Workshop *Explaining Explanation*

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**Object-Based Truthmaker Semantics for Modals and Attitude Reports**

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1. **Introduction**

Aim of the talk

Give an outline of a truthmaker semantics for attitude reports and modal sentences, based on a novel ontology of attitudinal and modal objects (‘object-based truthmaker semantics’).

* Object-based truthmaker semantics addresses a range of philosophical and linguistic issues for the standard account of the semantics of attitude reports and modal sentences.
* The ontology of modal and attitudinal objects is well-reflected in natural language and also motivated e.g. by the distinction between light and heavy permission.

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1. **The traditional view**

Ontology involved in attitude reports

Two sorts of objects associated with mental and illocutionary acts:

[1] Mental acts or states and illocutionary acts

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

The Relational Analysis

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

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

Apparent support for the Relational Analysis

Special quantifiers in sentential position:

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

John thinks *something.*

Reports of sharing:

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

Bill believes that it is raining.

Mary believes that it is raining.

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1. **Object-Based Truthmaker Semantics for attitude reports (and modal sentences)**

**3.1. The new ontology**

The semantics of attitude reports is based on a third category of objects: attitudinal objects. Attitudinal objects consist in:

[1] *cognitive and illocutionary products* (judgments, decisions, claims, requests, promises) (in the sense of Twardowksi’s 1911 notion of a (non-enduring) product)

[2] *mental states* (beliefs, desires, hopes, etc)

Similarly, the semantics of modal sentences is based on a category of modal objects:

obligations, permissions, needs, abilities, essences, etc. , which share relevant features with attitudinal objects

Attitudinal objects (and modal objects) share three characteristic properties that together distinguish them from both propositions and acts or events as well as states

[1] Truth- and satisfaction conditions (and falsehood/violation conditions)

(3) a. John’s claim that that S is true / false.

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

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

(4) a. John’s request to be promoted was fulfilled.

b. ?? John’s act of requesting was fulfilled.

(5) a. John followed Mary’s advice.

b. ? John followed Mary’s activity of advising.

(6) a. John complied with the instruction.

b. ??? John complied with the act of instructing.

(7) a. John ignored the command.

b. John ignored the act of commanding.

(8) John fulfilled the obligation / need.

b. John took up the permission,

[2] Similarity relations based on shared content only

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

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

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

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

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

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

[3] Part-whole structure based on partial content

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

‘Part of John’s decision’ cannot be ‘part of the action of deciding’.

‘Part of John’s claim’ cannot be ‘part of the speech act of claiming’.

‘Part of John’s answer’ cannot be ‘part of John’s answering’.

Part of John’s belief: partial content

Part of John’s belief state ???

Parts of modal objects: always partial contents

Part of John’s obligation / need / John’s ability

Linguistic support for attitudinal objects

[1] The semantics of nominalizations

[2] The semantics of special quantifiers (‘nominalizing quantifiers’): *something, everything* etc

Attitudinal objects are no less important than events and states, sometimes even more important:

The attitudinal object may be ontologically prior to the event /state described by the verb (conclusion, recognition, belief, intention)

**3.2. The logical form of ‘simple’ attitude reports within object-based truthmaker semantics**

Davidsonian event semantics: Events as Davidsonian implicit argument of attitude verbs.

Function of *that*-clause complements of attitude verbs: act semantically predicates of the attitudinal object associated with the Davidsonian event (state) argument

(11) a. John claims that S.

b. John makes the assumption that S.

c. ∃e(think(e, John) & [*that* S](att-obj(e)))

(12) a. John believes that S.

b. John has the belief that S.

c. ∃e(believe(e, John) & [that S](att-obj(e)))

Philosophical motivations for the analysis

[1] Propositions are no longer treated as the objects of attitudes; rather sentential contents serve to characterize the contentsof attitudinal objects

[2] Intentionality, the ability of represent, is treated as a property of *mental entities* (states, products) only, rather than of abstract meaning objects (propositions)

Consequences:

- no issue of the truth-directedness of an abstract object

- no issues of the unity of the proposition (the truth conditions of a complex abstract objects)

- no issue of arbitrary identification (of an abstract meaning object)

Linguistic motivations for the analysis

Special (nominalizing) quantifiers range over attitudinal objects (or kinds of them)

(13) a. John claims / knows / fears *something.*

b. John imagines / expects *that.*

c. John claims *what* Mary claims.

(14) a. John said something nice (namely that S).

b. John said something that made Mary very upset.

Restrictions on reports of shared content of different attitudes

(15) a. ?? John expects what Mary believes, namely that Sue will study harder.

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

The logical form of attitude reports with special quantifiers

(16) a. John said thought something nice.

b. ∃e ∃e’(say(e, John) & nice(e’) & e’ = att-obj(e))

(17) a. John expects what Mary expects

b. ∃e e’e’’(expect(e, John) & e’ = att-obj-kind(e) & think(e’’, Mary) & e’ = att-object-

kind(e’’))

**3.3. The semantic role of modal objects**

The logical form of modal sentences

(18) a. John needs to leave.

b. John has a need to leave.

c. ∃d(need(d) & [*John to leave*](d))

(19) a. John is permitted to leave.

b. John has permission to leave.

c. ∃d(is permitted(d, John) & [*John to leave*](d))

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1. **How do clausal complements (sentential units) act semantically as predicates of attitudinal and modal objects?** 
   1. **Possible-worlds-based account**

Attitudinal (and modal) objects d are associated with a set of alternative worlds f(d):

(20) [S] = λd[∀w(w ∈ f(d) ↔ S is true in w)]

The difficulty

The account cannot apply to *modal objects of possibility*

(21) a. John is obliged to leave.

b. John is allowed to leave.

Problem also arises for attitude reports, i.e. illocutionary act reports:

(22) a. John forced Mary to leave.

b. John allowed Mary to leave.

Make sentential content dependent on embedding verb? – noncompositioal semantics:

(23) [S] = λd[∃w(w ∈ f(d) & S is true in w)]

Difficulties for possible worlds-account as such:

inapplicable to explicit permissions (*John gave Mary permission to leave*)

* 1. **Truthmaker semantics**

Sentence-based truthmaker semantics: Fine (2014, 2017, to appear a, b)

Object-based truthmaker semantics: Moltmann (2018)

Exact truth-making/satisfaction

A situation or action s is an *exact truthmaker/satisfier* of a sentence S or attitudinal object d (s ╟ S / s ╟ d) iff s is a truthmaker/satisfier of S/d and wholly relevant for the truth/satisfaction of S / d.

Truthmaking conditions for complex sentences:

(24) 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*.

Truthmaker semantics assigns sentences both exact truthmakers (verifiers) and exact *falsifiers*, situations or actions that are falsemakers of a sentence and wholly relevant for the sentence being false.

Truthmaking for negations:

(24) e. s ╟ *not* S iff s ╢ S.

Complex sentences are assigned both truthmaking and falsemaking conditions

Fine (2017): A sentence S has as its meaning a pair <*pos(S),* *neg(S)*> consisting of a *positive denotation*, the set *pos(S)* of verifiers of *S*, and a *negative denotation*, the set *neg(S)* of falsifiers of *S*.

Partial content (Yablo 2015, Fine 2017):

(25) 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.

Object-based truthmaker semantics

Difference between obligations and permissions (and modals objects of other flavors of different forces):

Obligations have both satisfiers and ‘violators’; permissions have only ‘satisfiers’

Attitudinal and modal objects: also have a positive extension and possibly a negative extension (if their force is that of necessity).

(26) Sentence meanings as properties of attitudinal and modal objects of either modal force

λd[pos(S) is a partial content of pos(d) & ∀s(s ╢ S → s ╢ d) in case neg(d) ≠∅]

Motivation for (26): underspecification of the satisfaction conditions of desires, hopes, and needs:

(27) a. Fiona wants to catch a fish (that she can eat). (Fara 2007)

b. John hopes to get a coat (that keeps him warm).

c. Bill needs to hire an assistant (that speaks French)

The speaker uttering (27a) need not know what the exact constraints are that Fiona’s desire may impose on what satisfies it.

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1. **The logical form of more complex attitude reports**
   1. **Response-stance verbs**

(28) a. John repeated that it will rain.

b. John confirmed / denied that it was raining.

c. John agreed that Bill is lazy

d. John reminded Mary to return the keys.

Further evidence against the Relational Analysis of attitude reports: the semantics of partly

(29) a. John partly ate the chicken.

b. ??? John partly claims that Mary is incompetent.

c. ??? John partly thinks that that the students are talented

Response-stance verbs (Cattell 1978)

(30) a. John partly confirmed / denied that the students failed the exam.

b. John partly agreed that Bill is lazy.

Formal semantics:

*Agree* as a three-place predicate taking the contextually given attitudinal object as a third argument:

(31) ∃e(agree(e, John, d) & [*that S*](att-obj(e)) & [*that* S](d))

Support for (31): response-stance verbs more easily allow for substitution:

(32) John agreed with the request to leave.

*Partly* expressing a relation between events and types of events:

Part structure of the event inherited from the part structure of the object arguments.

(33) a. ∃e’(partly(e’, ê[eat(John, d)])

b. ∃e’(partly(e’, ê[agree(e, John, d)] & [*that S*](att-obj(e)) & [*that* S](d))

* 1. **Factive verbs**

Factive verbs pattern with response-stance verbs in various syntactic respects (Cattell1978),

They also behave the same with respect to *partly*:

(34) a. John partly recognizes that he failed.

b. John partly recognizes the fact that S.

Clausal complements of factive verbs also have a double function:

- They characterize the described cognitive product / epistemic state

- They give the content of a (non-worldly) fact

Non-worldly facts characterized by a sentence S as modal objects whose satisfiers are situations that are part of the actual world and truthmakers of S.

For f as a world-relative operator mapping the positive semantic value of a sentence onto the corresponding factive modal object:

(35) ∃e(realize(e, John, fw([S])) & [that S](att-obj(e)) & [that S]( fw(pos(S)))

Clausal subjects

*Is true* gives the content of a contextually given content-bearer (a claim, rumor, or suggestion) (Moltmann 2018b):

(36) a. That S is true.

b. true([that S](d))

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**Conclusion**

With an ontology of attitudinal and modal objects, truthmaker semantic can be extended to attitude reports and modal sentences, addressing a range of issues that standard semantic theories have or or would have difficulties with.

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