Too weak to be pronounced:
pro-drop and PF-LF mismatches in pronouns

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Abstract

In *Gradient Harmonic Grammar* (Smolensky & Goldrick 2016), *syntactic strength* is considered an inherent property of linguistic items. In this paper, I propose that syntactic strength plays a crucial role in *pro*-drop and in other phenomena that have often been related to a vague concept of "strength". I suggest that *pro*-drop results from failed lexicalization of weak pronouns in the presence of a strong T. Subject clitics of non-*pro*-drop languages instead stem from *strengthening* of weak pronouns in the context of a weak T. This strength-based approach to pronouns can be also extended to the independent phenomenon of mismatches between strong forms and weak semantics of pronouns, which is problematic for standard accounts à la Cardinaletti & Starke 1999 and it is not accounted for by any other theory of *pro*-drop. In general, such an approach is a mere extension of what has been tacitly presupposed while talking about strength for *pro*-drop (Rizzi 1986a; Alexiadou & Anagnostopoulou 1998), and for other phenomena (see Cardinaletti & Starke 1999 for pronouns; Chomsky 2013, 2015; Cecchetto & Donati 2022 for labeling).

Keywords syntactic strength, *pro*-drop, subject clitics, PF-LF mismatches.

1   Introduction

This paper proposes a new account of *pro*-drop, of the distribution of weak and strong pronominal elements, and of PF-LF mismatches in pronouns, based on the concept of *syntactic strength*. Syntactic strength is an inherent property of linguistic items. A naive notion of strength has been extensively used in the previous literature within different grammatical theories and for different phenomena (for instance, see Chomsky (2015); Cecchetto & Donati (2022) for strength in the *labeling theory*, Rizzi (1986a) for the *GB* treatment of *pro*-drop, Alexiadou & Anagnostopoulou (1998); Holmberg (2010); Roberts (2010) for minimalist analyses of *pro*-drop, Chomsky (1991) for the general assumption that functional categories can be strong or weak). This paper provides a clear implementation of this rather abstract property that seems to be necessary for modeling various linguistic phenomena. Strength is a property of functional heads that can be measured by numerical weights and referred to by operations, rules and constraints. The analysis is couched in *Gradient Harmonic Grammar*, which can be proven to be the only theory able to integrate the concept of strength in grammar.

In this article, it will be shown that Italian *pro*-drop is a case of "failed" Spell-out (section 5), that clitics in French and in Northern Italian dialects are the result of "strengthening" (section 6), that some apparently strong elements are instead "camouflaged" weak ones (section 7).

2 Null, weak and strong pronouns

2.1 Competition between null/weak and strong pronouns in Standard Italian

Null subject languages, or *pro*-drop languages, allow pronominal subjects to remain implicit in the correct information-structure contexts. Null subjects have been traditionally called *pro*.[1] In languages of this type, there is competition between null/weak and strong pronouns. Strong pronouns are used under focus, topic, coordination, cleft, prepositions and in isolation (Cardinaletti & Starke 1999). Elsewhere, the null subject should be chosen for a pragmatically felicitous utterance. This general description fully applies to Standard Italian, which is a canonical null subject language. As shown in (1), the pronominal subject can be either a null pronoun (1a), or a strong one (1b). The unmarked way to express the meaning 'she eats' is with the null subject. A strong pronoun is also possible, under the conditions described here above. For instance, the unmarked answer to a question such as 'what is Eva doing?' is (1a), while (1b) is naturally produced with contrastive focus (for instance, followed by the continuation *ma Paolo no* 'but Paolo does not').

(1) a. *Mangia.*
         eat.PRS.3SG
     b. *Lei   mangia.*
         3SG.F eat.PRS.3SG
         'She eats.'   (Italian)

The lexicon of Italian does not contain any nominative clitics. There is only one possible set of lexical entries for nominative pronouns, namely the strong pronouns as *lei* in (1b). On the surface, there is competition between an overt lexical entry (1b), and nothing (1a).

The realization of direct and indirect objects is different. In the internal argument position, strong pronouns alternate with clitic pronouns. An example is given in (2). The strong pronoun (2a) must be used in all cases discussed above (after a preposition, under focus...), while elsewhere the clitic object (2b) should be used, instead. Differently from the subject position (cf. (1a)), a null referential object is not possible (2c), unless it is arbitrary (Rizzi 1986a).

(2) a. *Paola vede   lei.*
         Paola see.PRS.3SG 3SG.F
     b. *Paola la=vede.*
         Paola 3SG.F.ACC=see.PRS.3SG
         'Paola sees her.'
     c. *Paola vede.*
         Paola see.PRS.3SG
         'Paola sees.' (ungrammatical with the meaning 'Paola sees her.')   (Italian)

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[1] In this paper, I use the label '*pro*' to refer to the lack of an overt preverbal subject, but I do not commit to the theoretical status of *pro* as a special, empty pronoun. As will become clear in section 5, I consider *pro* as a super-weak pronoun that does not make it to Spell-out.

2.2 Form and interpretation of pronouns in Standard Italian

When two items stand in competition, it is often the case that the phonologically and/or morphologically weaker element has more uses and interpretations than the stronger one, which contains more structure and is semantically specialized, in a sort of "iconicity" scenario (see compositional account of pronouns by Cardinaletti & Starke 1999; Déchaine & Wiltschko 2002; Stegovec 2019). Among pronouns, clitics are phonologically weak (they need a host, cannot be stressed, are monosyllabic), structurally small (they behave as heads rather than as phrases), and have a wider distribution and less semantic restrictions than full pronouns. Clitic and strong pronouns also differ with respect to bound variable/referential readings, strict/sloppy readings, and animacy restrictions. I illustrate these points in what follows.

The availability of bound variable readings depends on the type of pronoun. Clitics are either referential or bound variables, whereas strong pronouns must be referential and do not admit bound variable interpretations (although they can be co-referential with other items). Hence, a non-referential quantifier such as *nessuno* 'nobody' can bind a pronoun as a variable only if this is a clitic, as shown in (3a), but not if it is a strong pronoun, as shown in (3b).

(3)   a.   *Nessuno$_i$ vuole   che io   lo$_{i,j}$=inviti.*
           nobody   want.PRS.3SG that 1SG 3SG.M.ACC=invite.CONJ.PRS.1SG
           'Nobody$_i$ wants that I invite him$_{i,j}$.'
      b.   *Nessuno$_i$ vuole   che io   inviti   lui$_{*i,j}$.*
           nobody   want.PRS.3SG that 1SG invite.CONJ.PRS.1SG 3SG.M
           'Nobody$_i$ wants that I invite him$_{*i,j}$.'

In (3a), the clitic pronoun *lo* can refer both to the quantifier 'nobody', and to someone else, while the strong pronoun *lui* in (3b) can only pick out the latter option.

Another example concerns the possible readings of pronouns. Clitic pronouns allow for both strict and sloppy identity (4a), differently from strong pronouns that show a ban on sloppy readings (4b).

(4)   a.   *Paolo ha   guardato [suo fratello]$_i$ e   anche Eva*
           Paolo have.PRS.3SG look.PRTC his brother   and also Eva
           l$_{i,j}$=ha   guardato.
           3SG.M.ACC=have.PRS.3SG look.PRTC
           'Paolo$_i$ has looked at his$_i$ brother and Eva$_j$ has looked at his$_i$/her$_j$ brother too.'
      b.   *Paolo ha   guardato [suo fratello]$_i$ e   anche Eva ha*
           Paolo have.PRS.3SG look.PRTC his brother   and also Eva have.PRS.3SG
           guardato   lui$_{i,*j}$.
           look.PRTC 3SG.M
           'Paolo$_i$ has looked at his$_i$ brother and Eva$_j$ has looked at his$_i$ brother too.'

In (4a), the clitic can pick out both the antecedent 'Paolo's brother' (strict interpretation), or the property 'one's brother', thereby referring to Eva's brother (sloppy interpretation). In(4b), the strong pronoun forces the strict interpretation.

Another contrast is due to animacy: only clitic pronouns can refer to both animate

and inaminate referents, while strong pronouns are marked as [+animate].

(5) a. *Paolo la=sta   pulendo.*
         Paolo 3SG.F.ACC=stay.PRS.3SG clean.GER
         'Paolo Paolo cleaning her/it.'
     b. *Eva sta   pulendo lei.*
         Paolo stay.PRS.3SG clean.GER 3SG.F
         'Paolo is cleaning her.'

In (5a), the object can either refer to Paolo's room, or to his little sister, for instance. Instead, the object in (5b) can only refer to a person, not to an object.

Interestingly, the contrasts above are only observed when there is competition between two elements (clitic vs. strong pronouns in the object position, *pro* vs. strong pronouns in the subject position). In those environments where the strong form must be used (such as in coordination, with prepositions, or under narrow focus with the operator *solo* 'only'), the strong pronoun loses its usual marked interpretation and the contrasts above are neutralized (see Despić 2011; Stegovec 2019 for Slavic languages).[2] For instance, example (3) has shown that strong pronouns cannot be bound variables. Crucially, this requirement disappears when the strong pronoun is the only possible choice. This is shown in (6).[3]

(7) *Nessuno$_i$ vuole   che io vada   con lui$_{i,j}$ alla festa.*
     nobody   want.PRS.3SG that 1SG go.CONJ.PRS.1SG with 3SG.M to.the party
     'Nobody$_i$ wants that I go with him$_{i,j}$ at the party.'

In prepositional phrases (an environment where clitics cannot show up for independent reasons), the pronoun can only be realized in the strong version. Nonetheless, the strong pronoun in (7) can be either referential or a bound variable, exactly as clitics do (cf. (3)).

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[2] A comparable case is the negative effect of demonstrative pronouns (Sichel & Wiltschko 2021). The marked negative semantics of the demonstrative is only activated when a personal pronoun could also have been used instead of the demonstrative pronoun.

[3] The same behavior is detectable in other environments (focus, coordination). For reasons of space, I have excluded from the main text the following examples for narrow focus for this and the other phenomena mentioned above.

(6) a. *Nessuno$_i$ vuole   che io inviti   solo lui$_{i,j}$.*
         nobody   want.PRS.3SG that 1SG invite.CONJ.PRS.1SG only 3SG.M
         'Nobody$_i$ wants that I invite only him$_{i,j}$.'
     b. *Paolo ha   guardato solo [suo fratello]$_i$ e   anche Eva*
         Paolo have.PRS.3SG look.PRTC only his brother and also Eva
         ha   guardato solo lui$_{i,j}$.
         have.PRS.3SG look.PRTC only 3SG.M
         'Paolo$_i$ has looked only at his$_i$ brother and Eva$_j$ has looked only at his$_i$/her$_j$ brother too.'
     c. *Da   quando Paolo ha   una nuova auto, guarda   solo lei.*
         from when   Paolo have.PRS.3SG a   new   car look.PRS.3SG only 3SG.F
         'Since Paul has a new car, he only looks at her.'

4

Similarly, example (4) has illustrated that only clitic pronouns can have both strict and sloppy readings, while strong pronouns enforce the strict reading. However, the strong pronoun in a prepositional phrase can have both strict and sloppy readings, as clitics do. This is shown in (8).

(8) *Paolo ha   parlato   con [suo fratello]ᵢ e   anche Eva ha*
     Paolo have.PRS.3SG talk.PRTC with his   brother and also   Eva have.PRS.3SG
     parlato   con luiᵢ,ⱼ.
     talk.PRTC with 3SG.M
     'Paoloᵢ has talked to hisᵢ brother and Evaⱼ has talked to hisᵢ/herⱼ brother too.'

Animacy restrictions are also lifted when the strong pronoun is the only possible choice. This is shown in (9), where the strong pronoun in the prepositional phrase refers to an inanimate object.

(9) *Paolo ha   una nuova auto. Senza di lei   non va   più*
     Paolo have.PRS.3SG a   new   car   without of 3SG.F not go.PRS.3SG anymore
     da   nessuna parte.
     from any   parts
     'Paolo has a new car. Without her he no longer goes anywhere.'

So far, I have focused on the distinctions between clitic and strong pronouns in the direct/indirect object position. The same facts arise in the subject position. Example (10) shows a similar contrast to (3): null subjects can be either referential or bound variable (10a), while strong pronouns do not allow for the bound variable reading (10b).

(10) a. *Nessunoᵢ ha   detto   che sarebbe   venuto.*
          nobody   have.PRS.3SG say.PRTC that be.COND.PRS.3SG come.PRTC
          'Nobodyᵢ said that heᵢ,ⱼ would have come.'
      b. *Nessunoᵢ ha   detto   che luiᵢ*,ⱼ sarebbe   venuto.*
          nobody   have.PRS.3SG say.PRTC that 3SG.M be.COND.PRS.3SG come.PRTC
          'Nobodyᵢ said that he*ᵢ,ⱼ would have come.'

These data illustrate the *Montalbetti effect* (Montalbetti 1984): in languages where the opposition overt vs. null is present, there are specific semantic effects associated with overt vs. null embedded subjects in the scope of a quantifier (see also discussion in Barbosa 1995; Sheehan 2006; Despić 2011).[4]

This effect disappears when the strong pronoun is the only possible choice. Example (11) illustrates that under focus (realized either with the operator *solo* 'only' (11), or with the subject in postverbal position) strong pronouns allow for both options.

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[4] Montalbetti (1984) has also noted that clitics pattern with null subjects in that they easily function as variables, as shown in the data in (3). See also Barbosa (1995); Sheehan (2006); Despić (2011).

(11) *Nessuno$_i$ ha   detto   che solo lui$_{i,j}$ sarebbe*
      nobody   have.PRS.3SG say.PRTC that only 3SG.M be.COND.PRS.3SG
      venuto.
      come.PRTC
      'Nobody$_i$ said that only he$_{i,j}$ would have come.'

Similar data to (11) have been provided by Sheehan (2006: 69,71) on the baseline of Barbosa (1995: 50).

Null subjects also allow for both sloppy and strict identity, similarly to clitics and differently from strong pronouns (cf. (4)). This is shown in (12).

(12) a. *Paolo pensa   che [suo padre]$_i$ sia   il   migliore e*
          Paolo think.PRS.3SG that his father be.CONJ.PRS.3SG the best   and
          anche Eva pensa   che sia   il   migliore.
          also   Eva think.PRS.3SG that be.CONJ.PRS.3SG the best
          'Paolo$_i$ thinks that his$_i$ father is the best and Eva$_j$ also think that his$_i$/her$_j$ father is the best.'
      b. *Paolo pensa   che [suo padre]$_i$ sia   il   migliore e*
          Paolo think.PRS.3SG that his father be.CONJ.PRS.3SG the best   and
          anche Eva pensa   che lui$_{*i,j}$ sia   il   migliore.
          also   Eva think.PRS.3SG that 3SG.M be.CONJ.PRS.3SG the best
          'Paolo$_i$ thinks that his$_i$ father is the best and Eva$_j$ also think that his$_i$ father is the best.'

Again, the contrast disappears under focus. Here, the strong pronouns is forced, and it allows for both interpretations as *pro* does (cf. (12)). This is shown in (13).

(13) *Paolo pensa   che solo [suo padre]$_i$ sia   il   migliore e*
      Paolo think.PRS.3SG that only his father be.CONJ.PRS.3SG the best   and
      anche Eva pensa   che solo lui$_{i,j}$ sia   il   migliore.
      also   Eva think.PRS.3SG that only 3SG.M be.CONJ.PRS.3SG the best
      'Paolo$_i$ thinks that his$_i$ father is the best and Eva$_j$ also think that his$_i$/her$_j$ father is the best.'

The animacy restriction works exactly in the same way. *pro* allows both for inanimate and animate referents (14a), while strong subjects do not (14b), unless they are used under focus (14c). Where *pro* is not a possible option, like after the operator 'only', the strong pronoun can also pick out an inanimate referent.

(14) a. *Viene   pulita   da Paolo.*
          come.PRS.3SG clean.PRTC by Paolo
          'She/it is cleaned by Paolo.'
      b. *Lei viene   pulita   da Paolo.*
          3SG.F come.PRS.3SG clean.PRTC by Paolo
          'She is cleaned by Eva.'

c. *Solo lei   viene   pulita   da Paolo.*
   only 3SG.F come.PRS.3SG clean.PRTC by Paolo
   'Only she/it is cleaned by Eva.'

These data shows that Italian *pro* behaves as a clitic pronoun. Note that *pro* has been categorized as a weak pronoun (and not as a clitic) by Cardinaletti & Starke (1999), and this idea has been adopted by Holmberg (2005); Roberts (2010). In general, the arguments brought by Cardinaletti & Starke (1999) in favor of treating *pro* as a weak pronoun prove that *pro* is not a strong pronoun, and are all compatible with *pro* being a clitic pronoun.[5] The crucial fact here is that *pro* behaves as a very weak element, it being either a clitic (a head) or a weak pronominal (a phrase). In particular, I consider *pro* to be a clitic pronoun, or even something weaker, as will become clear in section 5.[6]

2.3 Clitic subjects in French and Northern Italian varieties

Differently from Standard Italian, other languages require an overt subject, which can appear in the form of a strong, weak or clitic pronoun. For instance, example (15) shows that in French clitic pronouns are possible subjects, whereas null subjects are excluded.

(15)   a. *Elle=mange.*
         3SG.F=eat.PRS.3SG
     b. **Mange.*
         eat.PRS.3SG
         'She eats.'   (French)

Most scholars agree on the fact that French pronominal subjects are clitics, and that French clitics have a clear pronominal status (since Rizzi 1986b). This is confirmed by their distribution with negation and under coordination.

Some languages exhibit a hybrid behavior between French and Standard Italian: subjects can be left implicit (as in Standard Italian), but only for certain person values, and elsewhere a clitic or a strong pronouns must appear (as in French). Languages of this type are many Northern Italian dialects (hence, NIDs), but also some varieties in Southern France and Switzerland (Poletto & Tortora 2016). Depending on the dialect, subjects are realized as either null pronouns, non-specialized (invariant) clitics, or specialized (person-specific) clitics, which can be further distinguished for gender. There is massive variation among these varieties that are halfway between *pro*-drop and non-*pro*-drop languages (I refer the reader to Manzini & Savoia 2005: 117-118 for data). In this paper, I provide data from Basso Polesano (Poletto 1996).

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[5] An argument for considering *pro* as a weak pronoun comes from right dislocation and marginalization (Cardinaletti 2001). Other arguments provided by Cardinaletti & Starke (1999) are the following. (i) *pro* has the semantic properties of a deficient pronoun in that it can be expletive, impersonal, have non-human referents; (ii) *pro* can only occur in designated specifier positions, like weak pronouns in general; (iii) *pro* is always chosen when there is the choice between a strong pronoun and a *pro* counterpart.

[6] In different languages, *pro* might pattern more closely with clitics than in others. For instance, in Slovenian *pro* behaves as a clitic as far as binding and animacy restrictions are concerned, but it only allows strict reading as strong pronouns do, differently from (14) (Runić 2014; Stegovec 2019).

Basso Polesano is spoken in the province of Rovigo (Veneto). It has three types of subject clitics: one for third person specified for gender (*el* for masculine in (16)), an invariant one for first/second person and for the expletive (*a* in (17) and (19)), and an extra marker for second person (*te* in (17) and (18)). Example (16) illustrates the possibilities for a third person subject. There must be an overt subject: either a DP or proper noun (16a), or a clitic (16b). The clitic and the DP can cooccur (16c), but according to Poletto (1996) then the DP is dislocated (as in the Italian *Mario, lui mangia tanto* 'Mario, he eats a lot'). A null pronoun is not possible (16d).

(16)   a.   *Mario magna   tanto.*
                 Mario eat.PRS.3SG a lot
                 'Mario eats a lot.'
        b.   *El=magna.*
                 3SG=eat.PRS.3SG
                 'He eats.'
        c.   *Mario el=magna   tanto.*
                 Mario 3SG=eat.PRS.3SG a lot
                 'Mario eats a lot.'
        d.   **Magna.*
                 eat.PRS.3SG
                 'He eats.'   (Basso Polesano, Poletto 1996: 275, 278)

First and second person subjects must also be overtly expressed. In the absence of a strong pronoun, the invariant clitic *a* must be used (17a,c). Sentences without *a* are ungrammatical (17b,d). This clitic is instead excluded with third person (17d).

(17)   a.   *A=magno.*
                 a=eat.PRS.1SG
                 'I eat.'
        b.   **Magno.*
                 eat.PRS.1SG
                 'I eat.'
        c.   *A=te=magni.*
                 a=2SG=eat.PRS.2SG
                 'You eat.'
        d.   **Te=magni.*
                 2SG=eat.PRS.2SG
                 'You eat.'
        e.   **A=el=vien.*
                 a=3SG.M=eat.PRS.3SG
                 'He comes.'   (Basso Polesano, Poletto 1996: 281,293)

Note that second person requires not only the invariant clitic *a*, but also an extra clitic *te*, as shown in (17c). This second person clitic is always obligatory, even with the strong pronoun *ti*, as illustrated in (18).

(18)   a.   *Ti   te=magni.*
              2SG 2SG=eat.PRS.1SG
              'You eat.'
        b.   **Ti   magni.*
              2SG eat.PRS.1SG
              'You eat.'   (Basso Polesano, Poletto 1996: 294)

The subject cannot be null even when it has an expletive function. In this case, the invariant form *a* is used, as shown in (19).

(19)   a.   *A piove.*
              a rain.PRS.3SG
        b.   **Piove.*
              rain.PRS.3SG
              'It rains.' (Basso Polesano, Poletto 1996: 281)

    There are many other varieties that behave as Basso Polesano, or slightly differently. In general, all NIDs have subject clitics in their lexicon, even though in many varieties the paradigm is not complete (Poletto 1997; Poletto & Tortora 2016). The availability of subject clitics depends on the person (and number) feature of the subject, as illustrated for Basso Polesano. Crucially, when a clitic is available in the lexicon of a NID, this is required and cannot be dropped, regardless of the discourse conditions. This seems to suggest that these languages are non-*pro*-drop. However, in the previous literature NIDs have been considered as *pro*-drop languages (Poletto 1996, 2000; Cardinaletti & Repetti 2008). An argument in favor of this view is the fact that subjects other than clitics (i.e., strong pronouns and DPs) can be dropped in the same structural and pragmatic conditions that determine subject drop in Standard Italian. In addition, many subject clitics of NIDs do not display the typical meaning and distribution of subjects (Poletto & Tortora 2016). Clitics of NIDs are in general considered to be inflectional morphemes, rather than independent pronouns as the French ones (Rizzi 1986b; Brandi & Cordin 1989; Benincà 1994; Poletto 1996, 1997, 2000; Poletto & Tortora 2016).[7] For instance, the NIDs clitics must be repeated in coordination, differently from the French clitics; they also have a doubling character, differently from other pronominal clitics, such as Italian accusative clitics. Nonetheless, it is clear that in Basso Polesano and other NIDs with subject clitics there is always a subject expressed, it being either a clitic or a strong pronoun. For this reason, in section 6 I will argue that NIDs with extra subject-markers (these being clitics or inflectional affixes) belong to the non-*pro*-drop category (although in a different way with respect to languages as French). I consider evidence for this claim the fact that in these languages subject clitics cannot be dropped, thereby never allowing "completely null" subjects.

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[7] The treatment of subject clitics in NIDs as inflectional markers dates back to Rizzi (1986b). However, as explained in Poletto & Tortora (2016), the tests used by Rizzi (1986b) have been shown to be partially unreliable (because negation does not always occupy the same position in different languages) or to have exceptions (see the coordination test). The discussion of these points go beyond the scope of this paper. However, this uncertainty regarding the status of (at least some of) the clitics in NIDs confirms that an approach capable of integrating gradience in grammar would be needed. A strength-based approach can model all these distinctions as a consequence of different strength values.

3 The problem of *pro*

Pro-drop is a very well-studied phenomenon. For this reason, a comprehensive discussion of all the previous approaches to *pro*-drop lies outside the scope of this article (I refer the reader to D'Alessandro (2015) for an overview from the historical perspective, and to Sheehan (2016) for the evaluation of the different predictions of various accounts). In this section I will just summarize some of the existing approaches by focusing on the main points of debate: the presence and licensing of a null element in argument position, and the role of the head bearing agreement (this head being Agr, Infl or T).

There are four main approaches to Romance null subjects, respectively based on empty *pro* (Rizzi 1986a), pronominal T (Alexiadou & Anagnostopoulou 1998), deletion (Holmberg 2010; Roberts 2010), and ellipsis (Duguine 2013).

The very influential analysis by Rizzi (1986a) assumes the existence of an empty category called *pro*, which is a pronoun with no content at LF and at PF. This item needs to be licensed and identified by certain mechanisms. The main drawback of this approach is the postulation of a nominal category inherently unspecified for number, person, and gender is not a trivial assumption. Moreover, the mechanisms of licensing and identification, formulated within Government and Binding theory, cannot be easily reformulated within current frameworks such as Minimalism (see discussion in Holmberg 2005). In fact, *pro* should be assigned feature values by Agr, but the head responsible for agreement is standardly considered to be inherently unvalued and to receive its feature values by the subject.

An approach that dispenses with *pro* has originally been formulated by Borer (1986), and further developed by Barbosa (1995, 2011); Alexiadou & Anagnostopoulou (1998, 2021). The central idea is that in null subject languages there is no need for an empty pronoun because T is pronominal and its morphological agreement is interpretable. According to Alexiadou & Anagnostopoulou (1998), T bears a [D] feature, as pronouns do, and this is enough to satisfy the requirement of having a subject, without any additional empty element. This assumption presents some complications regarding issues such as Theta role assignment, or the source of ϕ-features. In subsequent work, Alexiadou & Anagnostopoulou (2021) have suggested that in null subject languages T bears interpretable but unvalued ϕ-features ([iϕ:_]). These are valued by Agree with a covert Topic operator in the CP periphery (following Frascarelli 2007). These ϕ-features, phonologically realized as an affix, are assigned a Theta role because they head a chain whose foot is a null subject *pro* in Spec,VoiceP. The disadvantages of this approach are the technicalities (such as Agree with an empty topic). More in general, analyses based on the role of rich morphological agreement (which is an idea dating back to Taraldsen (1980)) raise some general concerns. First of all, it is not obvious how to establish when agreement is morphologically strong and when is not. Moreover, phonological information should not be able to influence syntax, within a strict modular theory of grammar as the one adopted here and by previous analyses (see discussion in Müller 2006). It should also be noted that, although there is a general correlation between *pro*-drop and overt agreement in consistent null subject languages, this connection is only a tendency, as proved by the empirical survey by Gilligan 1987.

Other analyses attribute some particular features to T, which allow the subject pronoun to be deleted. Proponents of the deletion approach are Holmberg (2005, 2010);

Sheehan (2006); Roberts (2010). Under this view, *pro*-drop is failed PF-realization of a pronoun, and agreement is the Spell-out of uninterpretable features. According to Holmberg (2010), T bears a [uD] feature. Null subjects are inherently deficient pronouns in the form of ϕP. Agree between [uD] and ϕP has two consequences: it makes the pronoun definite, and values the ϕ-probe on T. Given that now T and this ϕP forms a a chain, the pronoun is not pronounced; only the highest copy of the subject, incorporated into T as agreement, is pronounced as an affix on the verb. Approaches of this type require various technical assumptions to delete the pronoun: deficient pronouns, "rich T", plus a deletion mechanism such as phonological reduction in chains (Holmberg 2010), impoverishment (Roberts 2010), or deletion under feature non-distinctness (Sheehan 2006).

A particular type of deletion approach is the ellipsis account by Duguine (2013, 2014). Duguine proposes that regular ellipsis can account for Romance *pro*-drop, similarly to what is generally assumed for languages such as Japanese (see Neeleman & Szendrői 2007). A similar analysis is also proposed by Holmberg (2005) for first and second person null subjects in Finnish. The main problem of the ellipsis approach is the fact that a null subject is expected to behave as a canonical DP, and in particular it is expected to have the same referential properties of its antecedent. However, in section 2.2 I have shown that null subjects do not behave as overt subjects (i.e., strong pronoun in Italian).

In addition to the problems related to *pro*, all the above mentioned analyses cannot account for either the PF-LF mismatches in Italian pronouns (see section 2.2) or the obligatory subject clitics of inflectional type in Italian dialects (see section 2.3). In contrast, the analysis developed in this paper considers syntactic strength to be the property responsible for *pro*-drop, obligatory subject clitics, PF-LF mismatches in pronouns, and morphological agreement. Nonetheless, it shares with the deletion/ellipsis accounts the idea that *pro*-drop is the failed realization of a defective pronoun, as will become clear in section 5.

4 Strength in syntax

4.1 Gradient Harmonic Grammar

The analysis developed in this paper is couched in the framework of *Gradient Harmonic Grammar (GHG)*, launched by Smolensky & Goldrick (2016). GHG is a version of *Optimality Theory*, a linguistic theory based on competition among candidates that are evaluated by conflicting constraints. The peculiarity of GHG is the use of *weights*, which are assigned to both constraints (as in *Harmonic Grammar*, Smolensky & Legendre 2006) and symbols in linguistic expressions (*gradient symbolic representations*). The different weights of the constraints simply translate a constraint ranking into numbers. Violations ascribed to the candidates by the constraints are gradient, depending both on the weight of the offended constraint and on the weight (i.e., strength) of the offending items. The strength of linguistic elements is discussed in section 4.2.

This framework offers a new perspective on how to derive different types of phenomena where syntactic strength seems to play a role (see Müller (2022) for an adequate discussion of the framework and for other case studies). So far, most of the work couched in Gradient Harmonic Grammar has been done in phonology; but see Putnam & Schwarz 2017; Lee 2018; Lee & Müller 2018; Müller 2017, 2019; Müller et al. 2022; Müller 2022;

Schwarz 2020 for recent applications of GHG to syntactic problems.

Applying this framework to *pro*-drop (and to the other topics discussed in this paper) has many advantages with respect to previous theories of *pro*-drop. In fact, GHG is the only theory that allows to implement the widely accepted view that *pro*-drop is related to strength of verbal heads, and to account for additional phenomena such as the PF-LF mismatches presented in section 2.2. GHG introduces in the grammar a concrete implementation of the vague concept of strength of syntactic categories. With the simple assumption that strength is a property of linguistic items (which is always made, but left implicit in all other theories so far, see section 5), various stipulations and problems of other theories of *pro*-drop can be eliminated. The same tool can also independently be used to account for the mismatches in form and meaning of clitic and strong pronouns, which have never been connected to the issue of *pro*-drop before. Moreover, the gradience of strength allows to model asymmetries that go beyond the presence or lack of a feature, as it seems the case for subject clitics in NIDs.

4.2   Syntactic strength

Linguistic elements are not categorical but may have different level of activity (i.e., can be strong or weak, as known since Ross 1973b,a). For syntactic heads, I consider this property to be *syntactic strength*. This is a syntactic feature associated with a number that encodes the presence and activity of a head in the structure. In general, numerical strength values assigned to linguistic objects are taken to be within the interval [0, 1] (see other works couched in this framework, mentioned in the previous section). Default elements have discrete strength of value 1, while defective items are weaker elements. Optimization procedures only allow for a discrete inventory of values. In this paper, I assume three possibilities: full elements with strength 1, weak elements with strength 0.6, super-weak elements with strength 0.1. In addition, I introduce a new element with respect to standard GHG approaches to syntax. I propose that strength can be modified by operations. In particular, strength can be increased derivationally. This operation is a possible repair that can be used to avoid violations of markedness constraints. Note that the process of *strengthening* is by no means new in GHG applications in the field of phonology (see Rosen 2016; Smolensky & Goldrick 2016; Zimmermann 2019, 2021, among others).

As far as the source of strength is concerned, this is a deep question that still needs to be answered. Future works couched in this framework, together with what has already been done, will certainly contribute to the resolution of this question. In general, strength is motivated by the linguistic behavior of linguistic elements. As there is no source for ϕ-features, but there is evidence for them because there are operations that refer to them, there is no source for strength-features. In the specific case of pronouns, I assume that the amount of strength of a pronoun correlates with the amount of structure that the pronoun contains. Following the well-known approaches by Cardinaletti & Starke 1999; Déchaine & Wiltschko 2002, not all pronouns have the same size. Pronouns can be distinguished at least among three types: strong, weak and clitic. Their status depends on the number and type of features (and nodes, which are bundles of features). Building on this, I assume that more structure can be translated into more strength. DP_1 corresponds to strong pronouns that have been analyzed as involving more projections. If some heads are missing, i.e. the pronoun is defective in some respects, this is reflected by a weaker value

of strength on the D head: $DP_{0.1}$, $DP_{0.6}$. I consider weak pronouns and clitics to be items with 0.6 strength: they are both defective, their difference being in one being phrasal and one just a head.[8] I suggest that very weak DPs corresponds to what is traditionally called *pro*, i.e. a non-pronounced pronoun.

The approach is schematized in (20) to (22).

(20) Strong

DP_1

D_1 NP

|

N

(21) Weak/clitic

$D_{0.6}$

|

$D_{0.6}$

(22) *pro*

$D(P)_{0.1}$

|

$D_{0.1}$
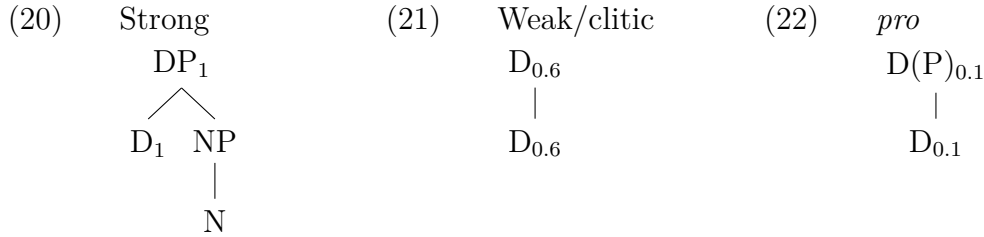
Ultimately, strength correlates with the features on the head: the head D_1 in (20) has a c-selectional [●N●] feature that allows it to select for a NP complement. $D_{0.6}$ and $D_{0.1}$ in (21)–(22) do not have it. This means that a difference in heads/features results into a difference in strength. Hence, different syntactic structures are mapped to different strength values, which are used as shortcut for the whole structure by the different operations.

Since strength is a syntactic property, it is not visible after Spell-out: output forms are not associated with gradient strength values, which only matter for syntactic computation (as also assumed in most works framed in GHG). At Spell-out, trees (20) and (21) can be translated into the following vocabulary entries for strong /lei/ (nom, acc) and clitic /la/ (acc).

(23) a. /lei/ $\leftrightarrow$ D[ϕ:3sg.f] + NP
      b. /la/ $\leftrightarrow$ D[ϕ:3sg.f, case:acc]

As (23) shows, vocabulary entries do not make reference to strength value, since this is a pure syntactic element. Strength is like a diacritic that regulates syntactic operations, and then disappears at Spell-out. The syntactic structure is, however, still visible for lexical substitution.

The correlation between strength and morphosyntactic features just established can be easily extended to heads such as T, V. For example, various accounts of *pro*-drop have proposed that the T head of null subject languages is strong, and this strength has been interpreted in different ways: T is a governing head of special type because it can assign nominative case (Rizzi 1986a), is pronominal because it has interpretable ϕ-features (Alexiadou & Anagnostopoulou 1998, 2021), or bears a [D] feature (Holmberg 2005; Roberts 2010). The particular features postulated for the T head of null subject

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[8] Since in this paper I do not deal with weak pronouns, I merge them together with clitics. Of course weak pronouns should be slightly stronger than clitics because they are phrases (i.e., heads that project). One possibility would be to introduce a strength distinction: weak pronouns are 0.7 strong, clitics 0.5. I leave the fine and gradient distinctions among different pronouns to further research. I also leave the question of pronominal decomposition open. It is certainly possible to assign strength to different subparts of the pronouns and lexically realizing different supbarts of them, in the spirit of Kayne (2000); Cardinaletti & Starke (1999); Déchaine & Wiltschko (2002); Stegovec (2019). Different strength values could also be attributed to different features on the same head. I also leave this option to future explorations.

languages, which result into a "strong" behavior, are here substituted by a single strength value. Hence, in null subject languages such as Italian, finite T is strong: T_1. This high strength value correlates with the amount of features that it bears. T_1 determines independent tense, triggers EPP movement and head movement, copies the ϕ-features from the subject, assigns nominative case: [Tense], [$\bullet$D$\bullet$], [$\bullet v\bullet$], [uϕ:_], [ucase:nom].[9] In other languages, such as French and Basso Polesano, finite T is weak: $T_{0.6}$.

Note that compositional approaches to weak and strong pronoun à la Cardinaletti & Starke (1999) cannot be easily applied to the clausal spine: it cannot be simply said that Italian T is stronger because it contains more nodes, since there should be no variation in the hierarchy of functional projections. Instead, strength seems to be the best tool to handle this kind of phenomena.

5 Pro-drop is no PF-realization

In this section, I develop a strength-based analysis of *pro*-drop, which dispenses with the empty category *pro*, with any particular feature of T apart from strength, and with any special mechanism for identification of the ϕ-features of null subjects. The central idea is that *pro*-drop is the result of *not* spelling out weak elements. So-called *pro* is a "normal" pronoun, but it is too weak to undergo certain processes such as lexicalization. This kind of DP is possible in other languages as well (see section 6). Cross-linguistically, the different outcomes of the derivation depend on both the strength of the head T and the weight of the relevant constraints. It is the combination of a weak DP and a strong T that lead to *pro*-drop because these two elements are related to the subject position, which is traditionally associated to the specifier of T (Spec,T).

Here and in the next sections, I provide various tableaux that contain different elements. The first column contains an input with strength, and a set of possible output candidates (one of which is the optimal one). The other columns are dedicated to weighted constrains and to the penalties they assign. The weight of the constraints is written next to the name of the constraints. The violations (written in the corresponding cells) are obtained by multiplying the weight of the offended constraint by the strength of the offending element (written in the input). Harmonic scores are represented in the last column and are obtained by summing all the violations together. The candidate with the better harmonic score (i.e., the closest to 0) wins the competition.[10]

In a language like Standard Italian, a null subject emerges when a syntactic structure with a weak DP and a strong T, as in (24), undergoes Spell-out.

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[9] The correlation among all these properties may break down in different ways. For instance, French has V-to-T movement, but no *pro*-drop, Russian has rich subject agreement morphology, but no V-to-T movement, and so on. The availability of such processes in a given language depends not only on the strength of T, but also on the weight of the relevant constraints. I refer the reader to Müller (2022) for details.

[10] As in Harmonic Grammar, the weights of the constraints are made up for the analysis. In general, the weight to be adopted is the lowest one that can account for the phenomenon under investigation, but any translation of the constraint ranking into numbers is in principle possible. Computational analyses can prove that the numbers used in GHG-analyses are learnable. See for instance Rosen (2019) for the issue of learnability.

(24)

$$\text{TP}$$

$$\text{DP}_{0.1} \quad\quad \text{T}_1$$
$$[\phi\text{:3sg.f}]$$
$$[\text{case:nom}]$$
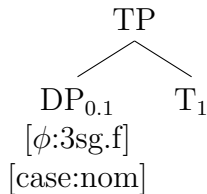
At Spell-out, phonological exponents are inserted into the terminal nodes in (24). The complex head T+v+V is substituted by the lexical verb (for example, the verb *mangiare* 'eat') with morphological agreement (3 person singular). The super-weak DP in (24) must also undergo lexical realization. This derivational step is represented in Tableau (25).

(25)   Spell-out of $\text{DP}_{0.1}$ in Standard Italian $\rightarrow$ *mangia* 'she eats'

$\text{DP}_{0.1}$ T_1(mangia)	VI_{-4}	$\textsc{Dep}_{-2}$	H
☞ a. mangia	0.1	0	-0.4
b. lei mangia	0	1	-2

In Tableau (25), candidate (a) does not insert any Vocabulary Item for the weak DP. Because the D head is not realized by vocabulary insertion, this candidate incurs a violation by the constraint VI, defined as follows.

(26)   VI(Vocabulary Insertion): *X^0 if X^0 is not realized by vocabulary insertion (Lee & Müller 2018).

This constraint assigns a gradient penalty for a syntactic head that is not realized by any phonological exponent. The violation is equal to the strength of the head that is not realized by any exponent. Vocabulary insertion is triggered by this constraint, but is also preempt by the constraint Dep, given in (27).

(27)   Dep: All material that shows up in the output is present in the input (Lee & Müller 2018).

This is a version of the faithfulness constraint Dep, standardly used in Optimality Theory. It gives a penalty for lexical insertion, which is equal to 1 because output forms do not have gradient strength. In Tableau (25), Dep is violated by candidate (b). This candidate substitutes the D head with the only compatible pronoun in the lexicon of Italian, the strong form *lei*.[11] By doing so, it causes a violation that is more severe than the violation introduced by candidate (a). Hence, candidate (a) in Tableau (25) wins. This means that

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[11] To be more precise here, the form *lei* is not compatible with the input, because it requires a bigger structure that is not there (see vocabulary entries in (23)). I have put this candidate with the form *lei* in Tableau (25) only to clarify the point. However, given that there are no subject clitics in Italian, there is no possible exponent for a weak D head. This means that both candidates in (25) do not contain any lexicalized pronoun. Cf. Tableau (30) for a similar case and relevant discussion.

in languages with strong T (such as Standard Italian), weak subjects are not substituted by any vocabulary entry. The two constraints VI and Dep are responsible for "failed" lexicalization of the weak DP. Note that strong T does not play a role in the step in (25). However, it is crucial in creating the input of (25), as will be shown in the discussion around Tableau (35).

As shown in (25), failure to spell out a super-weak element is not very "costly", compared to insertion of lexical material. However, the result changes if the pronoun in the input is strong: not realizing a strong head (D_1) is much worse that not realizing a weak head ($D_{0.1}$), as shown in Tableau (28).

(28)   Spell-out of DP_1 in Standard Italian $\rightarrow$ *lei mangia* 'she eats'

DP_1 T_1(mangia)	VI_{-4}	DEP_{-2}	H
a. mangia	1	0	-4
☞ b. lei mangia	0	1	-2

As shown in Tableau (28), the constraints VI and Dep determine that non-defective DPs are spelled out as strong pronouns.

Weak elements that are a bit stronger than the super-weak element $DP_{0.1}$ should also be spelled out. As shown in Tableau (29), candidate (b), which is the one undergoing lexical insertion, is the optimal one. However, in Standard Italian there is no Vocabulary Item that is available for substitution here. In fact, a $DP_{0.6}$ corresponds to a clitic, as represented in the structure in (21). The lexicon of Italian does not contain any clitics that are marked for nominative case. Thus, this derivation results again in *pro*-drop, although this time the cause for the null subject is in the morpho-phonology, and not in the morpho-syntax (as instead in (25)).

(29)   Spell-out of $DP_{0.6}$ in Standard Italian $\rightarrow$ *mangia* 'she eats'

$DP_{0.6}$ T_1(mangia)	VI_{-4}	DEP_{-2}	H
a. mangia	0.6	0	-2.4
☞ b. mangia	0	1	-2

If the DP in (29) is not a subject (i.e., it is marked as accusative or dative), then it is spelled out by the corresponding clitic. This is shown in the derivation (30), which only illustrates vocabulary insertion for the object clitic in the sentence *lo mangia* 'she eats it'.

(30)   Spell-out of $DP_{0.6}$ (object) in Standard Italian → *lo mangia* 'she eats it'

$DP[acc]_{0.6}$ T_1(mangia)	VI_{-4}	DEP_{-2}	H
a. mangia	0.6	0	-2.4
☞ b. lo mangia	0	1	-2

So far, I have illustrated the derivational step of lexical insertion in a language like Standard Italian. Before this process, there are previous derivational steps that create the input for Spell-out. For instance, the subject is merged in its base position, and then moves to the preverbal subject position, creating a structure as in (24). Movement to the subject position, traditionally called EPP movement, is the step that provides the input for Spell-out in tableaux (25), (28), (29). I adopt the standard assumption that this movement happens because the T head bears an EPP feature [●D●] that triggers internal Merge of the subject to Spec,T. The constraint responsible for discharging the EPP feature is MERGE CONDITION (MC), defined in (31).

(31)   MERGE CONDITION (MC): structure-building features participate in Merge (Heck & Müller 2013).

MC triggers Merge, penalizing undischarged Merge features. The gradient violation is equal to the strength of the head triggering Merge (i.e., the T head). This constraint is contrasted by STAY!, in (32). STAY! penalizes internal Merge, assigning a gradient violation equal to the strength of the undergoer of internal Merge (i.e., the DP subject).

(32)   STAY!: do not move.

Discharge of an internal Merge feature results into the creation of a specifier. I suggest that there is a constraint that evaluates the strength of the dependency between the head and its specifier (for every specifier in case of multiple specifiers). The constraint, called *HEAD+SPEC<1, is defined as follows.

(33)   *HEAD+SPEC<1: the strength of a head and its specifier must be > 1.

This is a markedness constraint on the output: weak heads (i.e., weaker than 1) should not have weak specifiers. The gradient violations are assigned as follows: 1-x (if $x<1$), where x is strength of head plus strength of the item in the specifier position.

In addition, strength can be derivationally increased. However, this process causes a violation of a faithfulness constraint that specifically looks at the amount of strength, DEP[STRENGTH], defined in (34).

(34)   DEP[STRENGTH]: the total strength of the input must be equal to the strength of the output.

DEP[STRENGTH] penalizes the addition of strength from the input to the output. It assigns a gradient violation equal to the strength of the output minus the strength of the

input.

In Tableau (35), I show how the optimal candidate $DP_{0.1}$ T_1, which will then become the input of Tableau (25), emerges in the step before Spell-Out.

(35)   EPP satisfaction in Standard Italian → $DP_{0.1}$ T_1

$T_{[\bullet D \bullet]1}$ ... $DP_{0.1}$	MC_{-20}	*HEAD+SPEC$<1_{-10}$	DEP[STRENGTH]$_{-2}$	STAY!$_{-1}$	H
a. $T_{[\bullet D \bullet]1}DP_{0.1}$	1	0	0	0	-20
☞ b. $DP_{0.1}$ $T_{[\bullet D \bullet]1}$	0	0	0	0.1	-0.1
c. DP_1 $T_{[\bullet D \bullet]1}$	0	0	0.9	0.1	-1.9

Candidate (a) leaves the subject in situ, thereby incurring a violation by MC. Candidate (b) moves the subject to Spec,T. A violation is registered by STAY!. Nonetheless, the harmonic score of this candidate turns out to be the best one. Candidate (c) does the same as candidate (b), but it also increases the strength of the DP, adding a further violation by DEP[STRENGTH]. None of the candidates violate *HEAD+SPEC<1 because T is strong enough to satisfy this constraint even in the presence of a super-weak DP.

Hence, a super-weak DP moves to the subject position, satisfying the EPP feature of a strong T. As already seen in derivation (25), super-weak DPs are not lexically realized at Spell-out. However, they can occupy Spec,T in the syntax, as derivation (35) has just shown. The strong T head of Italian has a strong EPP feature, so strong that it can be satisfied even by a very weak element. However, if T is weaker, as in French and in Basso Polesano, its EPP feature requires a strong element that can "compensate" for its weakness. In non-*pro*-drop languages, satisfaction of the EPP causes the DP to be *strengthened*. This will be shown in the next section.

6   Non *pro*-drop languages: strengthening as a repair

In this section, I suggest that lack of *pro*-drop is due to strengthening of weak DPs in the presence of weak T. In those languages where the head T is weak, i.e. weaker than 1, the EPP feature of T cannot be satisfied by a weak element (because of the constraint *HEAD+SPEC<1). Adding strength to the DP is a strategy to avoid the violation of the markedness constraint *HEAD+SPEC<1, despite the introduction of a violation of DEP[STR].

I will now provide the derivation for French. Assuming that French T is weak (0.6), the step of EPP satisfaction is shown in (36) (to be compared with the Italian one in (35)).[12]

_____

[12] French is well-known for having a mixed behavior between Italian and English: it does not allow for *pro*-drop, but it exhibits verbal head movement and permits free inversion. Translated into strength, the French T head behaves as weak for the purpose of *pro*-drop, and as strong with respect to head-movement. The precise account of these facts is left for further research. A possible implementation would be to assign different weights to the constraints in different languages in such a way that the French data are derived (see Müller 2022 for this strategy).

(36)   EPP satisfaction in French ($T_{0.6}$) $\rightarrow$ $DP_{0.6}$ T_1

$T_{[\bullet D \bullet]0.6}$ ... $DP_{0.1}$	MC$_{-20}$	*HEAD+SPEC<1$_{-10}$	DEP[STR]$_{-2}$	STAY!$_{-1}$	H
a. $T_{[\bullet D \bullet]0.6}$ $DP_{0.1}$	0.6	0	0	0	-12
b. $DP_{0.1}$ $T_{[\bullet D \bullet]0.6}$	0	0.3	0	0.1	-3.1
☞ c. $DP_{0.6}$ $T_{[\bullet D \bullet]0.6}$	0	0	0.5	0.1	-1.1

Candidate (a) does not carry out movement. The failure to discharge the movement-inducing feature [$\bullet D \bullet$]) is penalized by MC. In candidate (b), subject movement saves the violation by MC, but introduces a penalty from STAY!. By creating a specifier, it also violates *HEAD+SPEC<1 because the sum of the strength of the head and its specifier is too low. This latter problem is solved by candidate (c) by increasing the strength of the subject. Although this introduces a violation from DEP[STR], candidate (c) receives the best harmonic score and is the chosen output. Hence, in French a super-weak $DP_{0.1}$ is strengthened up to a weak $DP_{0.6}$. The weak EPP feature of a weak T head cannot be satisfied by anything: it requires a strong element that can "compensate" for the weakness of T.[13]

Thereafter, the output of the derivation in (36) undergoes a derivational step similar to (29). In such a step, the winner is candidate (b), where the DP is substituted by a Vocabulary Item. In fact, differently from Italian, the lexicon of French contains clitic pronouns marked for nominative case. Hence, $DP_{0.6}$ (originally, $DP_{0.1}$) is substituted by a clitic pronoun.

(37)   Spell-out of $DP_{0.6}$ in French $\rightarrow$ *elle mange* 'she eats'

$DP_{0.6}$ $T_{0.6}$(mange)	VI$_{-4}$	DEP$_{-2}$	H
a. mange	0.6	0	-2.4
☞ b. elle mange	0	1	-2

The derivation for Northern Italian dialects is very similar to what has been just shown for French. It has been suggested that subject clitics in NIDs do not behave as pronominal items, but rather as agreement morphemes with a doubling function (see Poletto 1996: 272 and references in section 2.3). Assuming that this view is correct, I suggest that this contrast between French and NIDs can be derived if in NIDs strength is added by introducing an extra D head incorporated into the T head. In NIDs, the input $DP_{0.1}$ $T_{0.6}$ becomes the output $DP_{0.1}$ $D_{0.6}$=T_1. The insertion of an extra D head contributes to strengthening of the T head. Strengthening targets the DP in French, and the T head in NIDs.

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[13] This consideration is comparable to what is implicitly assumed as a trigger for subject movement within the labeling theory (Chomsky 2015; Cecchetto & Donati 2022). In languages where T is too weak, as English, T cannot label the projection. The subject moves to Spec,T to solve the issue. If there is a subject in Spec,TP, then the label becomes $<\phi, \phi>$: ϕP. Hence, English weak T can label TP only after it is "strengthened" by the subject (Chomsky 2015: 10).

The crucial difference between the French derivation in (36) and the NIDs derivation in (38) is the different weight of the constraint DEP[STR], which has more weight (i.e., importance) in NIDs than it has in French. Increasing strength is more "costly" in NIDs than it is in French. In such languages, it is better to introduce new material (thereby violating DEP, see (27)), rather than to manipulate strength, as shown in Tableau (38).

(38)   EPP satisfaction in NIDs ($T_{0.6}$) $\rightarrow$ $DP_{0.1}$ $D_{0.6}$ $T_{0.6}$

$T_{[\bullet D\bullet]0.6}$ ... $DP_{0.1}$	MC_{-20}	*HEAD+SPEC<1_{-10}	DEP[STR]$_{-4}$	DEP$_{-2}$	STAY!$_{-1}$	H
a. $T_{[\bullet D\bullet]0.6}$ $DP_{0.1}$	0.6	0	0	0	0	-12
b. $DP_{0.1}$ $T_{[\bullet D\bullet]0.6}$	0	0.3	0	0	0.1	-3.1
c. $DP_{0.6}$ $T_{[\bullet D\bullet]0.6}$	0	0	0.5	0	0.1	-2.1
d. $DP_{0.1}$ $D_{0.1}$ $T_{[\bullet D\bullet]0.6}$	0	0.2	0	0.1	0.1	-2.3
☞ e. $DP_{0.1}$ $D_{0.6}$ $T_{[\bullet D\bullet]0.6}$	0	0	0	0.6	0.1	-1.3

Candidate (a) has a very low harmonic score because it does not discharge the EPP feature, thereby violating MC. In candidate (b), the satisfaction of the EPP feature introduces a violation of *HEAD+SPEC<1 because both T and the DP are weak. Adding strength to the DP is a possibility, but candidate (c) is not the optimal one because of the penalty from DEP[STR] (compare this candidate with candidate (c) of Tableau (36)). Candidate (d) instead inserts an extra D head in the structure in order to avoid the violation of *HEAD+SPEC<1. Crucially, the weakest D head as possible ($D_{0.1}$), cannot solve the problem: *HEAD+SPEC<1 is still violated. The head to be inserted is 0.6 strong, as the optimal candidate (e) shows. This head increases the total strength of the TP, eliminating the violation given by *HEAD+SPEC<1.[14]

The structure $DP_{0.1}$ $D_{0.6}$ $T_{0.6}$ is the output of the EPP satisfaction step in (38), and the input for the Spell-out step in (39).

(39)   Spell-out of $DP_{0.1}$ $D_{0.6}$ in Basso Polesano $\rightarrow$ *el magna* 'he eats'

$DP_{0.1}$ $D_{0.6}$ $T_{0.6}$(magna)	VI$_{-4}$	DEP$_{-2}$	H
a. magna	0.6 + 0.1	0	-2.8
☞ b. el magna	0.1	1	-2.4

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[14] A further candidate in (38) could simply add strength to T without inserting any additional D head. The input $T_{0.6}$ $DP_{0.1}$ would then become $DP_{0.1}$ T_1. The difference with the French derivation in (36) would be due to specific DEP constraints (DEP[T] for French, DEP[D] for NIDs) that determine which head should not be strengthened in that language. Nonetheless, I prefer not to adopt this approach for the following reasons. It is not obvious how to realize the extra-strength on T as an affix, and how to reconcile it with finite agreement on T, which is instead the Spell-out of a ϕ-probe. Moreover, recall that more strength may correspond to more structure (see pronouns in section 4.2). Thus, strengthening of T can be "translated" into adding more structure, which happens by adjoining an additional D head to the T head. Finally, the account proposed in the paper also explains the doubling character of these clitics.

In Tableau (39), the "real" subject, $DP_{0.1}$, is not spelled out (the NIDs derivation for $DP_{0.1}$ is as the Italian derivation in Tableau (25)). In this sense, NIDs are *pro*-drop languages: super-weak DPs can occupy the subject position (i.e., they are contained in the output of derivation (38)), but then fail to undergo lexicalization, as is the case in Standard Italian. This is in line with the fact that NIDs have been considered as *pro*-drop languages in the previous literature. The situation is different from French, where a super-weak DP never appears in the specifier of T (see derivation (36)). However, NIDs allow super-weak subjects only if extra-strength is added in the form of a "supporting" D head, as shown in the EPP-related derivational step in (38). This extra D head is then spelled out by a clitic pronoun, as in candidate (b) in Tableau (39). In this sense, NIDs are non-*pro*-drop languages. Null subjects always require the presence of a doubling element, $D_{0.6}$. This is realized as a clitic, since these languages have lexical entries for subject clitic pronouns in their lexicon (the NIDs derivation for $D_{0.6}$ is as the Italian derivation for accusative clitics in (30)).

The present analysis predicts that subject clitics in NIDs may result from two different processes: either as doubling element for a super-weak pronoun, as in derivation (39), or as the Spell-out of a weak DP (cf. the similar derivations (29)–(30)). In the former scenario, clitics are closely related to the verb, and behave as inflectional affixes. In the latter case, clitics behave as their French counterpart. Hence, a gradient picture emerges, where not all subject clitics have the same status. This prediction needs to be evaluated with further studies, but at first sight it seems on the right track. As the overview by Poletto & Tortora (2016) shows, subject clitics in NIDs do not form an homogeneous class. In particular, some subject clitics are of the French type. For instance, the dialect of Alasso has the French order between negation and the subject clitic (Poletto & Tortora 2016: 774). In addition, in the variety of Loreo subject clitics are not repeated in coordination (Poletto & Tortora 2016: 778).

The strengthening function of clitics in NIDs can also be identified in some special clitics of some varieties, although further studies are needed for this issue. Some NIDs have clitics that seems to contribute to the well-formedness of the structure, but disappear when there are other clitics. For instance, in Friulan subject clitics are obligatory. However, they are not phonologically realized when they appear in a cluster with other clitics, including negation, direct and indirect objects, impersonal and reflexive arguments (Poletto 1997: 785). This phenomenon seems to indicate that subject clitics of this type do not have anything to do with subject realization, but seem to be some kind of "strength-support" when the T head and its specifier are not strong enough. In fact, they are not present when the total strength is already sufficient.[15]

A final remark on ϕ-features should be done. In NIDs, there is sensitiveness to different ϕ-features (see for instance the Basso Polesano data in section 2.3). Not all subjects require the support of clitics, while second person always requires a clitic or more than one. Second person clitics are the most common ones across NIDS. If a NID has only one clitic, this is a second person clitic (Renzi & Vanelli's (1983) generalization). Note that even in Standard Italian second person is "less *pro*-drop" than other person:

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[15] A similar case seems to be that of auxiliary clitics. The dialect of Cornuda has auxiliary clitics that behave as place holder for clitic positions (Poletto & Tortora 2016: 784-785). Interestingly, these auxiliary clitics disappear when an object clitic is realized in proclisis, as if there would be no need anymore for strengthening.

the pronoun for second person cannot be dropped in the subjunctive, not even when there is a contextually salient second person singular antecedent, as shown in (40).

(40) *So   che hai   provato ma non è   facile che*
      know.PRS.1SG that have.PRS.2SG try.PRTC but not be.PRS.3SG easy that
      *(tu)   possa   riuscirci.
      2SG.NOM can.SUBJ.2SG manage
      'I know that you have tried but it's not going to be easy for you to succeed.'
      (Standard Italian, Cardinaletti 1997)

The general intuition for addressing this problem is that different features may have different strength. In particular, second person should be considered as weaker than other person features. For instance, I suggest that in Basso Polesano the T head requires strengthening when it is marked for second person via agreement with the subject. This goal can be achieved with a markedness constraint specified for second person either in the syntax (a special version of *HEAD+SPEC<1, like *HEAD[ϕ:2]+SPEC[ϕ:2]<2) or at Spell-out (with a constraint that favors the realization of second person, like MAX[ϕ:2]).

To sum up, different languages may exhibit slightly different strategies to reduce the markedness of a weak T with a weak DP. Adding strength is a repair to avoid the violation given by *HEAD+SPEC<1 when the strength of the items within the TP is too low. The difference between the two strategies (the French one, strength-to-DP, and the NIDs one, strength-to-T) is modeled with different weights ascribed to the constraint DEP[STR].

7   PF-LF mismatches

In section 2.2, I have discussed some interpretational differences between *pro* and strong pronouns (in the subject position), and between clitic and strong pronouns (in the object position). I have also shown how these differences are lost when the competition between these items breaks down. In this case, the stronger form surfaces but loses its specific interpretation (Despić 2011; Stegovec 2019).

I repeat a relevant example in (41). Clitics can be interpreted as either referential or bound variables (41a), whereas strong pronouns must be referential (41b). With prepositions, only strong pronouns can appear. In this context where the choice is forced, the strong pronoun behaves as a clitic: it has both strict and sloppy interpretation (41c).

(41) a. *Nessuno$_i$ vuole   che io   lo$_{i,j}$=inviti.*
          nobody   want.PRS.3SG that 1SG 3SG.M.ACC=invite.CONJ.PRS.1SG
          'Nobody$_i$ wants that I invite him$_{i,j}$.'
      b. *Nessuno$_i$ vuole   che io   inviti   lui*$_{i,j}$.*
          nobody   want.PRS.3SG that 1SG invite.CONJ.PRS.1SG 3SG.M
          'Nobody$_i$ wants that I invite him$_{*i,j}$.'
      c. *Nessuno$_i$ vuole   che io   vada   con lui$_{i,j}$.*
          nobody   want.PRS.3SG that 1SG go.CONJ.PRS.1SG with 3SG.M
          'Nobody$_i$ wants that I go with him$_{i,j}$.'

The idea behind the contrast in (41a,b) is that clitics are weak pronouns not only in

the syntax, but also in the semantics. A $DP_{0.6}$ is interpreted in the semantics with less specifications than a DP_1. Instead, strong pronouns are semantically strong in the sense that they receive a complete semantic interpretation. This is also because they introduce a referential index, whereas clitics are defective in this respect and acquire their reference from the context. This fact is generally modeled with extra syntactic structure (Cardinaletti & Starke 1999; Déchaine & Wiltschko 2002; Stegovec 2019).

Mismatches between form and interpretation are possible. In (41c), we see a phonologically strong pronoun with a weak interpretation. This pattern can be explained if the DP is underlyingly weak in the syntax, but it is strengthened at Spell-out. In a sense, it is a "fake" strong pronoun (or "camouflaged", following Despić 2011): the strong form is only superficial and does not correspond to the expect syntactic (and semantic) structure. For PF-LF mismatches of this type, I suggest a similar solution to what I have proposed for lack of *pro*-drop in French and NIDs in section 6. Exactly as the constraint *HEAD+SPEC>1 leads to strengthening of the subject pronoun when T is weak, other markedness constraints cause strengthening of the DP in other configurations. The strong pronoun in (41c) is actually a weak pronoun, as its interpretation shows. However, it is strengthened to avoid the violation of a markedness constraint that does not tolerate weak elements in the complement position of certain heads. For instance, the constraint *P+COMPL<2 penalizes prepositions that combine with weak complements. The derivation for the PP complement in (41c) is as follows.[16]

(42)   Strengthening of clitics after prepositions in Standard Italian $\rightarrow$ P_1 DP_1

P_1 $DP_{0.6}$	*P+COMPL<2$_{-10}$	DEP[STR]$_{-2}$	H
a. P_1 $DP_{0.6}$	0.4	0	-4
☞ b. P_1 DP_1	0	0.4	-0.8

Since in Italian prepositions require strong complements (the head P and its complement must be non-defective, amounting to the total strength of 2), a weak DP complement must undergo strengthening. This conclusion is alike to what has been argued by Despić (2011: 19): "in many cases, overtly strong pronouns in focus positions are in fact *camouflaged* clitics which display all bona fide properties of weak/deficient pronouns". The strength-based analysis of *pro*-drop proposed in this paper can easily cover these cases where a strong pronoun behaves as a weak one. Other PF-LF mismatches, such as those discussed in section 2.2, are accounted for in a similar way. Strong pronouns with weak interpretation correspond to weak elements that have been strengthened in their form because of independent requirements.

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[16] In this paper, I adopt the Y-model of grammar: syntax feeds PF (the phonological module) and LF (the semantic module). The kind of strengthening discussed in this section, which leads to fake strong pronouns, should then happen at a derivational point when it does not influence semantics, namely after Transfer and immediately before Spell-out. This means that the constraint *P+COMPL<2 (and similar constraints that lead to PF-LF mismatches) operates in the post-syntax, differently from *HEAD+SPEC>1. Alternatively, one can imagine that the pronoun is strengthened only after its reference has been established, and that computation of the reference of a pronoun happens before Spell-out, as soon as the conditions for its interpretation are met (hence, immediately for strong pronouns, and after binding for clitics).

8   Conclusion

In this paper, I have proposed that syntactic strength is a property of linguist items that influences their distribution, realization and interpretation. This is a natural implementation of many previous accounts of various phenomena that have been related to a vague concept of "strenght" that was not encoded in the grammar. One such phenomenon is *pro*-drop. In this paper, I have proposed that a null subject is the null realization of a very weak element. This is an option only for those languages where the inflectional head is strong enough, such as Italian. In languages where this is not the case, the weakness of the relevant argument must be compensated with some extra strengthening. Either the argument is strengthened, thereby favoring its lexical realization with the consequence of preventing *pro*-drop, as in French, or the verbal head is strengthened by inserting more structure, resulting in an ambiguous status between *pro*-drop and non-*pro*-drop, as is the case in Northern Italian dialects. Beyond *pro*-drop, this analysis can also explain why a strong element behaves as a weak one in some syntactic contexts: it has simply been strengthened in the syntax because of markedness constraints.

Other phenomena that I could not address for reasons of space can be analyzed with syntactic strength. An example is the ban on weak elements in the object position in Standard Italian (no null referential arguments, and no clitics in the base position). These facts can be simply modeled with a weak V head, and a constraint that causes its complement to be strengthened. The violation of the relevant markedness constraint is avoided by either strengthening the object (no object *pro*), or destroying the offending configuration via repel-based movement (cliticization). Another application of this analysis concerns morphological agreement, which tends to be fully realized in languages with strong T. The idea is that agreement can be subject to impoverishment rules that are sensitive to the strength of the T head. Because strong T resists impoverishment, its ϕ-features make it to Spell-out.

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