*The Ontology and Semantics of Parts and Wholes*

Friederike Moltmann

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BCL, Université Côte d'Azur

Handout 3

**Integrity-Based Approaches to Part-Whole Structure 1**

Extensional mereology

Part relation that is transitive, reflexive, antisymmetric, involves unique sums (thus extensional)

No structure of the whole, no functions of parts.

Different structural or functional wholes with the same parts:

Collection of lines – triangle

Wood – chair

Wood – pile of wood

Water – puddle of water

Plurality of people – committee

Committee 1 – committee 2

Rain – rain fall

Notions of structure

Spatial relations among parts (for material objects)

Temporal relations among parts (for events)

Function of parts with respect to the function of the whole (e.g., committee)

A simple notion of an integrated whole:

A maximally self-connectedness entity (R-integrated whole) (Simons 1987)

(1) Definition of an R-integrated whole

 For a symmetric, reflexive relation R, for the transitive closure Rtrans of R:

 X is an R-integrated whole if for any y, z, y <x, y < x, y Rtrans z and for no y, z, y < x,

 ¬z < x, y Rtrans z.

(3) Definition of transitive closure of a relation R

 For a relation R, x Rtrans y iff for entities x1, … xn, x R x1 & x1 R x2 … & xn R y

Examples of relations R

Spatial contiguity

Temporal contiguity

Kinship relation

Being part of the same class, family, committee

Special case of an F-integrated whole: FF-integrated whole

(3) Definition of a relation FF based on a property F

 x FF y iff F(x) and F(y).

Examples

(4) a. the blue things

 F = being blue.

 b. The children in the garden

 F = child in the garden

Some linguistic applications

The readings of part-related predicates *compare* and *distinguish* (Moltmann 1997)

FF-integrated wholes:

(5) a. John cannot distinguish the boys and the girls

 b. Mary compared the blue and green balls.

R-integrated wholes

(6) The students that share a dorm room will get the same key

R: share a dorm room with:

(7) a. Mary compared the furniture.

 b. Mary compared the furniture in the two rooms.

R: be in the same room as

The meaning of *times*

(8) a. John came several times today.

 b. John slept several times today.

General questions

Are integrated wholes always objects?

Perhaps not:

Pluralities that are integrated wholes

Quantities that are integrated wholes

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**2. Another application: Completion-related verbs of absence**

**2.1. Absence vs. presence**

Absence as the negation of presence:

(9) a. John is absent

 b. John is not present.

Absence as a ‘negative event’, as a truthmaker of negated sentences

(10) a. There is nothing that makes it is raining true.

 b. The absence of rain makes it true that it does not rain today.

‘Absence of rain’ as an entity (reified absence)

**2.2. Completion-related absence**

Absence of something that should be there in order for something else to be complete.

Completion-related predicates of absence:

English: *lack, be missing*

German: *mangeln, fehlen*

French: *manquer*

Italian: *mancare*

Completion-related verbs of absence are intensional transitive verbs:

Existential quantification does not go through:

(11) a. The door lacks a key.

 b. There is a key x, the door lacks x.

*Lack* does not just mean absence, but is a modal notion

Sometimes lack = not have:

(12) a. The door has a key.

 b. The door lacks a key.

(13) a. The cat has a tail.

 b. The cat lacks a tail.

(14) a. The picture has a frame.

 b. The picture lacks a frame.

But *lack* presupposes incompleteness, unlike *have:*

(15) a. Mary has a ponytail.

 b. ?? Mary lacks a ponytail.

(16) a. The house has a balcony.

 b. ?? The house lacks a balcony.

(17) a. John has a daughter.

 b. ??? John lacks a daughter.

(19) a. John has a painting by Picasso

 b. ??? John lacks a painting by Picasso.

Unlike have, *lack* is a modal notion, involving a weak form of necessity:

When acceptable, (15b) entails:

(20) Mary should have a ponytail.

When acceptable (17b) entails:

(21) John should have a daughter.

Application condition for *lack*

*Lack* relates to a conceptual whole and presupposes that that conceptual is not fully manifested or realized.

The whole *lack* relates to need not have objects as its realizations:

May involve relations of possession, kinship, friendship:

(22) a. John lacks a car.

 b. John lacks a father.

 c. Mary lacks a close friend.

The conceptual whole lack relates to may also be a plurality:

(23) a. The students were in the hallway, but John was missing.

 b. Bill saw the students, but John was missing.

Generalization

*Lack* involves the notion of an integrated wholes that is itself not tied to single objecthood.

More general conclusion

The notion of an integrated whole is independent of the notion of a single object!

More related issues

*Have* and *lack* can also relate an individual to a quality:

(24) a. Joe has wisdom.

 b. Joe lacks wisdom.

(25) a. Mary has talent.

 b. Mary lacks talent.

(26) a. Mary’s lack of understanding was astonishing.

 b. Mary’s lack of attention to details ruined the project.

Particularized qualities (tropes) are not really parts of objects

Parts of material objects: spatial parts

Parts of events: temporal parts

Tropes are not spatial or temporal parts!

Location-related *lack*:

(27) a. There is a lack of water

 b. There is water.

**2.3. Toward a semantics of *lack***

Making use of an ontology of lacks

Alternation between simple and complex predicates:

(28) a. John has a lack of understanding.

 b. John lacks understanding.

Same alternation with the modal verb *need*:

(29) a. John needs a car.

 b. John has a need for a car.

But can lacks even be entities?

Chomsky on *lacks* and *mistakes*:

If I say ‘the flaw in the argument is obvious, but it escaped John’s attention’, I am not committed to the absurd view that among the things in the world are flaws, one of them in the argument in question. Nonetheless, the NP ‘the flaw in the argument’ behaves in all respects in the manner of truly referential expressions like ‘the coat in the closet’ – for example, it can be the antecedent of *it* and serves as an argument, taking a theta-role. Suppose now that we make a rather conventional move, and assume that one step in the interpretation of LF is to posit a domain D of individuals that serve as values of variables and as denotata. Among these individuals are specific flaws (…), John’s lack of talent, and so on.’ (Chomsky *Lectures on Government and Binding*, 1982, p. 324).

The domain D: for Chomsky just another level of syntax…

The present approach: take lacks seriously ontologically.

Lacks are like needs: entities that come with satisfaction conditions, and that disappear once satisfied.

(30) ∃d(have(John, d) & lack(d) & [*of understanding*](d))

(31) a. The house lacks a door.

 b. The lack d of a door (based on a conceptual whole C) is satisfied iff

 for any possible entity y such that for the actual (partial) manifestation x of C, the

 composition of x and y is a complete manifestation of C: there is an entity z, door(z)

 such that z is part of y.

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**3. The predicate of absence *be missing***

*Be missing* seems to share uses with *lack*.

(32) a. A leg is missing from the chair.

 b. The chair lacks a leg.

(33) a. A door is missing froil the hut

 b. The hut lacks a door.

Semantic differences

1) *Be missing* involves a restriction to structural parts, but not so *lack*.

2) The subject of a *lack-*sentences explicitly refers to an entity said to be incomplete; *be missing* involves implicit reference to a conceptual whole that is said to be incomplete (Zimmermann 2014).

Ad 1):

Unlike *lack*, *be missing* not generally possible with qualities:

(34) a. The candidate lacks talent.

 b. ??? Talent is missing (from the candidate).

(35) a. The description lacks a deeper understanding of the situation.

 b. ??? A deeper understanding is missing from the description.

*Be missing* dislikes mass NPs, in contrast to *lack*:

(36) a. The well lacks water.

 b. ??? Water is missing from the well.

(37) a. The dish lacks salt.

 b. ??? Salt is missing from the dish.

*Lack* and *be missing* display the mass-count distinction

The subject argument of *is missing* is restricted to structural or functional parts with respect to a structured whole, but not so the object argument of *lack*.

A related observation

The subject of *be missing*-sentences may quantify ‘objects’ restricted by the conceptual whole (Zimmermann 2014, Saebo 2014):

(38) a. Three screws are missing (from the IKEA set).

 b. Three stamps are still missing (from John’s almost complete stamp collection).

(38a) can mean that three screws of a particular kind meant to be in the IKEA self-assembly package were not there (and perhaps do not even exist).

(38b) can mean that particular kinds of stamps meant to complete the collection were not yet there (and perhaps do not even exist).

What does this mean?

The subject of *be missing*-sentences permits quantification over variable parts (individual concepts or variable embodiments in Kit Fine’s sense).

The same quantifier may range over actual and variable parts (‘individual concepts’) of the whole.

(39) Several things are missing from the collection: the stamp Bill had stolen and the two

 stamps any such collection should contain.

Conclusion

The semantics of *be missing* involves not only conceptual wholes, but also conceptual completing parts (variable parts).

These notions are entirely unavailable in extensional mereology.

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**4. The transitive verb *miss***

Transitive *miss* describes objectual attitude of longing for an object:

(40) John misses his brother.

Same reading with ‘miss’ in many languages:

French, *manquer*, Italian, *mancare*, German *fehlen*

*Miss* like *be missing* is restricted to objects with a boundary

*Miss* excludes quantities and qualities:

(41) a. ?? Mary misses hot water.

 b. ?? Joe misses kindness.

*Miss* relates an existing object or an object that existed in the past;

describes a mental state whose satisfaction requires closeness (in physical space or interaction) with the missed object.

Satisfied mental state:

constitutes a form of completeness: relevant relations to the object in question

Unsatisfied mental state:

those relations are not in place.

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**5. Predicates of replacement**

Predicates of replacement are semantically related to the predicate *be missing*.

Replacement can apply only to well-delimited, often functional parts:

(42) Mary replaced the wheel / the table top / the screw.

*Replace* cannot apply to qualities, surfaces, appearances of objects:

(43) ??? Mary replaced the color / the texture / the weight / the surface / the appearance of

 the object.

Quantities can be replaced only when they are described as well-delimited:

(44) a. John replaced the water in the container.

 b. ??? John replaced a bit of water in the container.

Replacement means taking away a structural / functional part and putting a similar or equivalent object in its place.

Interesting observation

*Replace* can even apply to structural / functional parts described as absent:

(45) John replaced the missing screw.

A proposal:

*The missing screw* refers to a variable object that fails to have an actual manifestation.

That variable object is replaced by an actual part, or rather by a variable part that has an actual manifestation.

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**6. Conclusion**

The notion of an integrated whole is a semantically important one.

1) It is responsible for certain readings of plural and mass NPs.

2) It is at the center of the semantics of completion-related verbs of absence.

The notion of an integrated whole is independent of the notion of a single object.

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