

An economy theory of PRO

Overview: This paper provides a novel account of the nullness and the distribution of obligatorily controlled (OC) PRO. Though there is reason to believe that PRO may not always be null (Szabolcsi (2009) and McFadden & Sundaresan (2014)), this abstract shows that the distribution of PRO follows an implicational economy hierarchy, deriving the tendency for PRO to be null.

To do so, this paper shows that PRO is a highly deficient pronoun, building on Cardinaletti & Starke (1999)'s (C&S) theory of pronominal deficiency. Via C&S, I first present empirical evidence for the notion that PRO is a reference variable or minimal pronoun (following Sigurðsson 2008, Kratzer 2009, Landau 2015). Then, I show via five case studies that as a clause becomes more deficient in syntactic and semantic features, its subject must become more deficient as well. The distribution and nullness of PRO is derived under C&S's framework in which the smallest possible pronoun, PRO, is preferred as the subject of control infinitives because it is the most economical subject that can be interpreted as a bound variable.

OC PRO as a deficient pronoun: I first go over the various empirical properties of OC PRO in relation to the tests used by C&S to distinguish strong and deficient pronouns. I show that PRO has the properties in Table 1, aligning with the properties of deficient pronouns.

Pronouns	D-antecedent?	Expletive?	Impersonal?	Inanimate?	De se reading?
Strong	✗	✗	✗	✗	✗
Deficient	✓	✓	✓	✓	✓
OC PRO	✓	✗	✓	✓	✓

C&S note that strong pronouns don't need an antecedent in the sentence or context. OC PRO, by definition, must have a local antecedent (disregarding the notorious case of *promise*):

- (1) John_i persuaded Mary_j [PRO_{*i/j} to take out the trash].

Like other deficient pronouns, PRO can have an inanimate reading (see Landau 2013 for more):

- (2) John_i forced the car_j [PRO_j to stop].

It can have an impersonal reading (this is more robust in Dutch or German (Landau (2013)):

- (3) It was decided to move forward.

Unlike other deficient pronouns, it cannot usually have an expletive reading (except *weather-it*), but this is independently predicted because PRO, by stipulation, must receive a θ -role:

- (4) There_i can't be peace [without there/*PRO_i being war first].

In addition, Patel-Grosz (2019) shows that null deficient pronouns in Kutchi Gujarati must be read *de se*, while strong pronouns need not. It has been well-known that PRO is obligatorily interpreted *de se*. The overt pronoun in (5a) can be read *de re*, while PRO in (5b) cannot be:

- (5) Leo is very drunk and on fire. He says the man in the mirror is on fire, but it is himself.
 a. Leo claimed he was on fire. b. # Leo claimed to be on fire.

C&S show that whenever a more deficient form of a pronoun is possible in a sentence, it must be picked over all other alternatives, due to an economy constraint *Minimize Structure*.

Clause size and subject size: Second, I argue that there is a fine-grained, implicational relationship between clause and subject size: the more deficient a clause is, the more deficient its subject must be. This follows the framework of clause size by Wurmbrand & Lohninger (2019) (W&L). I assume that infinitives can come in three sizes: CP (ex. the complement of *claim*), TP (*decide*, *want*) and vP (*try*, *begin*). I show that all languages obey an *implicational hierarchy*, in that a more deficient clause never allows a larger subject than that is possible in a larger clause.

Starting with Tamil, according to McFadden and Sundaresan (2011), it allows overt NPs without case or focus in adjunct infinitives (CP or TP) (6a), but not in vP-infinitives (*try* in (6b)).

- (6) a. [Vasu poori porikk-a] Raman maavu vaangi-n-aan.
 Vasu.NOM poori.ACC fry-INF Raman.NOM flour.ACC buy-PST-M.3SG
 'Raman bought flour for Vasu to fry pooris.
 b. Ramani PRO/taan/*Vasu saadatt.ai saappi.d.a paa.tt.aan
 Raman.NOM PRO/self.NOM/*Vasu.NOM rice.ACC eat-INF try.PST.3MSG
 'Raman_i tried [PRO_i for himself_i/*for Vasu to eat the rice].'

W&L show that Greek and Serbian are similar to Tamil, allowing *pro* (a deficient pronoun under C&S's framework) in CP or TP embedded clauses but only allowing PRO as a vP-subject.

Icelandic, on the other hand, appears to lack a subject entirely in the vP-complement of *try*, but not in the TP-complement of *hope*. As is well-known, (7) shows case concord between PRO and *ein*. But in (7), *try* instead of *hope* is not acceptable in the appropriate context (Höskuldur Thráinsson, p.c.). (7) is only acceptable with *try* if *eina* is in the nominative form, which is *ein*.

- (7) María_i vonast/*reydni til [að PRO_i vanta ekki eina_i í tíma].
 Mary.NOM hopes/*tried for to lack not alone.ACC in class

'Mary hopes/*tried not to be missing alone from class.' Thráinsson (2007)

Finally, the phenomenon of *partial control* (PC) indicates that languages appear to allow even more deficient subjects in vP-infinitives. PC is only attested in CP- and TP-infinitives:

- (8) The department chair wanted/*tried to gather at 6.

To recap, in Tamil, Greek and Serbian, vP-infinitives necessarily have smaller subjects than CP- or TP-infinitives. In Icelandic, the subject of the smallest vP-infinitive appears to be missing entirely. Finally, the phenomenon of PC is restricted to larger (CP or TP) infinitives. This indicates a fine-grained correlation between the deficiency of a clause and its subject.

Analysis: A summary of my pronoun sizes and economy hierarchy is given below:

- (9) a. Strong: DP > FocusP > ϕ P > NP c. Clitic: ϕ P > NP
 b. Deficient: FocusP > ϕ P > NP d. PRO: NP (CP/TP) or $\emptyset$ (vP)
 (10) **Economy hierarchy:** $\emptyset$ > PRO > Clitic > Weak pronoun > Strong pronoun

I account for PC and Icelandic concurrently by assuming Wurmbrand (1998)'s theory of semantic control, in which vP-infinitives lack a subject entirely ($\emptyset$). Thus, there is a finer-grained relationship in subject and clause size than just finite vs. nonfinite: vP-infinitives can allow even smaller subjects than TP-infinitives. As W&L point out, as an embedded clause decreases in size, it becomes more and more dependent on the matrix clause. I extend this to subjects. $\emptyset$ trivially satisfies *Minimize Structure*. Why is PRO (usually) null? As C&S show, as a pronoun becomes more deficient (ex. *pro*), it is more likely to be null. The reason why PRO is null is because it is the most deficient possible pronoun. PRO is independently ruled out from (most) finite clauses because it lacks the features to satisfy the syntactic and semantic needs of finite T.

PRO is allowed as the subject of nonfinite T due to the semantics of control (ex. Chierchia 1990, Kratzer 2009) in which PRO is interpreted as a bound variable. PRO exists simply because it is the most economical bound variable subject. This account does not extend to ECM or *for*-infinitives, given that they do not have a bound variable semantics. I am able to derive Szabolcsi (2009)'s observation that PRO is overt when contrastively focused in Hungarian and Italian (among others), given the syntactic and semantic differences. Finally, non-OC PRO (which is +human) is treated as a strong pronoun, which I leave for future research.

Selected References

- Cardinaletti, Anna & Michal Starke. 1999. The typology of structural deficiency: A case study of the three classes of pronouns 145–234.
 McFadden, Thomas & Sandhya Sundaresan. 2014. Finiteness in South Asian languages: an introduction. *Natural Language & Linguistic Theory* 32(1). 1–27. <http://www.jstor.org/stable/43697712>.
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 Wurmbrand, Susanne. 1998. *Infinitives*. Cambridge: Massachusetts Institute of Technology dissertation.