Workshop *Looks, Attitudes, and Syntactic Embedding*

NYU, November 1, 2019

**Truthmaker Semantics for Intensional Transitive Verbs**

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**1. Truthmaker Semantics**

**1. 1. Sentence-based and object-based truthmaker semantics**

Notions of truthmaker semantics

Exact truthmaking and falsitymaking,

Truthmaking and falsitymaking conditions for complex sentences

(Bilateral) sentence meanings as pairs consisting of a set of verifiers and a set of falsifiers

Sentence-based truthmaker semantics (Fine 2012, 2017)

Truthmaking (just) a relation between situations or actions and sentences

Object based truthmaker semantics (Moltmann 2013, 2017, 2018a, b, c)

Truthmaking (also) as a relation between sentences or actions and objects

Attitudinal objects: claims, requests, promises, beliefs, judgments, decisions, intentions, fears

Modal objects: obligations, permissions, needs

Other, similar objects: searches, purchases, hirings, debts, recognitions, sensations, impressions

Some motivations for object-based truthmaker semantics

- General intuitions of what bears truth or satisfaction conditions or more generally content

- Particular satisfiers may have to relate to the object they satisfy in a particular way in which they could not relate to sentences:

Sometimes situations as satisfiers require a causal connection to the object (purchases, searches)

Sometimes only actions can act as satisfiers that are performed with the intention of satisfying the attitudinal object (intention, request etc.) (Searle 1983).

- Application of truthmaker semantics to the ontology of the mind, to social objects

- New semantics of attitude reports without using propositions

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

- The semantics of intensional transitive verbs: *need, look for, hire, buy, find*

**1.2. Basics of truthmaker semantics (Fine 2017)**

Exact truth-making/satisfaction s ╟ S / s ╟ d:

The situation or action s is an *exact truthmaker/satisfier* of the sentence S / the attitudinal or modal object d.

Standard truthmaking conditions for complex sentences:

(1) 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’.

Truthmaking for negations:

(1) c. s ╟ *not* S iff s ╢ S.

Bilateral propositions:

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

(2) 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.

Application of partial content relation for accounting for invalid inferences:

(3) a. You may take an apple.

 b. You may take an apple or the gold.

**1.3. Object-based truthmaker semantics**

New logical form of attitude reports

(4) a. John claims that it is raining.

 b. ∃e(claim(e, John) & [*that it is raining*](att-obj)(e)))

New logical form of modal sentences

(5) a. John needs to leave.

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

(6) a. John is permitted to leave.

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

Difference between obligations and permissions (and other modal / or attitudinal objects of necessity and possibility):

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

Same for demands vs. invitations, suggestions.

An attitudinal or modal object d has a positive denotation pos(d) and a (possibly empty) negative denotation neg(d).

(7) Sentence meanings as properties of attitudinal and modal objects (of all sorts)

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

Motivation for the partial content condition

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

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

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

It is the modal or attitudinal object that specifies what the exact satisfiers are, the sentence underspecifies them

The Nominalization Theory of special quantifiers and pronouns (Moltmann 2013):

Special quantifiers (*something*, *what, the same* etc) in place of the clausal complement of an attitude verb stand for the same sorts of things that the nominalization of the verb would stand for: attitudinal objects or kinds of them.

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**2. Intensional transitive verbs**

**2.1. Types of intensional transitive verbs**

Verbs of absence: *need, look for (three readings), want,*

Verbs of possession: *own, buy, sell, offer, give,*

Verbs of recognition: *recognition, see*

Verbs of nomination: *nominate, hire*

Verbs of imagination and depiction: *imagine,* *see, paint,*

three readings of *find*, two of them intensional, two readings of *need*

three readings of *look for*

Criteria for intensionality: not lack of existence-entailment, but:

Nonspecific reading of indefinite complements (‘any may do’ for verbs of absence)

Sharing of an unspecific object

Special quantifiers and pronouns (*something, what, the same thing* etc) in place of complement

**2.2. Interpretation of weak quantifiers**

(8) a. John needs an assistant / at least two assistants / exactly two assistants / at most two

 assistants / more assistants than secretaries.

 b. John needs no assistant.

Difference to clausal complements:

(9) a. John promised exactly two papers.

 b. John promised to write exactly to papers.

(10) a. John needs two assistants.

 b. John needs to have exactly two assistants.

Moltmann (1997): Complement in (8), (10a) specifies what John must have in a minimal situation in which his needs are satisfied – better: in a situation exactly satisfying his needs:

(11) a. For every minimal situation s (maximally similar to w in the respects relevant in s)

 such that John is P in s, John stands in R (‘have’) to exactly two assistants in s

 <now better: exactly satisfying John’s need>

 b. For every minimal situation s such that Ps(John), {x | Rs(John, x)} ∈ [*exactly*

 *two*]s([*assistants*]s) (quantifiers as functions from situations to sets of properties)

Other examples from Moltmann (1997):

(12) John saw at most ten trees.

‘John takes the situation he sees to have the property of having at most ten trees in its domain.’

(13) John hired at most two assistants.

‘In the minimal situation resulting from the hiring, John has at most two assistants.’

The interpretation of strong quantifiers:

(14) John needs every assistant.

Why doesn’t (14) mean ‘for every situation s exactly satisfying John’s needs, John has every assistant in s.’? (14) has only an extensional reading.

Reason (Moltmann 1997): Strong quantifiers *presuppose their domain*, which roughly means their domain needs to be actual or else ‘pre-identified’

(15) The modal account of ‘need’ Moltmann (2008)

 x needs Q is true in w iff for every minimal situation s such that wRneed,x s, for some

 property P∈ [Q], {y | <x, y> ∈ Rc(s)} = P(s). (quantifiers as set of properties)

**2.3. Disjunctive complements**

Invalid inference (Zimmermann 1993, Moltmann 1997):

(16) a. John needs a coat.

 b. John needs a coat or a shirt.

But not with all intensional transitives:

(17) a. John hired an assistant.

 b. John hired an assistant or a secretary.

(18) a. John imagined a castle.

 b. John imagined a castle or a mountain.

(19) a. John recognized a tree.

 b. John recognized a tree or a house.

**2.4. Sharing of the ‘object’ of transitive verbs**

Generalizations (Moltmann 2008, 2013)

Extensional and intensional verb cannot generally share their object (pace Montague 1973):

(20) a. ??? John met what Bill is looking for, namely a rich heiress.

 b. ??? John talked to what Bill needs, a competent assistant.

 c. ?? John weighed what he was looking for, a suitcase.

(Apparent) extensional verbs and intensional verb can sometimes share their object

(21) a. John bought what he needed, a car.

 — > Actual situation is satisfaction situation

 b. John bought what Mary really needs. (But John did not buy it for her)

 —> Type of situation is satisfaction situation

 c. I found what I needed, a competent assistant.

(22) a. John has what Mary needs. (Thus Mary should ask John for it).

 —> Actual situation is possible satisfaction situation

 b. John has what Mary once needed.

 —> Type of situation is satisfaction situation

Two intensional verbs can sometimes share their object

(23) a. John promised Mary only what she really needed, namely a car.

 b. Mary needs what she lacks.

 c. John offered Mary what she wanted (namely a glass of wine—he actually did not get

 to pour her one).

 d. I now own what I needed (namely half the estate).

 e. He accepted what I offered him (namely a glass of wine, but before I could pour him

 one, a ﬁre broke out).

(24) a. ?? John painted what Mary needs / recognized / owns / described, namely a castle.

 b. ?? John recognized (when looking at the picture) what Mary needs, a castle.

 c. ?? John found what Mary mentioned, a large suitcase.

Sharing of type of situation:

(25) a. John promised Mary what Sue really needs, namely a car.

 b. John himself lacks what Mary needs.

 c. John has found what Bill is still looking for, namely a person who can do the job.

Conditions on when apparent extensional and intensional verbs can ‘share’ their object

1. The ‘extensional’ verb describes a situation that is a satisfaction situation of the modal object / product associated with the intensional verb.

2. The ‘extensional verb’ represents the type of situation whose instances are satisfaction situations of the product described by the intensional verb.

Shift from modal objects or kinds of them to satisfiers:

[1] a. John’s need of a horse

 b. the need of a horse

[2] a. the satisfaction of John’s need of a horse

 b. the satisfaction of the need of a horse

What intensional transitive verbs share are variable objects or rather variable satisfiers of their respective products, construed on the basis of shared satisfaction situations (Moltmann 2013).

**2.4. Variable satisfiers**

Variable objects / variable embodiments (Fine 1999):

entities (of type e) associated with functions from times to manifestations

Variable objects inherit existence and location properties as well as circumstance-relative properties from their manifestations (at circumstances).

Properties inherited from manifestations in other worlds/situations require a modal:

(26) a. The book John needs to write must / may have a greater impact than the book he has

 already written.

 b. ??? The book John needs to write has a greater impact than the book he has already

 written.

 ‘The book John needs to write’:

associated with a function mapping a situation exactly satisfying John’s need to the book John has written in that situation

The need may impose more specific conditions that the book needs to meet, which the speaker need not know about.

There may be different situations as part of the same world that contain different books and that meet the need.

🡪 The variable object involves situations that are exact truthmakers/satisfiers of the need.

The denotation of the relative clause *book John needs to write* (Moltmann 2013, to appear)

(27) a. λv[∃d(need(d) & ∀i(i ╟ d 🡪 (writei(John, v) & booki(v))) ]

 b. The property of being a variable object d such that for some need of John‘s, in any

 satisfaction situation of that need, d is a book John writes.

Uniqueness: use of ordering among variable objects and minimality operator with respect to that ordering. F: manifestation function:

(28) a. For variable objects d and d’, d ≤ d’ iff F(d) ⊆ F(d’).

 b. min≤ d[∃e(promise(e, John) & ∀i(i╟ product(e) 🡪 writei(John, d) & booki(d))]

**2.5. Sharing of the object of two intensional transitive verbs**

Sharing of a variable satisfier of the products associated with the two verbs.

Sharing of variable satisfiers of findings and searches

(29) a. John found what he was looking for, a house. (finding as ‘coming across’)

 b. John found what he was looking for, an assistant. (finding as ‘hiring’)

 c. John found what he was looking for, a role model. (finding as ‘recognizing’)

Sharing of satisfaction situations relating to the same modal object or connected modal objects: situations of finding are satisfaction situations of the search.

Satisfaction situations of findings and searches require causal relations to the product

Situations of finding (which may involve events of coming across, of nomination, or recognition) can satisfy a search only if they are caused by the search, not if they are just of the right sort.

Variable objects that are ‘generated’ by a purchase

(30) a. the bottle of wine John bought over the internet

 b. John now owns what he bought over the interne.

Purchases as modal objects:

The purchase described in (30a, b) is realized only by situations of John’s ‘having’ a bottle wine that are caused by the purchase.

**2.5. Some observations about perception verbs (Moltmann 2013, Chapt. 5, Sect 6.2.)**

(31) John saw a ghost

Complement has predicative, recognitional role.

Nominalizations should stand for ’products’ or ‘results’ of events of perception.

Those bear the sorts of properties sense data are standardly taken to have: sensory properties, but not sortal properties (*white sensation*)

They appear to also be the sorts of things special quantifier complements of perception verbs range over:

(32) a. John saw something (that was) white.

 b. John saw something that was a white horse.

But they do not appear to come with correctness (veridicality) conditions

(33) a. ??? John saw something correct / right.

 b. John said something correct.

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