Pronoun movement and probe generosity[*]

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Abstract

If elements move to satisfy the needs of a probe, as in a theory of attraction, why can more than one element move? Looking at clitic pronouns, we advance a view of this *probe generosity* motivated by the same economy considerations underlying the Principle of Minimal Compliance (Richards 1997, 1998): once the probe has its needs satisfied by the highest goal, as locality requires, it is free to interact with other goals just in case they would not have done a better job of satisfying those needs. This accounts for a particularly rich system of pronominal cliticization in several Sierra Zapotec languages (Oto-Manguean: Oaxaca), in which movement is restricted both by the Person–Case Constraint (PCC; Perlmutter 1971, Bonet 1991) and by hierarchy-sensitive constraints based on gender. It allows also for a principled understanding of the attested crosslinguistic variation in what might be called, more generally, *Phi–Case Constraints (ΦCCs)*. These form a tightly constrained typology, whose highly asymmetrical shape derives from the cyclic probing enabled by economy-driven probe generosity.

In a theory of attraction, some element (the goal) moves to satisfy the needs of a functional head (the probe) (Chomsky 2000, 2001). In some cases, like clitic pronoun movement in Greek (Anagnostopoulou 2003:194–215) or *wh*-movement in Bulgarian (Rudin 1988), multiple elements can move — and they do so even though the probe can be satisfied by the displacement of just one goal, as evinced by successful derivations containing just one movable element. This ability, of a probe to interact with more goals than it needs to, we call *probe generosity*. It is a simple observation that poses a fundamental mystery: If elements move only to satisfy the needs of a probe, why are such apparently extraneous movements permitted?

For clitic pronouns, answers to this question have largely focused on those configurations in which multiple movements are ruled out. In Greek, for example, it is possible for both an indirect and a direct object pronoun to cliticize (1a), but not if the direct object is first or second person (1b) (Anagnostopoulou 2003:252).

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(1)   a.   Tha **mu**$_1$ **to**$_2$ stilune t_1 t_2.
           FUT **1SG.DAT 3SG.N.ACC** send.3PL

           'They will send it to me.'   (Anagnostopoulou 2005:202)

       b.   * O   Kostas **mu**$_1$ **se**$_2$ sístise t_1 t_2.
           the Kostas **1.DAT 2.ACC** introduced

           Intended: 'Kostas introduced you to me.'   (Bonet 1991:178)

This restriction on the movement of pronouns, based on their person features as well as their hierarchical position (i.e., whether they are the structurally higher or lower argument), is called a *Person–Case Constraint (PCC)* (Perlmutter 1971, Bonet 1991).

     While many languages with clitic pronouns exhibit some restriction on their movement, they do not all have the "Strong" PCC found in Greek. A small typology of these person-based constraints has emerged over the years. As compiled by Nevins (2007, 2011), there is the "Me-First" PCC in Romanian, which prohibits the lower clitic pronoun from being first person (Farkas and Kazazis 1980); and, there is the "Weak" PCC, found in varieties of Spanish (Pancheva and Zubizarreta 2017), which bans third-person pronouns from cliticizing just in case a lower pronoun is local person; and, finally, there is the "Ultrastrong" PCC, attested in Classical Arabic (Fassi Fehri 1993), in which a lower clitic pronoun can never outrank a higher clitic pronoun on a person hierarchy (e.g., $1 > 2 > 3$). (See Pancheva and Zubizarreta 2017 for a comprehensive survey of languages with each constraint.)[1]

     We expand this typology to include the *Gender–Case Constraints (GCCs)* found in several Sierra Zapotec languages (Oto-Manguean: Oaxaca, Mexico). These languages express a finely articulated, largely animacy-based gender system in their third-person pronouns. In one variety, while an animal object pronoun can move when an elder human subject pronoun has moved (2a), the inverse is not possible (2b).

(2)   a.   Blen=**e'**$_1$=**b**$_2$ t_1 t_2.
           hug.COMP=**3.EL=3.AN**

           'S/he (an elder) hugged it (an animal).'   (Laxopa: FSR, SLZ1012, 15:16)

       b.   * Udi'inn=**eb**$_1$=**ne'**$_2$ t_1 t_2.
           bite.COMP=**3.AN=3.EL**

           Intended: 'It (an animal) bit her/him (an elder).' (Laxopa: FSR, SLZ1012, 19:25)

Sierra Zapotec GCCs, which operate over a four-way gender system, give a more fine-grained perspective on the typology of on clitic movement than the more familiar PCCs do. And together, GCCs and PCCs — or, more broadly, *Phi–Case Constraints (ΦCCs)* — reveal this typology to be tightly constrained.

     To derive this typology, we propose a source for probe generosity based in the same economy considerations that underlie the Principle of Minimal Compliance (Richards 1997:225–339, 1998). Even if the first goal encountered by a probe suffices to satisfy its needs, it can move any another goal in its domain that would not have done a better job of satisfying them.

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[1]Sometimes a "Superstrong" PCC is also mentioned. It differs from the Ultrastrong PCC only in prohibiting identical third-person combinations as well (Pancheva and Zubizarreta 2017). We address these combinations, and whether they are actually syntactically ill-formed, later.

(3)   *Economy-Driven Probe Generosity (initial version)*
        A probe P that has been valued (i.e., $\text{VALUE}(P) \neq \varnothing$) can move any goal G that it c-commands iff, for all relevant features F on G, $F \subseteq \text{VALUE}(P)$.

Representing a probe's needs as features that are valued by a goal via Agree (Chomsky 2000:135–137), additional goals can move to the probe, just in case their features are a subset of its value. This permits, in principle, movement of more than one goal. Some goals will not be eligible, though, and this gives rise to the attested constraints on pronoun movement based on person and gender.

With this source for probe generosity, the probe interacts with more than one goal, but it does so cyclically, one at a time. The most familiar accounts of the Strong PCC also appeal to cyclic probing (Béjar and Rezac 2003, Anagnostopoulou 2003:280–306, among others), though they trace its source to the needs of probes, which can be generous as long as their needs remain unsatisfied. While such an account perhaps could be extended to the GCCs in Sierra Zapotec for basic cases, we argue that it provides no way of understanding why these constraints are lifted in ditransitives. In subject–indirect object–direct object clusters, as we will see, GCCs are enforced when comparing the first and second pronouns, but not the second and third.

Ours is not the first account of the typology of such constraints on pronoun movement. For PCCs, Nevins (2007, 2011) advances a theory, building on work by Anagnostopoulou (2005), that assumes a parallel source for probe generosity. The probe interacts simultaneously with all goals in its domain (cf. Hiraiwa 2000), subject to certain restrictions based on the features of the goals and the relativization of the probe. While this can be generalized to generate the attested ΦCCs, it cannot explain why these are the only constraints on pronoun movement that are attested. By allowing the probe to interact with all goals in parallel, it is silent about why the typology of pronoun constraints is highly asymmetrical. This arises directly, by contrast, from the cyclic probing that is enabled by the source we propose for probe generosity.

1   Constraints on pronoun movement in Zapotec

Several closely-related Zapotec varieties from the Sierra Norte of Oaxaca — or simply, Sierra Zapotec — exhibit a four-way strictly semantic distinction in gender based on animacy, humanness, and formality. They oppose elder humans (EL), non-elder humans (HU), animals (AN), and inanimates (IN). These gender distinctions are primarily realized in the languages' third person pronouns, as shown in Table 1 for the Zapotec variety spoken in Santiago Laxopa.[2]

In all persons and genders, these languages have two series of pronouns, corresponding to strong and clitic pronouns in Cardinaletti and Starke's (1999) typology. As we will see below, the clitic pronouns undergo movement, subject to three constraints: the Strong PCC, a GCC, and an additional constraint on identical adjacent pronouns. The forms of the GCCs differ across Laxopa Zapotec[3] and the other two varieties we consider, those from (Hidalgo) Yalálag (López and

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[2]The Zapotec languages, a group of Oto-Manguean languages spoken throughout Oaxaca, Mexico, all have elaborate gender systems. The Northern Zapotec languages from the Sierra Norte that we report on here have a four-way gender distinction, but other Zapotec languages formally mark additional gender categories, including adult male, adult female, child, baby, young unmarried man, deity, and disparaged referent (Marlett 2010).

[3]We include here speakers from (Santiago) Laxopa itself, as well as the smaller neighboring town of San Sebastián Guiloxi. While there are very minor differences between the varieties, there is no variation, as far as we know, between them in the phenomena that we consider.

	STRONG	CLITIC		STRONG	CLITIC
1SG	*neda'*	*=a'*	**3.EL**	*llè'*	*=e'* ∼ *=ne'*
1PL.EXCL	*dziu'*	*=dzu*	**3.HU**	*lleba'*	*=ba'*
1PL.INCL	*netu'*	*=tu'*	**3.AN**	*lleb*	*=(e)b*
2SG	*lé'*	*=u'*	**3.IN**	*llen*	*=(e)n*
2PL	*le'e*	*=le*			

Table 1: Strong and clitic pronouns in Santiago Laxopa Zapotec (Toosarvandani 2017:129)

Newberg 2005, Avelino Becerra 2004) and (San Bartolomé) Zoogocho (Long and Cruz 2000, Sonnenschein 2004). Before looking at these constraints in detail, we first consider how and why pronouns move in Sierra Zapotec.

1.1 Pronouns and pronoun movement

The two series of pronouns are used in a range of syntactic environments, including as arguments of the verb (subject, direct object, and indirect objects), possessors, and complements of some prepositions.[4] Their form is, for the most part, invariant across these grammatical functions.[5]

At least for pronouns in subject position, their distribution is one familiar from Cardinaletti and Starke's (1999) typology. The clitic pronoun appears obligatorily in information-structurally neutral contexts, e.g., out of the blue or with broad focus.

(4)   a.   Dzaw{**=a'**,   ***neda'**} yet.
            eat.CONT=**1SG** **1SG**   tortilla
            'I am eating a tortilla.'   (Laxopa: RM, GZYZ048, 05:08)

       b.   Tsini'a{**=ba'**,   ***lleba'**} behle' jed.
            cook.CONT=**3.AN** **3.AN**   meat chicken
            'S/he is cooking chicken.'   (Laxopa: RDR, SLZ1029, 22:26)

The strong forms appear when the pronoun bears narrow focus in a postverbal position, as well as when a pronoun is a fragment answer, undergoes focus movement, or is in a coordination structure.

Up to three pronouns can move. A subject of any gender — as well as any person — can appear as a clitic pronoun (5a–d). When direct or indirect objects are a clitic pronoun, they follow the subject in a rigid order: subject–indirect object–direct object (6a–b).

(5)   a.   Shlag**=e'**   beku'.
            kick.CONT=**3.EL** dog
            'S/he is kicking out the dog.'   (Laxopa: FSR, SLZ067-s, 5)

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[4]The data presented in this section comes entirely from Laxopa, though the generalizations extend as far as we know to the other Sierra varieties.

[5]There is only one exception that we know of. In some varieties, there is a separate series of clitics used for experiencer subjects, e.g., in Zoogocho (Sonnenschein 2004:44–47). The vowel in the third person animal and inanimate clitics is only epenthetic, inserted to avoid certain consonant clusters. And, the two allomorphs of the third person elder clitic, *=e'* and *=ne'*, are conditioned by linear order, as we discuss below. The former appears first in a clitic cluster, with the latter appearing in all other positions (Foley et al., to appear-a).

b. Shle'e=**ba'** yet=e'n.
smell.CONT=**3.HU** tortilla=DEF

'S/he smells the tortilla.' (Laxopa: FSR, SLZ003-s, 3)

c. Shtahs=**eb**.
sleep.CONT=**3.AN**

'It is sleeping.' (Laxopa: FSR, SLZ056-s, 11)

d. Bzhu'u=**n**.
rip.COMP=**3.IN**

'It ripped.' (Laxopa: FSR, SLZ032-s, 3)

(6) a. Blen=**ba'=b**.
hug.COMP=**3.HU=3.AN**

'S/he hugged it.' (Laxopa: FSR, SLZ1012, 16:53)

b. Tsgaw=**a'=ba'=n**.
feed.CONT=**1SG=3.HU=3.IN**

'I feed it to her/him.' (Laxopa: FSR, SLZ1017, 36:30)

To appear on the verb, clitic pronouns undergo syntactic movement. Cliticization is, for instance, not permitted out of a coordination structure; instead a strong pronoun is required.

(7) a. * Ts-ja-wi=**e'**₁ [t₁ na xna'=a'] taw=a'.
CONT-AND-visit=**3.EL** and mother=1SG grandmother=1SG

'S/he and my mother went to visit my grandmother.'
(Laxopa: RM, GZYZ052, 57:32)

b. Ts-ja-wia [**lle'** na xna'=a'] taw=a'.
CONT-AND-visit **3.EL** and mother=1SG grandmother=1SG
(Laxopa: RM, GZYZ052, 56:25)

At least for the highest pronoun, this movement is driven by the needs of a functional head, as in a theory of attraction. The probe searches its c-command domain for a suitable goal, subject to standard locality conditions, i.e., Relativized Minimality (Rizzi 1990) or Attract Closest (Chomsky 2000:122). When it finds one, movement of this closest goal can ensue.

(8)
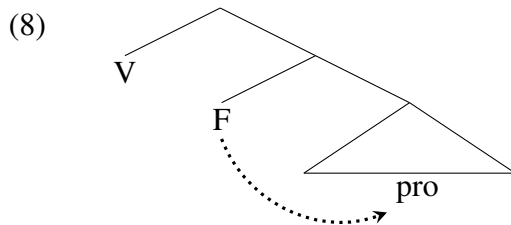
Sichel and Toosarvandani (2018) argue that this pronoun movement involves attraction, based on certain intervention effects. An object pronoun can move only if the subject is also a pronoun that moves (9a). When the subject is an R-expression, the object can only be a strong pronoun (9b); cliticization across (9c) or onto (9d) the subject is prohibited.

(9)　a.　Betw=**ba'=b**.
　　　hit.COMP=**3.HU=3.AN**
　　　'S/he hit it.'　　　　　　　　　　　　　　　　　　(Laxopa: RDR, SLZ1029-s, 3)

　　b.　Betw　Maria **lleb**.
　　　hit.COMP Maria **3.AN**
　　　'Maria hit it.'　　　　　　　　　　　　　　　　　　(Laxopa: RDR, SLZ1029, 28:07)

　　c.　* Betw=**b**$_2$　　Maria$_1$ t$_2$.
　　　hit.COMP=**3.AN** Maria
　　　Intended: 'Maria hit it.'　　　　　　　　　　　　　(Laxopa: RDR, SLZ1029, 29:34)

　　d.　* Betw　　Maria$_1$=**b**$_2$　t$_2$.
　　　hit.COMP Maria=**3.AN**
　　　Intended: 'Maria hit it.'　　　　　　　　　　　　　(Laxopa: RDR, SLZ1029, 30:12)

This pattern is expected if R-expressions count as interveners, even if they are not able to move themselves (see Preminger, to appear for one proposal for why this might be).

We will assume that clitic pronouns originate inside a "big DP" (Uriagereka 1995, Nevins 2011, a.o.), and that they move via phrasal movement to the specifier of a functional head (Nevins 2007, 2011). This is simply for concreteness. As far as we know, everything we say is compatible with clitic pronouns moving by head movement, as Preminger (to appear) recently proposes, or even realizing a functional head, with their DP associate moving covertly (Sportiche 1993). Here, we focus on the constraints on this movement (see Anagnostopoulou 2006 for an overview of these issues).

1.2　Three constraints on pronoun movement

In Sierra Zapotec, all subject pronouns can move, as shown in 5a–d above, and indeed must in neutral contexts. But, in monotransitive clauses, movement of the lower pronoun — the object — is subject to three constraints based on the person and gender of both the subject and object.

This is perhaps most clear in Yalálag Zapotec. Setting aside plural pronouns, the realization of all possible person–gender combinations for subject and object pronouns is shown in Table 2. When movement of the lower pronoun is restricted, that cell is colored a shade of gray.

		OBJECT					
		1SG	2SG	3.EL	3.HU	3.AN	3.IN
SUBJECT	1SG	–	*V=a'…rwe'*	*V=e'*[6]	*V=a'=be'*	*V=a'=ba'*	*V=a'=n*
	2SG	*V=o'…nada'*	–	*V=o=e'*	*V=o'=be'*	*V=o'=ba'*	*V=o'=n*
	3.EL	*V=e'…nada'*	*V=e'…rwe'*	*V=e'…le'e*	*V=e'=be'*	*V=e'=ba'*	*V=e'=n*
	3.HU	*V=be'…nada'*	*V=be'…rwe'*	*V=be'…le'e*	*V=be'…lebe'*	*V=be'=ba'*	*V=be'=n*
	3.AN	*V=ba'…nada'*	*V=ba'…rwe'*	*V=ba'…le'e*	*V=ba'…lebe'*	*V=ba'…leba'*	*V=ba'=n*
	3.IN	*V=en…nada'*	*V=en…rwe'*	*V=en…le'e*	*V=en…lebe'*	*V=en…leba'*	*V=en…len*

Table 2: *Pronoun combinations in Yalálag (López and Newberg 2005:8)*

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[6]For this combination, a general phonological process of vowel coalescence turns the underlying sequence of =a'=e' into =e'.

In all Sierra Zaptoec varieties, when the lower pronoun cannot move — for any of the reasons we will discuss — it is realized as a strong pronoun, as shown for Yalálag in 10 (see Foley et al., to appear-a for Laxopa and Sonnenschein 2004:38 for Zoogocho).

(10)   a.   * Bdinn=**ba'=be'**.
             bite.COMP=**3.AN=3.HU**
             Intended: 'It bit [her]/him.'

       b.   Bdinn=**ba'**   **lebe'**.
             bite.COMP=**3.AN 3.HU**
             'It bit [her]/him.'   (Yalálag: Avelino Becerra 2004:34)

Moving forward, we will condense somewhat overfull representations like Table 2 into more manageable matrices like 11. The vertical axis will always represent the structurally higher argument, while the horizontal axis will represent the structurally lower argument. For Sierra Zapotec, these will be the subject and object, respectively, but in other languages it may be the indirect and direct object.

(11)   *Yalálag*

	1SG	2SG	3.EL	3.HU	3.AN	3.IN
1SG	–	*	✓	✓	✓	✓
2SG	*	–	✓	✓	✓	✓
3.EL	*	*	(✓)	✓	✓	✓
3.HU	*	*	*	(✓)	✓	✓
3.AN	*	*	*	*	(✓)	✓
3.IN	*	*	*	*	*	(✓)

A checkmark indicates that movement of the lower pronoun is syntactically grammatical, while an asterisk indicates that it is syntactically ungrammatical. As we discuss below, sometimes pronoun movement is filtered morphologically, even though it is syntactically well-formed; this is represented by putting parentheses around the checkmark. (The two combinations with identical local-person pronouns are ruled out for binding theoretic reasons, and so we set them aside.)

The first restriction on pronoun movement is the Strong PCC (the darkest shade of gray). It prohibits movement of object pronouns that are local person.

(12)   *Strong PCC (all Sierra Zapotec varieties)*
       An object clitic pronoun cannot be local (first or second) person.

In Greek, the Strong PCC similarly constrains the lower of two arguments, though these are the indirect and direct object, e.g., 1 (Anagnostopoulou 2003:251–252). The Strong PCC is shown for Yalálag below, but it is found in all three Sierra Zapotec varieties (see Toosarvandani 2017:131 on Laxopa and Sonnenschein 2004:54 on Zoogocho).

(13)   a.   *1 ≫ 2*

             * Bi   llre'=**la'=o'**.
             NEG see.HAB=**1SG=2SG**

             Intended: 'I don't see you.'

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b. *2 ≫ 1*
    * Bi   llre'**=lo'=a'**.
    NEG see.HAB**=2SG=1SG**
    Intended: 'You don't see me.'

c. *3 ≫ 1*
    * Bnaw**=ba'=a'**.
    follow.COMP**=3.AN=1SG**
    Intended: 'It followed me.'

d. *3 ≫ 2*
    * Bet=te**=ba'=o'**.
    kill.COMP=ASS**=3.AN=2SG**
    Intended: '[It] killed you.'   (Yalálag: Avelino Becerra 2004:32–33)

The Strong PCC is what we might call an *absolute* constraint on pronoun movement, since it bans one or more person–gender categories from a grammatical position. This corresponds to ruling out two entire columns in the paradigm above, including some cells above the diagonal.

Besides this constraint, a third-person object pronoun cannot cliticize if it has the same form as the subject pronoun. This rules out the third-person combinations along the diagonal (the lightest shade of gray).

(14) a. * Bchew**=e'=e'**.
          kick.COMP**=3.EL=3.EL**
          Intended: 'He kicked him.'   (Avelino Becerra, p.c.)

     b. * Llne'**=be'=be'**.
          speak.HAB**=3.HU=3.HU**
          Intended: 'He is speaking to him.'

     c. * Bdinn**=ba'=ba'**.
          bite.COMP**=3.AN=3.AN**
          Intended: 'It bit it.'

     d. * Bchochj**=en=en**.
          bite.COMP**=3.IN=3.IN**
          Intended: 'It hit it.'   (Yalálag: after Avelino Becerra 2004:34–35)

Foley et al. (to appear-a) argue that this is a morphological, not a syntactic, constraint (cf. Nevins 2007 for 3–3 combinations in Spanish), which prohibits adjacent clitic pronouns from being exponed identically.

(15)   **X–X Constraint (cf. Foley et al., to appear-a)*
       Adjacent clitic pronouns cannot have the same morphological exponent.

The combinations in 14a–d thus are syntactically well-formed, though they are filtered morphologically.

The morphological nature of this constraint cannot be determined solely by looking at Yalálag, since the combinations along the diagonal are also featurally identical. But comparison across

Zapotec varieties shows that the *X–X Constraint really is a morphological one. In Laxopa, as well as in Zoogocho (see Sonnenschein 2004:54), the elder clitic pronoun has two allomorphs conditioned entirely by morphological environment: =*e'* appears immediately following the verb (16a), while =*ne'* appears elsewhere, for instance in non-initial position (16b).

(16)   a.   Ba   gut=**e'**.
                  already die.COMP=**3.EL**
                  'S/he already died.'   (Laxopa: RDR, SLZ1029-s, 12)

           b.   Ba   betw=u'=**ne'**.
                  already hit.COMP=2SG=**3.EL**
                  'You already hit her/him.'   (Laxopa: RDR, SLZ1029-s, 13)

This allomorphy is not conditioned by syntactic position, but entirely by linear adjacency to the verb. In positive imperatives, which do not have an overt subject, the initial allomorph =*e'* is used for a third-person elder object (as has also been observed for another closely related variety; López Nicolás 2009:15).

(17)   B-ja-wi=**e'**!
        COMP-AND-visit=**3.EL**
        'Go visit her/him!'   (Laxopa: RDR, SLZ1029-2, 14)

The crucial point here is that, in Laxopa and Zoogocho, a combination of two elder clitic pronouns is well-formed, since the *X–X Constraint is not violated in these varieties, which have distinct exponents for them.[7] (See Foley et al., to appear-a for a similar argument involving experiencer subjects.)

(18)   a.   Bdell=**e'**=**ne'**.
                  hug.COMP=**3.EL**=**3.EL**
                  'S/he (an elder) hugged her/him (an elder).'   (Laxopa: RM, GZYZ030, 34:15)

           b.   Na da Dolor=en'   dxe=**e**=**ne'**...
                  and late Dolores=DEF say.CONT=**3.EL**=**3.EL**
                  'And the late Dolores said to him...'   (Zoogocho: Sonnenschein 2004:384)

By analogy, we take all the third-person combinations on the diagonal to be syntactically grammatical, though some of them may be ruled out morphologically in certain varieties. It will thus be necessary to account for why both pronouns can move in these combinations.

Finally, there are further restrictions on combinations of third-person pronouns based on gender, and specifically a hierarchy of gender categories: EL > HU > AN > IN. For Yalálag, this constraint, stated in 19, prohibits an object pronoun from moving when it exceeds the subject pronoun on this hierarchy.

(19)   *Gender–Case Constraint (Yalálag)*
        An object clitic pronoun cannot exceed a subject clitic pronoun on the gender hierarchy.

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[7]There is some interspeaker variation within Laxopa Zapotec in the grammaticality of 18a. We suspect that the morphological constraint in 15 may, for some speakers, be stated in terms of featural makeup and not morphological exponents. We do not find such variation within a speech community to be surprising: for three out of four gender categories, featural and phonological identity are indistinguishable.

In contrast to the Strong PCC, this GCC in Yalálag is a *relative* constraint on pronoun movement. Clitic pronouns from a given gender category — say, animal — are not prohibited categorically from occupying object position, only if they are more animate than the subject pronoun.

(20) a. Bchew=**be'=ba'**.
          kick.COMP=**3.HU=3.AN**
          '[S/h]e kicked it.'
    b. * Bdinn=**ba'=be'**.
          kick.COMP=**3.AN=3.HU**
          'It bit [her]/him.'   (Yalálag: Avelino Becerra 2004:34)

Unlike the Strong PCC, however, which all three Sierra Zapotec varieties share, there are differences in the GCC they have.

1.3 Variation in Gender–Case Constraints

While all three Sierra varieties have a relative constraint on pronoun movement that refers to gender, their shapes vary (Sonnenschein 2004:51–54, Foley et al., to appear-b):

○ Yalálag enforces the gender hierarchy strictly: no object clitic pronoun can ever outrank a subject clitic pronoun (Avelino Becerra 2004:33–34, López and Newberg 2005:8).

(21) *Yalálag*

	1SG	2SG	3.EL	3.HU	3.AN	3.IN
1SG	–	*	✓	✓	✓	✓
2SG	*	–	✓	✓	✓	✓
3.EL	*	*	(✓)	✓	✓	✓
3.HU	*	*	*	(✓)	✓	✓
3.AN	*	*	*	*	(✓)	✓
3.IN	*	*	*	*	*	(✓)

○ Laxopa generally obeys the same gender hierarchy, prohibiting most of the same combinations of clitic pronouns, except one: an elder object is possible with a non-elder subject (Toosarvandani 2017:131).

(22) *Laxopa*

	1SG	2SG	3.EL	3.HU	3.AN	3.IN
1SG	–	*	✓	✓	✓	✓
2SG	*	–	✓	✓	✓	✓
3.EL	*	*	(✓)	✓	✓	✓
3.HU	*	*	✓	(✓)	✓	✓
3.AN	*	*	*	*	(✓)	✓
3.IN	*	*	*	*	*	(✓)

In one way of understand this GCC, the hierarchy is only enforced for combinations involving non-human subject pronouns.

(23) *Gender–Case Constraint (Laxopa)*
If a subject clitic pronoun is non-human, an object clitic pronoun cannot exceed it on the gender hierarchy.

○ Zoogocho is the most lenient variety. The only combinations it disallows are ones with inanimate subject clitic pronouns (Sonnenschein 2004:54).

(24) *Zoogocho*

	1SG	2SG	3.EL	3.HU	3.AN	3.IN
1SG	–	*	✓	✓	✓	✓
2SG	*	–	✓	✓	✓	✓
3.EL	*	*	(✓)	✓	✓	✓
3.HU	*	*	✓	(✓)	✓	✓
3.AN	*	*	✓	✓	(✓)	✓
3.IN	*	*	*	*	*	(✓)

This GCC can be understood as the gender hierarchy only applying when the subject is an inanimate pronoun.

(25) *Gender–Case Constraint (Zoogocho)*
If a subject clitic pronoun is inanimate, an object clitic pronoun cannot exceed it on the gender hierarchy.

It is necessary to account for why, in a given language, a probe is able to move more than one goal, though not in the combinations ruled out by a PCC or GCC. At the same time, the variation observed across Sierra Zapotec in these constraints introduces a more ambitious goal, to explain why the attested constraints on pronoun movement have the shape they do. We aim to derive this typology, though to motivate our account we start with the first goal. We argue next that, based on certain syntactic contexts where gender-based constraints on movement are lifted, the generosity of probes cannot be reduced simply to their needs.
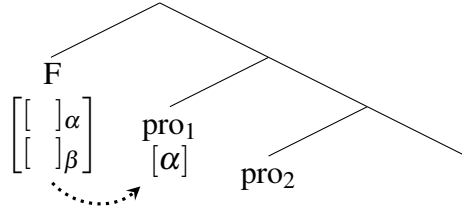
2   How needy are probes?

One obvious solution to the problem of probe generosity would be to deny that there is a problem to begin with. In other words, when we see a probe interacting with more than one goal, its needs have not been completely satisfied by the first goal it finds. So the probe can search again to find another. This possibility — which we might call *need-based* probe generosity, as a probe does not satisfy all its needs at once — underlies one familiar theory of the Strong PCC.
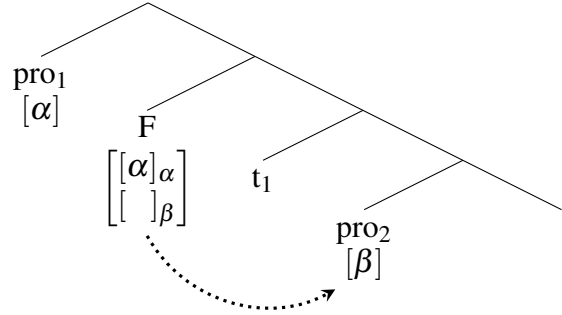
If a probe's needs are represented as a *relativization*, a set of unvalued features that receive their value through Agree (Chomsky 2000, 2001), it is not implausible that these relativizations might be ordered. Béjar and Rezac (2003) and Anagnostopoulou (2003:280–306) propose that a probe can bear just such a sequence of unvalued features (see also Coon and Keine 2018). Even if valuing one of these *subprobes* leads to movement of a pronoun (26a), the probe can look for another pronoun to value the next subprobe (26b).

(26)   a.

$$\begin{array}{l} \text{F} \\ \begin{bmatrix} [\ \ ]\alpha \\ [\ \ ]\beta \end{bmatrix} \end{array} \quad \begin{array}{l}\text{pro}_1 \\ [\alpha]\end{array} \quad \begin{array}{l} \\ \text{pro}_2\end{array}$$

b.

$$\begin{array}{l}\text{pro}_1 \\ [\alpha]\end{array} \quad \begin{array}{l}\text{F} \\ \begin{bmatrix}[\alpha]\alpha \\ [\ \ ]\beta\end{bmatrix}\end{array} \quad t_1 \quad \begin{array}{l}\text{pro}_2 \\ [\beta]\end{array}$$

The assumptions here about Agree are standard: (i) Agree operates downward, so that the probe must c-command the goal, and (ii) it is subject to a locality condition: a probe can only Agree with the closest matching goal (Chomsky 2000:122–123).[8]

With this source for probe generosity, more than one pronoun can move, because of how the probe's relativization is sequenced. And these can be sequenced so that not all pronouns can move from all positions. This is the mechanism, according to Béjar and Rezac and Anagnostopoulou, that underlies the Strong PCC. As we discuss below, it can be extended to GCCs in Sierra Zapotec, at least in monotransitive clauses. However, this kind of explanation does not account for why these constraints are lifted in ditransitives, where object pronouns are able to move freely regardless of their respective genders. We thus conclude that there must be another source for probe generosity.

Besides sequencing the probe's unvalued features, there are other ways of thinking about how the needs of a probe might be deferred. Probes could simply be articulated, so that their features, while not intrinsically ordered, could be valued independently of one another (Béjar 2003, Béjar and Rezac 2009, Walkow 2012). Or, the ordering of subprobes could be cashed out in the sequence of functional projections, with each of a probe's unvalued features corresponding to a distinct functional head (Bianchi 2006, Preminger 2014:31–39). While these alternatives come with substantively different commitments, we stick to the version of probe generosity illustrated in 26 to make our point.

2.1   Deriving the Strong PCC

The Strong PCC is an absolute constraint on pronoun movement. Stated in its most general form, it prohibits a lower pronoun from moving just in case it is first or second person.

(27)   *Strong PCC*
   A lower clitic pronoun cannot be local (first or second) person.

This abstracts away from the specific grammatical roles of the pronouns involved, whether indirect and direct objects, as in Greek (1), or the subject and object, as in Sierra Zapotec (13).

This constraint on pronoun movement arises, Béjar and Rezac (2003) and Anagnostopoulou (2003:280–306) propose, from the sequencing of a probe's relativization — and, in particular, the resulting ability it has to distinguish between goals based on which subprobe they value. If the probe is sequenced so that it looks for two different features — say, α and β, as in 26 above — it searches for α first. If α is π (person), the closest pronoun, regardless of its person, will always
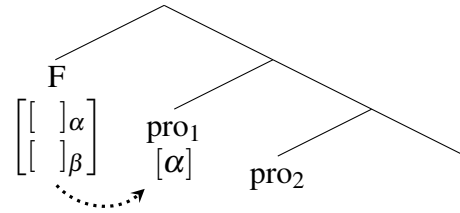
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[8]For a probe P, a matching goal G is the closest to P iff there is no matching goal G' such that P c-commands G' and G' c-commands G (Chomsky 2000:122).

be able to value this subprobe and move out of the domain of the probe, shown for a grammatical combination in 28a and an ultimately ungrammatical one in 28b.
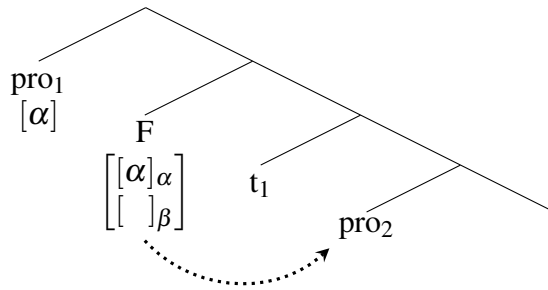
(28)   a. *1 ≫ 3*

   F
   $\begin{bmatrix} [\ \ ]\alpha \\ [\ \ ]\beta \end{bmatrix}$ pro$_1$
   [α]
              pro$_2$

   b. **1 ≫ 2*
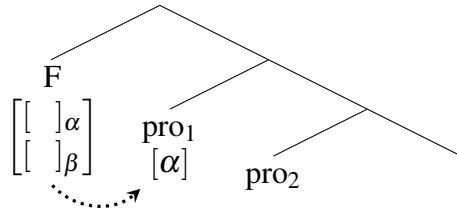
   F
   $\begin{bmatrix} [\ \ ]\alpha \\ [\ \ ]\beta \end{bmatrix}$ pro$_1$
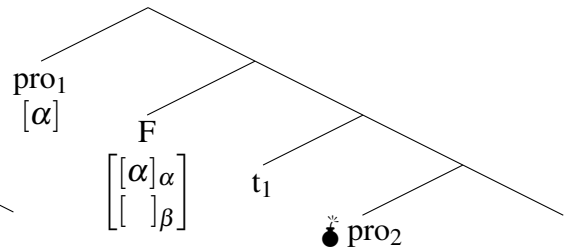   [α]
              pro$_2$

The probe can then look again for β, finding the lower pronoun. When this is third person, the second subprobe can be valued and the pronoun can move (29a). But something must go awry in derivations where it is a local-person pronoun, where it does not move (29b).

(29)   a. *1 ≫ 3*

   pro$_1$
   [α]
        F
        $\begin{bmatrix} [\alpha]\alpha \\ [\ \ ]\beta \end{bmatrix}$ t$_1$
                   pro$_2$

   b. **1 ≫ 2*

   pro$_1$
   [α]
        F
        $\begin{bmatrix} [\alpha]\alpha \\ [\ \ ]\beta \end{bmatrix}$ t$_1$
                   💣 pro$_2$

For Béjar and Rezac, a local-person pronoun cannot move from this position because of a requirement that the pronoun itself imposes. This *Person Licensing Condition* requires local-person clitic pronouns to Agree with a functional head in person (see also Preminger 2011:925–934).

(30)   *Person Licensing Condition (cf. Béjar and Rezac 2003:53)*
       A first- or second-person clitic pronoun must enter into an Agree relation for person.

A local-person pronoun thus can never move from the lower position, since by that point in the derivation the probe's person feature will have already been valued. Whatever β in 29b is — usually it is taken to be # (number) — it is not sufficient to satisfy the Person Licensing Condition. Third-person pronouns, by contrast, can move from this position because they are not subject to the same requirement.

2.2 The irrelevance of person licensing

The Person Licensing Condition actually turns out to play only an instrumental role in this account, once the Strong PCC is considered from a broader typological perspective (see also Coon and Keine 2018). No condition like the one in 30 can be involved in deriving the GCCs in Sierra Zapotec, since they are *relative* constraints on pronoun movement. There is no single class of pronouns that must Agree with a certain category. In Yalálag, whether or not an object pronoun moves will always depend on both its gender and the subject's. For instance, a human object pronoun can move if the subject pronoun is elder or human, but not if it is animal or inanimate.

(31)   *Gender–Case Constraint (Yalálag)*
         An object clitic pronoun cannot exceed a subject clitic pronoun on the gender hierarchy.

Moreover, this special licensing requirement would bear responsibility for deriving the attested variation in GCCs. But this seems extremely unlikely: neither the gender hierarchy nor the inventory of pronouns appears to vary across Sierra Zapotec, just the constraints on their movement (cf. Coon and Keine 2018).[9]

But the underlying logic of need-based probe generosity does not really require the Person Licensing Condition. To derive the Strong PCC, all that is necessary is for the probe to have two subprobes: the first finds any pronoun, while the second can only find third-person pronouns. This probe is shown in 32, where each subprobe is defined extensionally by the goals that can value it. Since the second subprobe can only be valued by a third-person pronoun, a local-person pronoun can never move from a lower position.

(32) $$\begin{bmatrix} [\quad]_{\{1,\,2,\,3\}} \\ [\quad]_{\{3\}} \end{bmatrix}$$

Of course, with a standard feature geometry for person, in which third person has a proper subset of the features of local person, it would not be possible to identify the subprobes in 32 with distinct features. Anagnostopoulou (2003:288) offers one way of deriving this probe's effects, by imposing a matching constraint on probing (see Coon and Keine 2018 for a related, but different idea).[10]

To derive the GCC in 31, then, what is needed is a very fine-grained probe that can only Agree with goals in descending order down the gender hierarchy (see Bianchi 2006 and Walkow 2012 for proposals very much in this spirit, though they deploy different assumptions about how probes are structured). The most compact such probe is shown in 33, though there are others with an equivalent effect.

(33) $$\begin{bmatrix} [\quad]_{\{1,\,2,\,3.\textsc{el}\}} \\ [\quad]_{\{3.\textsc{el},\,3.\textsc{hu}\}} \\ [\quad]_{\{3.\textsc{hu},\,3.\textsc{an}\}} \\ [\quad]_{\{3.\textsc{an},\,3.\textsc{in}\}} \\ [\quad]_{\{3.\textsc{in}\}} \end{bmatrix}$$

For combinations of subjects and objects, this derives, along with the Strong PCC, the GCC in Yalálag: the lower pronoun must be third person and either equal to or lower than the higher pronoun on the gender hierarchy. (There must be an independent restriction on how many pronouns can move; five are not possible, as far as we know.)

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[9]This is true more generally. As others have observed for person (Nevins 2007, 2011, Anagnostopoulou 2005, Pancheva and Zubizarreta 2017), the range of PCCs that are attested — not just Strong, but also Me-First, Weak, and Ultrastrong — forestalls any account that relies on certain classes of pronouns having special properties. Just like the GCCs in Sierra Zapotec, the Weak and Ultrastrong PCCs require reference to both the lower and higher clitics' φ-features, ruling out certain combinations based on their relative positions on a person hierarchy.

[10]The second subprobe can only be valued if the goal matches, in some particular sense, the value for the first subprobe. Thus, the probe can only enter into an Agree relation with a third-person pronoun in the lower position.

2.3 The problem with ditransitives

This cannot, however, account for pronoun movement in ditransitives. Given the order of subprobes in 33, pronouns should move in a strictly hierarchy-obeying way. This is indeed possible (34a), but the direct object can also exceed the indirect object on the gender hierarchy (34b) (Toosarvandani 2017:136–137).[11]

(34)　a.　Ba　　blo'ed=a'$_1$**=ne'**$_2$**=b**$_3$　　　　t$_1$ t$_2$ t$_3$.
　　　　　already show.COMP=1SG**=3.EL=3.AN**
　　　　　'I already showed it to her/him.'　　　　　(Laxopa: RM, GZYZ015, 49:45)

　　　b.　Ba　　blo'ed=a'$_1$**=b**$_2$**=ne'**$_3$　　　　t$_1$ t$_2$ t$_3$.
　　　　　already show.COMP=1SG**=3.AN=3.EL**
　　　　　'I already showed her/him to it.'　　　　　(Laxopa: RM, GZYZ015, 48:35)

It is not simply the case that these constraints somehow do not apply in ditransitives: both the PCC (35a) and GCC (35b) hold between subject and indirect object.

(35)　a.　* Elo'ed**=ba'**$_1$**=o'**$_2$　　t$_1$ t$_2$　bidao'$_3$.
　　　　　show.POT**=3.AN=2SG**　　　　child
　　　　　Intended: 'S/he will show the child to you.'　　(Laxopa: RM, GZYZ017, 10:08)

　　　b.　* Be**=ba**$_1$**=ba'**$_2$　　　t$_1$ t$_2$　yej　　ni$_3$.
　　　　　give.COMP**=3.AN=3.HU**　　　flower this
　　　　　Intended: 'It gave this flower to her/him.'　　(Laxopa: RM, GZYZ017, 54:27)

If probes are generous only to satisfy their own needs, there is no way to ruling in both ditransitive combinations (34a–b) while also deriving the contrast between the parallel subject–object combinations (36a–b).

(36)　a.　Blen**=e'**$_1$**=b**$_2$　　　t$_1$ t$_2$.
　　　　　hug.COMP**=3.EL=3.AN**
　　　　　'S/he hugged it.'　　　　　　　　　　(Laxopa: FSR, SLZ1012, 15:16)

　　　b.　* Udi'inn**=eb**$_1$**=ne'**$_2$　　t$_1$ t$_2$.
　　　　　bite.COMP**=3.AN=3.EL**
　　　　　Intended: 'It bit her/him.'　　　　　　(Laxopa: FSR, SLZ1012, 19:25)
　　　　　[FSR: "*Udi'innebne'*??　No!"]

Simply adding more subprobes to the probe in 34 to allow for an elder pronoun to be attracted after an animal pronoun in 35b would, undesirably, rule in ungrammatical monotransitive cases as well.

We take this to show that there is another reason that pronouns can move. In ditransitives, while the highest pronoun plausibly moves to satisfy the needs of the probe, there is no way of understanding what these needs are such that they could motivate movement of the other pronouns to give rise to both combinations in 34a–b. There must, in other words, be another source for probe generosity.

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[11]We asked three speakers from Laxopa for their judgments of 34a–b. They all accepted both combinations as possible, though they sometimes also offered an alternative without movement of one object. This contrasts strikingly with their reactions to the parallel two-pronoun combinations. While the combination in 36a was readily accepted, the one in 36b was immediately rejected as ungrammatical.

3 A different source for probe generosity

The patterns of pronoun movement in Sierra Zapotec suggest another way in which a probe can interact with more than one goal. This still happens, we argue, cyclically with a functional head finding goals one at a time.

(37)   a.
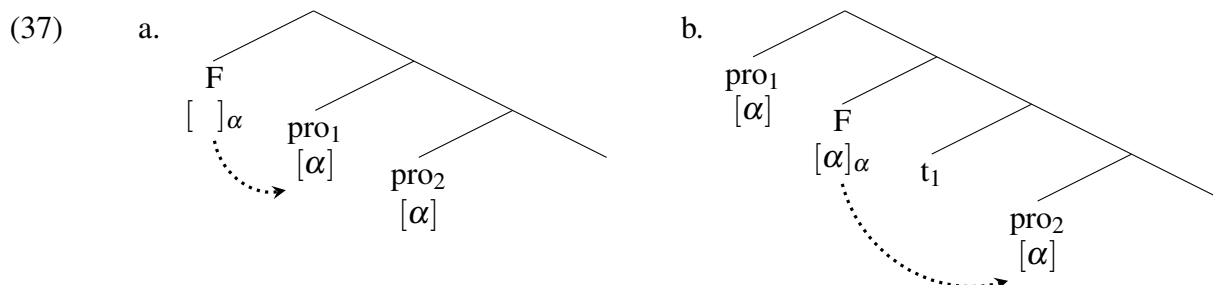
Even if the probe's needs are completely satisfied by the first goal, it can interact with another goal in its domain just in case that goal would not have done a better job of satisfying those needs. This source for probe generosity, which we suggest arises from the same considerations of economy that motivate the Principle of Minimal Compliance (Richards 1997, 1998), can derive the GCCs, as well as their obviation in ditransitives (see Preminger, to appear for a different application of this principle to pronoun movement).

3.1 The Principle of Minimal Compliance

In some languages, most famously Bulgarian, more than one *wh*-phrase can — and perhaps even must — move to a clause-initial position (Rudin 1988).

(38)   a.   **Koj**$_1$ **kavko**$_2$ **na kogo**$_3$ dade t$_1$ t$_2$ t$_3$?
            who what   to whom gave
            'Who gave what to whom?'

b.   ?? **Koj**$_1$ **na kogo**$_3$ dade t$_1$ **kavko**$_2$ t$_3$?
            who to whom gave   **what**

c.   ?? **Koj**$_1$ **kavko**$_2$ dade t$_1$ t$_2$ **na kogo**$_3$?
            who what   gave   **to whom**

d.   ** **Koj**$_1$ dade t$_1$ **kavko**$_2$ **na kogo**$_3$?
            who gave   **what   to whom**   (Pesetsky 2000:19–20)

While the highest *wh*-phrase in the clause must be first, subsequent *wh*-phrases can occur in any order (Bošković 1997:238–239).

(39)   a.   Koj$_1$ **kogo**$_2$ **kak**$_3$ e tselunal t$_1$ t$_2$ t$_3$?
            who **whom how** is kissed
            'Who kissed whom how?'

b.   Koj$_1$ **kak**$_3$ **kogo**$_2$ e tselunal t$_1$ t$_2$ t$_3$?
            who **how whom** is kissed   (Bošković 1997:239)

If *wh*-phrases move to satisfy the needs of a functional head (say, C), the rigid position of the highest *wh*-phrase is not surprising. Given locality, the probe must move the closest *wh*-phrase first. But the free order of the other *wh*-phrases is unexpected.

Richards (1997:225–339, 1998) proposes that this freedom arises from the *Principle of Minimal Compliance*, an economy principle that allows a constraint on movement or other syntactic dependencies to go unchecked after it has been satisfied once.

(40)   *Principle of Minimal Compliance*
         For any dependency *D* that obeys constraint *C*, any elements that are relevant for determining whether *D* obeys *C* can be ignored for the rest of the derivation for purposes of determining whether any other dependency *D′* obeys *C*.
         An element *X* is relevant to determining whether a dependency *D* with head *A* and tail *B* obeys constraint *C* if:

   (i) X is along the path of *D* (that is, *X = A*, *X = B*, or *A* c-commands *X* and *X* c-commands *B*), *and*

   (ii) *X* is a member of the class of elements to which *C* makes reference.

(Richards 1998:601)

The details of this original formulation of the principle are not a huge concern here. Its effects are the following: once one instance of movement to a given position has obeyed a constraint on movement, such as locality, that constraint is lifted for subsequent instances of movement to the same position.

For Bulgarian multiple *wh*-questions, at the point in the derivation when the probe first searches for a goal, it can only find and move the subject *wh*-phrase because it is the closest one. After that, either *kogo* 'whom' (39a) or *kak* 'how' (39b) can move, since the locality condition on movement has already been checked at this position already. The remaining *wh*-phrases tuck in below the first *wh*-phrase in whatever order they move, giving rise to the flexible order.

In its original formulation, the Principle of Minimal Compliance seems only to describe what constraints hold when a probe enters into multiple dependencies, saying nothing about *why* the additional goals can, or must, move. But the principle can be thought of as grounded ultimately in considerations of economy. Examining a structure to ensure that an instance of movement satisfies a given constraint, such as a locality condition, comes with a certain cost. Incurring this cost again can be avoided once the constraint has been successfully checked a single time. We suggest that similar considerations can motivate probe generosity.

3.2   Economy-driven probe generosity

In a theory of attraction, movement takes place to satisfy the needs of a probe. More formally, this dependence can be encoded by decomposing movement into two steps. First, the probe Agrees with a goal; then, the goal is (Internal) Merged in a local relationship with the probe (Chomsky 2000:135–137). The successful application of Agree and valuation of the probe's features is, in other words, a necessary condition for the goal to move.

This condition can be lifted, we suggest, for the same reasons underlying the Principle of Minimal Compliance. Once a goal is Merged in the specifier of the probe, preceded by the requisite

17

Agree relation, subsequent goals can be Merged in the same position without Agreeing. Said another way, once the probe has Agreed with and moved one goal, additional goals can piggy-back on this Agree relation, moving to the same position. This source for probe generosity is stated in 41.

(41)   *Economy-Driven Probe Generosity (initial version)*
          A probe P that has been valued (i.e., VALUE$(P) \neq \varnothing$) can move any goal G that it c-commands iff, for all relevant features F on G, $F \subseteq$ VALUE(P).

We are assuming here that φ-feature are privative features arranged in a feature geometry (Harley and Ritter 2002). The relativization of a probe, while sometimes described as "unvalued features," might thus be better thought of as comprising "empty slots" into which features are copied from the goal (Preminger 2014:47–49). When some features have been copied onto the probe in this way, we can say informally that it has been "valued."

It might seem strange that the principle in 41, if it is grounded in considerations of economy, can give rise to *more* movement. The principle of Last Resort mandates, for a given operation, as few applications as are necessary for the derivation to succeed (Chomsky 1995:200–201). This is, for instance, incorporated into the contemporary theory of attraction, minimizing instances of (Internal) Merge by allowing it to apply only after the establishment of a prior Agree relation (Chomsky 1995:297, cf. Lasnik 1995, Collins 1997). Without saying anything more, then, if a probe is to move more than one goal, it must enter into a separate Agree relation with each one.

In this context, the principle in 41 satisfies the demands of Last Resort, reducing applications of Agree by removing it, in certain cases, as a precondition for Merge. In particular, it does this when one Agree relation has already taken place and *subsequent Agree relations would not produce a significantly different result*. In multiple wh-movement, for instance, once a probe searches for and moves the closest *wh*-phrase into its specifier (42a), the only elements that can move after this are other *wh*-phrases.
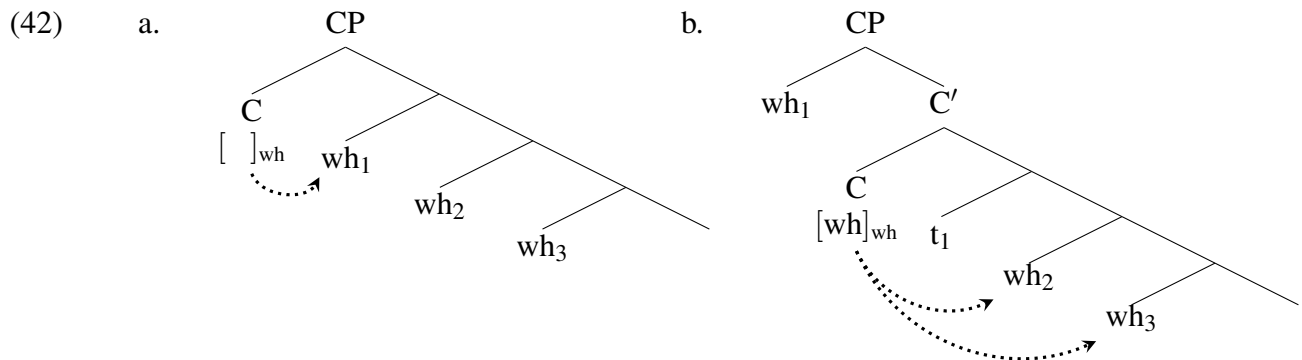
These additional goals need not Agree with the probe in order to move, since they bear the same *wh*-features as the highest goal. If they had entered into an Agree relation with the probe, they would have valued it in exactly the same way.

Importantly, the source for probe generosity in 41 above does not actually require total identity: it allows movement of additional goals that have just a proper subset of the probe's value (breaking the symmetry of the identity relation). Under this view, what comes for "free", so to speak, is movement of syntactic objects containing the same amount or less information than what is already

encoded on the probe. These subsequent goals would not have done a better job of valuing the probe. This asymmetry is not perceptible in *wh*-questions, where the feature geometry, putatively comprising just a single member, is so simple. But in more complex featural domains, such as person and gender, probe generosity will allow movement of additional goals that are only partially identical to the highest goal.

3.3 Gender-based constraints on pronoun movement

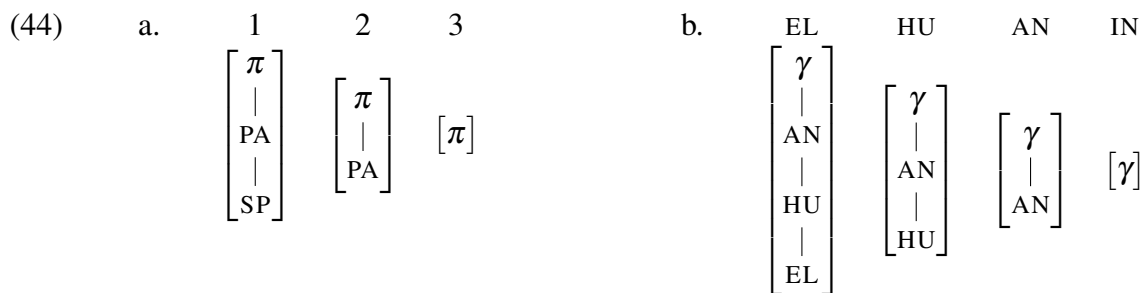Take the paradigm of pronoun movement for Yalálag, the Zapotec variety where the gender hierarchy is most transparently reflected.

(43)   *Yalálag*

	1SG	2SG	3.EL	3.HU	3.AN	3.IN
1SG	–	*	✓	✓	✓	✓
2SG	*	–	✓	✓	✓	✓
3.EL	*	*	(✓)	✓	✓	✓
3.HU	*	*	*	(✓)	✓	✓
3.AN	*	*	*	*	(✓)	✓
3.IN	*	*	*	*	*	(✓)

Looking just at combinations of third-person pronouns, those on the diagonal are correctly ruled in, because they are featurally identical (though they might be filtered morphologically, as we argue in Section 1). The source for probe generosity in 41 also allows an object pronoun lower on the gender hierarchy than the subject pronoun to move, as in the combinations above the diagonal, assuming a reasonable feature geometry for gender in Sierra Zapotec.
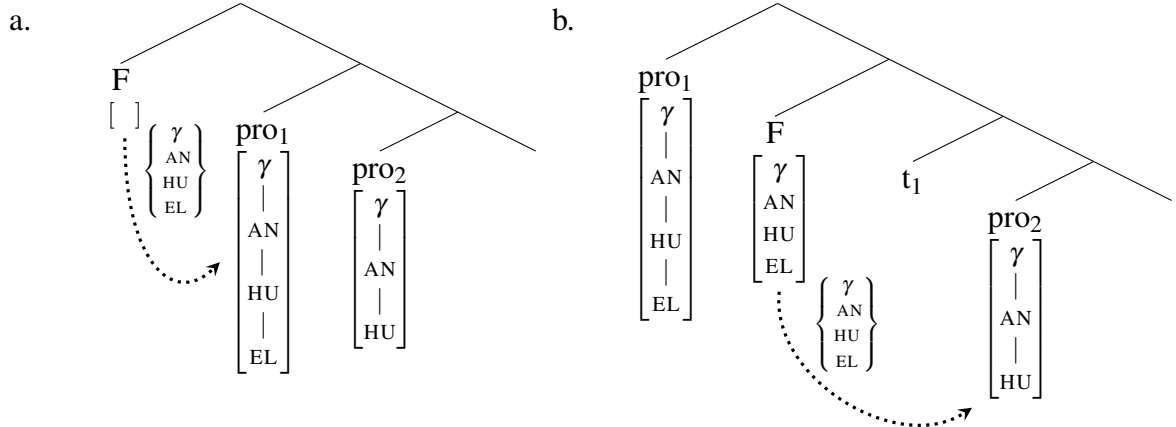
The four-way gender distinction in Sierra Zapotec, which is a strictly semantic one, can be represented with four features that are totally ordered by entailment: EL(DER) $\subset$ HU(MAN) $\subset$ AN(IMATE) $\subset$ γ. As with person, it is possible to treat these gender features as forming a geometry encoding these entailment relations (cf. Harley and Ritter 2002).

(44)   a.   1   2   3   b.   EL   HU   AN   IN

$$
\begin{bmatrix} \pi \\ | \\ \text{PA} \\ | \\ \text{SP} \end{bmatrix}
\begin{bmatrix} \pi \\ | \\ \text{PA} \end{bmatrix}
\begin{bmatrix} \pi \end{bmatrix}
\qquad
\begin{bmatrix} \gamma \\ | \\ \text{AN} \\ | \\ \text{HU} \\ | \\ \text{EL} \end{bmatrix}
\begin{bmatrix} \gamma \\ | \\ \text{AN} \\ | \\ \text{HU} \end{bmatrix}
\begin{bmatrix} \gamma \\ | \\ \text{AN} \end{bmatrix}
\begin{bmatrix} \gamma \end{bmatrix}
$$

At this point, this is probably all we need to commit to. We are uncertain, in particular, about the relationship between gender and other φ-features. Harley and Ritter (2002:514–518) take gender to entail *number*, but the animacy-based gender system in Sierra Zapotec plausibly also has some formal connection to person. We look at person and gender more or less independently, because the ΦCCs that refer to them have such different shapes.

With this feature geometry, both pronouns are able to move for all combinations of third-person pronouns in 43 along or above the diagonal. The probe can be relativized to look for all gender features. It consequently can Agree with and move an elder pronoun in subject position (45a).

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(45)   *Yalálag: 3.EL ≫ 3.HU*

a.

F
[ ] { γ / AN / HU / EL }

pro₁
[γ | AN | HU | EL]

pro₂
[γ | AN | HU]

b.

pro₁
[γ | AN | HU | EL]

F
[γ / AN / HU / EL] { γ / AN / HU / EL }

t₁

pro₂
[γ | AN | HU]

In this case, the probe is able to copy all the features it needs. So after moving the higher pronoun, it can move any pronoun lower on the gender hierarchy, including a human object pronoun, whose features are a subset of the probe's value (45b).

With this relativization in Yalálag, probe generosity does not permit movement of the lower pronoun in any combination below the diagonal, where the lower pronoun exceeds the higher one on the gender hierarchy, e.g. 46.

(46)   *Yalálag: *3.HU ≫ 3.EL*

pro₁
[γ | AN | HU]

F
[γ / AN / HU] { γ / AN / HU / EL }

t₁

pro₂
[γ | AN | HU | EL]
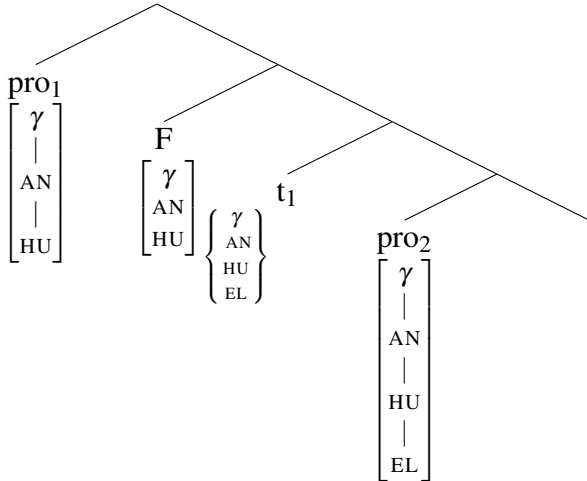
The probe is now able to copy only some of the features it is looking for from the higher pronoun. Since the lower pronoun has more relevant features than have been valued on the probe, it cannot move. The logic here is fully general and extends to all other third-person combinations, giving rise to the full GCC in Yalálag for subject and object pronouns.

Between object pronouns, though, movement is correctly predicted to be free. After the subject pronoun moves, either object in a ditransitive can move next, as long as it has a subset of the features that the probe is valued for. This is responsible for the obviation of the GCC that we described in Section 2.3.[12]

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[12]Indirect objects asymmetrically c-command direct objects. Many Zapotec languages have a "backwards binding"

(47) a. Ba blo'ed=a'$_1$**=ne'$_2$=b$_3$**   t$_1$ t$_2$ t$_3$.
already show.COMP=1SG**=3.EL=3.AN**
'I already showed it to her/him.'   (Laxopa: RM, GZYZ015, 49:45)

b. Ba blo'ed=a'$_1$**=b$_2$=ne'$_3$**   t$_1$ t$_2$ t$_3$.
already show.COMP=1SG**=3.AN=3.EL**
'I already showed her/him to it.'   (Laxopa: RM, GZYZ015, 48:35)

This comes along with a lifting of locality. Recall from Section 1 that pronoun movement is subject to intervention by other DPs. An object pronoun cannot move across an R-expression subject (9c). This effect disappears in ditransitives: indirect and direct objects do not intervene for one another (see Avelino Becerra 2004:29–30 on Yalálag and Sonnenschein 2004:157 on Zoogocho).

(48) a. Bnexjw**=a'$_1$=b$_3$**   t$_1$ Bedu'u t$_3$.
give.COMP**=1SG=3.AN**   Beto
'I gave it to Beto.'   (Laxopa: RDR, SLZ1029-s, 15)

b. Bnexjw**=a'$_1$=ba'$_2$**   t$_1$ t$_2$ beku'$_3$.
give.COMP**=1SG=3.HU**   dog
'I gave the dog to him/her.'   (Laxopa: RDR, SLZ1029, 40:32)

As the Principle of Minimal Compliance dictates, these subsequent goals are able to avoid checking a locality constraint when they move, just as they get around the requirement that they value the probe before doing so.

4 A typology of Phi–Case Constraints

This source for probe generosity also derives the crosslinguistic typology of constraints on pronoun movement. In particular, it captures two generalizations characterizing the shape of the attested ΦCCs (Foley et al., to appear-b).

construction, in which an argument can be "omitted" just in case it c-commands a coreferential possessor (Black 1996, Avelino et al. 2018). In (i), for instance, the subject — which otherwise is obligatory — can be null, since it corefers with the possessor of the object.

(i) Ben**(=a')** lizh**=a'**.
do.COMP**=1SG** house**=1SG**
'I built my house.'   (Laxopa: RM, GZYZ055, 0:30)

(ii) Bi=a'**(=ba'$_1$)** zxikw**=ba'$_1$**.
give.COMP=1SG**=3.HU** dog**=3.HU**
'I gave her/his$_1$ dog to her/him$_1$.'   (Laxopa: RM, GZYZ055, 21:18)

(iii) Ni gwa=a'***(=ba'$_1$)** xna**=ba'$_1$**.
here give.POT=1SG**=3.HU** mother**=3.HU**
'I will give her/him$_1$ to her/his$_1$ mother.'   (Laxopa: RM, GZYZ055, 49:45)

Similarly, the indirect object can also be omitted if it corefers with the possessor of the direct object (ii). But the direct object cannot be omitted under coreference with the possessor of an indirect object (iii).

(49)   a.   *Growing Staircase*

(✓)	✓	✓	✓
✓	(✓)	✓	✓
✓	✓	(✓)	✓
*	*	*	(✓)

(✓)	✓	✓	✓
✓	(✓)	✓	✓
*	*	(✓)	✓
*	*	*	(✓)

(✓)	✓	✓	✓
*	(✓)	✓	✓
*	*	(✓)	✓
*	*	*	(✓)

b.   *Moving Wall*

−	✓	✓
*	−	✓
*	✓	✓

−	*	✓
*	−	✓
*	*	✓

The first generalization, *Growing Staircase*, characterizes relative constraints, like the GCCs in Sierra Zapotec (49a). The second, *Moving Wall*, characterizes absolute constraints, such as the Strong PCC (49b).

These generalizations follow from economy-driven probe generosity, when combined with some more precise assumptions about how probes are valued. When a probe finds a matching goal, some features from the goal are copied onto the probe. We suggest that what is copied, invariantly, is a subtree in a feature geometry, a "feature treelet" whose root node corresponds to what the probe is searching for. However, a probe can copy less or more of a feature geometry, either copying just the root — corresponding to just a single feature — or the root and all the nodes it dominates (Preminger 2014:47–49).

This copying mechanism, which plausibly derives from how probes iteratively search through a feature geometry (Preminger, to appear), restricts the logical space of probes to just those constraints on pronoun movement that conform to either Growing Staircase or Moving Wall. In particular, no constraint is predicted that is not anchored in the bottom left corner of the paradigm. This is a highly asymmetrical typology of ΦCCs, derived directly from the cyclic probing enabled by economy-driven probe generosity.

4.1   Relative constraints

Starting with the relative constraints on pronoun movement, if we look across the higher-resolution paradigms of GCCs, a striking pattern emerges. Moving from Zoogocho to Laxopa to Yalálag, starred cells are arranged in successively taller "staircases."

(50)   a.   *Zoogocho*

	3.EL	3.HU	3.AN	3.IN
3.EL	(✓)	✓	✓	✓
3.HU	✓	(✓)	✓	✓
3.AN	✓	✓	(✓)	✓
3.IN	*	*	*	(✓)

b. *Laxopa*

	3.EL	3.HU	3.AN	3.IN
3.EL	(✓)	✓	✓	✓
3.HU	✓	(✓)	✓	✓
3.AN	*	*	(✓)	✓
3.IN	*	*	*	(✓)

c. *Yalálag*

	3.EL	3.HU	3.AN	3.IN
3.EL	(✓)	✓	✓	✓
3.HU	*	(✓)	✓	✓
3.AN	*	*	(✓)	✓
3.IN	*	*	*	(✓)

For any of these constraints, a combination is ungrammatical only if it is below the diagonal and all combinations below it and to its left are also ungrammatical. This generalization is defined more formally in 51.

(51)   *Growing Staircase*
For every ungrammatical combination of a higher pronoun α and a lower pronoun β, (i) $\beta > \alpha$ (on a feature hierarchy), and (ii) every combination of a higher pronoun δ and a lower pronoun γ such that $\delta < \alpha$ and $\gamma > \beta$ is also ungrammatical.

As it happens, Growing Staircase also characterizes the typology of relative PCCs, albeit in miniature, since these paradigms are smaller (three by three).

(52)   a.   *Weak PCC*

	1	2	3
1	–	✓	✓
2	✓	–	✓
3	*	*	(✓)

b.   *Ultrastrong PCC*

	1	2	3
1	–	✓	✓
2	*	–	✓
3	*	*	(✓)

The Weak PCC, found in varieties of Spanish between objects (Pancheva and Zubizarreta 2017, cf. Bonet 1991:182), forms the shortest staircase. The Ultrastrong PCC, attested in Classical Arabic also between indirect and direct objects (Fassi Fehri 1993), has an additional step.

The GCC in Yalálag, which enforces the gender hierarchy strictly, arises — as we argue in Section 3.3 above — when the probe is relativized to all gender features. The increasingly lax constraints found in Laxopa and Zoogocho correspond, as shown in 53a, to probes that are relativized to fewer features.

(53) a. $[\quad]_{\{\gamma,\ \text{AN, HU, EL}\}}$ Yalálag GCC   b. $[\quad]_{\{\pi,\ \text{PA, SP}\}}$ Ultrastrong PCC

  $[\quad]_{\{\gamma,\ \text{AN, HU}\}}$ Laxopa GCC $[\quad]_{\{\pi,\ \text{PA}\}}$ Weak PCC

  $[\quad]_{\{\gamma,\ \text{AN}\}}$ Zoogocho GCC

When a feature is subtracted from the probe's relativization, it is never copied onto the probe as part of its value, and hence it is never relevant for the movement of other goals. The probe in Laxopa, for instance, once it is valued for HU by any human pronoun, whether elder or non-elder, will be able to move another human pronoun, again regardless of whether it is elder or non-elder. The varying sensitivities of relative PCCs to the person hierarchy can similarly be traced to the probe's relativization, as in 53b.

Not every logically possible relativization is listed above. There are eight such relativizations for person, drawing from three features, and 16 for the four-way gender system in Sierra Zapotec. Some of these seem immediately desirable, such as $[\quad]_{\{\pi\}}$ or $[\quad]_{\{\gamma\}}$, which permit any combination of pronouns. Or, $[\quad]_{\{\ \}}$, which does not allow for any pronoun movement at all.

Others yield patterns that are not currently attested, but which nevertheless conform to Growing Staircase as defined above. For instance, $[\quad]_{\{\gamma,\ \text{AN, EL}\}}$ creates a staircase with one very large step.

(54)

	3.EL	3.HU	3.AN	3.IN
3.EL	(✓)	✓	✓	✓
3.HU	*	(✓)	✓	✓
3.AN	*	✓	(✓)	✓
3.IN	*	*	*	(✓)

It would not be surprising to us if, in fact, the constraint in 54 is never attested, and that the only possible relative constraints are the ones arising from the probes in 53a–b. In this case, a very natural restriction on probe relativizations would do the job (cf. Béjar and Rezac 2009:43).

(55) *Entailment Condition on Probe Relativizations*
  If the relativization for a probe includes feature F, it also includes every feature F' such that $F \subset F'$.

The task, then, would be to find an explanation for this condition. But its simplicity suggests that this might indeed be possible.

Importantly, the source for probe generosity that we propose rules out, independently of the probe's relativization, any constraint that does not obey Growing Staircase. There is no probe that can give rise to an unattested constraint in which a combination on or along the diagonal is ungrammatical (56a) or a combination under the diagonal is ruled out that does not form a step (56b).

(56) a.

	3.EL	3.HU	3.AN	3.IN
3.EL	(✓)	✓	✓	✓
3.HU	*	*	*	✓
3.AN	*	*	*	✓
3.IN	*	*	*	(✓)

b.

	3.EL	3.HU	3.AN	3.IN
3.EL	(✓)	✓	✓	✓
3.HU	✓	(✓)	✓	✓
3.AN	✓	*	(✓)	✓
3.IN	*	*	*	(✓)

In all hierarchy-satisfying combinations along and above the diagonal, the lower pronoun has fewer features than the higher pronoun, and so will be able to move if the higher one does. And, if the probe has been valued for some feature (say, AN), it will be able to move *all* elements with that feature, thereby ruling in every combination below the diagonal in that row.

4.2 Absolute constraints

In the absolute constraints, a different generalization emerges. Starting this time in the person domain, where it is most clear, the Me-First PCC (Farkas and Kazazis 1980, Nevins 2007) prohibits movement of a first-person direct object pronoun when the indirect object has also cliticized. The Strong PCC, found in Greek and Sierra Zapotec, is more stringent, banning any local-person pronoun from moving from this position.

(57) a. *Me-First PCC*

	1	2	3
1	–	✓	✓
2	*	–	✓
3	*	✓	(✓)

b. *Strong PCC*

	1	2	3
1	–	*	✓
2	*	–	✓
3	*	*	(✓)

If a pronoun of some person is prohibited from moving from the lower position, then so too is any pronoun higher on the person hierarchy. This generalization, which we call *Moving Wall*, is stated in a more general form in 58.

(58) *Moving Wall*
For every ungrammatical combination of a higher pronoun α and a lower pronoun β, every combination with a lower pronoun γ such that $\gamma > \beta$ (on a hierarchy) is also ungrammatical.

For gender, the four-way system in Sierra Zapotec would predict the constraints obeying Moving Wall in 59a–c.

(59) a.

	3.EL	3.HU	3.AN	3.IN
3.EL	(✓)	✓	✓	✓
3.HU	*	(✓)	✓	✓
3.AN	*	✓	(✓)	✓
3.IN	*	✓	✓	(✓)

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b.

	3.EL	3.HU	3.AN	3.IN
3.EL	(✓)	*	✓	✓
3.HU	*	(✓)	✓	✓
3.AN	*	*	(✓)	✓
3.IN	*	*	✓	(✓)

c.

	3.EL	3.HU	3.AN	3.IN
3.EL	(✓)	*	*	✓
3.HU	*	(✓)	*	✓
3.AN	*	*	(✓)	✓
3.IN	*	*	*	(✓)

While we have not yet found a Zapotec language with an absolute GCC corresponding to 59a or 59b, Teotitlán del Valle Zapotec essentially has the constraint in 59c. When the subject has cliticized, the only pronoun that can move from direct object position is an inanimate one (Gutiérrez Lorenzo 2014:45–47, Julia Nee, p.c.).[13] Given how well the GCCs in Sierra Zapotec mirror the attested relative PCCs, we would not be surprised if future fieldwork uncovers the absolute GCCs in 59a–b, completing the typology of absolute constraints.

4.3 Feature copying and the Moving Wall

Nothing we have said so far allows the patterns of pronoun movement characterized by the absolute constraints, in which combinations above the diagonal *can* be ruled out. These can be folded in, we suggest, with some more precise assumptions about the mechanism of probe valuation.

Upon finding a matching goal, a probe copies some features from it, as determined by its relativization. We assume that, if these features are arranged in a feature geometry, it is always a structured set of features — what we will call a *feature treelet* — that is copied from the goal. We further take the probe to search iteratively in a downward fashion through the goal's feature structure to find a treelet to copy (Preminger, to appear). The probe's relativization thus contains the features that it will seek to match to the root node of some treelet (Preminger 2014:47–49).

There are, in principle, two things that might happen once a probe finds a node on a goal matching its relativization. It might copy the (nonbranching) treelet that contains just that feature or it might copy the entire (branching) treelet rooted in that feature. We assume that both modalities are, in principle, available.

(60)   *Feature Treelet Copying*
        For a probe P whose relativization contains a feature F, when P finds a matching goal G, it copies from G onto P either:

   (i) F, or   (nonbranching treelet)

   (ii) F and any nodes that F dominates.   (branching treelet)

---

[13]This simplifies things somewhat (see Gutiérrez Lorenzo 2014:45–47 for full details). First, Teotitlán del Valle Zapotec actually has a five-way gender distinction, which includes the four categories familiar from Sierra Zapotec plus a deity category, which plausibly occupies the highest rung on the hierarchy. Second, the constraint represented in 59c only holds when the subject is singular. Third, the prohibition on direct object pronouns moving is lifted when the subject is a local person pronoun clitic. Finally, indirect object pronouns do not seem to be restricted in the same way that direct object pronouns are. This is a complex set of interactions between person, gender, number, and grammatical role that certainly merits further investigation.

In some ways, copying a branching treelet, which we will argue below underlies the absolute constraints, might be thought of as the default. But it does not seem so improbable to us that a probe might also be able to copy the nonbranching treelet corresponding to just the feature the probe is looking for, which underlies the relative constraints. It is not entirely clear at this point what determines the availability of these two modalities. By hypothesis, they must be able to coexist in the same language, since Sierra Zapotec has both an absolute and a relative constraint on pronoun movement.

Feature treelet copying in 60 permits a unification of absolute and relative constraints, with both arising from economy-driven probe generosity. First, a slight reformulation of this principle is needed, so it refers to feature treelets rather than just features.

(61)   *Economy-Driven Probe Generosity (final version)*
       A probe P that has been valued (i.e., VALUE(P) $\neq \varnothing$) can move any goal G that it c-commands iff, for all relevant feature treelets F on G, $F \subseteq$ VALUE(P).

This leaves the account of relative constraints untouched (since individual features are just non-branching treelets). At the same time, probe generosity derives the Strong PCC and other absolute constraints. It will never permit a local-person pronoun to move from a lower position if the probe is relativized to copy a whole feature treelet rooted in PA, which we notate as $\left[\begin{array}{c} \ \end{array}\right]_{\left\{\begin{array}{c} PA \\ | \\ ... \end{array}\right\}}$.

(62)   a.   *1 ≫ 2*
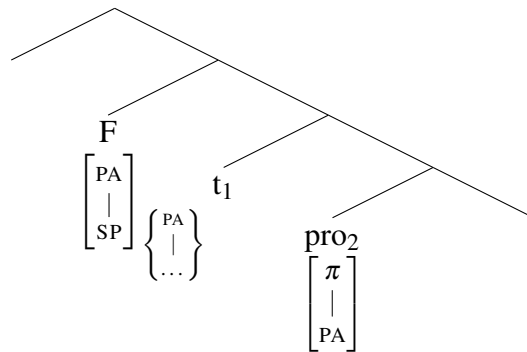
       b.   *2 ≫ 1*
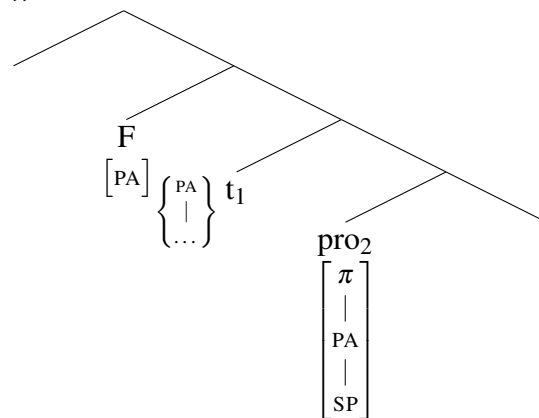
When the higher pronoun is first person (62a), the probe will copy a branching feature treelet rooted in PA (with SP as its daughter). A lower pronoun that is second person will not then be able

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to move, since the relevant feature treelet rooted in PA that it bears — namely just PA — is not an element of the probe's valuation set. The same logic holds when the higher pronoun is second person and the lower pronoun first person (62b). By contrast, a third-person pronoun in the lower position will always be able to move because it does not have any features relevant to the probe (and the empty set is a subset of every set).[14]

With a probe copying an entire branching feature treelet, there are three possible relativizations for person, thus deriving Moving Wall. Two of these correspond to the Me-First and Strong PCCs, while the third derives a language in which only the higher pronoun can move.

(63) $\left[\ \ \right]_{\{SP\}}$ Me-First PCC

    $\left[\ \ \right]_{\left\{\begin{smallmatrix} PA \\ | \\ \dots \end{smallmatrix}\right\}}$ Strong PCC

    $\left[\ \ \right]_{\left\{\begin{smallmatrix} \pi \\ | \\ \dots \end{smallmatrix}\right\}}$ No movement of (non-identical) lower pronouns

While we talk about these relativizations as probes in and of themselves, the Strong PCC of course coexists alongside relative GCCs, as in Sierra Zapotec. In these languages, a probe will consist of the union of a person relativization and a gender relativization. Since we assume no entailment relation between the person and gender feature geometries, these relativizations will not interact with one another and can simply be added to one another.

5   Against parallel interaction

A striking feature of Growing Staircase and Moving Wall is how asymmetrical these generalizations are. A staircase can be anchored in the bottom left corner of the paradigm, but not any other; walls move across the paradigm from the left (and perhaps also bottom) edge, but not the right edge. That is to say, there are no attested constraints on pronoun movement that look like either 64a or 64b.

(64)   a.

(✓)	*	*	*
✓	(✓)	*	*
✓	✓	(✓)	*
✓	✓	✓	(✓)

    b.

✓	✓	*	*
✓	✓	*	*
✓	✓	(✓)	*
✓	✓	*	(✓)

---

[14]A third-person pronoun in the higher position will, strictly speaking, not be able to move solely through the action of the probe in 62, since it does not have PA. But a probe will have other relativizations — say, for gender or number — that a third-person pronoun can value.

With the source for probe generosity that we have proposed, this asymmetry arises directly from how the probe finds goals cyclically. Because of locality, a probe c-commanding its goals will, in the first instance, only be able to find and be valued by the highest goal. It thus excludes the existence of constraints, like those in 64a or 64b, that would allow a lower pronoun to move when its relevant features are a *superset* of the probe's value.

This restrictiveness is not found in another theory of the crosslinguistic variation in constraints on pronoun movement. Looking just at PCCs, Nevins (2007, 2011) proposes, building on earlier work by Anagnostopoulou (2005), that these constraints arise when a probe interacts with all the goals in its domain in parallel.[15] More concretely, the probe is generous because it Multiple Agrees with all accessible goals simultaneously (Hiraiwa 2001). Though it is not clear how, or even whether, the probe is valued via this operation, constraints on pronoun movement arise from independent restrictions on when Multiple Agree can hold.

One condition is responsible for the relative constraints: *Contiguous Agree* prohibits a probe from Agreeing with a goal in some feature for which it is relativized just in case there is an intervening goal that lacks that feature.[16]

(65)   *Contiguous Agree (cf. Nevins 2007:291)*
        For a probe P relativized to a feature F with a goal G that bears F, there can be no G' such that:
        (i) P c-commands G' and G' c-commands G, and
        (ii) G' does not bear F.

The Ultrastrong PCC, for instance, is produced by a probe relativized to at least the SP and PA features. Contiguous Agree is satisfied when the higher pronoun has all the features of the lower pronoun (66a). But if the lower pronoun has either SP or PA and the higher pronoun does not, then Multiple Agree is impossible and movement is ruled out (66b).[17]

(66)   a.   *1 ≫ 2*   b.   **2 ≫ 1*

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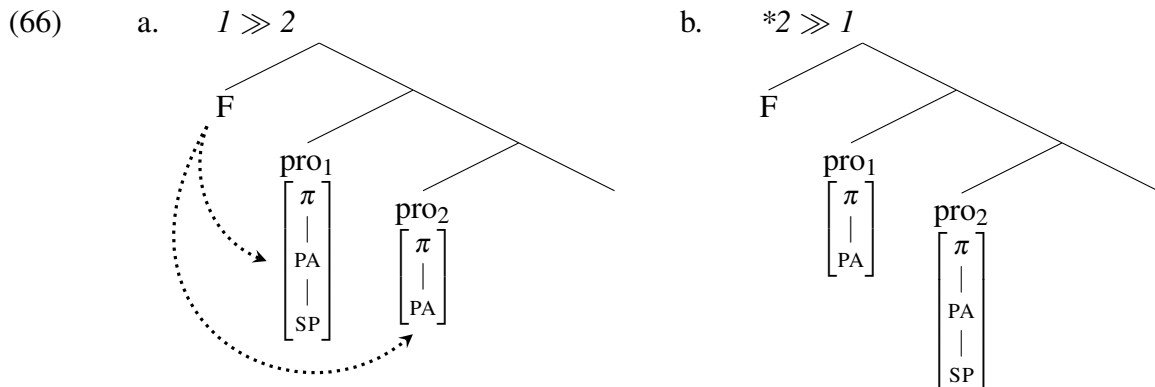
[15]Pancheva and Zubizarreta (2017) propose a different theory of this crosslinguistic variation, grounded in the grammatical encoding of perspective (see also Charnavel and Mateu 2015). Looking just at PCCs in ditransitives, they assign a privileged role to the point of view associated with the indirect object, which makes it incompatible with certain person categories. It is not clear to us how their account might be extended to gender-based constraints or to those constraints that restrict the movement of object pronouns based on features of the subject pronoun.

[16]Nevins (2011) argues that person features are bivalent. We adapt his theory to the assumptions we use here, where these are privative. This does not affect in any significant way his account of PCCs, though it does elide the differences that he seeks to draw between person and number.

[17]It is somewhat unclear why, in Nevins' theory, just the higher pronoun can move in this circumstance. If Multiple Agree is not constrained by locality (Hiraiwa 2001), either it should apply simultaneously to all goals, in which case they all move, or not apply at all, in which case none move.

The Weak PCC would result from a probe relativized just to PA, so that all local-person pronouns are, in essence, equivalent for the purposes of Contiguous Agree.

This theory can be extended in a straightforward fashion to the GCCs in Sierra Zapotec that conform to Growing Staircase with the probe relativizations in 67a–c. Each step in the staircase is produced by adding a feature to the relativization.

(67)   a.   [AN] *(Zoogocho)*

	3.EL	3.HU	3.AN	3.IN
3.EL	(✓)	✓	✓	✓
3.HU	✓	(✓)	✓	✓
3.AN	✓	✓	(✓)	✓
3.IN	*	*	*	(✓)

b.   [HU, AN] *(Laxopa)*

	3.EL	3.HU	3.AN	3.IN
3.EL	(✓)	✓	✓	✓
3.HU	✓	(✓)	✓	✓
3.AN	*	*	(✓)	✓
3.IN	*	*	*	(✓)

c.   [EL, HU, AN] *(Yalálag)*

	3.EL	3.HU	3.AN	3.IN
3.EL	(✓)	✓	✓	✓
3.HU	*	(✓)	✓	✓
3.AN	*	*	(✓)	✓
3.IN	*	*	*	(✓)

There is an obvious similarity between this theory based on parallel interaction and our own. In both cases, some degree of partial identity is enforced, based on a probe's relativization, between the pronouns that move. But, under our account there is an intrinsic asymmetry between the highest pronoun and all other pronouns arising from the cyclic application of Agree. This asymmetry is erased if the probe interacts with all goals simultaneously.

Thus, this theory based on parallel interaction, though it can derive the constraints that comprise Growing Staircase, does not derive the generalization itself. The privileged status of the highest pronoun is simply stipulated in the definition of Contiguous Agree. There is nothing that rules out an inverse version of this condition, which would prevent a *superior* pronoun from having some feature that the *inferior* pronoun lacks.

(68)   *Inverse Contiguous Agree*
For a probe P relativized to a feature F with a goal G that bears F, there can be no G' such that:

(i) P c-commands G and G c-commands G', and

(ii) G' does not bear F.

This would generate constraints on pronoun movement conforming to a "Growing Icicle" pattern, the inverse of the attested Growing Staircase.

(69)

(✓)	✓	✓	*
✓	(✓)	✓	*
✓	✓	(✓)	*
✓	✓	✓	(✓)

(✓)	✓	*	*
✓	(✓)	*	*
✓	✓	(✓)	*
✓	✓	✓	(✓)

(✓)	*	*	*
✓	(✓)	*	*
✓	✓	(✓)	*
✓	✓	✓	(✓)

While Nevins (2011:941 *et passim.*) makes a connection to locality conditions, Contiguous Agree is in fact the *opposite* of an intervention-based constraint like Relativized Minimality (Rizzi 1990). Rather than singling out an intervener with the same feature as a lower element, it singles one out that does *not* have that feature (see also Coon and Keine 2018).

To derive absolute constraints, Nevins proposes a second restriction on Multiple Agree, whose effects are felt when a probe is relativized to the *contrastive* value for a feature.

(70)   *Matched Values (cf. Nevins 2007:291)*
       For a probe P relativized to a contrastive value for feature F, either all goals G that are contrastive for F must have F or they do not have F.

Contrastiveness is defined paradigmatically: a pronoun G is contrastive for F if there is another pronoun G' that is featurally identical to G, except that: (i) if G has F, G' does not have F, and (ii) if G does not have F, G' has F (cf. Nevins 2007:289). So, for instance, first and second person pronouns are contrastive for SP, but not PA or π.

A probe with a contrastive relativization rules out any two adjacent columns in a paradigm. For person, this means that Matched Values can give rise to the Strong PCC (71a). As Nevins (2007:300) notes, Matched Values also predicts an unattested "Me-Last" constraint that is somewhat "strange" (71b).

(71)   a.   *Contrastive* [SP] *(Strong PCC)*

	1	2	3
1	–	*	✓
2	*	–	✓
3	*	*	(✓)

       b.   *Contrastive* [PA] *(unattested)*

	1	2	3
1	–	*	*
2	✓	–	*
3	✓	*	(✓)

In the gender domain, Matched Values predicts an even more extravagant range of constraints. While one of these conforms to Moving Wall (72a), the others do not (72b–c).

(72)   a.   *Contrastive* [EL] *(unattested)*

	3.EL	3.HU	3.AN	3.IN
3.EL	(✓)	*	✓	✓
3.HU	*	(✓)	✓	✓
3.AN	*	*	(✓)	✓
3.IN	*	*	✓	(✓)

b. *Contrastive* [HU] *(unattested)*

	3.EL	3.HU	3.AN	3.IN
3.EL	(✓)	*	*	✓
3.HU	✓	(✓)	*	✓
3.AN	✓	*	(✓)	✓
3.IN	✓	*	*	(✓)

c. *Contrastive* [AN] *(unattested)*

	3.EL	3.HU	3.AN	3.IN
3.EL	(✓)	✓	*	*
3.HU	✓	(✓)	*	*
3.AN	✓	✓	(✓)	*
3.IN	✓	✓	*	(✓)

Thus, while Matched Value can account for some of the absolute constraints that comprise Moving Wall, it does not account for the generalization itself.

The challenge that Moving Wall and Growing Staircase pose here is the same. The ΦCCs that comprise the two generalizations are all anchored in the bottom-left corner of the paradigm. A theory of these constraints that assumes simultaneous interaction between a probe and all goals in its domain simply is not restrictive enough to derive this fact. For the relative constraints, it was stipulated as part of the definition of Contiguous Agree. But this is not necessary with a different source for probe generosity. The asymmetrical shape of the typology is produced by the probe finding its goals cyclically.

6   Conclusions and future prospects

Constraints on the movement of clitic and other weak pronouns have intrigued linguists for a long time, since at least the work of Perlmutter (1971) and Bonet (1991). We have offered a new perspective on the crosslinguistic typology of such constraints from the domain of gender. The movement of clitic pronouns in Sierra Zapotec is restricted by a strictly semantic gender system, whose members are ordered by entailment. Though both subject and object pronouns may in principle cliticize, certain combinations are prohibited. The specifics differ slightly across varieties, but in general an object pronoun may not move if it is higher on a gender hierarchy than the subject pronoun.

The more articulated hierarchy of gender in Sierra Zapotec provides a higher resolution view of variation in GCCs, and ΦCCs more broadly. Patterns that might have seemed arbitrary or accidental reveal themselves as systematic in the larger paradigmatic space of gender. The two generalizations we identified — Growing Staircase and Moving Wall — reflect a highly asymmetric typology, one that demands a principled explanation.

We have proposed to derive these generalizations, and the asymmetry in the shape of the typology, from how probes are able to move more than one goal. This probe generosity, we suggested, can arise from the same considerations of economy that underlie the Principle of Minimal Compliance, whose effects are particularly salient with multiple *wh*-movement. A probe can move additional goals if they would not have done a better job of satisfying the probe's needs than the first goal it found, as calculated in terms of either individual features or non-trivial constituents in a feature geometry. With this source for probe generosity, the probe finds its goals cyclically. The

result is a direct mapping between the shape of the typology and the entailment relations that hold within a featural domain.

Besides person and gender, we might wonder what other domains reveal the action of this economy-driven probe generosity. One obvious candidate is number. While there is substantial debate about the semantics of number and its featural representation (see, for instance, Harbour 2008, 2011 and Nevins 2011), if number categories are (partially) ordered by entailment, we would expect to find constraints on movement sensitive to them. Nevins (2011) postulates that Number–Case Constraints (#CCs) do not exist, a gap he ties to the featural representation of number.[18] But just as GCCs were not observed until languages with rich gender systems, like Sierra Zapotec, were investigated, #CCs may be more likely to be found in languages with three or more number categories (including, for instance, dual or paucal). Though these would, of course, have to stand in the right entailment relations to one another.

The analogy we have drawn between pronoun movement and multiple *wh*-movement suggests another possibility. It is not hard to imagine how the $\overline{\text{A}}$-domain might be organized by entailment (cf. Abels 2012). If all *wh*-phrases are also foci, for instance, this entailment relation could be manifested in a constraint on the movement. In a language where *wh*-phrases and other foci are attracted by the same probe, a relative constraint would allow both types of elements to move if the focus c-commanded the *wh*-phrase (73). But if the *wh*-phrase c-commanded the focus, the lower element would have to remain in situ (74a–b).

(73)   Only SHE$_1$ whom$_2$ did t$_1$ see t$_2$?

(74)   a.   * Who$_1$ only HIM$_2$ did t$_1$ see t$_2$?

      b.   Who$_1$ t$_1$ saw only HIM$_2$?

Before these predictions can be tested, much work needs to be done: to establish the featural structure of these domains, to find a context where they are implicated in probe generosity. These remarks are thus necessarily speculative, but they point in a direction that we hope proves fruitful.

References

Abels, Klaus. 2012. The Italian left periphery: A view from locality. *Linguistic Inquiry* 43:229–254.

Anagnostopoulou, Elena. 2003. *The syntax of ditransitives: Evidence from clitics*. Berlin: Mouton de Gruyter.

Anagnostopoulou, Elena. 2005. Strong and weak person restrictions: A feature checking analysis. In *Clitic and affix combinations: Theoretical perspectives*, eds. Lorie Heggie and Francisco Francisco Ordóñez, 199–235. Amsterdam: John Benjamins.

Anagnostopoulou, Elena. 2006. Clitic doubling. In *The Blackwell companion to syntax*, eds. Martin Everaert and H. C. van Riemsdijk, 519–581. Oxford: Blackwell.

Avelino, Heriberto, John Foreman, Pamela Munro and Aaron Huey Sonnenschein. 2018. Covert subjects in Zapotec. *Symposium on Oaxacan Linguistics (SOL)* 2.

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[18]There may be a #CC in Teotitlán del Valle Zapotec, where (third-person inanimate) singular object pronouns may cliticize when the subject pronoun is third person, whether singular or plural, but a plural object pronoun cannot (Gutiérrez Lorenzo 2014:45, Julia Nee, p.c.). There are some wrinkles in the data — plural object pronouns of any gender can cliticize when the subject is local person — but this may be one instance of a #CC.

Avelino Becerra, Heriberto. 2004. Topics in Yalálag Zapotec, with particular reference to its phonetic structure. Ph.D. Dissertation, University of California, Los Angeles.

Béjar, Susana. 2003. Phi-syntax: A theory of agreement. Ph.D. Dissertation, University of Toronto.

Béjar, Susana and Milan Rezac. 2003. Person licensing and the derivation of PCC effects. In *Romance linguistics: Theory and acquisition*, eds. Ana Teresa Pérez Leroux and Yves Roberge, 49–62. Amsterdam: John Benjamins.

Béjar, Susana and Milan Rezac. 2009. Cyclic Agree. *Linguistic Inquiry* 40:35–73.

Bianchi, Valentina. 2006. On the syntax of personal arguments. *Lingua* 116.

Black, Cheryl A. 1996. A backwards binding construction in Zapotec. *Work Papers of the Summer Institute of Linguistics* 40:75–87.

Bonet, Eulàlia. 1991. Morphology after syntax: Pronominal clitics in Romance. Ph.D. Dissertation, Massachusetts Institute of Technology.

Bošković, Željko. 1997. On certain violations of the Superiority condition, AgrO, and economy of derivation. *Journal of Linguistics* 33:227–254.

Cardinaletti, Anna and Michal Starke. 1999. The typology of structural deficiency: A case study of the three classes of pronouns. In *Clitics in the languages of Europe*, ed. H. C. van Riemsdijk, 145–233. Berlin: Mouton de Gruyter.

Charnavel, Isabelle and Victoria Mateu. 2015. The clitic binding restriction revisited: Evidence for antilogophoricity. *The Linguistic Review* 32:671–701.

Chomsky, Noam. 1995. Bare phrase structure. In *Evolution and revolution in linguistic theory*, eds. Héctor Campos and Paula Kempchinsky, 57–109. Washington: Georgetown University Press.

Chomsky, Noam. 2000. Minimalist inquiries: The framework. In *Step by step: Essays on Minimalist syntax in honor of Howard Lasnik*, eds. Roger Martin, David Michaels, and Juan Uriagereka, 89–156. Cambridge, MA: MIT Press.

Chomsky, Noam. 2001. Derivation by phase. In *Ken Hale: A life in language*, ed. Michael Kenstowicz, 1–52. Cambridge, MA: MIT Press.

Collins, Chris. 1997. *Local economy*. Cambridge, MA: MIT Press.

Coon, Jessica and Stefan Keine. 2018. Feature gluttony. Ms., McGill University and University of Southern California, URL https://ling.auf.net/lingbuzz/004224.

Farkas, Donka and Kostas Kazazis. 1980. Clitic pronouns and topicality in Rumanian. *Chicago Linguistic Society (CLS)* 16:75–82.

Fassi Fehri, Abdelkader. 1993. *Issues in the structure of Arabic clauses and words*. Amsterdam: Springer.

Foley, Steven, Nick Kalivoda and Maziar Toosarvandani. To appear-a. Forbidden clitic clusters in Zapotec. *Chicago Linguistic Society (CLS)* 53.

Foley, Steven, Nick Kalivoda and Maziar Toosarvandani. To appear-b. Gender–Case Constraints in Zapotec. *Workshop on Structure and Constituency in Languages of the Americas (WSCLA)* 22.

Gutiérrez Lorenzo, Ambrocio. 2014. Construcciones de verbos seriales en el zapoteco de Teotitlán del Valle. Master's thesis, Centro de Investigaciones y Estudios Superiores en Anthropología Social.

Harbour, Daniel. 2008. *Morphosemantic number: From Kiowa noun classes to UG number features*. Dordrecht: Springer.

Harbour, Daniel. 2011. Valence and atomic number. *Linguistic Inquiry* 42:561–594.

Harley, Heidi and Elizabeth Ritter. 2002. Person and number in pronouns: A feature-geometric

analysis. *Language* 78:482–526.

Hiraiwa, Ken. 2000. On nominative-genitive conversion. *MIT Working Papers in Linguistics* 39:66–124.

Hiraiwa, Ken. 2001. Multiple Agree and the defective intervention constraint in Japanese. *MIT Working Papers in Linguistics* 40:67–80.

Lasnik, Howard. 1995. Case and expletives revisited: On Greed and other human failings. *Linguistic Inquiry* 26:615–633.

Long, Rebecca and Sofronio Cruz. 2000. *Diccionaria Zapoteco de San Bartolomé Zoogocho Oaxaca*. Mexico City: Instituto Lingüístico de Verano.

López, Filemón and Ronaldo Newberg. 2005. *La conjugación del verbo zapoteco, zapotevco de Yalálag*. Mexico City: Instituto Lingüístico de Verano.

López Nicolás, Oscar. 2009. Construcciones de doble objeto el el zapoteco de Zoochina. Master's thesis, Centro de Investigaciones y Estudios Superiores en Anthropología Social.

Marlett, Stephen A. 2010. Personal pronouns: Inventory. In *The Zapotec grammar files*, eds. Cheryl A. Black, H. Andrew Black, and Stephen A. Marlett. SIL International.

Nevins, Andrew. 2007. The representation of third person and its consequences for person-case effects. *Natural Language and Linguistic Theory* 25:273–313.

Nevins, Andrew. 2011. Multiple agree with clitics: Person complementarity vs. omnivorous number. *Natural Language and Linguistic Theory* 29:939–971.

Pancheva, Roumyana and Maria Luisa Zubizarreta. 2017. The Person Case Constraint: The syntactic encoding of perspective. *Natural Language and Linguistic Theory* .

Perlmutter, David. 1971. *Deep and surface structure constraints in syntax*. New York: Holt, Reinhart, and Winston.

Pesetsky, David. 2000. *Phrasal movement and its kin*. Cambridge, MA: MIT Press.

Preminger, Omer. 2011. Asymmetries between person and number in syntax: A commentary on Baker's SCOPA. *Natural Language and Linguistic Theory* 29:917–937.

Preminger, Omer. 2014. *Agreement and its failures*. Cambridge, MA: MIT Press.

Preminger, Omer. To appear. What the PCC tells us about "abstract" agreement, head movement, and locality. *Glossa* .

Richards, Norvin. 1997. What moves where when in which language? Ph.D. Dissertation, Massachusetts Institute of Technology.

Richards, Norvin. 1998. The principle of minimal compliance. *Linguistic Inquiry* 29:599–629.

Rizzi, Luigi. 1990. *Relativized minimality*. Cambridge, MA: MIT Press.

Rudin, Catherine. 1988. On multiple questions and multiple wh fronting. *Natural Language and Linguistic Theory* 6:445–501.

Sichel, Ivy and Maziar Toosarvandani. 2018. Zapotec pronouns and attraction. *2nd Symposium on Oaxacan Linguistics* .

Sonnenschein, Aaron. 2004. A descriptive grammar of San Bartolomé Zoogocho Zapotec. Ph.D. Dissertation, University of Southern California.

Sportiche, Dominique. 1993. Clitic constructions. In *Phrase structure and the lexicon*, eds. Johan Rooryck and Laurie Zaring, 213–276. Dordrecht: Springer.

Toosarvandani, Maziar. 2017. On reaching agreement early (and late). In *Asking the right questions: Essays in honor of Sandra Chung*, eds. Jason Ostrove, Ruth Kramer, and Joseph Sabbagh, 124–138. Santa Cruz, CA: Department of Linguistics, University of California, Santa Cruz.

Uriagereka, Juan. 1995. Aspects of the syntax of clitic placement in Western Romance. *Linguistic*

Inquiry 26:79–123.

Walkow, Martin. 2012. Cyclic agree derives restrictions on cliticization in Classical Arabic. In *Papers from Arabic Linguistics XXVI: Papers from the annual symposium on Arabic linguistics, 2012*, eds. Reem Khamis-Dakwar and Karen Froud, 135–160. Amsterdam: John Benjamins.