s thought is the same as Mary’s.

 b. ??? John’s thought is the same as Mary’s claim.

 c. ? John’s thinking is the same as Mary’s thinking.

(11) a. John’s hope is the same as Mary’s hope.

 b. ??? John’s hope is the same as Mary’s claim.

[3] Part-whole structure based on partial content

Parts of attitudinal (and modal) objects are always partial contents, never temporal parts

‘Part of John’s claim’ vs ‘part of the speech act of claiming’

‘Part of John’s decision’ vs ‘part of the action of deciding’.

‘Part of John’s belief’ vs. part of John’s belief state (???)

Properties of concreteness

(12) a. John’s claim surprised us.

 b. I overheard Bill’s remark.

 c. John’s request yesterday

**3.3. The semantics of simple attitude reports with attitudinal objects**

Semantic function of *that*-clause complements of (simple) attitude verbs

Predicates of the attitudinal object ‘associated with’ the attitude verb, specifying its satisfaction condition or content (roughly, the set of situations or actions that make it true)

[the claim that it is raining] = the d [claim(d) & [it is raining](d)]

Status of attitudinal objects wrt. to the attitude verb

Arguments of the attitude verb?

- Attitudinal objects are not Davidsonian events.

- Implicit internal arguments?

The Kratzer / Moulton view:

Clausal complements are predicates of implicit content bearer arguments of attitude verbs:

(13) a. John claims [N that S]

 b. claim(j, d) & [that S](d)

The present approach: focus on complex attitude predicates (light verb – noun)

(14) a. John claims that S.

 b. John makes the claim that S.

 c. ∃d(make(John, d) & claim(d) & [*that* S](d))

Derive the syntactic structure of ‘simple’ attitude reports from attitude reports with complex predicates (Arsijeneviç 2009)

(15) a. John claims [that he is French]

 b. John claim-make [DP ~~claim~~ [that [FP ~~claim~~ (+assert)]] [F+assert] [he is French]

Semantics of special quantifiers/pronouns

Special quantifiers and pronouns stand for attitudinal objects or kinds of them:

(16) John claimed *something* shocking.

Restrictions on reports of a shared content of different attitudes

(17) a. ?? John expects *what* Mary claims, namely that Sue will study harder.

 b. ?? John’s expectation is Mary’s claim.

The analysis:

(19) a. John made some [claim – thing shocking].

 b. John has expectation that ~~expectation~~ Mary has ~~expectation~~

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**4. Extending the semantics by extending the range of objects**

**4.1. Modal objects and the semantics of modals**

Properties of modal objects

Same three content-related properties:

Satisfaction conditions, part structure based on partial content, similarity relations based on content and type.

The semantics of modal sentences based on modal objects

Alternation with complex predicates:

 (20) a. John needs to leave.

 b. John has a need to leave.

 c. ∃d(have(d) & need(d) & [*John to leave*](d))

Syntactic analysis:

Derive simple modal predicates from complex modal predicates (Harves / Kayne 2012).

**4.2. Facts and states of affairs**

(21) a. John regrets that S.

 b. John regrets the fact that S.

 c. John regrets partly (Nfact that S).

- Substitution permitted

- Referential (DP) status of factive complements (Kastner 2015)

Other roles of clauses

(22) a. That S is unexpected.

 b. the unexpectedness (of the fact) that S

(23) a. That S is likely.

 b. the likelihood (of the situation in which) (that) S

Facts and states of affairs as modal objects

The fact that S:

the modal object whose satisfiers are just the actual situations that make S true.

The states of affairs in which S:

The modal object whose satisfiers are just the situations that make S true.

**4.3. Contextually given attitudinal objects: response stance verbs (Cattel 1978)**

Same DP status as factive complements (Kastner 2015)

(24) a. John repeated (the claim) that it will rain.

 b. John repeated [N that S].

 c. ∃e(repeat(e, John, dc) & [*that* S](dc))

**4.4. Intensional objects**

Intensional objects: searches, purchases, debts

Share the same characteristic features realization or representational adequacy conditions

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**5. Truthmaker semantics**

**5.1. Motivations for ‘object-based’ truthmaker semantics**

Notions of truthmaker semantics

Exact truthmaking ╟ and falsemaking ╢

Truthmaking and conditions for complex sentences:

 (25) a. s ╟ S *and* S’ iff for some s’ and s’’, s = sum(s’, s’’) and s’ ╟ S and s’’ ╟ S’.

 b. s ╟ S *or* S’ iff s ╟ S or s ╟ S’.

 c. s ╟ ∃x S iff s ╟ S[x/d] for some individual *d*.

 d. s ╟ *not* S iff s ╢ S.

Sentence meanings as *bilateral contents*:

pairs of a set of truthmakers and a set of falsity makers

Falsity conditions for conjunctions and disjunctions:

(26) a. s ╢ S *and* S’ iff s ╢ S or s ╢ S’.

 b. s ╢ S *or* S’ iff for some *s’* and *s’’*, s = sum(s’, s’’) and s’ ╢ S and s’’ ╢ S’.

Notion of partial content (Yablo 2015, Fine 2017a)

(26) For sets of situations or actions A and B, B is a *partial content* of A iff every satisfier of

 A contains a satisfier of B and every satisfier of B is contained in a satisfier of A.

Sentence-based truth maker semantics

Truthmaking / Satisfaction as a relation between situations or actions and sentences

Object based truthmaker semantics

Truthmaking (also) as a relation between situations or actions and (attitudinal, modal, intensional) objects

Motivations for object-based truthmaker semantics

- Truthmaker theory as a general theory of content; general intuitions of what bears content: applying truthmaker theory to the ontology of the mind

- Explanation of differences of types of satisfaction predicates applying to different modal and attitudinal objects

- New semantics of attitude reports without using propositions and without regarding actions (action types) as truth bearers (Soames, Hanks)

- New semantics of modals, based on a variety of modal objects and their satisfaction conditions

- The semantics of intensional NPs: *the book John needs to write, the house John is looking for, the bottle of wine John bought on the internet* (Moltmann 2013)

**5.3. Satisfaction vs truth conditions**

Some attitudinal objects have satisfaction conditions, rather than truth conditions:

(27) a. John’s requests / demand / promise was satisfied / fulfilled.

 b. Mary’s desire was fulfilled.

(28) a. The demand was as ignored.

 b. The promise was broken.

 (29) a. John fulfilled the demand by handing in the paper in time.

 b. John followed / ignored the advice by staying home.

What characterizes attitudinal objects that have satisfaction conditions rather than truth conditions?

 Attitudinal objects that require the world to fit the representation, rather than the representation fit the world – a ‘world-to-word/mind-direction of fit’, rather than a ‘word/mind-to-world direction of fit’ (Searle 1969, 1983)

But what exactly is a direction of fit?

**5.3. A normative account of the notion of direction of fit using truthmaking**

An attitudinal object with a word-world direction of fit is *correct* in case there is a part of the world that makes it true. An action performed in recognition of an attitudinal object with a world -word direction is *correct* in case it satisfies the attitudinal object.

Word/mind-to-world direction of fit:

The attitudinal / modal object itself needs to fulfil a norm.

World-to-word/mind direction of fit:

The attitudinal / modal object imposes an action-guiding norm or purpose on a satisfier of the attitudinal object).

(30) Word/mind-world direction of fit

 An attitudinal object *o* has a *word-world direction of fit* just in case *o* is associated with a

 constitutive norm n and satisfies n in a world *w* iff there is a situation *s*, *s* < *w*, that makes

 *o* true.

(31) World-word/mind direction of fit for illocutionary objects

 An illocutionary object *o* has a *world-word direction of fit* just in case any action *a*

 performed in response to *o* satisfies the norm imposed by *o* in a world *w* iff *a* is part of *w*

 and satisfies *o*.

Nonfactive future-oriented emotive attitudinal objects:

(32) John’s hope / desire that he would win was fulfilled / ??? true.

Desires and hopes also come with a world-word/mind direction of fit, but do not always require as satisfiers actions

Hopes and desires, implying a positive emotive response to their satisfaction (under normal circumstances), impose a requirement or norm on the future course of the world, with the emotive response constituting a kind of purpose to be attained by a relevant part of the future course of the world.

**5.4. Modal and attitudinal objects with the modal force of possibility**

Attitudinal and modal objects that have a world-to-word/mind direction of fit can be ‘satisfied’ or ‘fulfilled’ only if their modal force is that of necessity.

Proposals, permissions, offers, and invitations cannot be ‘satisfied’ or ‘fulfilled’; instead an offer may be ‘taken up’ and an invitation ‘accepted’.

Unlike requests and obligations, proposals, permissions, offers, and invitations cannot be ‘violated’: not taking up an offer or accepting an invitation is not a violation, but not satisfying a demand or fulfilling a promise is.

*Ignore* conveys violation with modal objects of necessity; but with modal objects of possibility it conveys simple failure to satisfy it: ignoring a permission is not violating it; but ignoring a command or request is.

An account in terms of truthmaker theory

Attitudinal and modal objects of necessity come with a set of satisfiers and a nonempty set of violators.

Attitudinal and modal objects of possibility come only with a set of satisfiers (and an empty set of violators).

(33) Truthmaker-based meaning of sentences specifying satisfaction conditions of attitudinal

 and modal objects

 λd[pos(d) = pos(S) & (neg(d) ≠ Ø 🡪 neg(d) = neg(S))]

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**6. Conclusion**

* Attitudinal, modal and intensional objects form an ontological category distinct from events, states and propositions.
* Attitudinal objects are extremely well-reflected in European languages and play a central role in the semantics of attitude reports.
* Attitudinal, modal and intensional objects naturally go along with a truthmaker semantics.

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