

Konstanz, May 15, 2025

Variable Wholes and Variable Parts and the Semantics of Completion-Related Verbs of Absence

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Introduction

Variable embodiments / variable objects

Standard examples: the president of the US, the water in the container, ships, colleges entities allowing for the replacement of matter or of parts.

Topic of the talk

Variable objects and variable parts in the semantics of semantics of completion-related verbs of absence: English *lack* and *be missing*

(1) The house lacks a door.

Completion-related predicates of absence are modal verbs of weak necessity conveying the absence of a (type) of entity for the completion of a whole, a conceived whole.

Related phenomena

- Predicates of completion: *complete(ly)*, *partial(ly)*
- Expressions of replacement: *replace*, *instead of*, *in place of*

The ontology

1. Different notions of part structures and of wholes:

- 1) Pluralities / mereological sums
- 2) Wholes built from entities and structure (hylomorphism)
- 3) Wholes prior to the parts: functional wholes, wholes with variables parts

2) and 3) generate variable objects and objects with variable parts

2. An ontology of (merely) conceived or ideal wholes:

Intuitive examples: plans, architectural designs, musical compositions

3. An ontology of ‘lacks’:

Modal objects of weak necessity of completion-related absence, generated by conceptual wholes

Two kinds of lacks:

- 1) lacks whose satisfiers are completing parts
- 2) lacks whose satisfiers are situations of the incomplete entity having a completing part

Overall view

Notion of part structure:

- Wholes may be prior to the parts and determine what the parts are.
- Conceived or ideal wholes ‘generate’ variable objects and variable parts
- Related ideas: slot mereology (Bennett 213)

Modality:

- ‘Localized’ notion of modality: modality based on particular conditions involving particular entities
- Modal truths are based on modal objects and their satisfaction / truthmaking conditions (Moltmann 2018, 2024)

Plan of the talk

1. Distinguish the notion of completion-related absence from other notions of absence in ontology
2. Some observations about part-whole structure and completion as reflected in natural language
3. Semantics for intensional transitive lack and the associated modal *should*
4. Semantics of *be missing* and quantification over variable parts
5. Some observations about transitive *miss*
6. Remarks about expressions of replacement

1. Notions of absence

1.1. Absence vs. presence

Absence as the negation of presence:

- (2) a. John is absent
 b. John is not present.

Absence as a 'negative event', as a truthmaker of a negated sentence:

- (2) c. The absence of rain makes *It is not raining* true.

'Absence of rain' as an entity, a reified absence (Kukso 2004)

1.2. Parts that consist in the absence of constituting material

Holes, openings, empty spaces of art works

1.3. Completion-related absence

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

Completion-related verbs of absence in many languages

English: *lack, be missing*, German: *mangeln, fehlen*, French: *manquer*, Italian: *mancare*

What sorts of things can be complete wholes

A simple notion of an integrated whole: maximally self-connectedness entity (R-integrated whole) (Simons 1987, Moltmann 1997)

(3) Definition of an R-integrated whole

For a symmetric, reflexive relation R, for the transitive closure R_{trans} of R:

X is an R-integrated whole if for any y, $y < x$, and any z, $z < x$, $y R_{\text{trans}} z$, and for no y, $y < x$, and z, $\neg z < x$, $y R_{\text{trans}} z$.

FF-integrated whole: $xFFy$ iff Fy and Fy .

Fact

R-integrated wholes (and integrated wholes in general) need not be objects:

pluralities (as many) can be integrated wholes, quantities (stuff) can be integrated wholes:

- (4) the students, the students that share this room, the water in the bottle

2. The role of wholes in ontology

2.1. Entities that are functional parts

Doors, door knobs, window frames, ... are entities individuated in terms of a (conceptual) whole.

Conceptual wholes are part of our ordinary ontology, e.g., plans, architectural designs, ...

2.2. The transitivity of the part relation

The transitivity of the part relation depends on the nature of the whole:

Invalid:

(5) The page is part of the book

The book is part of the library.

The page is part of the library.

But transitivity depends on the nature of the whole:

Valid:

(6) The page is part of the book.

The book is part of Kant's written work.

The page is part of Kant's written work.

Written work allows for transitivity, but within limits: not for inferences with 'the empty pages of the book', 'the margins of the page', etc.

Potential ways of dismissing problems for transitivity

1) dismiss functional parts as the only parts (*part* does not pick out all the parts)

2) distinguish different part relations, for different ontological 'levels'

The present approach

Take intuitions reflected in linguistic data seriously (*part of*, but also other expressions).

Parts may depend on the whole if the whole is a structured or functional whole.

The part relation as such is not transitive.

2.2. The role of wholes for completion

Completion-related expressions: *partial(ly)*, *complete(ly)*

Two kinds of completion:

1) Full match of a concrete whole that is an original (in the present or the past)

- (7) a. partial copy of the paper
 b. a complete copy of the paper
- (8) a. partial reconstruction of the church
 b. complete reconstruction of the church

2) Full manifestation of a conceived whole

- (9) a. partial realization of the plan
 b. complete realization of the plan
- (10) a. John partly forgot the poem.
 b. John completely forgot the poem.

Completion of a whole and absence of a part

Complete and *be missing* NP display the same kinds of interpretations.

Relative to an original:

- (11) a. The quotation is complete.
 b. The quotation is missing a few words.

Relative to an actual or conceived whole:

- (12) a. The collection is complete.
 b. After the break-in, the collection is missing a piece.
- (13) a. The house is complete.
 b. The house is only missing the windows.

Predicates of completion may make reference to different types of wholes

Two words for ‘complete’ in German:

voellig (the whole is homogeneous) and *vollstaendig* (the whole comes with discrete units)

- (14) a. die vollstaendige Uebersetzung
 ‘the complete translation’
 b. ??? die voellige Ubersetzung
- (15) a. die voellige Dunkelheit
 ‘the complete darkness’
 b. ??? die vollstaendige Dunkelheit

Similarly for predicates of completion-related absence:

be missing: the whole is structured; *lack*: the whole may be homogenous

(16) a. The translation is missing a sentence.

b. The drink lacks / ? is missing some salt.

Generalization

Natural language displays a range of part-whole-related expressions involving not just a part-of-relation, but also reference to concrete or conceived wholes and different structures of a whole.

3. The semantics of *lack*

3.1. *Lack* as an intensional transitive verb

Completion-related verbs of absence are intensional transitive verbs:

Unspecific reading of the complement, not permitting existential quantification:

(17) a. The door lacks a key.

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

But *lack* is not a proposition-embedding intensional verb:

(18) * The door lacks having a key.

3.2. The notion of absence conveyed by *lack*

Lack does not just mean 'not present'

lack = *not have*?

(19) a. The door has a key.

b. The door lacks a key.

(20) a. The cat has a tail.

b. The cat lacks a tail.

(21) a. The picture has a frame.

b. The picture lacks a frame.

But *lack* does not just mean 'not have'.

Lack presupposes incompleteness, unlike *have*:

(22) a. Mary has a ponytail.

b. ?? Mary lacks a ponytail.

- (23) a. The house has a balcony.
 b. ?? The house lacks a balcony.
- (24) a. John has a daughter.
 b. ??? John lacks a daughter.
- (25) a. John has a painting by Picasso
 b. ??? Bill lacks a painting by Picasso.

Unlike have, *lack* is a modal notion, conveying weak necessity:

When acceptable, (22b) entails (26a), (23b) entails (26b), (24b) entails (26c), (25b) entails (26d), on some reading of *should*:

- (26) a. Mary should have a ponytail.
 b. The house should have a balcony.
 c. John should have a daughter.
 d. Bill should have a Picasso.

Application condition for *lack*

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

The conceptual whole *lack* relates to need not have objects as its realizations, but instead configurations of individuals with their relations of possession, kinship, friendship:

- (27) a. John lacks a car.
 b. John lacks a father.
 c. Mary lacks a close friend.

Hypothesis

The relations constitutive of the whole that *lack* relates to are just those that can be conveyed by *have* (*have a leg, a window, a car, father, close friend*).

The conceptual whole may also be realized by a plurality as many (Oliver / Smiley 2013):

- (28) The student protesters lack a leader.

Location-related *lack*: the conceptual whole pertains to a location or a situation

- (29) a. There is a lack of water.
 b. There is water.
- (30) a. There was a lack of attention to the speaker.

- b. There was a lack of female speakers.

Generalization

Lack involves the notion of an integrated whole that is itself not tied to single objecthood. The notion of an integrated whole is independent of the notion of a single object anyway.

3.3. Quality-related *lack*

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

- (31) a. Joe has wisdom.
 b. Joe lacks wisdom.
- (32) a. Mary has talent.
 b. Mary lacks talent.
- (33) 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

But qualities may be parts of conceived wholes, and tropes may manifest those qualities.

Discrepancy between conceived whole and its manifestation?

3.4. The semantics of *lack*

Alternation between simple and complex predicates

- (34) a. John has a lack of understanding.
 b. John lacks understanding.

Same alternation with the modal verb *need*:

- (35) a. John needs to have a car.
 b. John has a need for a car. (Harves/Kayne 2012)
 c. $\exists d(\text{HAVE}(d, \text{John}) \ \& \ \text{need}(d) \ \& \ [\text{John to have a car}](d))$

(35c) is the analysis of (35a, b) within object-based truthmaker semantics (Moltmann 2008, 2024): quantification over modal objects, as made explicit by the complex predicate.

Modal objects

- arise in different ways: can be produced (permissions) or generated by particular conditions (teleological modal objects)
- come with satisfaction conditions, best formulated in terms of truthmaker semantics

But can lacks even be entities?

Chomsky on *lacks* and *flaws*:

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.

(36) a. John lacks understanding.

b. $\exists d(\text{have}(\text{John}, d) \ \& \ \text{lack}(d) \ \& \ [\textit{of understanding}](d))$

(37) a. John should have understanding.

b. $\exists d(\text{should}(d) \ \& \ [\textit{John have understanding}](d))$

The satisfaction conditions of a *lack*

(38) a. the house’s lack of a door.

- b. For a conceptual whole *C* such that the house is an incomplete actual manifestation of *C*, the house’s lack *d* of a door, based on *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*.

Involvement of variable embodiments (variable objects) (Fine 1999, 2020)

Variable embodiments are entities associated with a ‘form’ function f from times (and worlds/situations) to manifestations.

What is to be added: manifestations may be (somewhat) incomplete.

(39) The generation of lacks from incomplete manifestations of variable wholes

Suppose for a conceptual whole C and a variable object d associated with a function f_C , such that for the present time t and actual world w , the entity a , $a = f_C(d, t, w)$, is incomplete with respect to C . Then there is a lack e at t in w such that an entity b satisfies e just in case $a \otimes b$ is a complete manifestation of C , where \otimes is a suitable structure-preserving composition function.

(40) The semantics of a lack of an N

For a conceptual whole C , a variable object d associated with the manifestation function f_C and a modal object e , a time t and world w such that $f_C(d, t, w)$ is an incomplete realization of C ,

$[lack\ of\ an\ N]^{t,w}(e, C)$ iff $lack(e)$ and for any x in an (accessible) world w' , if x satisfies e , then there is a y , $[N]^{t,w'}(y)$ such that $y < x$.

Explaining the modal (weak necessity) inference

(41) The house lacks a door.

The house should have a door.

(42) a. $\exists e(HAVE(e, house) \ \& \ lack(e) \ \& \ [of\ a\ door](e))$

b. $\exists e'(should(e') \ \& \ [the\ house\ have\ a\ door](e'))$

Map the houses' lack e of a door satisfiable by an entity containing a door x onto a lack e' satisfiable by situations s in which the house has x .

(43) Mapping object-related lacks to corresponding situation-related lacks (informally)

For the house's lack e of a door:

for any x , such that $house(y)$ and $y < x$, x satisfies e' iff for the situation s that is the house's having x , $s \Vdash e'$.

3. The predicate of absence *be missing*

3.1. The semantic peculiarities of *be missing*

Be missing seems to share uses with *lack*.

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

b. The chair lacks a leg.

(45) a. A door is missing from 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*-sentence 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* is not generally possible with qualities:

(46) a. The candidate lacks talent.

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

(47) 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*:

(48) a. The well lacks water.

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

(49) a. The dish lacks salt.

b. Salt is missing from the dish. (is acceptable only if salt was part of the recipe)

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 ‘individual objects’ restricted by the completion (Zimmermann 2014, Saebo 2014):

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

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

(50a) 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).

(50b) 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?

Saebo (2024)

The subject of *be missing*-sentences permits quantification over individual concepts individuated pragmatically.

Simpler alternative

The subject of *be missing*-sentences permits quantification over variable parts generated by parts of the conceptual whole.

Further observation (Saebo 2024)

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

(51) Several things are missing from the collection: the stamp Bill had stolen and the two stamps any such collection should contain.

Variable objects are of the very same type as particular objects (of type e). Thus, quantifiers may range over variable objects and particular manifestations (or rather rigid embodiments), i.e., variable and rigid parts.

3.2. The semantics of *be missing*: quantification over variable parts

Be missing as a four-place predicate holding of a lack, a conceptual whole C , a variable object generated by C and a variable part generated by a sufficiently small part of C

(52) Semantics of *be missing*

For a time t and world w , a conceptual whole C and a variable object d associated with the manifestation function f_C and such that $f_C(d, t, w)$ is an incomplete realization of C , and a variable object d' associated with the manifestation function $f_{C'}$, for a small part C' of C , for a lack e ,

$[be\ missing]^{t,w}(e, C, d, d')$ iff e pertains to d and for any x in an (accessible) world w' , if x satisfies e , then $[d']^{t',w'} < x$.

Conclusion

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

4. The transitive verb *miss*

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

(53) John misses his brother.

Same reading with 'miss' with French *manquer*, Italian, *mancare*, German *fehlen*

Transitive *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 obtain

Unsatisfied mental state: those relations are not in place.

5. Expressions replacement

5.1. Verbs of replacement

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

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

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

(55) ??? 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:

(56) 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.

5.2. Adverbials of replacement

- (57) a. Instead of a car, John took a bicycle to get to work.
 b. John praised Mary instead of Sue.
 c. John praised Mary instead of criticizing her.
 d. Instead, John went home.

Instead-phrases target variable occupiers of slots in an event or a situation (Bennett's slot mereology 2013)

6. Conclusion

- The notion of a conceived whole with its incomplete actual manifestation is at the center of the semantics of completion-related verbs of absence
 - Structured or functional (conceived) wholes may come with variable parts, which are involved in the semantics of *be missing* and expressions of expressions of replacement.
 - Natural language reflects a highly intensional notion of part-whole structure, in stark contrast to classical mereologies.
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