Part is *part* (plus pragmatics)

In this work, I argue that the natural language item *part* (and its translational equivalents[1]) is the same as the mereological notion of PROPER PART (represented $\sqsubset$), full stop. Taking this to be true yields a seemingly incorrect prediction about the denotation of partitives like (1), which has prompted some authors to partition the metaphysical and natural language senses of *part*. I will show that by deferring to pragmatics, a model which takes *part* to mean $\sqsubset$ is possible.

(1) part of the New Yorkers

I assume, following Link (1983), that (definite) plural DPs denote individuals of type e rather than sets ($\langle e,t\rangle$, cf. Bennett 1974; van der Does 1991; Winter 2001). Definite plural DPs are the maximal sum of "atomic" individuals in the set denoted by the bare noun (2). In this case, being an individual/subplurality in the plurality denoted by such a DP cannot be represented with set membership or a subset relation. Instead, this relationship is a kind of parthood (see also Champollion and Krifka 2016) which specifically holds between atomic individuals and sums (3). System-internally, individuals like *Jerry* are atoms in having no proper parts. Thus, Link posits another mereological relation between objects like *Jerry* and *Jerry's hand*.

(2) a. $[[\text{New Yorker}]]^c = \{\text{j(erry)}, \text{g(eorge)}, \text{e(laine)}, \text{k(ramer)}\}$
b. $[[\text{the New Yorkers}]]^c = j \oplus g \oplus e \oplus k$

(3) a. $j \sqsubset j \oplus g \oplus e \oplus k$ b. $j \oplus e \sqsubset j \oplus g \oplus e \oplus k$

However, this analysis is at odds with a strong cross-linguistic generalization observed by Moltmann (1997); Wagiel (2021). In many languages, partitives can take both singular and plural complements, the result of the first denoting a part of a singular individual and the second denoting a subplurality of a plurality (4)-(5).[2] The authors take this to support an analysis with only one parthood relation which can hold between both parts and individuals as well as individuals and pluralities.

(4) part of the {book/books}

(5) ein Teil {des Apfels / der Apfel}
a part {the.GEN.SG apple.GEN.SG / the.GEN.PL apple.GEN.PL}
'(a) part of the apple/apples' [German]

However, parthood is traditionally thought of as a transitive relation—if (6-a) is true, (6-b) follows. If the same is true of natural language *part*, it should follow from (7-a) that (7-b) is true, which seems intuitively false. Link's approach, which I'll call SPLIT PARTHOOD (SP), sidesteps this issue by positing distinct parthood relations which hold between different kinds of mereological objects.

(6) a. $x \sqsubset y \wedge y \sqsubset z$ b. $x \sqsubset z$

(7) a. Jerry's hand is part of Jerry. Jerry is part of the New Yorkers.
b. #Jerry's hand is part of the New Yorkers.

Moltmann and Wagiel account for the badness of (7) by proposing that the transitivity of parthood can fail under certain circumstances. Explicitly, they posit that for any given pair individuals, one can only be part of another if there is no intervening individual which is an INTEGRATED WHOLE (8). How the authors define an integrated whole is different (Moltmann appeals specifically to R-integrated wholes (Simons, 1987) while Wagiel captures the property with MAXIMALLY-STRONG SELF-CONNECTEDNESS (Casati and Varzi, 1999)), but the end result is that a materially-real, single, whole individual like *Jerry* constitutes an integrated whole and (7-b) cannot be true. I call such approaches FORMALIZED TRANSITIVITY SUSPENSION (FTS).

(8) $\forall x_e \forall y_e \forall z_e.(x \sqsubset y \wedge y \sqsubset z \wedge \neg \texttt{int-wh}(y)) \rightarrow x \sqsubset z$

Both SP and FTS distinguish part-words from the metaphysical relation $\sqsubset$; the problem I outline above presents good motivation for doing so. However, I argue that these positions are unnecessary; part-words can be defined exactly as (9) without further conditions on transitivity. In place of such a constraint, (7) is ruled out by the pragmatic module. Consider first (10), which is true of any countable NP be it *New Yorker*, *apple*, etc. without FTS. Assuming a gunky universe where there is no smallest part of any object, both sets will be infinitely long; nevertheless, the set consisting of parts of the singular will always be a subset of the set of parts of the plural. In addition to everything in the first set, the second set will contain every part of every other integrated whole and the sums of those integrated wholes.

(9) $[[\text{part}]]^c = \lambda y_e \lambda x_e.x \sqsubset y$

(10) $\{x_e : x \sqsubset [[\text{ART NP.SG}]]\} \subset \{y_e : y \sqsubset [[\text{ART NP.PL}]]\}$

Without FTS, *part of the New Yorkers* has a far wider range of possible referents than *part of the New Yorker*. If a cooperative interlocutor wanted to refer to some part of a single New Yorker, the MAXIM OF QUANTITY (Grice, 1975) demands that they use a partitive with a singular complement over a plural.[3] By competition, the stronger partitive DP.SG will win over its respective partitive DP.PL if the presupposition of being a part of a singularity is satisfied. In turn, the conventional meaning of a partitive DP.PL is the result of an implicature—such partitives are understood to refer to the integrated wholes (and their sums) which compose the complement DP by Gricean reasoning.

Support for this reanalysis comes from the emergence of inclusive interpretations in cases of epistemic uncertainty, as is well-known for bare plurals (Sauerland et al., 2005). Suppose the aforementioned New Yorkers have been tasked with repainting a fleet of boats. In (11), the answer to the question is positive even if George only painted part of a single boat. Similarly, patients of mixed sizes are possible under universal quantification, as opposed to only integrated wholes and their sums.

(11) Q: Has George painted part of the boats?
A: Yes; in fact, he painted the starboard side of USS Anchorage.

(12) Every New Yorker painted part of the boats. Elaine painted part of USS Bataan, Kramer painted USS Anchorage and USS Ticonderoga, Jerry painted USS Arlington, and George...

Beyond cases of epistemic uncertainty, the negative quantifier *no* lends further evidence to this story. Given the definition in (13), the contradiction in (14) should not appear if a sub-ship part is not in the set denoted by the partitive. This fact and the acceptability of the cases above cannot be explained by SP or FTS. On the other hand, the weaker meaning for the partitive DP.PL—derived via my unrestrainted definition for *part*—explains the data wholesale.

(13) $[[\text{no}]] = \lambda P_{\langle e,t\rangle} \lambda Q_{\langle e,t\rangle} . \neg \exists x . P(x) \wedge Q(x)$

(14) No part of the boats {was/were} painted. #Jerry (only) painted half of USS Ticonderoga.

I conclude that the meaning of *part* and equivalents can be captured solely with the relation $\sqsubset$. Apparent issues with the problem of transitivity are obviated by pragmatics and need not be ruled out by the lexical or semantic modules. Furthermore, the proposal accounts for the observations in (11)-(14), which previously would have been unexplained. I concede, however, that we cannot completely eliminate integrated wholes or some similar concept; among other things, counting and distributivity would be difficult to model. I submit only that we do not need such a notion for an analysis of *part*.

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Notes

[1] This proposal pertains only to topology-insensitive part-words. See Wagiel (2021) for topology-sensitive part-words.

[2] See also partitives with other quantifiers (*some*, *all*, *most*, *half*, etc.).

[3] If we further assume that the plural DP is more morphologically-marked than the singular, the maxim is doubly-violated.