

OPTIMAL AGREEMENT AT M-STRUCTURE:
PERSON IN DARGWA

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Abstract

The rules of person agreement in languages of the Dargwa group (North-East Caucasian) are complex and based on the relative prominence of the core arguments on the personal and grammatical function hierarchies. The rules are also subject to much cross-dialectal variation. I argue that this variation can best be captured by assuming that the agreement marker specifies the person and number of an m-structure function called TH, which can be identified with either of the core arguments. The choice of agreement controller is determined not by functional annotations, but by four OT constraints: TH-1, TH-2, TH- \overline{GF} and TH-ABS. Thus the same f-structure maps to different c- and m-structure pairs in different Dargwa varieties based on variation in constraint orderings. This allows us to capture cross-dialectal variation in a uniform way while providing generalizations about which of the logically possible agreement systems are actually attested.

1 Dargwa: an overview

Dargwa (or Dargi) is a subgroup of the Nakh-Daghestanian language family. In the Soviet period, a single standard language was created based on the dialect of Aqusha. This is the only Dargwa variety that has official status, but it is not intelligible for the speakers of most other dialects (Koryakov & Sumbatova 2007).

Most of the key features of Dargwa are shared with other Daghestanian languages. These are ergative alignment (at least morphologically), SOV basic word order, a rich system of nominal spatial cases and a complex verbal morphology. Like in other North-East Caucasian languages that possess it, gender agreement is always controlled by the absolutive argument of the clause:

(1) Shiri

- a.

pat'imat	r-ax-ul	ca<r>i
Patimat.F	F-go.IPFV-PRS-CVB	COP<F>

'Patimat¹ is walking.'
- b.

murad-li	pat'imat	r-uc-ib-li	ca<r>i
Murad.M-ERG	Patimat.F	F-catch.PFV-PRET-CVB	COP<F>

'Murad has caught Patimat.'

An outstanding feature of Dargwa is the existence of person agreement, which is rare for North-East Caucasian (apart from Dargwa, it is only found in Udi and Tabasaran). Person agreement is not tied to a particular thematic role or grammatical function, but is determined based on relative prominence of the arguments on the person and grammatical function hierarchies:

¹From here on, the agreement controller will be put inside a frame for clarity.

(2) Ashti

- a. di-l ʔa^hli us-a-d b. ʔa^hli-dil u us-a-t:i
1Sg-ERG Ali [M]catch.PFV-PRET-1 Ali-ERG 2Sg [M]catch.PFV-PRET-2
'I caught Ali.' 'Ali caught you.'

The points that I would like to make regarding person agreement are the following²:

1. Controllers of both gender and person agreement occupy dedicated structural positions.
2. The controller of gender agreement is PIV in Falk's (2006a) terms.
3. Person agreement cannot be assigned to any dedicated f-structure position.
4. Rather, there is a dedicated position (TH) in the m-structure of the clause (Frank & Zaenen 2004) that the projection of the controller of person agreement occupies.
5. Optimality theory acts as a filter that selects the correct c- and m-structure pair for a given f-structure based on a set of constraints; differences in constraint ranking explain differences between languages.

My analysis will concern twelve varieties for which sufficient data is available: Aqusha, Urakhi, Tanti, Kubachi, Ashti, Shiri, Icari, Khuduts, Qunqi, Kaytag, Chirag and Mehweb (see map³ in Appendix).

2 Agreement rules

When applied to Dargwa, the terms "gender" and "person" agreement are simply convenient labels: "gender" markers also express number and (in a limited way) person, while "person" markers also express number.

2.1 Gender

There are three genders in the singular: masculine (M), feminine (F) and neuter (N); and two genders in the plural: human (HPL) and nonhuman (NPL). The assignment of nouns to these classes is purely semantic.

The only exception are 1st and 2nd person plural controllers which trigger the gender marker *d* (identical to nonhuman plural)⁴.

The set of gender markers is the same in all varieties, barring phonological differences. A typical one (found e.g. in Shiri and Icari) is shown in the following

²The data of Shiri and Ashti come from my fieldwork in Daghestan; the data of other dialects come from published sources, in particular the general summaries in Sumbatova (2011a,b). I am thankful to Nina Sumbatova, Miriam Butt, Tracy Holloway King, the anonymous reviewers, and the audience of LFG13 for their comments on earlier versions of this paper. I would also like to thank my Ashti consultants, in particular Murad Gadžimuradov and Abdul Bakhmudov, and my Shiri consultants, in particular Magomed Gasanov, Abdulkadir Khulabekov, Akhmed Rabadanov, and Ibragim Rabadanov. All errors are mine.

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³The original map has been provided by Yuri Koryakov and is used with his permission. I have added circles representing the varieties surveyed in this paper.

⁴Some analyse this as 1st and 2nd person plural pronouns belonging to a separate gender; see Corbett (2013) for a discussion of why such an analysis is problematic.

table:

	Singular	Plural
M	<i>w</i>	<i>b</i>
F	<i>r</i>	
N	<i>b</i>	<i>d</i>

Gender agreement is marked by prefixes found with most verb stems, by suffixes on essive and allative-marked nouns and on some adverbs. The copula also contains a gender morpheme, which is an infix in some dialects and a suffix in others: cf., e.g. Shiri *ca<w>i* (COP<M>), *cai* (COP<N>), and Ashti *sa-w* (COP-M), *sa-b* (COP-N).

Clause-level elements (verbs, adverbs, and the copula) agree with the argument that carries Absolutive case, as shown in (1) above⁵.

2.2 Person

There are several sets of person markers in Dargwa, which are distributed among different clause types and tense-aspect-mood series. The most widely used is the clitic set, which has the following structure (the forms shown are found in southern varieties):

	SG	PL
1	=da	
2	=di	
3	(cai)	

The form *cai* (where is the neuter marker) is the copula (which has slightly different form in different varieties, see above). It is used to mark the 3rd person in clauses with non-verbal predicates and in some tense-aspect-mood series; in other series that use the clitic set 3rd person is zero-marked.

The clitic markers are used in analytic verb forms and in clauses with nominal or adjectival predicates:

(3) Icarı (Sumbatova & Mutalov 2003: 139–140)

- | | |
|--|---|
| <p>a. <i>murad tuχtur=ca-w</i>
Murad doctor=COP-M
'Murad is a doctor.'</p> | <p>b. <i>du tuχtur=da</i>
1Sg doctor=1
'I am a doctor.'</p> |
|--|---|

There are also a few synthetic sets of person markers. The only set that will figure in my examples is the preterite set:

	SG	PL
1	-di	-d-a
2	-t:i	-t:-a
3	-aj, -i	

⁵In some dialects, adverbs and the copula can, under special circumstances, agree with the Ergative or Dative subject (Sumbatova 2010). The nature of this type of agreement is as yet unclear, and I will ignore it in this paper.

- (4) Shiri
 ʔaʎli meq b-arq'-aj
 Ali wedding N-DO.PFV-PRET.3
 'Ali married.'

In Mehweb, there is just one person marker in each of the sets (ra in the clitic set), which marks 1st person in declarative sentences and 2nd person in interrogative sentences, cf. the examples for declaratives in (12).

Notably, none of the person marker sets has a number distinction in the 3rd person, thus there is no way to determine the agreement controller when both arguments are 3rd person.

In intransitive clauses, person agreement is always controlled by S (the only core argument). In transitive clauses, the controller is chosen between A (the subject) and P (the direct object). It is important to demonstrate that the choice of controller is dependent on grammatical function, not on case. Dative subjects can control agreement as well as ergative subjects:

- (5) Shiri
dam murad či-w-ag-a-di
 1Sg.DAT Murad SUPER[LAT]-M-see.PFV-PRET-1
 'I saw Murad.'

The rules that determine the choice of A vs. P in transitive clauses are complex and show considerable variation. All the Dargwa varieties can be broadly divided into two classes: those where the controller is predominantly determined by the person hierarchy, and those where subject control is dominant.

2.2.1 Speech act participant-dominated control

The first group is the largest and consists of **Icari**, **Qunqi**, **Khuduts**, **Kaytag**, **Aqusha** (and Standard Dargwa), **Tanti**, **Ashti**, **Urakhi**, **Chirag** and certain idi-olectal variants of **Shiri**. In these dialects, the agreement rules are the following (cross-dialectal variation shown wherever present):

1. If one of the arguments is 3rd person, and the other is 1st or 2nd person, agreement is controlled by the speech act participant:

- (6) Shiri
- | | |
|---|---|
| a. A = 1 , P = 3
du-dil ʔaʎli us-a-di
1Sg-ERG Ali [M]catch.PFV-PRET-1
'I caught Ali.' | b. A = 3, P = 1
ʔaʎli-dil du us-a-di
Ali-ERG 1Sg [M]catch.PFV-PRET-1
'Ali caught me.' |
|---|---|

2. If both arguments are speech act participants, there are differences among varieties. In **Icari**, **Qunqi**, **Khuduts** (Amuq) and **Kaytag**, agreement is controlled by the 2nd person argument:

(7) Icarl (Sumbatova & Mutalov 2003: 79–80)

- | | |
|---|--|
| a. A = 1, P = 2 | b. A = 2 , P = 1 |
| du-l u uc-ib=di | u-l du uc-ib=di |
| 1Sg-ERG 2Sg [M]catch.PFV-PRET=2SG | 2Sg-ERG 1Sg [M]catch.PFV-PRET=2SG |
| ‘I caught you.’ | ‘You caught me.’ |

In **Aqusha**, **Tanti**, **Ashti**, **Urakhi**, and for some speakers of **Shiri (Shiri-1)**, agreement in this case is controlled by P:

(8) Ashti

- | | |
|---|---|
| a. A = 1, P = 2 | b. A = 2, P = 1 |
| di-l u j-us-a-ti | u-dil du us-a-d |
| 1Sg-ERG 2Sg F-catch.PFV-PRET-2 | 2Sg-ERG 1Sg [M]catch.PFV-PRET-1 |
| ‘I caught you (fem.).’ | ‘You caught me (masc.).’ |

In **Chirag**, it is controlled by A:

(9) Chirag

- | | |
|--|--|
| a. A = 1 , P = 2 | b. A = 2 , P = 1 |
| dic:e ʔu r-iq:an-da | ʔic:e du r-iq:an-de |
| 1Sg.ERG 2Sg F-lead.IPFV-1 | 2Sg.ERG 1Sg F-lead.IPFV-2SG |
| ‘I am leading you.’ | ‘You are leading me.’ |

For some speakers of **Shiri (Shiri-2)**, both A and P can control agreement in this case:

(10) Shiri

- | | |
|--|--|
| a. A = 1 , P = 2 | b. A = 2 , P = 1 |
| du-dil ʔu r-uc-a-di | ʔu-dil du r-uc-a-ti |
| 1Sg-ERG 2Sg F-catch.PFV-PRET-1 | 2Sg-ERG 1Sg F-catch.PFV-PRET-2 |
| a'. A = 1, P = 2 | b'. A = 2, P = 1 |
| du-dil ʔu r-uc-a-ti | ʔu-dil du r-uc-a-di |
| 1Sg-ERG 2Sg F-catch.PFV-PRET-2 | 2Sg-ERG 1Sg F-catch.PFV-PRET-1 |
| ‘I caught you (fem.).’ | ‘You caught me (fem.).’ |

3. The 3rd person marker (or zero, or copula) is only used when both arguments are 3rd person:

(11) Ashti

- A = 3, P = 3
pat'imat-li rasul us-aj
 Patimat-ERG Rasul [M]catch.PFV-PRET.3
 ‘Patimat caught Rasul.’

2.2.2 Subject control

There are only three varieties where subject control dominates: **Mehweb**, which has subject agreement as the only possibility, and **Kubachi** and some idiolectal variants of **Shiri**, where subject control is always possible, but can be overridden by the person hierarchy.

Mehweb only has dedicated agreement markers for the first person (in declar-

ative sentences), most frequently $\text{\textcircled{1}ra}$. These markers only appear with 1st person subjects (S/A), thus the person hierarchy does not seem to play any role in this variety:

(12) Mehweb (Magometov 1982)

- | | |
|--|--|
| <p>a. A = $\text{\textcircled{1}}$, P = 2
 nu-ni ħu w-arz-ur=ra
 1Sg-ERG 2Sg M-praise.PFV-PRET=1
 ‘I praised you (masc.).’</p> | <p>b. A = 2, P = 1
 ħu-ni nu w-arz-ur
 2Sg-ERG 1Sg M-praise.PFV-PRET
 ‘You praised me (masc.).’</p> |
| <hr/> | |
| <p>c. A = $\text{\textcircled{1}}$, P = 3
 nu-ni it
 1Sg-ERG DemDist
 w-arz-ur=ra
 M-praise.PFV-PRET=1
 ‘I praised him.’</p> | <p>d. A = 3, P = 1
 it-iʔi-ni nu
 DemDist-OBL-ERG 1Sg
 w-arz-ur
 M-praise.PFV-PRET
 ‘S/he praised me (masc.).’</p> |

For some speakers of Shiri (Shiri-3), A can always control agreement, but P may optionally become the controller if it is higher than A on the hierarchy $2 > 1 > 3$:

(13) Shiri-3

- | | |
|---|---|
| <p>a. A = $\text{\textcircled{1}}$, P = 2
 du-dil ʔu r-uc-a-di
 1Sg-ERG 2Sg F-catch.PFV-PRET-1
 ‘I caught you (fem.).’</p> | <p>b. A = $\text{\textcircled{2}}$, P = 1
 ʔu-dil du r-uc-a-ti
 2Sg-ERG 1Sg F-catch.PFV-PRET-2
 ‘You caught me (fem.).’</p> |
| <p>a’ A = 1, P = $\text{\textcircled{2}}$
 du-dil ʔu r-uc-a-ti
 1Sg-ERG 2Sg F-catch.PFV-PRET-1
 ‘I caught you (fem.).’</p> | |
| <hr/> | |
| <p>c. A = $\text{\textcircled{1}}$, P = 3
 du-dil pat’imat r-uc-a-di
 1Sg-ERG Patimat F-catch.PFV-PRET-1
 ‘I caught Patimat.’</p> | <p>d. A = $\text{\textcircled{3}}$, P = 1
 pat’imat-li du uc-aj
 Patimat-ERG 1Sg [M]catch.PFV-PRET-3
 ‘Patimat caught me.’</p> |
| | <p>d’. A = 3, P = $\text{\textcircled{1}}$
 pat’imat-li du uc-a-di
 Patimat-ERG 1Sg [M]catch.PFV-PRET-1
 ‘Patimat caught me.’</p> |

In **Kubachi**, the subject can always control agreement, but speech act participant P may optionally become the controller if A is 3rd person:

(14) Kubachi (Magometov 1963: 274–275, 282)

- | | |
|--|--|
| <p>a. A = $\text{\textcircled{1}}$, P = 2
 du-dil u w-i:t-u-l=da
 1Sg-ERG 2Sg M-beat.IPFV-PRS-CVB=1
 ‘I am beating you (masc.).’</p> | <p>b. A = $\text{\textcircled{2}}$, P = 1
 u-dil du
 2Sg-ERG 1Sg
 w-i:t-u-l=di
 M-beat.IPFV-PRS-CVB=2SG
 ‘You are beating me (masc.).’</p> |
|--|--|

- c. A = $\boxed{1}$, P = 3
du-dil id
 1Sg-ERG DemDist
 w-i:t-u-l=**da**
 M-beat.IPFV-PRS-CVB=1
 ‘I am beating him.’
- d. A = $\boxed{3}$, P = 1
id-dil du
 DemDist-ERG 1Sg
 w-i:t-u-l=**sa-w**
 M-beat.IPFV-PRS-CVB=COP-M
- d'. A = 3, P = $\boxed{1}$
id-dil du
 DemDist-ERG 1Sg
 w-i:t-u-l=**da**
 M-beat.IPFV-PRS-CVB=1
 ‘He is beating me.’

The data of various dialects is summarized in the following table:

person		agreement marker						
A	P	Ic	Aq	Sh2	Kub	Sh3	Mhw	
1	2	2	2	1/2	1	1/2	1	
2	1	2	1	1/2	2	2	∅	
1	3	1	1	1	1	1	1	
3	1	1	1	1	3/1	3/1	∅	
2	3	2	2	2	2	2	∅	
3	2	2	2	2	3/2	3/2	∅	
3	3	3	3	3	3	3	∅	

Legend: Ic = Icari, Aq = Aqusha, Sh2 = Shiri-2, Kub = Kubachi, Sh3 = Shiri-3, Mhw = Mehweb.

3 Analysis

In this section, I will propose an LFG account of agreement in Dargwa that makes extensive use of m-structure projected from f-structure (Frank & Zaenen 2004) and Optimality Theory (Prince & Smolensky 1993, Bresnan 2000). I will assume that all agreement features are found at m-structure, thus the entries for nouns and pronouns are like the following:

<i>murad</i>	N	(↑ PRED) = ‘Murad’	<i>du</i>	N	(↑ PRED) = ‘me’
		(↑ _μ PERS) = 3			(↑ _μ PERS) = 1
		(↑ _μ NUM) = SG			(↑ _μ NUM) = SG
		(↑ _μ GENDER) = M			

3.1 Gender

Gender agreement in Dargwa is syntactically ergative as it is controlled by the S/P (absolute) argument. The question is whether this is a purely morphological fact, or Dargwa is syntactically ergative. This, in turn, must be established based on the behaviour of other constructions.

It appears that different constructions have different pivots. As an example, I will provide the data of Ashti. In Ashti, simple reflexives can be both S/A- and S/P-oriented, but complex ones are always S/A-oriented:

(15) Ashti

- a. *rasul-li sin-na sa-w waq^ʕ-aq^ʕ-ip:i*
 Rasul-ERG Refl-GEN Refl-M hit-hit.PFV-PERF[3]
- b. * *sin-na sin-dil rasul waq^ʕ-aq^ʕ-ip:i*
 Refl-GEN Refl-ERG Rasul hit-hit.PFV-PERF[3]
- ‘Rasul has hit himself.’

This type of complex reflexive is a sequence of two forms of the reflexive pronoun: the genitive form and the form bearing the case assigned to the position that the pronoun occupies. Thus in (15a) the pronoun stands in the Absolutive while in (15b) it stands in the Ergative.

In addition, the simple converb in Ashti can only be center-embedded if it is same-subject, where subject is understood as the S/A argument (Belyaev 2011).

At the same time, some constructions are strictly S/P oriented. These include, apart from gender agreement, for example, reciprocals. The antecedent may only be Ergative if the pronoun is in some oblique case form; if the antecedent and the pronoun correspond to positions where ergative (or dative, with experiencer verbs) and absolutive are assigned, the antecedent always receives Absolutive case⁶ (reciprocal pronouns consist of two numerals *sa* ‘one’, the first of which stands in the antecedent’s case while the second carries the case of the pronoun):

- (16) a. *rasul-li ʔali gap-w-a:q^ʕ-aj*
 Rasul-ERG Ali praise-M-do.PFV-PRET.3
 ‘Rasul praised Ali.’
- b. i. *rasul=ba ʔali sa-l sa gap-b-a:q^ʕ-aj*
 Rasul=and Ali one-ERG one praise-HPL-do.PFV-PRET.3
- ii. * *rasul=ba ʔali-dil sa-l sa gap-b-a:q^ʕ-aj*
 Rasul=and Ali-ERG
 ‘Rasul and Ali praised **each other**.’
- (17) a. *ʔali-dil rasul-li-j paltar d-ik:-aj*
 Ali-ERG Rasul-OBL-DAT clothes NPL-give.PFV-PRET.3
 ‘Ali gave clothes to Rasul.’
- b. i. *ʔali=ba rasul-li sa-li-j sa paltar dik:aj*
 Ali=and Rasul-ERG one-OBL-DAT one
- ii. * *ʔali=ba rasul-li-j sa-li-j sa paltar dik:aj*
 Ali=and Rasul-OBL-DAT
- iii. * *ʔali=ba rasul salij sa paltar dik:aj*
 ‘Ali and Rasul gave clothes to each other.’

Thus, to describe the data of Ashti, both an f-structure position that reflects S/A and an f-structure position that reflects S/P are required. An appropriate framework that captures this is found in Falk (2006a):

- The traditional grammatical function SUBJ is split into two: \widehat{GF} and PIV.

⁶The case marker in coordinating constructions which use the conjunction *=ba* undergoes suspended affixation.

- \widehat{GF} (the “most prominent argument”, or subject proper) is always identical to the subject in the classical sense (S/A).
- PIV (the pivot) gets language-specific assignment:
 - in accusative languages, it is always identified with \widehat{GF} ;
 - in syntactically ergative languages, it is identified with \widehat{GF} of intransitive verbs and with OBJ of transitive verbs;
 - other languages may employ more complex ways of determining the value of PIV.

Thus, Ashti can be analyzed as a syntactically ergative language, identifying PIV with \widehat{GF} in intransitive clauses and with OBJ in transitive ones. As a preliminary generalization, Ashti reflexives and converbs are \widehat{GF} -oriented (Falk’s theory actually predicts this for anaphora), while reciprocals⁷ and gender agreement are PIV-oriented.

The definitions for gender morphemes are thus straightforward:

$$b- \left((\uparrow \text{PIV})_{\mu} \text{ NUM} \right) =_c \text{ SG}$$

$$\left((\uparrow \text{XCOMP} * \text{PIV})_{\mu} \text{ GENDER} \right) =_c \text{ N}$$

Note the functional uncertainty expression ($\uparrow \text{XCOMP} * \text{PIV}$). It expresses the possibility of long-distance gender agreement with S/P of a subordinate clause:

(18) Shiri

- a. pat’imat-li-ž **hulk-ni** d-arq’-iž b-uχ:-u
 Patimat-OBL-DAT chudu-PL NPL-do.PFV-INF N-know.IPFV-HAB.3
 (verb agrees with the subordinate clause/default gender, neuter)
- b. pat’imatliž **hulkni** darq’iž d-uχ:-u
 NPL-know.IPFV-HAB.3
 (verb agrees with direct object / PIV of the subordinate clause)

‘Patimat can make *chudu*.’

Falk’s *Pivot Condition* requires for any functional uncertainty path crossing a clause boundary to terminate in PIV. If one accepts this condition, the existence of such a type of long-distance agreement is a clear argument in favour of syntactic ergativity.

3.2 Person

3.2.1 An f-structure position?

In the previous section, it has been established that gender agreement is determined by the PIV function. It is thus plausible to assume that person agreement is also connected to some fixed grammatical function, which gets variable assignment depending on the person hierarchy. Since one cannot freely introduce *ad hoc* f-structure functions, such an analysis amounts to stating that the subject (\widehat{GF}) gets variable assignment in Dargwa (although this is in contradiction with Falk’s theory).

It can be clearly seen that this is not the case. Syntactic constructions that

⁷Presumably, reciprocals in Ashti are not subject to the standard constraints on anaphora. Why this is so is a question for further inquiry.

are subject (S/A)-oriented behave in the same way regardless of whether A or P controls agreement in a transitive clause. For example, secondary predicates marked by *-mu:til* ‘when’ are S/A-oriented, and do not switch reference if the verb agrees with the patient:

- (19) Ashti
- a. milic:a-dil us-ip:i qilgu **kep-mu:til**
policeman-ERG [M]catch.PFV-PERF[3] thief drunk-when
‘The policeman_i caught the thief_j when he_{i,*j} was drunk.’
- b. milic:a-dil du us-ip:i=da **kep-mu:til**
policeman-ERG 1Sg [M]catch.PFV-PERF=1 drunk-when
‘The policeman_i caught me_j when he_i / *I_j was drunk.’

Thus, the subject position is filled by the S/A argument regardless of verb agreement.

In general, the person agreement controller appears to play no role in any other area of grammar. This means that person agreement in Dargwa is syntactically irrelevant and should not be tied to a particular f-structure function.

3.2.2 Listing the alternatives?

Staying within f-structure, the most obvious way of dealing with person agreement is to simply list the rules for each of the cases. For example, the definitions for Ashti person markers will be like the following:

$$\begin{array}{l}
=da \left\{ \begin{array}{l} ((\uparrow \text{PIV})_{\mu} \text{PERS}) =_c 1 \quad | \quad ((\uparrow \widehat{\text{GF}})_{\mu} \text{PERS}) =_c 1 \\ ((\uparrow \text{PIV})_{\mu} \text{PERS}) =_c 3 \end{array} \right\} \\
=di \left\{ \begin{array}{l} ((\uparrow \text{PIV})_{\mu} \text{PERS}) =_c 2 \quad | \quad ((\uparrow \widehat{\text{GF}})_{\mu} \text{PERS}) =_c 2 \\ ((\uparrow \text{PIV})_{\mu} \text{PERS}) =_c 3 \end{array} \right\}
\end{array}$$

The former definition can be paraphrased as “either S/P is 1st person or A is 1st person while P is 3rd person”, the latter as “either S/P is 2nd person or A is 2nd person while P is 3rd person”. These definitions are descriptively adequate, but do not seem to have much explanatory value. More importantly, they do not allow us to capture cross-dialectal variation in a regular way. For example, the corresponding definitions for Içari would have the following form:

$$\begin{array}{l}
=da \left\{ \begin{array}{l} ((\uparrow \widehat{\text{GF}})_{\mu} \text{PERS}) =_c 1 \quad | \quad ((\uparrow \widehat{\text{GF}})_{\mu} \text{PERS}) =_c 3 \\ ((\uparrow \text{PIV})_{\mu} \text{PERS}) =_c 3 \quad | \quad ((\uparrow \text{PIV})_{\mu} \text{PERS}) =_c 1 \end{array} \right\} \\
=di \left\{ ((\uparrow \widehat{\text{GF}})_{\mu} \text{PERS}) =_c 2 \quad | \quad ((\uparrow \text{PIV})_{\mu} \text{PERS}) =_c 2 \right\}
\end{array}$$

The meanings of these agreement markers in Kubachi, Ashti, and Chirag would be again different. While the definitions are similar, it seems to be hard to come up with a parametric way of capturing the differences and similarities between them.

3.2.3 Optimality-theoretic constraints

The analysis that I would like to propose is based on the following idea. Dargwa provides a fixed structural position for the person agreement controller, which functional annotations freely identify with S, A or P ($\widehat{\text{GF}}$ or PIV). The task of picking out the appropriate controller is then relegated to Optimality Theory which

filters the possible candidates.

According to Bresnan (2000), I take (possibly underspecified) f-structure as the input. The candidate set is a set of quadruples consisting of c-structures, f-structures, m-structures and their correspondence functions (Lee 2004).

Since, as discussed above, the controller of person agreement is syntactically irrelevant, I assign it to a specialized function that I will call TH, which is found in the m-structure projected from the f-structure of the clause (Frank & Zaenen 2004). This allows us to have the same f-structure map to different c- and m-structure pairs in different Dargwa varieties.

This function can be freely filled by either GF or PIV, via a rule like the following (where f is any clausal f-structure):

$$\{(f_{\mu} \text{ TH}) = (f \text{ GF})_{\mu} \mid (f_{\mu} \text{ TH}) = (f \text{ PIV})_{\mu}\}$$

The entry for a person agreement marker is also uniform across dialects:

$$=da \text{ I } (\uparrow_{\mu} \text{ TH PERS}) = 1$$

The assignment of TH is evaluated in OT by the following four constraints that are evaluated for every m-structure m :

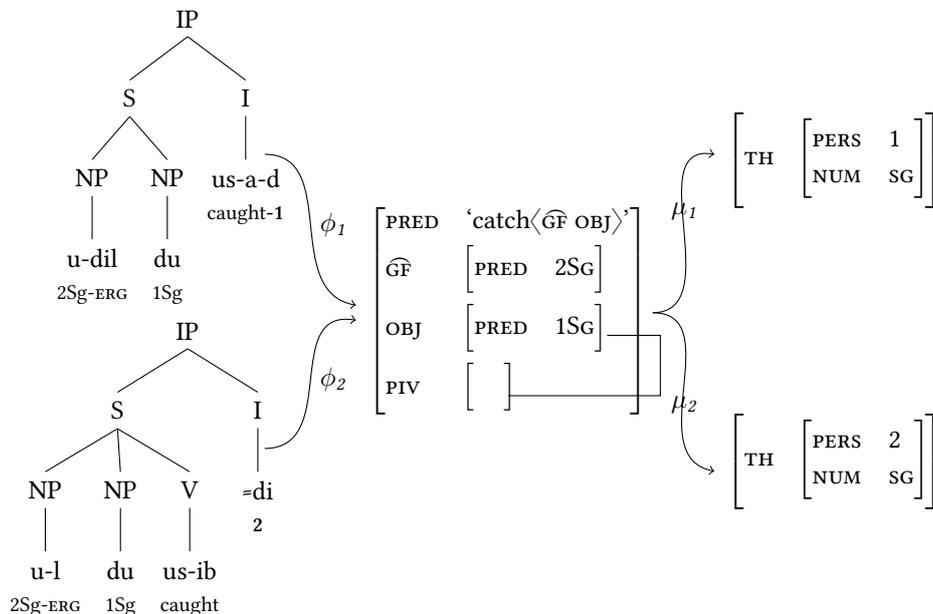
1TH $(m \text{ TH PERS}) =_c 1$ [TH is 1st person]

2TH $(m \text{ TH PERS}) =_c 2$ [TH is 2nd person]

TH-PIV $(\text{PIV}(m \text{ TH})^{-1})$ [TH is S/P]

TH-GF $(\text{GF}(m \text{ TH})^{-1})$ [TH is A/S]

Variation between various agreement patterns (and between languages) boils down to the c- and m-structure pairs that correspond to the same f-structure, cf. the following illustration of the difference between Ashti (8b, upper c- and m-structures) and Icari (7b, lower c- and m-structures):



The projections ϕ_1 and μ_1 correspond to Ashti, while ϕ_2 and μ_2 are for Icari. In the following paragraphs, I will show how different constraint rankings give

rise to the attested surface patterns.

A similar approach to agreement involving g-structure (grammatical marking structure) has been proposed in Falk (2006b). But I do not see the need to introduce an additional level of representation when m-structure already exists for capturing similar phenomena.

Second-person dominance. Systems where the 2nd person dominates have the most straightforward constraint ranking:

$$2\text{TH} \gg 1\text{TH} \gg \text{TH-PIV}, \text{TH-}\widehat{\text{GF}}$$

TH-PIV and TH- $\widehat{\text{GF}}$ are neutralized because they are only relevant when both A and P are speech act participants. The following tableaux illustrate how this ranking operates (I will provide analogous tableaux for other rankings below):

(20) Icari, Khuduts, Qunqi, Kaytag

a.

A = 1, P = 2	2TH	1TH	TH-PIV	TH- $\widehat{\text{GF}}$
a. TH = 1	*!		*	
☞ b. TH = 2		*		*

b.

A = 2, P = 1	2TH	1TH	TH-PIV	TH- $\widehat{\text{GF}}$
a. TH = 1	*!			*
☞ b. TH = 2		*	*	

c.

A = 3, P = 1	2TH	1TH	TH-PIV	TH- $\widehat{\text{GF}}$
☞ a. TH = 1	*			*
b. TH = 3	*	*!	*	

Speech act participant-dominance. The 1st and 2nd person have the same rank, and the choice between them is carried out according to who occupies the PIV position. This can be captured by allowing a disjunctive constraint $1\text{TH} \vee 2\text{TH}$ (Crowhurst & Hewitt 1997).

$$1\text{TH} \vee 2\text{TH} \gg \text{TH-PIV} \gg \text{TH-}\widehat{\text{GF}}$$

(21) Aqusha, Tanti, Shiri-1, Ashti

a.

A = 1, P = 2	$1\text{TH} \vee 2\text{TH}$	TH-PIV	TH- $\widehat{\text{GF}}$
a. TH = 1		*!	
☞ b. TH = 2			*

b.

A = 2, P = 1	$1\text{TH} \vee 2\text{TH}$	TH-PIV	TH- $\widehat{\text{GF}}$
☞ a. TH = 1			*
b. TH = 2		*!	

In Chirag, A and P are ordered in the opposite way:

$$1\text{TH} \vee 2\text{TH} \gg \text{TH-}\widehat{\text{GF}} \gg \text{TH-PIV}$$

(22) Chirag

a.	A = 1, P = 2	1TH \vee 2TH	TH- $\widehat{\text{GF}}$	TH-PIV
	☞ a. TH = 1			*
	b. TH = 2		*!	
b.	A = 2, P = 1	1TH \vee 2TH	TH- $\widehat{\text{GF}}$	TH-PIV
	a. TH = 1		*!	
	☞ b. TH = 2			*

Subject control. In Mehweb, the only variety where only subject control is possible, TH- $\widehat{\text{GF}}$ dominates the hierarchy:

$$\text{TH-}\widehat{\text{GF}} \gg 1\text{TH}, 2\text{TH}, \text{TH-PIV}$$

In Kubachi and Shiri-3, the situation is more complicated. The controller is *either* the subject or the absolutive if it outranks the subject on the person hierarchy.

This means that the person hierarchy and the grammatical function hierarchy have an equal status in these varieties. This can be captured by allowing under-specified constraint orderings (Anttila & Cho 1998). The ordering for Shiri will be:

$$\begin{aligned} \text{TH-}\widehat{\text{GF}} &\gg \text{TH-PIV} \\ 2\text{TH} &\gg 1\text{TH} \end{aligned}$$

This produces two alternative constraint orderings for each case⁸:

(23) Shiri-3

a.	A = 1, P = 2	2TH	1TH	TH- $\widehat{\text{GF}}$	TH-PIV
	a. TH = 1	*!			*
	☞ b. TH = 2		*	*	
	A = 1, P = 2	TH- $\widehat{\text{GF}}$	TH-PIV	2TH	1TH
	☞ a. TH = 1		*	*	
	b. TH = 2	*!			*
b.	A = 3, P = 1	2TH	1TH	TH- $\widehat{\text{GF}}$	TH-PIV
	☞ a. TH = 1	*		*	
	b. TH = 3	*	*!		*
	A = 3, P = 1	TH- $\widehat{\text{GF}}$	TH-PIV	2TH	1TH
	a. TH = 1	*!		*	
	☞ b. TH = 3		*	*	*

⁸Technically, orderings like “TH- $\widehat{\text{GF}}$ \gg 2TH \gg 1TH \gg TH-PIV” are also possible, but the surface effects of this ranking are equivalent to those of any other ranking where TH- $\widehat{\text{GF}}$ dominates. This also applies to the domination of 2TH, 1TH, or TH-PIV over all other constraints.

c.

A = 2, P = 1	2TH	1TH	TH- \widehat{GF}	TH-PIV
a. TH = 1	*!		*	
b. TH = 2		*		*
A = 2, P = 1	TH- \widehat{GF}	TH-PIV	2TH	1TH
a. TH = 1	*!		*	
b. TH = 2		*		*

This means that when A = 1, P = 2 (23a), or when A = 3, P = 1 (23b), both arguments can control agreement, but when A = 2, P = 1 (23c), or A = 1, P = 3, only A can be the controller, because it outranks P in both orderings.

Kubachi has the same overall system, but 1TH and 2TH are disjunctive, which leads to different results when A = 1 and P = 2 or vice versa:

$$\text{TH-}\widehat{GF} \gg \text{TH-PIV}$$

$$1\text{TH} \vee 2\text{TH}$$

(24) Kubachi

a.

A = 1, P = 2	1TH \vee 2TH	TH- \widehat{GF}	TH-PIV
a. TH = 1			*
b. TH = 2		*!	
A = 1, P = 2	TH- \widehat{GF}	TH-PIV	1TH \vee 2TH
a. TH = 1		*	
b. TH = 2	*!		

b.

A = 2, P = 1	1TH \vee 2TH	TH- \widehat{GF}	TH-PIV
a. TH = 1		*!	
b. TH = 2			*
A = 2, P = 1	TH- \widehat{GF}	TH-PIV	1TH \vee 2TH
a. TH = 1	*!		
b. TH = 2		*	

Variable control by speech act participants. In Shiri-2, both the 1st and 2nd person arguments can control agreement regardless of their f-structure function.

The disjoint constraint $1\text{TH} \vee 2\text{TH}$ dominates both TH- \widehat{GF} and TH-PIV, but the ordering of the latter two is unspecified:

$$1\text{TH} \vee 2\text{TH} \gg \text{TH-}\widehat{GF}$$

$$1\text{TH} \vee 2\text{TH} \gg \text{TH-PIV}$$

(25) Shiri-2

a.

A = 1, P = 2	1TH \vee 2TH	TH- \widehat{GF}	TH-PIV
a. TH = 1			*
b. TH = 2		*!	

A = 1, P = 2	$1\text{TH} \vee 2\text{TH}$	TH-PIV	TH- $\widehat{\text{GF}}$
a. TH = 1		*!	
b. TH = 2			*

b.

A = 2, P = 1	$1\text{TH} \vee 2\text{TH}$	TH- $\widehat{\text{GF}}$	TH-PIV
a. TH = 1		*!	
b. TH = 2			*
A = 2, P = 1	$1\text{TH} \vee 2\text{TH}$	TH-PIV	TH- $\widehat{\text{GF}}$
a. TH = 1			*
b. TH = 2		*!	

3.2.4 Summary

1	Icari, Khuduts, Qunqi, Kaytag	$2\text{TH} \gg 1\text{TH} \gg \text{TH-PIV}, \text{TH-}\widehat{\text{GF}}$
2	Aqusha, Tanti, Urakhi, Ashti, Shiri-1	$1\text{TH} \vee 2\text{TH} \gg \text{TH-PIV} \gg \text{TH-}\widehat{\text{GF}}$
3	Chirag	$1\text{TH} \vee 2\text{TH} \gg \text{TH-}\widehat{\text{GF}} \gg \text{TH-PIV}$
4	Shiri-3	$\text{TH-}\widehat{\text{GF}} \gg \text{TH-PIV}$ $2\text{TH} \gg 1\text{TH}$
5	Kubachi	$\text{TH-}\widehat{\text{GF}} \gg \text{TH-PIV}$ $1\text{TH} \vee 2\text{TH}$
6	Mehweb	$\text{TH-}\widehat{\text{GF}} \gg 1\text{TH}, 2\text{TH}, \text{TH-PIV}$
7	Shiri-2	$1\text{TH} \vee 2\text{TH} \gg \text{TH-}\widehat{\text{GF}}$ $1\text{TH} \vee 2\text{TH} \gg \text{TH-PIV}$

4 Enumerating the alternatives

Given the four constraints above, and assuming that they should all be ranked with respect to each other, there are $4! = 24$ possible rankings. The real number is much lower, however, since some groups of rankings are equivalent in terms of surface effects (neutralization known from much work in OT):

- When the ranking starts with $1\text{TH} \gg 2\text{TH} \gg \dots$ or $2\text{TH} \gg 1\text{TH} \dots$, the relative ranking of TH- $\widehat{\text{GF}}$ and TH-PIV is neutralized.
- The same concerns $1\text{TH}/2\text{TH} \gg \text{TH-PIV} \gg \dots$ and $1\text{TH}/2\text{TH} \gg \text{TH-}\widehat{\text{GF}} \gg \dots$
- If the hierarchy is dominated by either TH- $\widehat{\text{GF}}$ or TH-PIV, the order of everything else is irrelevant.

With this in mind, the overall number of possible unique orderings is only 8:

- $2\text{TH} \gg 1\text{TH} \gg \text{TH-}\widehat{\text{GF}}, \text{TH-ABS}$ (Icari, Qunqi, Khuduts, Kaytag)
- $1\text{TH} \gg 2\text{TH} \gg \text{TH-}\widehat{\text{GF}}, \text{TH-ABS}$ (not attested)
- $\text{TH-}\widehat{\text{GF}} \gg 1\text{TH}, 2\text{TH}, \text{TH-PIV}$ (Mehweb)
- $\text{TH-PIV} \gg 1\text{TH}, 2\text{TH}, \text{TH-}\widehat{\text{GF}}$ (not attested)
- $2\text{TH} \gg \text{TH-PIV} \gg 1\text{TH}, \text{TH-}\widehat{\text{GF}}$ (not attested)
- $1\text{TH} \gg \text{TH-PIV} \gg 2\text{TH}, \text{TH-}\widehat{\text{GF}}$ (not attested)
- $2\text{TH} \gg \text{TH-}\widehat{\text{GF}} \gg 1\text{TH}, \text{TH-PIV}$ (not attested)
- $1\text{TH} \gg \text{TH-}\widehat{\text{GF}} \gg 2\text{TH}, \text{TH-PIV}$ (not attested)

Allowing disjunction of features does not significantly increase the number of variants. Allowing $1\text{TH} \vee 2\text{TH}$ creates only 6 additional logically possible orderings; four of them are identical with those that were present before ($\text{TH-GF} \gg \dots$ and $\text{TH-PIV} \gg \dots$), thus leaving us with two possibilities, both of which are attested:

$1\text{TH} \vee 2\text{TH} \gg \text{TH-GF} \gg \text{TH-PIV}$ (Chirag)

$1\text{TH} \vee 2\text{TH} \gg \text{TH-PIV} \gg \text{TH-GF}$ (Aqusha, Urakhi, Tanti, Ashti, Shiri-1)

Allowing underspecified orderings is another matter, as this vastly increases the range of possibilities. However, most of them are, apparently, either equivalent to the ones previously listed or boil down to “anything goes”. For example, if 2TH is ranked higher than 1TH while there are no other orderings specified, any argument can serve as the controller (although the probabilities will not be equal, as per Anttila & Cho (1998)). The variants that really matter in terms of grammaticality are:

$2\text{TH} \gg 1\text{TH}; \text{TH-GF} \gg \text{TH-PIV}$ (Shiri-3)

$2\text{TH} \gg 1\text{TH}; \text{TH-PIV} \gg \text{TH-GF}$ (not attested)

$1\text{TH} \gg 2\text{TH}; \text{TH-GF} \gg \text{TH-PIV}$ (not attested)

$1\text{TH} \gg 2\text{TH}; \text{TH-PIV} \gg \text{TH-GF}$ (not attested)

$1\text{TH} \vee 2\text{TH}; \text{TH-GF} \gg \text{TH-PIV}$ (Kubachi)

$1\text{TH} \vee 2\text{TH} \gg \text{TH-PIV}; 1\text{TH} \vee 2\text{TH} \gg \text{TH-GF}$; (Shiri-2)

The unattested cases are regular and allow the formulation of the following principles:

- **Do not mix person and GF.** A GF constraint can never stand between two person constraints, and vice versa.
- **No first-person domination.** In no dialect does the 1st person dominate the 2nd person.
- **Avoid domination of GF over person.** There is only one variety where agreement is fully controlled by grammatical function – Mehweb, which has a very reduced agreement system to begin with (and is in general quite peripheral). Those who come closest are Shiri-2 and Kubachi, where subject agreement is in free variation with agreement controlled by the person hierarchy.

The first requirement may be a general principle not specific to Dargwa.

The other two requirements may reflect the diachronic evolution of person marking. In Sumbatova (2011a), it is proposed that person marking in Dargwa may have developed from an original allocutive marker, which marked the grammatical features of the listener. This means that the dominance of the 2nd person was the original situation, and all the other systems are innovative.

The whole variety of constraint orderings can be represented via a set of three parameters:

Parameter	Possible values		
Person hierarchy	$2Th \gg 1Th$	$1Th \vee 2Th$	
GF hierarchy	$Th-PIV \gg Th-\widehat{GF}$	$Th-\widehat{GF} \gg Th-PIV$ (only Mehweb, Kubachi)	no ordering (only Shiri-2)
Relation between hierarchies	$PERS \gg GF$	$GF \gg PERS$ (only Mehweb)	no ordering (only Kubachi, Shiri)

5 Conclusions

The analysis given herein provides an adequate account of hierarchical agreement in Dargwa and in its microvariation within this group of closely related idioms. It also provides an argument in favour of m-structure as an additional level of linguistic representation, where language-specific features that are not directly relevant for the syntactic structure of the language are located. The distinction between f- and m-structure allows us to treat cross-dialectal variation as stemming from the same f-structure being mapped to different c- and m-structure pairs based on different rankings of OT constraints.

At the same time, there are still several questions that have to be explored in more detail:

Other similar systems. Though rare, agreement systems like the one in Dargwa are attested in different languages of the world (Comrie 2003). For example, Tangut (Tibeto-Burman) seems to have had a system that is almost identical to that found in e.g. Ashti ($1,2 > 3$; $PIV > \widehat{GF}$) (Kepping 1981). Thus the analysis provided herein seems to be fully applicable to Tangut, if it is established that the person hierarchy indeed has no bearing on other syntactic phenomena in this language. It remains to be seen whether my analysis transfers as easily to other languages exhibiting hierarchical agreement.

Direct-inverse systems. Hierarchical agreement systems like the one in Dargwa are closely related to (though distinct from) direct-inverse systems (Payne 1999). Curiously, some Dargwa languages do have a kind of inverse, found in a limited number of verb forms that utilize so-called thematic vowels *-i-* and *-u-*. In Icari, for example, *-i-* is used when A is higher than P on the hierarchy $2 > 1 > 3$, while *-u-* is used in all other cases (Sumbatova & Mutalov 2003: 83). In Ashti, however, the situation is different: either *-i-* or *-u-* can be used when both A and P are speech act participants, with the choice depending on various factors such as telicity (Belyaev in press). It is possible that this difference between Icari and Ashti is related to the fact that only the former displays the $2 > 1 > 3$ hierarchy, while the latter makes no distinction between the 1st and 2nd persons. If this intuition is confirmed, then perhaps this analysis could be extended to cover Dargwa “direct-inverse” systems, too. If not, such systems will have to be accounted for by a separate mechanism.

Universality. The set of OT constraints is supposed to be universal. Yet agreement systems like this one are quite rare. It remains an open question whether this analysis can be extended to cover other morphosyntactic phenomena that depend

on the animacy/person hierarchy (Silverstein 1976), such as split ergativity and plural agreement. Such an extension would provide theoretical credibility for the analysis, which in its present form simply uses OT as a filtering mechanism based on constraints that have been devised specifically for Dargwa.

Correlation between agreement rules and genealogical classification. Even though the genealogical groupings within Dargwa are still unclear, it can be seen that the groups displayed in 3.2.4 do not correspond well to the preliminary lexicostatistical classification developed in Koryakov (2013). Neither is a straightforward explanation through language contact always plausible. The position of Ashti is especially striking, as it is a dialect that is very closely related to Kubachi (the ancestors of Ashti speakers migrated from Kubachi several hundred years ago); yet it has neither retained the Kubachi system nor borrowed the system of the neighbouring Qunqi and Khuduts. The Ashti agreement pattern could perhaps be explained by partial parametric change (the person hierarchy and *prv* started to dominate, but $1T_H \vee 2T_H$ remained).

List of glosses

COP: copula, CVB: converb, DAT: dative, Dem: demonstrative, Dist: distal deixis, ERG: ergative, F: feminine, GEN: genitive, HAB: habitual, HPL: human plural, INF: infinitive, IPFV: imperfective, LAT: lative, M: masculine, NPL: neuter plural, OBL: oblique, PERF: perfect, PFV: perfective, PL: plural, PRET: preterite, PRS: present, Refl: reflexive, SG/Sg: singular, SUPER: localization ‘above’

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Appendix. The Dargwa varieties analyzed in the paper, classified according to the constraint rankings

