*Work-in-Progress Workshop on Truthmaker Semantics*

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**Truthmaker Semantics, Factivity, and the Underspecification of Attitudes**

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1. **The traditional view**

Ontology involved in attitude reports

There are 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 logical form of attitude reports: 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.

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

**2.1. 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)

**2.2. 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-(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)?? 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’’))

**2.3. 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 clauses 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 explicit permissions (*John gave Mary permission to leave*)

* 1. **Truthmaker semantics**

Sentence-based truthmaker semantics: Fine (2017, …)

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 2017a):

(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

Option 1: [S] = λd[pos(S) is a partial content of pos(d) & ∀s(s ╢ S → s ╢ d)

in case neg(d) ≠∅]

Option 2: [S] = λd[pos(S) = pos(d) & neg(S) = neg(d) in case neg(d) ≠∅]

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

(27) 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:

(28) John partly ate the chicken.

Volunteered-stance verbs:

(29) a. ??? John partly claims that Mary is incompetent.

b. ??? 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:

Option 1:

The clausal complement of response-stance verbs serves to characterize a contextually given claim das well as the content of the reported attitude

(31) a. John agreed that S.

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

Problem: the Davidsonian event e by itself should be an event of agreement, but here it it not.

Option 2:

Lexical decomposition of the verb,

roughly: C1: asserting, C2: having been asserted, R: in response to

(31) c. ∃e’(C1(e, John) & [*that* S](att-obj(e)) & C2(d) & R(att-obj(e), d) & [*that* S](d))

Option 3:

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

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

Support for (30d):

Response-stance verbs more easily allow for substitution:

(32) a. John agreed with the request to leave.

b. John repeated the claim that it is raining.

c. John confirmed / denied the speculation that it was raining.

d. John reminded Mary of the requirement / request to return the key.

* 1. **Factive verbs**

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

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

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

b. John partly acknowledged that he made serious mistakes.

(34) John partly recognizes / acknowledges the fact that S.

Some factive verbs allow for substitution:

*notice that* S 🡪 *notice the fact that* S, *recognize that* S🡪 *recognize the fact that* S

Others do not:

*see that*, \* *see* *the fact that* S, *realize that* S, \* *realize 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 fact

in terms of truthmaking?

Facts as sets of actual truthmakers – the positive (actual) extension of S?

Better:

Make use of facts as nonworldy facts.

Such facts themselves have ‘truthmakers’: actual situations wholly relevant for their obtaining

Nonworldly facts: sentences qua being true

Clausal complements of factive verbs can then apply with the same meaning to such nonwordly facts:

(35) ∃e(recognize(e, John, S qua being true) & [that S](producte(e)) & [that S](S qua being

true))

Option 1 (factive verbs not allowing substitution by an explicit fact description)

Verb as a predicates of the epistemic attitudinal object as well as involving a condition on the truth of the complement, using a world of evaluation for the entire sentence:

(36) a. John realizes that S.

b. ∃e(realizes(e, John) & [that S](att-object(e )) & (pos(*that* S) ∩ {s|s < w}) ≠ ∅)

Option 2:

Non-worldly facts as modal objects whose satisfiers are situations that are part of the actual world.

For F a world-relative sortal for a factive modal objects:

(36) c. ∃d∃e(realize(e, John) & [that S](att-obj(e)) & that S(d) & Fw(d)))

Option 3 (for factive verbs allowing for substitution of their complement)

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

(36) d. ∃e(realize(e, John, fw([S]))

Clausal subjects:

With *is true* or *is correct* give the content of a contextually given content-bearer (a claim, rumor, or suggestion) (Moltmann 2018b)

(37) a. That S is correct.

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

Other clausal subjects as predicates of the Davidsonian argument:

(38) a. That John will be late is possible.

b. ∃e(possible(e) & [that John will be late](e))

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**5. Underspecification of the content of attitudinal objects by the clausal complement**

Underspecification of the satisfaction conditions of desires, hopes, and needs:

(39) 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.

Unlike with belief reports: implicit modes of presentation form part of speaker’s intention

No such underspecification for ‘truth-directed’ attitudes (???):

(30) a. John claimed that Fiona caught a fish (claim is true if she caught any fish whatsoever)

b. Mary said that Bill got a coat (true if Bill wore any coat whatsoever)

c. Mary heard that Bill hired an assistant (true if Bill hired any assistant whotsoever).

Also modals are distinguished as to whether they allow for underspecification (???)

Teleological and deontic modals:

(31) a. Fiona needs to catch a fish (in order to have something for dinner).

b. John needs to write a letter (and therefore cannot be disturbed).

But not epistemic modals:

(31) c. Fiona must have caught a fish.

The epistemic state reported in (28c) is correct just in case Fiona caught some fish or another.

If the generalization is right, then both sentence meanings in (26) would be needed (non compositional semantics?)

What does the difference consist in?

Hypothesis 1:

Difference consists in the nature of the satisfiers:

Desires, needs: have actions as satisfiers,

Claims, beliefs: have situations as verifiers

But underspecification also appears with desires whose satisfaction is obtained by situations, (32) a. John wants to receive enough milk

b. John wants Millie to drink milk

Moreover, underspecification appears with hope, where fulfilment conditions may not involve any action on the part of the agent.

Hypothesis 2:

Difference consists in whether an attitudinal or modal object has satisfaction conditions as opposed to truth conditions.

Desire, need: can only be satisfied and not be true

Claim, belief: can only be true, not satisfied and so for an epistemic state (epistemic modal)

What distinguishes satisfaction conditions and truth conditions?

Different directions of fit (Searle 1969, 1983)

Desires (and deontic or teleological modal objects) have a world-word/mind direction of fit, claims and beliefs (and epistemic modal objects) have a word/mind world direction of fit.

Difference in directions of fit resides in the norm associated with attitudinal/modal objects:

The aim of a desire or need is to have the world match the representation

The aim of a belief, claim, or epistemic state is to have the representation match the world.

But why does a particular direction of fit go along with the possibility of underspecification, and thus the choice among (26a) and (26b)?

Further issues:

Underspecification with belief reports:

(33) a. John believes that Mary won the race.

b. John believes that a woman won the race.

Alternative approach:

Desire and belief reports may be based on multiple desires and beliefs (Braun 2015)

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