# Plurality and collective predicate

**Handout 2**

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## Contents



## 1 Reading

- Chapter 2 of (Winter 2001) (read this before next week's class).

## 2 The problem of collective predication

Generalized boolean conjunction accounts for the following kinds of equivalences - this is called *distributive predication*.

(1) Mary and John slept.
$\Longleftrightarrow$ Mary slept and John slept.

(2) Most women or most men are tall.
$\Longleftrightarrow$ Most women are tall or most men are tall.

(3) Neither the milkman nor the postman arrived.
$\Longleftrightarrow$ Neither did the milkman arrive, nor did the postman.

This is because generalized boolean conjunction, at its base, is defined in terms of boolean conjunction: **and** $: T \to T \to T$.

Remember, we invoked *Montague lift* to convert expressions such as **Mary** and **John** into expressions with a boolean type.

(4) $\mathbf{Mary}^{\uparrow} \sqcap \mathbf{John}^{\uparrow}(\mathbf{sleep})$

(5) $((\lambda P\,.\,P(\mathbf{Mary})) \sqcap (\lambda P\,.\,P(\mathbf{John})))(\mathbf{sleep})$

(6) $(\lambda P\,.\,P(\mathbf{Mary}) \wedge P(\mathbf{John}))(\mathbf{sleep})$

(7) $\mathbf{sleep}(\mathbf{Mary}) \wedge \mathbf{sleep}(\mathbf{John})$

Generalized boolean conjunction predicts these kinds of equivalences for *all* NPs, and for *all* kinds of coordination.

Note that this general strategy doesn't just apply to binary logical operators, such as **and**, and **or**, but can be applied to unary logical operators, such as **not**.

Sometimes, we can analyze negation as a sentential operator of type $T \to T$:

(8) It's not the case that John slept.

(9) $\mathbf{not}(\mathbf{sleep}(\mathbf{John})))$

But what about cases like the following?

(10) John doesn't sleep.
$\mathbf{not}_{?}(\mathbf{sleep})(\mathbf{John})$

(11) John isn't tall.
$\mathbf{not}_{?}(\mathbf{tall})(\mathbf{John})$

There are various syntactic moves we could make to try to analyze all of the above cases in terms of sentential negation. But, what about the following kind of case

(12) John and not Mary slept.

**Exercise:** give a recursive definition for *generalized boolean negation*. Use boolean negation **not** $: T \to T$ as the base of the recursion. Show how it accounts for 9, 10, 11.
Finally, propose a Logical Form and analysis for 12. You'll need to use Montague lift!

There are however many simple and complex predicates that do not give rise to *distributive predication*.

(13) Mary and John weigh exactly 140kg.
$\not\Longleftrightarrow$ Mary weights exactly 140 kg, and John weighs exactly 140kg.

Note that some theories assume that (13) is *ambiguous* between a "distributive reading", on which distributive predication is valid, and a "collctive reading", on which it is not.

(14) Mary and John met.
$\not\Longleftrightarrow$ *Mary met and John met.

More complicated examples muddy the water, since certain distributive inferences are valid:

(15) Mary and the postman or the milkman met.
$\Longleftrightarrow$ Mary and the postman met, or Mary and the milkman met.

Other problematic examples:

(16) An american and a Russian played a duo together.

(17) Every American and every Russian spoke English to each other.

(18) The Americans and the Russians fought each other.

(19) Two Americans and three Russians made an excellent basketball team.

Note that here, the presence of *and* is crucial for obtaining collecitve effects.

(20) The Americans or the Russians fought each other.
$\Longleftrightarrow$ The Americans fought each other, or the Russians fought each other

(21) Neither the Americans nor the Russians fought each other.
$\Longleftrightarrow$ Neither did the Americans fight each other, nor did the Russians.

(22) The Americans and the Russians fought each other.
$\not\Longleftrightarrow$ The Americans fought each other, and the Russians fought each other.

## References

Winter, Yoad. 2001. *Flexibility principles in boolean semantics - the interpretation of coordination, plurality, and scope in natural language* (Current Studies in Linguistics 37). Cambridge Massachussetts: The MIT Press. 297 pp.