## Structural ambiguity in pseudo-partitives: the case of quantity nouns

1. Introduction. Pseudo-partitive DPs with a quantity noun (PPQs), like the amount of nuts I ate, can combine with predicates of quantities (e.g., estimate) or with predicates of concrete entities (e.g., eat). Scontras (2017) captures this flexibility while treating PPOs as uniformly denoting quantities, by extending Carlson's (1977) analysis of kind DPs, like the kind of nuts I ate. An alternative view extends Rothstein's (2009) analysis of pseudo-partitive DPs with container nouns, like three glasses of wine. On this view, the flexibility of PPQs reflects a structural ambiguity of DP. Here we present challenges to the uniformity hypothesis advanced by Scontras, and argue that these are avoided under the ambiguity view.

2. The flexibility puzzle. Numbers can be low but cannot be eaten, while nuts can be eaten but cannot be low. (1) and (2) therefore illustrate the flexibility of PPQs hinted at above: PPQs can yield predication of quantities, in (1), or of concrete entities, in (2). Scontras (2017) described this flexibility in pseudo-partitives with amount, but amount is just one representative of a larger class of quantity nouns with parallel effects in PPQs: in addition to number, this class also includes, e.g., quantity, volume, share, range, and proportion. Below, we will interpret Scontras' proposal for PPQs with *amount* as an analysis of PPQs in general. For ease of exposition, we focus on PPQs with number, but our argument holds for PPQs at large.

(1) [<sub>DP</sub> The number of nuts I ate] is low. (2) Ai ate  $[_{DP}$  the number of nuts I ate]

3. The uniformity hypothesis. Scontras (2017) takes PPQs to invariably denote quantities. Simplifying without affecting our argument, he construes quantities as families of pluralities of entities (e.g., nuts) whose members share a given measurement. In a world where the speaker ate 50 nuts, the number of nuts I ate denotes the quantity  $\{x: |x| = 50 \land nuts(x)\}$ . Composition is transparent in (1), since low is a quantity predicate. For cases like (2), Scontras invokes a *derived predication* postulate. Illustrated for *eat* in (3), the postulate allows for an entity predicate P to take a quantity argument q, yielding the existence implication that P applies to some entity that instantiates q. With instantiation construed as set membership, the intended truth conditions for (2) are derived: that Ai ate a plurality of 50 nuts. Motivating this proposal, Scontras notes a parallel to Carlson's (1977) treatment of DPs with kind. Carlson analyzed such DPs as uniformly denoting kinds. Common being a kind predicate, (5) is captured directly. For cases like (6), the Carlsonian approach, in the rendition of Chierchia (1998), assumes the postulate in (4). Parallel to (3), (4) allows for an entity predicate P to apply to a kind k in virtue of applying to some entity that instantiates k. Scontras in fact unifies (3) and (4) by construing both quantities and kinds as nominalized properties.

(3) Derived predication (quantities)

(4) Derived predication (kinds)

 $[eat](q)(y) \Leftrightarrow \exists x[[eat](x)(y) \land x \text{ instantiates } q]$  $[eat](k)(y) \Leftrightarrow \exists x [[eat](x)(y) \land x \text{ instantiates } k]$ 

(5) [<sub>DP</sub> The kind of nuts I ate] is common.

(6) Ai ate  $[_{DP}$  the kind of nuts I ate]

4. Scope and undergeneration. One of Carlson's central findings was that the existential force linked to a kind DP always scopes lowest. For example, such existence quantification cannot outscope negation: (7) states that Ai didn't see any typos of that kind, not that there were some she didn't see. This is correctly predicted if only *lexical* predicates can participate in derived predication, an assumption explicitly made in Carlson (1977) and derived as a corollary in Chierchia (1998). Scontras (2017) then predicts the same lowest scope restriction for PPQs. The baselines in (8) set the stage for testing this prediction. Apart from low scope, in (9a), the indefinite objects in (8) permit high scope, in (9b). The existence of high scope readings is confirmed by the coherence of either (8a) or (8b) in the position [...] in (11). We now observe that (10) too intuitively permits the high scope reading (9b), and is likewise coherent in (11). We conclude that, by excluding high scope for PPQs, a uniform Carlsonian analysis of PPQs undergenerates.

- (7) Ai didn't see [ $_{DP}$  that kind of typo]. (9) a.  $\neg \exists x[typos(x) \land |x| = n \land saw(x)(Ai)]$ (8) a. Ai didn't see [<sub>DP</sub> three typos].
  - b.  $\exists x[typos(x) \land |x| = n \land \neg saw(x)(Ai)]$
  - b. Ai didn't see [<sub>DP</sub> that many typos]. (10) Ai didn't see [ $_{DP}$  that number of typos].
- (11) Prof. Strict fires any RA who misses three typos in a manuscript that the RA proofread. Ai learned this the hard way: Prof. Strict fired her after [...], even though there were many typos that Ai *did* find.

**5. From quantity to existential quantifier?** The scope data above could be accommodated in a minimal revision of the proposal in Scontras (2017). The revised account still posits that PPQs uniformly denote quantities at the DP level, but now existential quantification can be attached to such DPs. In one implementation, quantities can be mapped to existential entity quantifiers by a silent operator, E in (12). This would allow for the wide scope reading of (10) to arise through covert quantifier raising, as in (13).

(12)  $\llbracket E \rrbracket(q)(P_{et}) \Leftrightarrow \exists x [x \text{ instantiates } q \land P(x)]$  (13)  $[_{DP} E [_{DP} \text{ that number of typos}]] \lambda_1 [not [Ai see t_{1,e}]]$ 

6. Quantity-only and overgeneration. The revised uniformity account overgenerates. Under this proposal, any quantity-denoting DP  $\delta$  is expected to have a homophone that quantifies existentially over entities, viz. [E  $\delta$ ]. The PPQs in (14) share a makeup not previously described, with *of* taking a wh-interrogative complement. Each of these "wh-PPQs" saturates a quantity predicate (*small, staggering, increase*), showing that they have quantity denotations. Now consider (15), which features a wh-PPQ as the complement of a quantity predicate, *estimate* in (15a), and an entity predicate, *eat* in (15b). (15b) is incomprehensible, contrasting crisply with both (15a) and (2). Apparently, E cannot attach to the PPQ in (15b). Why not? We do not see a principled answer other than that E does not actually exist in grammar.

(14) a. [DP the number of [CP how many people die from bear attacks]] is small (petkeen.com)
b. [DP the number of [CP how many trees are cut down each year]] is staggering (8billiontrees.com)
c. increase [DP the number of [CP how many pairs you'd need]] (wamaunderwear.com)

- (15) a. Ai estimated [ $_{DP}$  the number of [ $_{CP}$  how many nuts I ate]]
  - b. #Ai ate [<sub>DP</sub> the number of [<sub>CP</sub> how many nuts I ate]]

7. The structural ambiguity hypothesis. We retain from the revised uniformity account the idea that PPQs are ambiguous, but we motivate a different source of ambiguity. Landman (2004) observes semantic flexibility for pseudo-partitives with container nouns like *glasses* (PPCs), as in *three glasses of wine*: PPCs can yield predication of containers (e.g., glasses), as in (16a), or of stuff measured with containers (e.g., wine), as in (16b). Building on this, Rothstein (2009) argues, based on English and Hebrew, that in addition to the polysemy of container nouns, this flexibility reflects a structural ambiguity. A PPC can be headed by the container noun, as in (17a), or by the stuff noun, as in (17b). Positing a covert indefinite determiner  $\Delta$  correctly derives existential quantification over containers for (16a) and over stuff for (16b).

(16) a. Ai broke [<sub>DP</sub> three glasses of wine]. (17) a. [<sub>DP</sub>  $\Delta$  [<sub>NP</sub> [<sub>MEASP</sub> three ] [<sub>NP</sub> [<sub>N</sub> glasses] of wine]]]

b. Ai drank [ $_{DP}$  three glasses of wine]. b. [ $_{DP} \Delta$  [ $_{NP} [_{MEASP}$  three glasses] (of) [ $_{NP} [_{N}$  wine]]]] If Rothstein is correct about PPCs, we are led to expect that PPQs also permit multiple structures. Specifically, her proposal invites an analysis of PPQs illustrated in (18) for *that number of nuts*. The (referential) quantity reading arises from a structure where the head of NP is the quantity noun (*number*), as in (18a), and the (existential) entity reading from a structure where the head of NP is the entity noun (*nuts*), as in (18b). (18) a. [ $_{DP}$  that [ $_{NP} [_{N}$  number] of nuts]]  $\sim quantity reading$ 

b.  $[_{DP} \Delta [_{NP} [_{MEASP} \text{ that number}] \text{ (of) } [_{NP} [_{N} \text{$ **nuts** $}]]]] \rightarrow \text{entity reading}$ 

**8.** Challenges met. The undergeneration and overgeneration challenges for the uniformity hypothesis that we identify above are avoided under the ambiguity approach. Wide scope of the existential quantification for the PPQ in (10) falls out from the generalization, illustrated by the baselines in (8), that existential plural indefinites modified by measure phrases in general permit wide scope (cf., e.g., Ruys 2006). The unavailability of an entity reading in (15) follows from the fact that the syntactic form of wh-PPQs does not furnish an entity predicate (e.g., *nuts*) as a viable head noun for NP.

**9. Outlook.** To match the coverage of Scontras (2017) under the structural ambiguity approach to PPQs, an obvious remaining task is to detail the semantic composition for structures like those in (18), as well as the corresponding structures for PPQs with modifiers following the entity noun, like *the number of nuts I ate* or *the number of nuts in the bag*. One hypothesis invited by the wh-PPQ data in (14) is that quantity readings crucially invoke the grammar of wh-interogatives. This may help capture von Fintel et al.'s (2014) observation that PPQs can reference the same notion of *maximality* as wh-interogatives (Dayal 1996).

## References

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