

ON PARASITIC GAPS IN RELATIVE CLAUSES AND EXTRACTION FROM NP

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1. INTRODUCTION: Much research argues that cyclic spell-out at each phase (CP, vP, DP) explains phenomena such as successive cyclicity (Chomsky 2000, 2001, a.o.) and the locality of morpho-phonological processes (Marvin 2003, Embick & Marantz 2008, Embick 2010, a.o.). While several morphological works argue that NP (often re-cast as nP) is a phase as well, syntactic evidence for this concept is less-attested in the literature. Here I argue that parasitic gap (PG) licensing in relative clauses (RCs) by extraction from the same NP (1) is **unnoticed evidence for successive-cyclic movement from NP**, which we expect if NP is a phase:

(1) *Extraction from NP can license a PG in its relative clause*

- a. Who₁ did Mary take [pictures of t₁ [that weren't that flattering to PG₁]]?
- b. That's the guy $\emptyset$ ₂ I know [a friend of t₂ [who's got a very big grudge against PG₂]].
- c. [This guy]₃, I've noticed [an aspect of t₃ [that makes me really want to avoid PG₃]].

Here I analyze the properties of such examples, and several related predictions and puzzles.

2. BACKGROUND: Citko (2014) takes (1a) as evidence that extraction passes through spec-DP, assuming that the RC can be merged in the projection of D. However, restrictive RCs like those in (1) are typically analyzed as $\langle e, t \rangle$ predicates that adjoin to and combine with the $\langle e, t \rangle$ denotation of their NP sister via Predicate Modification (Heim & Kratzer 1998, pp. 88):

(2) $\{x \mid x \text{ is cat}\}_{[NP]} \cap \{x \mid x \text{ has orange fur}\}_{[RC]} = \{x \mid x \text{ is cat and } x \text{ has orange fur}\}$

I argue that if PGs require movement through the edge of the phrase to which the PG-container adjoins (Nissenbaum 2000), and if (restrictive) RCs are $\langle e, t \rangle$ predicates adjoined to NP (Heim & Kratzer 1998, a.o.), then (1) shows that movement from NP can pass through its edge (3):

(3) [WH₄ ... V [DP D [NP t₄ [N'' [N' N t₄] [RC ... PG₄]]]]]

Movement via spec-DP as well is not precluded, but not relevant here. Movement via the NP edge, in contrast, must be posited to facilitate PG licensing in such configurations.

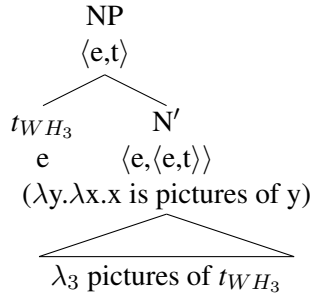
2.1. PGs and successive-cyclicity: A PG is a gap in an island which takes as its antecedent a phrase that A'-moves external to that island, as (4) shows for a sentential adjunct island. Nissenbaum (2000) argues that a PG is the trace of a null operator (Chomsky 1986, a.o.) which moves to the edge of the island and triggers Predicate Abstraction (Heim & Kratzer 1998), turning the island into a predicate. For examples like (4), he argues that successive-cyclic movement of the licenser from vP triggers Predicate Abstraction there as well, creating a position where the PG-containing adjunct can be merged and interpreted by Predicate Modification:

(4) Who₄ did you [vP t₄ [_{v'<e,t>} λ forget t₄] [AdjunctP<e,t> OP λ after talking to t_{OP} (=PG₄)]]?

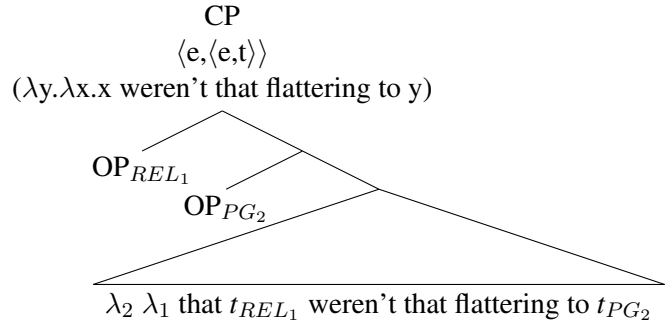
This connection between successive-cyclicity and PG-licensing in a given position is used by Legate (2006) to argue for phases in various contexts. These concerns predict that any island adjoined to a site of successive-cyclic movement should be able to contain a PG. Hence the acceptability of examples like (1) demonstrates the possibility of movement via NP edges.

3. ANALYSIS: I argue that RC-internal PGs are licensed under merger of a RC like (5b) to the N' node in a structure like (5a), which represents an NP exited by successive-cyclic extraction:

(5) a. *Movement via NP edge*



b. *PG-containing RC*



Since the basic denotation of NP is $\langle e, t \rangle$, Predicate Abstraction triggered by movement through its edge yields a two-place predicate at the N' level in (5a). The RC in (5b) is also a two-place predicate, because it undergoes two instances of Predicate Abstraction—one triggered by movement of the PG-forming operator, and another triggered by movement of the relativizing one (both of which movements I show are detectable via island tests). Thus this RC can merge to the N' in (5a) and combine with it via generalized Predicate Modification (Partee & Rooth 1983, Nissenbaum & Schwarz 2011), yielding a two-place predicate $\lambda y. \lambda x. x \text{ is pictures of } y \text{ and } x \text{ weren't that flattering to } y$. This function, which correctly models the reading for (1a) above, will have its first λe saturated by the trace of successive cyclic movement through NP, after which we have a typical type $\langle e, t \rangle$ NP, fit to undergo Functional Application with D/Q.

4. SUMMARY: The LF for the PG-bearing RCs in (1) requires successive cyclic movement from NP, a concept predicted by morphological work on phases but overlooked in syntactic work. The following two sections discuss some additional correct predictions of this analysis.

5. PREDICTION FOR STACKED RCs: Nissenbaum (2000) shows that when one vP hosts two sentential adjuncts, both can have a PG. However, if only one does, it must be the inner one (6):

- (6) a. Guess [which woman]₁ we'll try to hire t_1 [without even having a discussion about [her₁/PG₁]] [after getting the funding from the department].
 b. Guess [which woman]₁ we'll try to hire t_1 [after getting the funding from the department] [without even having a discussion about [her₁/*PG₁]].

I report that the same asymmetry holds for an NP with stacked RCs (7):

- (7) a. Guess [which actor]₈ I took pictures of t_8 [that weren't very flattering to [him₈/PG₈]] [that unfortunately turned out blurry].
 b. Guess [which actor]₈ I took pictures of t_8 [that unfortunately turned out blurry] [that weren't very flattering to [him₈/*PG₈]].

Nissenbaum argues that a PG-less sentential adjunct (type t) below a PG-bearing one (type $\langle e, t \rangle$) in the same vP is rejected (6b) since the PG-less adjunct would merge to a vP segment that is type $\langle e, t \rangle$ due to Predicate Abstraction triggered by extraction. This causes a type mismatch, which merging higher in vP avoids (6a). I show that these concerns (involving higher types) also derive (7), as expected if PGs in such RCs depend on the licenser moving via the NP edge.

6. ON THE ORDER OF OPERATORS: In the RCs in (1), the relativization gap precedes the PG, and in the corresponding structure in (5b), I have diagrammed the relativizing and PG-forming operators as moving with crossing paths, resulting in the latter tucking-in (Richards 1997, a.o.) at the RC edge. Indeed, Nissenbaum (2000) independently argues that overlapping operators must form crossing paths, an analysis which I argue that semantic concerns corroborate for

(1/5b). This result makes an additional prediction, when considered in the context of the finding in (8) from Nissenbaum about PGs in multiple movement contexts:

(8) **Generalization from Nissenbaum:**

When multiple phrases form specifiers of vP upon successive cyclically A'-moving from it, a single PG in a sentential adjunct of that vP can only be licensed by the structurally higher moved phrase.

In isolation, relativizing and PG-forming operators can both license (additional) PGs. But given (8), when the RCs in examples like (1) have a PG-bearing sentential adjunct, that PG should only be license-able by the relativizing operator, which is the higher one (5b). This is true (9):

- (9) a. Guess who₁ I painted [a silly portrait of t_1]₂ [that John likes to give copies of ___₂ to friends of PG₁ [**in order to make them want to buy PG₂**]].
b. *Guess who₁ I painted [a silly portrait of t_1]₂ [that John likes to give copies of ___₂ to friends of PG₁ [**in order to introduce them to PG₁**]].

7. IMPLICATIONS: I argue that movement via the NP edge is obligatory using binding tests from Lebeaux (1990), focusing on deverbal NPs from which the needed diagnostic extraction is possible (Tellier 2001). I also relate this finding to theories of sub-extraction more generally.