*Language and Ontology*

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Handout 6

**Plural Reference and Reference to a Plurality: The Point of View of Natural Language**

**1. Definite plurals and their readings**

Russellian (singular) definite descriptions

(1) [*the king of France*] = ιx[king(x, France)]

*The children*: definite plural description

*John and Mary*: conjoined NP, behaves like a plural

*The men and the women, the men and women*

Readings with definite plurals

Distributive reading:

(2) a. The children are happy.

Collective or distributive reading:

(2) b. The stones are heavy.

 c. The vase and the box are heavy.

Collective readings with subgroups

(2) d. The students gathered (in the different schools).

 e. The men and the women gathered.

Distributive readings available only with plurals, not with singular NPs:

 (2) g. The collection of paintings is expensive. (only collective reading)

Effects of *whole* and *individual*

*Whole* enables distributive readings:

(3) a. The whole collection is expensive.

*Individual* enforces distributive readings

(3) b. The individual stones are heavy.

 c. John compared the individual students.

How can the Russellian account be modified so as to account for definite plurals?

What kind of semantics of plurals can account for the different readings of plurals and conjoined NPs and for the effect of modifiers like *whole* and *individual*?

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**2. Two approaches to the semantics of definite plurals**

[1] Reference to a plurality (Link, Sharvy, Moltmann (1997,…)

(4) a. [*the children*]s = sum([*children*]s)

[2] Plural Reference (Boolos, Oliver/Smiley, McKay, Moltmann (2013, 2016)…)

(4) b. *The children gathered* is true iff *gathered* is true at once of all the xx of which

 *children* is true at once.

Distributivity:

(5) The stones D are heavy

D: distributivity operator, quantifies over all the members of the group of stones

Philosophical motivations for Plural Reference

* Avoid paradoxes
* Plural sentences involve no ontological commitment beyond that to individuals: (1a) is only about individual children not a group of children.

Motivation for Plural Reference

[1] Apparent parallels in the semantics of singular count and plural NPs.

*The child* refers to a single child,

*the children* should refer to a single entity as well, a plurality

*Some child* existentially quantifies over individual children, *some children* appears to quantify over entities of the sort of pluralities of children.

[2] Part-related construction that appear to apply to individuals and pluralities alike:

 *all / some of the house, all / some of the children.*

adverbial part-related modifiers *in part / to some extent* (*the house is in part / to some extent white, the people are in part /to some extent French*).

Reference to a Plurality: Two ontological approaches to pluralities

[1] The extensional mereological approach (Link 1983, …)

[2] The information-based approach: Moltmann (1997, 1998, 2005)

Differences:

- differ in the scope of the part-whole relation as needed for the semantics of plurals.

Extensional mereological theory makes use of a specific part relation applicable only to pluralities and the relation between individuals and pluralities.

Information-based theory makes use of a single notion of part structure applicable both to individuals and their parts and to pluralities.

- use fundamentally different formal notions of part-whole: extensional part relation vs part-whole relation involving the notion of integrated whole

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**3. Two notions of part-whole for the semantics of plurals**

**3.1. The extensional mereological notion**

Properties of the extensional mereological part relation:

- transitive

- closed under sum formation

- extensional (two entities sharing the same proper parts are identical).

The extension of a plural noun

set of sums of individuals, that is, elements of the extension of the corresponding singular count noun.

[*children*] = the set of sums of individual children

Extensional mereology needs to avoid that parts of individuals always count as parts of the pluralities of which the individuals are parts. Thus it must distinguish different part relations for individuals and for pluralities, part relations that will be tied to the syntactic categories singular count and plural nouns.

One part relation applies to *individuals*, entities in the extension of singular count nouns,

the other part relation applies to *pluralities*, entities in the extension of plural nouns.

Individuals count as *atoms* with respect to the extensional mereological part relation associated with plural nouns.

The notion of an atom, as a notion associated with singular count nouns, plays a central role in the extensional mereological theory of pluralities.

Problems for the notion of an atom

[1] inapplicable to nouns of the sort *thing, entity, sum, portion, quantity*

[2] is a language-relative notion and not a property of objects as such.

**3.2. The information-based notion of part-whole**

Characteristics

- Single part relation for individuals and pluralities

- Same conditions that drive the individuation of objects drive the ‘contextual individuation’ of higher-level pluralities, that is, pluralities of pluralities.

- These conditions crucially involve the notion of an *integrated whole.*

The notion of an atom does not play a role in the information-based theory, but instead the notion of an *integrated whole*.

Conditions of integrity that define an integrated whole

* Properties of form
* Having a boundary
* Being a maximal entity consisting of things having a property P or standing in a relation R

The role of the notion of an integrated whole for the mass-count distnction

Singular count nouns generally convey properties of integrated wholes, but not mass-nouns (which generally convey the absence of integrity).

Pluralities are themselves entities that consist of integrated whole and are not generally (strong) integrated wholes themselves.

Empirical motivations for the information-based theory

Constructions and modifiers that, independently of the mass-count distinction, impose conditions on the part structure of an entity involving conditions of integrity, defining an entity in the extension of a singular count noun as a plurality or defining a plurality as a higher-level plurality or of only having individuals as revenant parts

Examples

*- Individual* in *the individual students* imposes the condition that the plurality has no subgroups that are integrated wholes and thus are among the relevant parts of the plurality; rather only individuals are.

(6 ) a. John compared the individual students.

 b. John compared the students.

(6a) lacks the subgroup-comparsison reading that (6b) has!

*- Whole* as in *the whole collection* imposes the condition that the entity referred to is not an integrated whole, but a mere plurality.

(6) c. the whole collection is expensive

- Conjunctions such *the men and the women* may define a plurality as a higher-level plurality consisting of two integrated subgroups:

(6) d. The men and the women gathered.

 e. John compared the men and the women.

The men: the maximal group whose members share the property of being a man

The women: the maximal subgroup whose members share the property of being a woman

**3.3. Difficulties for both approaches to pluralities**

Accounting for predicates or reading of predicates apparently requiring plural arguments.

Empirical arguments in favor of plural reference, but at the same time a notion of a structured plurality is required.

This requires carrying over the notion of an integrated whole from the information-based theory, but now as a plural property.

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**4. Plural-specific predicates and readings of predicates**

[1] Distributive reading

(7) a. The boxes are heavy.

 a’. The collection of boxes is heavy.

(7) b. The team members lifted the piano.

 b’. The team lifted the piano.

Distribution over subgroups:

(7) c. John weighed the stones

 c’. The students gathered.

Distributivity operator (refinement)

(5’) For a situation s, [D VP]([*the* N’plur], s) = 1 iff for all d, d <s [*the* N’plur], [VP](d) = 1.

[2] Part-related predicates: predicates making reference to the parts, but not the whole of an argument (Moltmann 1997, 2005):

(8) a. John compared the students.

 b. # John compared the class.

(9) a. John cannot distinguish the students.

 b. # John cannot distinguish the class.

(10) a. The students are similar.

 b. The class is similar.

(11) a. John counted the students.

 b. John counted the class.

(11’) a. John has enumerated the students.

 b. # John has enumerated the class.

Predicates that make reference not only to the parts of an argument, but also to the whole (its organization or overall structure) not subject to the requirement:

 (12) John organized / rearranged the collection of things on his desk.

Part-related predicates may take into account relevant subgroups as the parts of the plurality

(13) a. John compared the men and the women.

 b. John compared the students (in the different classes).

Constraint on distributivity and part-related predicates:

The *Accessibility Requirement* (Moltmann (1997, 1998, 2005)

Predicates and readings making reference to the parts, but not the whole of an argument can apply to an entity x in a situation s only if x is not a (strong) integrated whole in s.

The Accessibility Requirement does not amount to a restriction to plural NPs, but may also be satisfied with singular count NPs of certain types:

[1] The adjectival modifier *whole* allows a singular count NPs to satisfy the requirement

(14) a. The whole collection is expensive.

 b. John has evaluated the whole class.

 c. John has enumerated the whole class.

[2] *Special (singular) quantifiers* can satisfy the requirement:

(15) a. Even John has evaluated *something*, namely the paintings.

 b. There is *something* John is unable to count, namely the grains of sand.

(16) a. *What* did John evaluate? – The paintings.

 b. *What* can’t John distinguish? – The cups.

*Several things* ranges over pluralities, allowing for both distributivity and part-related predicates:

(17) a. John has evaluated *several things*, the paintings, the sculptures, and the drawings.

 b. There are *several things* John cannot distinguish, the cups, the glasses, and the plates.

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**5. Attributive readings of definite plurals**

(18) a. Every year, John needs to evaluate the students.

 b. Every year, John needs to compare the students (in the various classes, whoever they

 may be).

Difficulty for approaches to higher-level plurality readings based on a contextually given division of a particular plurality

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**6. Constraints on higher-level plurality readings**

(19) a. John compared the men and women.

 b. John compared the men and the women.

(19a) has the reading ‘John compared the men to the women’, but not a reading ‘John compared the young men and women to the old men and women’ or alike, in contrast to (19b).

(20) a. The men and women gathered.

 b. The men and the women gathered.

Constraints on distributive readings:

(20a) has the reading ‘the young men and women gathered and the old men and women gathered’. (20b) has only the distributive reading ‘the men gathered and the women gathered’, no ‘mixed readings.

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**7. Reference to a plurality and number-related predicates**

No subplurality-readings available with number-related predicates:

(21) a. John counted the people.

 b. The stones are numerous.

 c. The students are twenty in number.

(22) a. John enumerated the students.

 b. John named the students.

(23) a. John counted the ten children – he counted one.

 b. John counted Mary – he counted one.

Problem for the information-based account:

pluralities being divided into contextually relevant parts that may be subpluralties ‘as one’.

Unproblematic for the notion of an atom? But the notion of an atom is problematic!

Moreover, (23) cannot be accounted for.

Unproblematic for the Plural Reference approach!

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**8. Plural Reference and the Accessibility Requirement**

Coercion, type shift

(24) a. John started reading the book.

 b. John started the book.

(25) a. John proposed watching a movie.

 b. John proposed a movie.

With predicates subject to the Accessibility Requirement, coercion is completely impossible:

(26) a. The collection is expensive.

 b. The class is similar.

(27) The Accessibility Requirement as a Condition on Plural Argument Places

 A predicate or semantic operation making reference to the parts, but not the whole of an

 argument in a particular argument position is a plural predicate with respect to that

 argument position.

How to deal cases in which the Accessibility Requirement can be satisfied by singular count nouns?

*Whole*: involves switch from reference to a single object to plural reference to its parts.

*Something* etc: genuine plural quantifier

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**9. Plural Reference and higher-level plurality readings**

(28) Distributivity with plural reference

 For a situation s,

 [D VP]([*the* N’plur], s) = 1 iff for all xx, xx <s [*the* N’plur] and INTs(xx), then

 [VP](d) = 1.

(29) Part-related predicates with plural reference

 For an individual d, a plurality xx, and a situation s, [*compare*](d, <xx, s>) = 1 iff

 [*compare to*](d, yy, zz) = 1 for any yy and zz such that yy < xx, zz < xx, INTs(yy), and

 INTs(zz).

*The men and women* vs *the men and the women*:

Multigrade predicate approach

*The men and the women* provides two arguments for a multigrade argument position, but not *the men and women*.

Problem:

Cannot be applied to distributivity (*the men and women / the men and the women gathered*).

Solution within the Plural Reference approach

Not just integrity conditions as conveyed by the content of predicates matter, but also metalinguistic integrity conditions, imposed by the use of referential terms, which will become an obligatory part of the content of the reference situation.

 *The men and the women*:

reference situation obligatorily specifies two pluralities as integrated wholes, on the basis of λx[Ref(x, *the* N’)] (property of being a referent of *the* N’).

*The men and women*:

reference situation either specifies a single plurality as a maximal plurality falling under λx[man(x) v woman(x)] or two sub-pluralities as maximal pluralities falling under λx[man(x)] and λx[woman(x)] respectively

Attributive readings of definite plurals on a higher-level plurality reading:

Make use of enriched plural descriptions, involving material defining plurality as a structured plurality in any situation of evaluation.

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**10. Restrictions on collective readings**

Restriction on predicates expressing properties of form or extension (Moltmann 2004):

(30) a. The children are big.

 b. The grains are round.

 c. The short speeches were long.

A new potential explanation with the plural reference approach:

Plural reference goes with distributive predication, collective predication is always derivative, based on singular reference.

Collective predication as derivative

[1] Plural predicates that alternate with a relational predicate such as *neighbors, roommates, equal (to), compare (with), similar (to), overlap (with), add (to)*

predicates are multigrade even with plural arguments involves the very same relation as is expressed by the explicit relational variant.

 [2] Event-related predicates such as *gather* and *lift the piano*

plural predicates on the basis of relations of participation of individuals in a collective event.

[3] Measure-related predicates such as *heavy*

if P(x1, d1) and P(x1, d2), then P(xx, d1+d2), for the plurality xx consisting of individuals x1 and x2 and degrees d1 and d2.

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**References**

Boolos, G. (1984): ‘To be is to be Value of a Variable (or to be the Values of Some

 Variables).’ *Journal of Philosophy* 81, 430-449.

------------ (1985): ‘Nominalist Platonism’. *Philosophical Review* 94, 327-44

Gillon, B. (1987): 'The Readings of Plural Noun Phrases in English'. *Linguistics and*

 *Philosophy* 10, 199-219.

Link, G. (1983): 'The Logical Analysis of Plurals and Mass Nouns'. In R. Baeuerle et al.

 (eds.): *Semantics from Different Points of View*. Springer, Berlin, 302-323.

---------- (1984): ‘Hydras: On the Logic of Relative Constructions with Multiple Heads’.

 In F. Landman / F. Veltman (eds.): *Varieties of Formal Semantics*. Foris, Dordrecht.

Linnebo, O. (2012): ‘Plural Quantification’. *Stanford Encyclopedia of Philosophy*. Online.

McKay, T. (2006): *Plural Predication*. Oxford UP, Oxford.

Moltmann, F. (1997): *Parts and Wholes in Semantics*. Oxford UP, Oxford.

---------------- (1998): 'Part Structures, Integrity and the Mass-Count Distinction'.

 *Synthese* 116, 75-111.

---------------- (2004): ‘Two Kinds of Universals and Two Kinds of Collections’. *Linguistics*

 *and Philosophy* 27.6.,739-776.

---------------- (2005): ‘Part Structures in Situations: The Semantics of *Individual* and *Whole*’.

 *Linguistics and Philosophy* 28, 599-641.

----------------- (2016): ‘Plural Reference and Reference to a Plurality. Linguistic Facts and

 Semantic Analyses’. M. Carrara / A. Arapinis / F. Moltmann (eds.): *Unity and Plurality.*

 *Philosophy, Logic, and Semantics*. Oxford University Press.

Ojeda, D. (1993): *Linguistic Individuals*. CSLI Lecture Notes, Stanford.

Oliver, A. / T. Smiley (2004): ‘Multigrade Predicates’. *Mind* 113, 609-680.

-------------------------- (2006): ‘A Modest Logic of Plurals’. *Journal of Philosophical Logic*

 35, 317-348.

-------------------------- (2013): *Plural Logic*. Oxford University Press.

Schein, B. (1995): *Plurals and Events*. MIT Press, Cambridge (Mass.).

Schwarzschild, R. (1996): *Pluralities*. Kluwer, Dordrecht.

Sharvy, R. (1980): ’A More General Theory of Definite Descriptions’. *Philosophical Review*

 89, 607-624.

Simons, P. (1987): *Parts. A Study in Ontology*. Oxford, Clarendon Press.

Yi, B.-Y. (2005): ‘The Logic and Meaning of Plurals. Part I’. *Journal of Philosophical*

 *Logic* 34, 459-506.

----------- (2006): ‘The Logic and Meaning of Plurals. Part II’. *Journal of Philosophical*

 *Logic* 35, 239-288.