*The Ontology and Semantics of Parts and Wholes*

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Handout 4

**Integrity-Based Approaches to Part-Whole Structure 2**

**1. The notion of integrated whole**

**1.1. The traditional notion of an integrated whole**

Intuitive description:

Having a form, structure, boundary, being maximally self-connected

Being unified, being a single thing by being unified

Historically

Aristotle, Husserl, … , Simons (1987),

Langacker (1987): notion of boundedness or having a boundary

Moltmann (1997, 1998): introduction of the general notion of an integrated whole to natural language semantics and of the notion of a maximally self-connected whole in particular

Recent uses of the notion of a maximally self-connected whole by linguists (Grimm, Filip, Sutton, Wagiel).

The notion of an R-integrated whole (maximal self-connectedness)

Rtrans: the transitive closure of R.

(1) Definition :

For a nonlogical, symmetric relation R, x is an *(R-)integrated whole* ((R)-INT-WH(x)) iff

for every y and z such that y < x and z < x, Rtrans(y, z), and for every y such that y < x, for

no w, ¬w < x, Rtrans(y, w).

Special case

FF-integrated whole:

(2) For a property F, FF(x, y- iff F(x) and F(y).

Issues

Is the notion of an integrated whole restricted to objects?

Does it always pertain to essential properties of objects?

Essential properties

* properties an object needs to have in order to exist
* properties an object needs to have in order to be what it is

The importance of the notion of form in the history of philosophy

Form or structure individuates objects, not just material (Aristotle, Koslicki)

Two entities are identical not just if they are constituted by the same matter, but also if they share the same essential form.  
Two forms of re-identification

Endurance: identity throughout times

Identity across different situations or worlds

A major philosophical puzzle

What constitutes the unity of matter and form?

What makes something constituted by matter and a form a single thing?

**1.2. Three types of integrated wholes**

1. Essential integrated wholes

Examples:

A heap of sand, a house, a tree, a statue, a ship, a person

Essential integrated wholes may allow for the replacement of parts or constituting material: Famous example: the ship of Theseus

But not all essential integrated wholes allow for the replacement of parts:

A word as an abstract object, the couple of John and Mary, the group of the students

Kit Fine’s notions:

Essential integrated wholes that allow for replacement of parts: *variable embodiments*

Essential integrated wholes that do not allow for replacement of parts: *rigid embodiments*

2. Accidental integrated wholes

The sand when taking the form of a heap

The clay when taking the form of a statue

The wood when having the form of a tree

3. Conceived integrated wholes

An object as merely conceived or perceived as an integrated whole:

A notion used in cognitive semantics (Langacker, Jackendoff)

Two uses of conceived integrated wholes in the literature:

Boundedness with a subjective center (Langacker 1987)

Merely conceived integrated whole in Moltmann (1998):

(3) a. the amount of sand (as opposed to ‘the sand’)

b. the collection of things over there

(4) a. the students together

b. the students as a whole

The claims:

Accidental and conceived integrated wholes are linguistically important:

Langacker (1987):

Subjective boundedness plays a role for the mass-count distinction.

Moltmann 1997, 1998:

Modifiers such as *as a whole* and *together* specify an entity as a merely conceived integrated whole, influencing the availablity of distributivity and part-related predicates.

Pluralities and quantities as accidental integrated wholes incfleunce the application of part-related expressions

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**2. The importance of the notion of integrated whole for formal part-whole relations**

**2.1. Extensional mereology**

Transitivity, unrestricted sum formation, unique sums (extensionality)

Consequence:

Different part relations for individuals, pluralities and quantities

Mass-count distinction defined in terms of atomicity and cumulativity

Individual:

Atom with respect to the plural-specific part relation:

Quantity:

Not an atom or not necessarily an atom with respect to the quantity-specific part relation

Domains of pluralities and quantities are cumulative, but not the domain of individuals.

**2.2. Problems for the division into different part structures**

Conceptual problem

Circularity:

Formulating the content of the mass-count distinction involves essential reference to domain-specific part relations, but those part relations depend on the use of mass nouns, singular count nouns, plural nouns themselves

🡪 No language-independent way of conceiving of the content of the mass-count distinction available within extensional mereology.

Empirical problems

(5) a. John ate part of/all of/some of what was on the table (the apple/the nuts/the bread)

b. John did not eat part of what was on the table

(6) a. part of the apples and the milk

b. part of the apple and the milk

c. John ate part of what was on the table and what was in the fridge.

Define a new generic part relation <gen for mixed domains on the basis of individual-, plurality- and quantity specific part relation?

But this gives rise to problems of transitivity:

(7) John painted part of the paintings.

**2.3. Problems for transitivity**

Moltmann (1998):

For essential integrated wholes, it depends on the whole what its parts are (and thus whether the part relation is transitive with respect to the parts pertaining to that whole)

Examples:

(7) The page is part of the book.

The book is art of the library.

The page part of the library.

(8) The page is part of Goethe’s written work.

The book is part of Goethe’s written work

The page part of Goethe’s written work.

Addendum to Moltmann (1998):

For quantities it depends on what quantities are made of whether the part relation is transitive.

Moltmann (1998):

(9) Condition on transitivity in the domains of individuals and quantities (nonessential

integrated wholes only):

If for pluralities, x, y, z, if x < y, y < z, then x < z only if y is not an integrated whole.

(10) Restriction on sum formation

For a non-empty set X, sum(X) exists only sum(X) would be an integrated whole.

Important:

The integrated whole may be merely accidental or conceived

(11) a. The sum that is ‘the children’: accidental integrated whole

b. A sum that is ‘five children together’: conceived integrated whole.

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**3. The mass-count distinction based on the notion of an integrated whole**

**3.1. Langacker (1987)**

Singular count nouns describe bounded entity, but not so mass nouns

Typical boundedness:

Boundedness in only one dimension: lines, fences

Boundedness with subjective center:

**3.2. Moltmann (1998)**

(12) a. For a singular count noun N and a reference situation s, if N(x, s), then x is an

integrated whole in x.

b. For a mass noun N and a reference situation s, if N(x, s), then x is not an integrated

whole in x.

Important:

An entity x is an integrated whole in a reference situation s if 1, 2, 3, or 4:

1. x is an essential integrated whole (in s)

2. x is an accidental integrated whole in s: x has properties defining it as an integrated whole perhaps only in the temporally restricted situation s or the circumstances of s.

3. x is conceived as an integrated whole relative to s (s being dependent on the mind of the speaker).

4. x is an integrated whole due to the particular partial information contained in s.

Accidental integrated wholes

(13) ??? The line of people/The (loose) collection of papers on my desk/The group of people

in the room does not exist anymore.

Conceived integrated wholes (attention: typos regarding acceptability in the paper!)

(14) a. This patch of snow is a new patch of snow.

b. ?? This patch of snow is new snow.

(15) a. This snow is new snow.

b.??This snow is a new patch of snow.

Implicit integrity conditions with *thing*

(16) a. This thing is an apple. (pointing at an apple)

b. ??? This thing is apple. (pointing at an apple or a piece of apple)

c. This stuff / The content of the bowl is apple. (pointing at small pieces of apples)

Implicit integrity conditions with *part*

(17) a. This wood is part/ ??? a part of the chair. (pointing at a piece or at pieces of wood)

b. The leg is a part of the chair.

c. The leg and the back are parts of / ??? a part of the chair.

**3.2. Integrated wholes and semantic selection**

The linguistic relevance of accidental integrated wholes:

(18) a. John compared the people/# the line of people.

b. John cannot distinguish the papers on my desk/# the loose collection of papers on my

desk.

c. John counted the people in the room/# the group of people in the room.

Integrated wholes due to partial information:

(19) The blue things (which are otherwise very different) are heavy.

(20) The Accessibility Requirement

A predicate or reading of a predicate that makes reference to the parts of an argument can

apply to an object x in a reference situation s only if x is not an integrated whole in s.

The semantic effect of adnominal *together:*

(21) a. John and Mary together weigh 100 pounds.

b. The stamps together cost 100 dollar.

c. The boxes together are too heavy.

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