Partial plurality anti-presupposition and local satisfaction

Introduction In this project, I aim to contribute to the discussion on the pronoun number by discussing the *partial plurality inference* with *quantificational subordination*. I propose an anti-presupposition account under a dynamic semantics with a set of variable assignments. The account correctly predicts when the anti-presupposition of plural pronouns disappears and it can further be extended to cover other problems with plural pronouns.

Partial plurality inferences Bare plurals under the scope of a quantifier trigger so-called *partial plurality inferences* (Spector, 2007; Sauerland et al., 2005; Sudo, to appear). (6a) is true iff exactly one coat has multiple pockets and the other coats do not have any pockets. (6b) presupposes that every passenger has at least one suitcases and at least one passenger have multiple suitcases. In both cases, the multiplicity inference is partial in the sense that it only arises for some of the witnesses in the quantifier domain.

Quantificational subordination The classical dynamic semantics assumes that quantifiers are inherent barrier for anaphora, e.g., (7). However, this assumption suffers from the phenomenon of *quantificational subordination* (Karttunen, 1969; van den Berg, 1996, a.o.), e.g., (8): the singular pronoun "it" picks up the value of the singular indefinite "a paper" in the preceding sentence. Some dynamic theories discard this assumption and explain the contrast between (7) and (8) with number mismatch (van den Berg, 1996; Nouwen, 2007; Brasoveanu, 2008, a.o.). They model a context as a set of variable assignments (*plural information states*). Under the scope of a quantifier, singular indefinites introduce a singular value to each member g of G. This value is summed up to a plural value in G. Thus, this value cannot be picked up with a singular pronoun as in (7). However, if a singular pronoun is under the scope of a quantifier, it can access to the values stored in each member g of G as in (8).

Inter-sentential plural inferences Let's see how these two threads of thoughts interact. (9) sets up the baseline. Although some speakers can use "them" to retrieve the value of "a paper" in (9), this is still marked. Now, consider (10). Here, the singular pronoun becomes unavailable, while the plural pronoun is perfectly fine. Notably, those speakers who rejected "them" in (9) accepted it in (10). Since the totality of books are plural in both contexts, this difference should be attributed to the plurality of books relative to each student. Thus, (10) indicates a partial plurality inference in cases of inter-sentential anaphora.

Global presuppositional competition My analysis is inspired by Sudo (to appear), which proposes an analysis of (6) with dynamic global implicature with plural information states. For the reason of space, I present a simplified version of his analysis. (1) and (2) show some representative output contexts for two sentences that minimally differ in the plurality of the indefinite. In (1), the value of u_2 is singular across members of H. In contrast, the value of u_2 varies in (2) because Sudo (to appear) takes bare plurals to be number neutral.

(1) Every student^{u_1} wrote a paper^{u_2}.:
$H_1 = \{h_1[u_1 \mapsto s_1, u_2 \mapsto p_1], h_2[u_1 \mapsto s_2, u_2 \mapsto p_2], h_3[u_1 \mapsto s_3, u_2 \mapsto p_3]\}$

(2) Every students^{u_1} wrote papers^{u_2}.:
$H_1 = \{h_1[u_1 \mapsto s_1, u_2 \mapsto p_1], h_2[u_1 \mapsto s_2, u_2 \mapsto p_2], h_3[u_1 \mapsto s_3, u_2 \mapsto p_3]\}$
$H_2 = \{h_1[u_1 \mapsto s_1, u_2 \mapsto p_1 + p_2], h_2[u_1 \mapsto s_2, u_2 \mapsto p_3], h_3[u_1 \mapsto s_3, u_2 \mapsto p_4]\}$
$H_3 = \{h_1[u_1 \mapsto s_1, u_2 \mapsto p_1 + p_2], h_2[u_1 \mapsto s_2, u_2 \mapsto p_3 + p_4], h_3[u_1 \mapsto s_3, u_2 \mapsto p_5 + p_6]\}$

Crucially, (1) is (anaphorically) more informative than (2) and leads to an implicature that the output for ⟦Every student wrote papers⟧ is (2) minus (1). As a result, H_1 is subtrated, while H_2 and H_3 survive, which results in the partial plurality inference.

I import this analysis to derive the contrast in (10). I assume that a singular pronoun presupposes that its antecedent is atomic (Sauerland, 2003; Sauerland et al., 2005; Brasoveanu, 2008). When this presupposition is trapped under the scope of a quantifier, one has the same candidates as (1) and (2). Notice that the presupposition is only satisfied in H_1.

(3) They$_{u_1}$ each submitted it$_{u_2}$.:
$H_1 = \{h_1[u_1 \mapsto s_1, u_2 \mapsto p_1], h_2[u_1 \mapsto s_2, u_2 \mapsto p_2], h_3[u_1 \mapsto s_3, u_2 \mapsto p_3]\}$

(4) They$_{u_1}$ each submitted them$_{u_2}$.:
$H_1 = \{h_1[u_1 \mapsto s_1, u_2 \mapsto p_1], h_2[u_1 \mapsto s_2, u_2 \mapsto p_2], h_3[u_1 \mapsto s_3, u_2 \mapsto p_3]\}$
$H_2 = \{h_1[u_1 \mapsto s_1, u_2 \mapsto p_1 + p_2], h_2[u_1 \mapsto s_2, u_2 \mapsto p_3], h_3[u_1 \mapsto s_3, u_2 \mapsto p_4]\}$
$H_3 = \{h_1[u_1 \mapsto s_1, u_2 \mapsto p_1 + p_2], h_2[u_1 \mapsto s_2, u_2 \mapsto p_3 + p_4], h_3[u_1 \mapsto s_3, u_2 \mapsto p_5 + p_6]\}$

Thus, the speaker may not utter (4) in H_1, while she can still do it in H_2 and H_3. This results in presuppsitional partial plurality inferences. I am open to the precise mechanism of this competition, but I adopt *Maximise Presupposition!* (Heim, 1991) for now.

(5) **Maximise Presupposition!**: If ϕ has an alternative ψ, one must use ψ, if
   a. the assertive meanings of ϕ and ψ are contextually equivalent,
   b. the presuppositions of ψ are stronger than those of ϕ, and
   c. the presuppositions of ψ are met in the context of utterance.

Borrowing the definitions of informativity from Sudo (to appear), ϕ and ψ are contextually equivalent in plural information state G iff $\{H|G[\phi]H\} = \{H|G[\psi]H\}$. ϕ is stronger than ψ iff for each G, there is at least one H such that $\{H|G[\psi]H\} \not\subset \{H|G[\phi]H\}$.

Local satisfaction Intra-sentential dependent pronoun (Rullmann, 2002) exemplified in (11) may pose a problem for this analysis. In van den Berg-style analysis, one can analyse the singular pronoun in (11) just like the singular pronoun in (8). However, this would wrongly predict that the plural pronoun is blocked in (11). This problem disappears once we notice that the presupposition is locally satisfied in (11): since the presupposition of a pronoun is tied with its antecedent, intra-sentential anaphora cancels it. As a result, the sentence as a whole does not presuppose anything and (5) does not apply. Note that it is crucial that the presupposition is checked against the output context (cf. Beaver, 2001; Sudo, 2014).

Loose end Summing up, the proposed analysis derives the partial plurality presupposition and correctly predicts the lack of competition in cases of intra-sentential dependent anaphora. For space reasons, I cannot spell out the full technical details here. However, I implement two versions of this analysis: one models a context as a set of plural information states, while the other models a context as a set of world-plural information state pairs. I argue for the latter based on examples such as (12). The classical principle of *Stalnaker's bridge* requires presuppositions to be satisfied in every world in the utterance context. As expressions such as "one or two NP^{u_n}" and "at least one NP^{u_n}" are compatible with $\langle w, G\rangle$ in which $G(u_n)$ is plural, the atomicity presupposition of "it" is not satisfied in some worlds. This violates Stalnaker's bridge and the contrast in (12) follows. The resultant analysis checks presuppositions against the input world and the output plural information state (cf. Beaver, 2001; Sudo, 2014).

Examples and references

(6) a. Exactly one of these coats has **pockets**.
b. Every passenger of this flight lost their **suitcases**.

(7) **Every** student has a bike^{u_1}. #It is blue.

(8) a. Every student^{u_1} wrote a manuscript^{u_2}.
i. They$_{u_1}$ **each** submitted it$_{u_2}$ to a journal.
ii. They$_{u_1}$ submitted them$_{u_2}$ to a journal.

(9) Context) There are ten PhD students in this department. This semester, every student wrote exactly one paper. Seven of these students submitted their papers to a journal.
a. Every PhD student^{u_1} wrote a paper^{u_2} in this semester.
b. Most of them$_{u_1}$ submitted {it / %them}$_{u_2}$ to a journal.

(10) Context) There are ten PhD students in this department. This semester, seven of them wrote exactly one paper, while the other three students wrote more than one paper. They all submitted their papers to a journal.
a. Every PhD student^{u_1} wrote (some) papers^{u_2} in this semester.
b. Most of them$_{u_1}$ submitted {*it / them}$_{u_2}$ to a journal.

(11) Context) A group of workmen offered to work during the Thanksgiving holiday.
a. **All** the workmen thought that {they / he} would naturally be the only one who is going to want that shift.
b. {**Every / Each**} workmen thought that {they / he} would naturally be the only one who is going to want that shift. (Moulton et al., 2022)

(12) Mary^{u_1} wrote **one or two** articles^{u_2}. She$_{u_1}$ sent {*it / them}$_{u_2}$ to L&P. (Krifka, 1996)

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