Agreement and argument marking are not categorically distinct

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1   Introduction

Over the past 40 years, many researchers have argued for, or assumed, that 'argument marking' and 'agreement' (or concord) reflect two fundamentally distinct modes of core argument realization in a syntactic structure (Jelinek, 1984; Austin and Bresnan, 1996; Siewierska, 2001; LeSourd, 2006; Hengeveld, 2012; Croft, 2013; Haspelmath, 2013; Mithun, 2013). These approaches are guided by the intuition that argument markers realize core arguments that are independent components of argument structure which must be present at some (or all) levels of grammatical representation. In contrast, agreement markers, as their name suggest, serve a dependent role in referring back to a core argument.

The challenges that arise on this dichotomous treatment of argument structure markers are familiar and largely recalcitrant. For mainly historical reasons, the status of markers has received particular attention in connection with languages that exhibit the diverse properties clustered under the umbrella of 'non-configurationality'. The most directly relevant property is the phenomenon of 'null anaphora'/'argument drop', because this creates conditions under which markers can, at least in principle, serve as the sole or primary realization of

a core argument.[1] Other properties, including syntactically free word order (as opposed to flexible constituent order) and apparently discontinuous constituents are only relevant to this question to the extent that they interact with modes of argument realization.

The fundamental challenge for contemporary theoretical and typological accounts lies in resolving the tension between *classifying individual elements* categorically as 'argument' or 'agreement' markers, while also *characterizing the distribution* of these elements in terms of their status. The tension rests in turn on the lack of any transparent, cross-linguistically valid, criteria for a categorical contrast between argument and agreement markers. It is reasonably clear what kinds of distributional patterns would provide empirical support for this distinction. Stable distributional contrasts would offer strong, even incontrovertible, evidence, if elements classified as 'argument markers' were to always occur in strict complementary distribution with arguments, whereas elements classified as 'agreement markers' were able (or required) to co-occur with the arguments that they ostensibly agree with.

In the absence of compelling empirical support, a range of strategies have been explored for preserving a categorical distinction between argument and agreement markers. The main theoretical debates have been conducted between proponents of the Pronominal Argument Hypothesis (Jelinek (1984) and following) and the Dual Structure Hypothesis (Austin and Bresnan (1996); LeSourd (2006), among others). Typological approaches have formed more of a unified front in attempting to circumvent empirical challenges by devising criteria for distinguishing referential markers, which 'truly instantiate' arguments, from agreement markers, which 'merely refer back' to them (Siewierska (2001); Hengeveld (2012); Croft (2013); Haspelmath (2013); Mithun (2013), among others).

A conspicuous gap in the preceding literature is the lack of any discussion of the types of patterns that would directly contradict, rather than merely 'complicate' or fail to support a categorical distinction between argument and agreement markers. The aim of the current paper is to fill this gap by examining data from Romontsch Tuatschin (Sursilvan,

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[1]From a typological perspective, it is open to question whether 'argument drop' is a genuine phenomenon, rather than a cross-linguistic default, but the resolution of this issue does not bear on the status of markers.

Rhaetoromance, Switzerland) that is incompatible with a categorical argument/agreement marker distinction. The relevant facts are briefly summarized below.

In Tuatschin, subject arguments can be expressed by affixal markers (verb endings), by phrasal markers (typically pronominal markers), or by both. Whenever the verb precedes a pronominal subject, it is not uncommon for the pronoun or the verbal ending to be omitted. These facts give rise to the following general conditions: (i) affixal and phrasal markers may both be present, (ii) either of these markers may also occur alone; neither type is obligatory, but (iii) at least one marker type must be present; either marker type can be absent as long as the other type is expressed. Hence affixal and phrasal markers are *functionally intersubstitutable*; either can function in isolation as the sole argument marker, and either can, in principle, be treated as an agreement marker when they co-occur. However, neither affixal nor phrasal markers can be classified categorically as argument or as agreement markers. Instead, what we observe in Tuatschin is a form of *cross-implicational* argument marking. The conventions of the language require that certain information about verbal arguments must be expressed, and the formal resources of the language provide two modes of realization of that information. The fact that it is the information rather than the mode of realization that is obligatory defies description in terms of a categorical argument/agreement marking dichotomy, and calls into question descriptive, theoretical and typological accounts that assume this dichotomy.

The marking patterns exhibited by Tuatschin have a range of significant consequences, which we briefly enumerate here and will be elaborated in greater detail in the discussion section of the paper. First of all, the recognition that languages may require the expression of particular *information* rather than the presence of specific formal realizations helps to account for the stubborn recalcitrance of the empirical challenges faced by accounts that attempt to describe cross-linguistic variation in marking strategies in terms of a formal argument/agreement distinction. Second, the untenability of a general distinction between argument and agreement markers entails that theoretical approaches incorporating this dis-

tinction, in whatever form, are equally unviable. Either these approaches make predictions that are falsified by the Tuatschin data, or they evade this result by making no predictions at all. Third, the Tuatschin patterns suggest the futility of the inventive strategies developed in the typological literature for routing around empirical challenges to the argument/agreement marker distinction. Fourth, and most generally, the arguments and implications presented in this paper provide a useful illustration of the value of confronting confirmation bias by identifying (and actively seeking out) the data that would falsify an empirically tenuous claim, rather than shoring up the claim by technical or terminological means.

2 The dichotomy controversy

Over the past 40 years, researchers, independent of their theoretical extraction, have endorsed the idea of a dichotomy between argument and agreement marking and the requirement for languages to exhibit a formal realization of *core verbal arguments*. Based on this premise, a wide range of approaches have attempted to identify — either as a general theoretical claim or a language specific one — which one of the affixal or phrasal markers (typically pronominal markers) should hold the principal role of core verbal argument marker. A common denominator across all approaches is the attempt to identify one *primary marker* and one *secondary marker*. The main diagnostic properties for this distinction are typically based on optionality and co-occurrence patterns.

On the theoretical side, the debate has opposed proponents of the Pronominal Argument Hypothesis (Jelinek (1984) and following) and the Dual Structure Hypothesis (Austin and Bresnan (1996); LeSourd (2006), among others). At the center of this debate are such languages that allow for null anaphora, such as the classic Warlpiri example referenced in (1). In Warlpiri, semantic arguments such as agents and patients need not be represented

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by syntactic phrasal arguments in the 'surface structure'.[2]

(1)   Warlpiri   [(Hale, 1983, p.7) via (Jelinek, 1984, p.40)]

    a.   ngarrka-ngku ka   panti-rni   The man is spearing him/her/it.
         man-ERG   AUX spear-NPST
    b.   warwirri ka   panti-rni   He/she is spearing the kangaroo.
         kangaroo AUX spear-NPST
    c.   panti-rni   ka   He/she is spearing him/her/it.
         spear-NPST AUX

Mainstream generative approaches assume that it is a property of all natural languages that all verbal core arguments must be represented by one and only one non-optional lexical argument.[3] Languages that display cases of null-anaphora pose an apparent challenge to this view, as phrasal argument markers appear to be completely optional, while sentences remain grammatical with only affixal markers referring to a verb's core arguments. In order to account for such languages, Jelinek (1984) proposes what is known as the *Pronominal Argument Hypothesis (PAH)*. Under the PAH, roles between phrasal and affixal markers are reversed for null-anaphora languages: the obligatory verbal person/number affixes[4], are reanalyzed as the required full instances of syntactic arguments[5] and primary argument markers (i.e., they are no longer seen as agreement markers); their optional phrasal co-referents (like 'subject'-NPs or free pronouns) are consequently[6] reanalyzed as optional adjuncts, instead of instances of syntactic arguments, thus obtaining secondary marker status (see Table 1, row 2).

An inverse view is presented in the *Dual Structure Hypothesis (DSH)* (Austin and Bresnan (1996); LeSourd (2006), among others). The DSH separates constituency and dependency

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[2]The assumption is that a verb like 'to spear' would normally be required to instantiate a subject and an object at the syntactic level. However, as Jelinek (1984) illustrates on Hale's (1983) example (1), either or both can be absent in sentences that are still deemed grammatical within the language.

[3]This idea derives from the 'Projection Principle' as first stated in (Chomsky, 1981), which stipulates that all argument marking properties of each lexical item must be represented *categorically* at *each* level. In other words, a lexical category must be present, including in the surface structure, to instantiate all of a verb's core arguments.

[4]Referred to in this literature as bound or zero pronominals (depending on grammatical person).

[5]Thus satisfying the Projection Principle.

[6]Within generative theory there can be no more than one categorical expression of any given argument.

(i.e., functional) representations and reconciles surface optionality of argument NPs with a more abstract functional saturation.[7] Under the DSH, verbal core arguments need only be present at the functional level, where all verbal predicates are posited to comprise default (empty) 'PRO' arguments, that are *implicitly present for all* subcategorized arguments. Those default arguments serve as empty functional categories when no other argument is present; whenever another phrasal argument is present, the phrasal argument 'unifies' with its corresponding default 'PRO' and takes its place. As a consequence, verbal affixes maintain their secondary (agreement) marker status while the primary marker remains associated with the explicit or implicit phrasal marker (see Table 1, row 3). This approach avoids recategorizing affixal markers as argument markers by stipulating abstract arguments at the functional level that are not expressed by overt constituents. But it also fails to explicitly represent observable structural differences between languages that do allow for null-anaphora and those who don't.

In fact, both approaches simply illustrate attempts to reconcile theory-internal constraints of mandatory argument realization with apparently contradictory observable patterns, in which arguments are not always realized as full NPs.[8] More relevantly to the scope of this paper though, both accounts also impose a clear categorical distinction between agreement and argument marking in form of a hierarchy between primary and secondary markers, even if their individual rankings differ. In PAH accounts, null-anaphora languages typically

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[7]One of the major proposals of a DSH account of non-configurational languages has been formulated within Lexical Functional Grammar (LFG) (Bresnan, 2001). The LFG grammar architecture separates the functional structure (or f-structure), where predicates and their arguments are stipulated and where sentences' argument structure is represented, from the constituent structure (or c-structure), where phrase structure is represented. It is built on three fundamental principles that apply to argument realization in the following way: (i) The completeness principle: *all arguments of a predicate must be expressed (or filled) in f-structure*; (ii) The coherence principle: *all syntactic arguments within an f-structure must be governed by a corresponding predicate*; The uniqueness principle: *syntactic arguments of a predicate can only be expressed once.* In configurational languages, f-structure and c-structure typically align. In non-configurational languages, however, Austin and Bresnan (1996) propose that arguments must be expressed (or filled) within the f-structure, but need not necessarily within the c-structure, thus appearing to be absent in surface form.

[8]Both assume that arguments must be expressed, either because of the Projection Principle (PAH) or because of the completeness principle (DSH). A main difference between the two theories is that within the PAH, arguments must be expressed at *each* level, whereas the completeness principle of the DSH holds for f-structure only.

do not possess agreement markers and all affixal markers are considered instances of full arguments, i.e., primary markers. Phrasal markers and full NPs, re-analyzed as adjuncts, obtain secondary marker status. In DSH accounts on the other hand, arguments are always present, either only as abstract 'PRO' arguments at the functional level or as full overt NPs at both the functional and constituency levels; affixal markers are always considered secondary agreement markers. A summary representation of the two opposing claims is illustrated in Table 1. Primary obligatory argument markers, according to either theory, are marked in boldface.

	PHRASAL MARKERS	AFFIXAL MARKERS
PAH	adjuncts	**arguments**
DSH	**arguments or empty 'PRO'**	agreement markers

Table 1: Arguments in null-anaphora languages according to the PAH (Pronominal Argument Hypothesis) and the DSH (Dual Structure Hypothesis). Primary markers are indicated in boldface.

Regardless of whether they circumvent the problem of optional arguments by positing empty categories (default 'PRO') or 'upgrade' the status of affixal markers from agreement to full arguments (primary markers), both families of analyses imply that agreement and argument marking are necessarily expressed by different sets of units within any given language, and that languages employ consistent and exclusive sets of units to mark either agreement or arguments. While the identity of the primary element may be debated, the underlying rationale for a fixed primary vs. secondary divide is never questioned. Nor do either of these approaches broach the question of the nature of evidence that would *in principle* be required to confirm or reject their analysis, let alone the existence of a categorical distinction between agreement and argument marking.

Within the typological literature, the classification of primary *vs.* secondary marker has largely centered around the description of *bound person forms* (typically affixal markers) and their co-occurrence (or not) with *other free (pro-)nominal arguments* (phrasal markers). The main concern revolves once more around the characterization of bound pronominal

forms as either referential (primary) markers or agreement (secondary) markers (Siewierska (2001); Hengeveld (2012); Croft (2013); Haspelmath (2013); Mithun (2013), among others): typically, a language's affixal marker that can only occur in complementary distribution with a free (phrasal) co-referent is considered a true referential marker, i.e., a primary argument marker; an affixal marker which only ever occurs in conjunction with a free co-referent is identified as an agreement marker, i.e., secondary marker. Cases where co-referent free forms are optionally present have let to a variety of interpretations, parallel to debates that have animated the theoretical sub-literature above.

Surprisingly, no approaches, neither on the theoretical nor on the typological side, appear to have sought out the type of data that would directly contradict, rather than merely 'complicate' or fail to support, the soundness of the assumed fundamental dichotomy between agreement and argument markers. Systematic complementary distributions between nominal arguments and phrasal (pronominal) markers is typically used as a diagnostic case for identifying argument markers (or referential markers) (see columns 2 and 3 in rows 1 and 2 in Table 2); allowed (or required) co-occurrence with nominal arguments is used to identify agreement markers (see column 4 in rows 1 and 2 in Table 2). But those only correspond to two out of eight logically possible instantiations of verbal core arguments. Cases where affixal markers appear without co-reference to a phrasal marker (row 3 in Table 2) do not suffice to fully probe the accuracy of a categorical argument/agreement dichotomy. The only type of evidence that could disprove the categorical distinction between agreement and argument markers would have to come from a language that would at the same time (i) allow for patterns in rows 1 and 2 (affixal agreement with either nominal arguments or pronominal markers), (ii) patterns in row 3 (affixal markers only),[9] *and* patterns in rows 4 and 5 (nominal or pronominal arguments without affixal agreement), *but not* (iii) patterns in row 8 (absence of any reference to verbal core arguments).[10] In such cases both affixal

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[9]The case where only affixal markers are expressed (row 3) corresponds to the scenario that gave rise the theoretical accounts discussed above.

[10]Data attesting patterns of the types indicated in rows 6 and 7, where nominal arguments occur simultaneously with pronominal arguments, could possibly challenge the notion of unique instantiation of arguments,

and phrasal markers could instantiate the only reference to a verb's core argument without a clear context-independent hierarchy as to which one of the two constitutes the primary or secondary marker. Interestingly, in addition to disproving the traditional formal dichotomy between agreement and argument marking units, such data would also present a compelling argument for the fact that languages care more about encoding information about a verb's argument, by whatever formal means available at a time, than about categorically assigning a fixed set of units to a specific grammatical role.

| | PHRASAL MARKER | | | |
	NOMINAL ARGUMENT	PHRASAL MARKER	AFFIXAL MARKER	
1	+	-	+	(i)
2	-	+	+	
3	-	-	+	(ii)
4	+	-	-	
5	-	+	-	
6	+	+	+	
7	+	+	-	
8	-	-	-	(iii)

Table 2: Logically possible co-occurrences between nominal arguments, affixal markers, and phrasal markers: the default patterns (i) in rows 1 and 2 are typically used as a diagnostic case for categorical distinctions and are highlighted in light gray. The diagnostic cases ((ii) simultaneous attestation of rows 3, 4, 5 and (iii) non-attestation of row 8) that would contradict a categorical distinction between agreement and argument markers are highlighted in a darker gray.

The remainder of this paper will focus on exactly such evidence. We present patterns in a language (Romontsch Tuatschin), where either type of marker can in principle be optional. Markers are only categorized as argument or agreement markers based on their local distribution but evade either categorization in absolute terms. In fact, upholding the traditional categorical divide between argument marking and agreement precludes any successful analysis of the individual elements within the structures they appear in, as the presence or absence of either is largely, but not fully, determined by the presence or absence of the other. Moreover, a categorical analysis identifying primary and secondary markers cannot possi-

but do not bear on the question of a categorical dichotomy between agreement and argument markers.

bly reflect the markers' communicative function, since all patterns illustrated in rows 1-5 in Table 2 are commonly attested in the language.[11]

3 Cross-implicational subject marking

The data we discuss in this paper present patterns of contextually influenced optionality that pose a challenge to even the most flexible categorical classification of affixal and phrasal argument marking. Our data suggest that no enterprise attempting to classify units into primary or secondary markers is likely to succeed, as the very status of any individual instance of each type of unit is highly dependent on the local context it appears in, and specifically on the presence or absence of the other type of marker in that context.

As we illustrate below, the language we discuss is characterized by a system of non-binary, cross-implicational, subject marking, where:

- subject arguments must be marked – either by affixal markers, or by pronominal markers, or by full noun phrases,

- one instance of marking suffices,

- but dual subject marking is possible.

In addition, there appear to be asymmetries across person and number regarding categorial marking strategies (affixal or phrasal).

The remainder of this paper will focus on Romansch Tuatschin argument marking patterns obtained through, first, an elicitation study and, second, corpus studies of natural spoken data. We show that the traditional categorical distinction between agreement and argument marking categories does not hold up in the face of this new empirical evidence.

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[11]This is true in both elicitation and natural language data.

3.1 Agreement in Romontsch Tuatschin

Romontsch Tuatschin is a Rhaetoromance (Romance) language spoken by approximately 1,500 speakers in Val Tujetsch in the Canton of the Grisons, Switzerland. It is part of the Sursilvan dialectal area, which is named after its largest variety 'Romontsch Sursilvan'. Previous accounts of Tuatschin include (Jaberg and Jud, 1928)[12] and (Caduff, 1952).[13] The most complete grammatical description is Maurer-Cecchini's 2021 *A grammar of Tuatschin*; but it does not describe the optional patterns discussed in this study. This study is based on original data collected by the authors.[14]

Similarly to other Romansh varieties, Sursilvan varieties reflect large amounts Germanic – specifically Swiss German – influence (Liver, 1999, 2010). In particular, all Sursilvan varieties align with typical West-Germanic languages in having developed regular verb second placement, which frequently causes subjects to appear after the verb (Anderson (2016, p. 176), Kaiser and Hack (2013, p. 78) and Kuen (1957)). Verb-subject ordering significantly interacts with the language's optional agreement patterns, especially in instances where subjects are expressed by pronominal markers.

Tuatschin standard word order tends to place the subject before the verb, but because the language has a verb-second constraint, postverbal subjects ensue whenever another constituent is placed at the beginning of a sentence (Maurer-Cecchini, 2021, p. 223). Some verbs exhibit special portmanteau word forms when they occur in pre-pronominal contexts (b. in examples (2) and (3)[15]). Conversely, some pronouns manifest as special enclitic forms when

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[12]See in particular point 10 on Camischolas, as small village in Val Tujetsch.

[13]Some additional information is also referenced in (Hendry, 2010) and further cited by Maurer-Cecchini (2021).

[14]Unless otherwise specified, all examples cited in this paper are original data obtained through elicitation or extracted from original recordings.

[15]The Romontsch Tuatschin examples in this paper adopt the orthography that has been developed in collaboration with the speakers during a large-scale documentation project. Sursilvan examples are given in the standard orthography. Examples that are not identified as belonging to one particular variety are in Romontsch Tuatschin. For other varieties or when multiple varieties are being compared, those varieties are identified by their specific language codes which follow the three-letter ISO 639-2 codes, which we expand for indicating subvarieties whenever necessary, i.e., ROH-S for Romontsch Sursilvan and ROH-T for Romontsch Tuatschin.

they occur in postverbal contexts (b. example (4)).

(2)   a.   el **è**   (3)   a.   i **è**   (4)   a.   **nus** fagiain

          he is   it is   **we** do

      b.   **sèl**   b.   **sai**   b.   fagiain**sa**

          is_he   is_it   do_**we**

An important property of Sursilvan varieties like Tuatschin is that subject pronouns can optionally be omitted if they occur postverbally (example (5)). In Sursilvan this has been shown to be prevalent for second person singular pronouns; but it also occurs with other persons as shown in an elicitation study by Hack and Gaglia (2009). Cathomas (2015) confirms these results based on a large SMS corpus study.

(5)   a.   Cu   té   fuvas pins   cantavas (té)   sut   la   duscha.   [ROH-T]
          cu   té   fuvas pins   cantavas (té)   sut   la   duscha
          when you were small sang   (you) under the shower
          You used to sing in the shower when you were small.

      b.   Sche ti   eis staunchels duesses   (ti)   plitost ir cul   bus.   [ROH-S]
          sche ti   eis staunchels duesses   (ti)   plitost ir cun-il   bus
          if   you are tired   should.2SG (you) rather go with-the bus
          If you are tired, you should rather take the bus.

Both Sursilvan and Tuatschin present a wide range of sandhi phenomena at word boundaries, including euphonic consonant insertions or adjacent vowel deletions. Some of those sandhi phenomena directly affect verbal endings.

(6)   a.   Al chor sun**d**'ju mardis.   [ROH-T]
          al chor sun-ju   mardis
          at choir am-I   Tuesday
          I sing in the choir on Tuesdays.

b. Cu'l   luvrava giu Cuera vev'el   duas soras o Mustair.   [ROH-T]
   cu-**e**l   luvrava giu Cuera vev**a**-el duas soras o Mustair
   when-he worked in Chur had-he two sisters in Disentis
   He used to have to sisters in Disentis, when he was working in Chur.

Sandhi phenomena involving adjacent vowel deletions are especially frequent with verb forms ending in vowels that occur with a postverbal subject, as in example (6-b). The consequence of those is an absence of the verbal ending indicating subject agreement for the first and third person singular forms (both ending in *-a*) in Tuatschin, but only the third person singular in Sursilvan (see Table 3). Indeed, the main difference between Sursilvan and Tuatschin verbal inflection lies in the *syncretism* that Tuatschin presents between the first and third person singular, while Sursilvan has a designated 1SG verbal ending *-el* (in all tenses and modes, for practically all verbs).[16] That difference also impacts observable argument marking strategies that speakers sometimes employ and that involve a form of mixing of the two dialects (see example 3.2.3 further down).

| | TUATSCHIN: CANTÀ |*'to sing')*| SURSILVAN: CANTA | r *'to sing'* | |
		PRESENT	PAST		PRESENT	PAST
1SG	ju	cont**a**	cantav**a**	jeu	cont**el**	cantav**el**
2SG	té	contas	cantavas	ti	contas	cantavas
3SG	el/ella	cont**a**	cantav**a**	el/ella	cont**a**	cantav**a**
1PL	nus	cantain	cantavan	nus	cantein	cantavan
2PL	vus	cantais	cantavas	vus	canteis	cantavas
3PL	els/ellas	contan	cantavan	els/ellas	contan	cantavan

Table 3: Tuatschin and Sursilvan present and past indicative sub-paradigms: the difference between the 1SG/3SG syncretism in Tuatschin *vs.* the existence of distinct 1SG and 3SG forms in Sursilvan is highlighted in gray.

Code-mixing is a prominent feature of Tuatschin. Adult Tuatschin speakers are typically heavily multilingual. Speakers living in Val Tujetsch natively speak at least two, if not more, Romansh dialects (minimally Tuatschin and Sursilvan[17]), as well as German (both Standard

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[16]For references on verbal inflection in Sursilvan varieties, see also (Jaberg and Jud, 1928, map VIII 8.1683). For general references on Romansh morphology see (Liver, 1982, 1999, 2010; Spescha, 1989).

[17]With at least reading proficiency in the (artificially) established standard, Rumantsch Grischun, and passive understanding of multiple other varieties.

High German and one local variety of Swiss German spoken in the Grisons).[18] Everyday conversations in the Tuatschin speaking area comprise high amounts of code-mixing and code-switching. In conversations between speakers of neighboring dialects, speakers tend to use their own variety, accommodating the other person's dialect to varying degrees. Insertion of German and Sursilvan lexical items or full utterances is ubiquitous.[19] More directly relevant to the scope of this study, Tuatschin and Sursilvan code-mixing also interacts with the expression of argument marking using affixal *vs.* phrasal marking, as well as the optional expression of either.

The remainder of this section presents four studies of the distribution and use of optional argument marking in Tuatschin involving affixal and phrasal markers. The first study is based on form elicitation; the other three rely on a large natural language sample.

3.2 Study 1: Romontsch argument marking constraints

The goal of our first study is to probe the intuitions of native speakers of Romontsch Tuatschin regarding optional affixal and phrasal subject marking, and to compare them to the intuitions of native speakers of Sursilvan. In particular, we focus on differences that would relate speaker behavior during sentence elicitation to structural differences between Tuatschin and Sursilvan, notably to the presence *vs.* absence of a 1SG/3SG syncretism (Table 3).

We designed a questionnaire with sentences whose primary focus was the interaction between overt phrasal subjects, their pre- or post-nominal placement, and potential verb form shortening (i.e., absence of affixal subject marking/agreement).

3.2.1 Method

Participants For both Tuatschin and Sursilvan, we tested 10 native speakers (20 speakers in total). All were native speakers of the respective variety they were tested for. Participant

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[18]They also often have at least passive knowledge of Italian and French, as well as — due to the importance of tourism sector in the area — English.

[19]This information comes from the authors' own experience working with the Tuatschin community and collected data. It is also observed in Maurer-Cecchini's 2021 grammar.

age ranged from 30 to 85 years. Four participants were in a long-standing relationship with a speaker of the other variety, but indicated that they were typically using their own variety in every day interactions.[20]

Stimuli For each participant we elicitated 52 sentences. The elicitation consisted in a translation-based task with Standard German as a source language and Tuatschin or Sursilvan as a target. Source sentences all had pronominal subjects, but varied in terms of 'targeted' pre- or postverbal subject placement.[21] Sentences included verbs in the present and imperfective past.[22] The study only focused on indicative forms. We tested all persons, but focused on singular forms only, as this is where vowel-final forms occur and where the structural paradigmatic differences between the two dialects manifest (Table 3). The result of this study is a collection of 1,040 translated sentences (520 for each variety), with one or more translation variants for each sentence.

Procedure Interviews were conducted in Sursilvan, Tuatschin, and German.[23] The elicitation sessions were fully recorded (audio and video) and simultaneously transcribed by one of the interviewers. In every interview, we initially collected one spontaneous translation for all sentences and subsequently solicited judgements on possible alternate translations.[24] Alternates involved either the omission of a pronominal subject that had been spontaneouly produced or its introduction, when the initial sentence had been produced without a phrasal subject marker. In order not to overly draw the participants' attention towards the focus

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[20]One couple was a couple in their mid seventies, still living in the Tuatschin speaking area, and the other an unmarried couple in their mid thirties and recently established in a larger Swiss German speaking city. All four speakers fully understand both dialects.

[21]Tuatschin and Sursilvan being verb-second languages just like German, using preverbal adverbials or preverbal subordinate clauses in the German source sentences will trigger postverbal subject placement in German and usually also lead to parallel constructions with postverbal subject placement in the two target varieties.

[22]Tuatschin and Sursilvan possess sets of synthetic present and simple imperfective past forms. Future and perfective past tense forms are periphrastic and were excluded from this study.

[23]Both Swiss and Standard German.

[24]Discussions about alternate translations were conducted in Sursilvan and German (both Swiss and Standard). Interviewees used a mix of Romansh and German varieties when discussing translation variations.

of this elicitation, alternate translations were only suggested by the interviewers at the end of the initial translation task, i.e., during a separate reviewing process. During this review, participants were asked to broadly rate alternate translations as equally acceptable, bad, or not quite as good or natural as the initial translation.

3.2.2 Results

First, results show that in both varieties the subject is always identified by *at least one* form of marking: either the affixal marker (verbal ending) or the (typically postverbal) pronominal phrasal marker, or both. As illustrated in example (7), both can be used simultaneously, either can be left out, but one has to be present.[25] These results suggest the existence of cross-implicational pressures on the presence of (pronominal) phrasal markers and the full realization of affixal markers: we find that phrasal subject markers are never dropped when their predicate verb form is shortened, i.e., when the affixal marker is not expressed; said differently, verbs are never shortened in the absence of a phrasal marker.

(7)   da quei temps cantav**el (jeu)**   aunc el   chor   [ROH-S]
      da quei temps cantav'   ***(jeu)** aunc en-il   chor
      at that time   sang   (I)   also in-the choir
      At that time, I also used to sing in a choir.

Second, in both Tuatschin and Sursilvan, we found an interesting symmetry between first and third person on the one hand and second person on the other: verb form shortening is only ever observed with first and third person subjects, but never with second person subjects. Table 4 summmarizes the percentages of sentences in which verb forms could be shortened: the column SHORT includes cases where sentences with shortened verb forms were either spontaneously produced or were rated as acceptable as a a possible alternative translation. A binomial test confirmed a strong preference for shortened verb forms for

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[25]In line 1, the verb form is long (i.e., the affical marker is present) and the phrasal marker is optional; in line 2, the verb form is shortened (i.e., the affixal maker is omitted) and the phrasal marker's presence is strictly required.

sentences with first and third person subjects (first person 76.7% (roh-t), 75.0% (roh-s); third person 70.0% (roh-t), 71.8% (roh-s)), whereas sentences with second person subjects were accepted exclusively with a full verb form .

Third, we tested what features allowed the pronouns to be left out completely. Results are summarized in Table 5.[26] Pronominal subjects could be left out with second person subjects (Tuatschin 70.3%, Sursilvan 67.6%), but less so with first person subjects (Tuatschin 3.9%, Sursilvan 17.5%) and not at all with third person subjects. A binomial test again confirmed the existence of significant symmetrical tendencies involving first and third person on the one hand and second person on the other. Again, this was true for both Tuatschin and Sursilvan.[27]

3.2.3 Discussion

The numbers in Tables 4 and 5 show that overall the two varieties seem to behave fairly similarly. The data from both varieties suggest a cross-implicational interaction between verb form shortening and mandatory postverbal pronominal subject realization.

Second person forms are never shortened in either variety, but second person pronouns are indeed dropped more readily than other pronouns (Tuatschin 70.3%, Sursilvan 67.6%),[28] thus corroborating earlier observations by Hack and Gaglia (2009) and Cathomas (2015).

In contrast, third person pronouns are never left out in either variety, while verb forms can be shortened in approximately 70.0% of all cases (Tuatschin 70.0%, Sursilvan 71.8%); see example (8).

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[26]The numbers are for the subset of relevant sentences that do not already contain another type of phrasal subject.

[27]Results were stronger for Tuatschin than Sursilvan, but significant in both.

[28]Speakers spontaneously dropped pronominal subjects in translations or rated sentences without pronominal subjects as acceptable alternate translations.

number/ %	SHORT		LONG		TOTAL		p-value
			Tuatschin				
1SG	99	76.7%	30	23.3%	129	100.0%	*8.374e-10*
2SG	**0**	**00.0%**	74	100.0%	74	100.0%	*< 2.2e-16*
3SG	28	70.0%	12	30.0%	40	100.0%	*0.01659*
TOTAL	127	52.3%	116	47.7%	243	100.0%	
			Sursilvan				
1SG	90	75.0%	30	25.0%	120	100.0%	*3.773e-08*
2SG	**0**	**00.0%**	71	100.0%	71	100.0%	*< 2.2e-16*
3SG	28	71.8%	11	28.2%	39	100.0%	*0.009475*
TOTAL	118	51.3%	112	48.7%	230	100.0%	

Table 4: Proportions of sentences with and without **shortened verb forms** in elicitation data: 'with' means that speakers either spontaneously produced a sentence with a shortened verb form or rated a sentence with a shortened verb form to be an acceptable possible alternate translation. The p-values are those of a simple exact binomial test with an even distribution of short and long forms as its null hypothesis.

number/ %	WITH		WITHOUT		TOTAL		p-value
			Tuatschin				
1SG	124	96.1%	**5**	**3.9%**	129	100.0%	*< 2.2e-16*
2SG	22	29.7%	**52**	**70.3%**	74	100.0%	*0.0006428*
3SG	40	100.0%	0	00.0%	40	100.0%	*1.819e-12*
TOTAL	186	76.5%	57	23.5%	243	100.0%	
			Sursilvan				
1SG	99	82.5%	**21**	**17.5%**	120	100.0%	*2.662e-13*
2SG	23	32.4%	**48**	**67.6%**	71	100.0%	*0.004065*
3SG	39	100.0%	0	00.0%	39	100.0%	*3.638e-12*
TOTAL	161	70.0%	69	30.0%	230	100.0%	

Table 5: Proportions of sentences with and without **pronominal subjects** in elicitation data: 'without' means that speakers either spontaneously produced a sentence without a (pronominal) subject or rated a sentence without pronominal subject to be acceptable as an alternate translation. The p-values are those of a simple exact binomial test with an even distribution of sentences with and without mandatory postverbal pronominal subject realization as its null hypothesis.

(8)   a.   a   sera   amblid'el adina puspé sias clavs agl   auto   [ROH-T]
               a   sera   amblida-el adina puspé sias clavs agl   auto
               the evening forget-he   always behind his   keys   in-the car
               He always forgets his keys in his car in the evenings.

         b.   La damaun cont'ella   sut   la   duscha   [ROH-S]
               la   damaun conta-ella sut   la   duscha
               the morning sing-she   under the shower
               She sings in the shower in the mornings.

Similarly, in both varieties, first person verb forms were spontaneously shortened more often than not (Tuatschin 76.7%, Sursilvan 75.0%); see example (9).

(9)   a.   Lu   cantav'ju al   chor.   [ROH-T]
               lu   cantava-ju ain-al chor.
               then sang-I   in-the choir
               At that time, I used to sing in a choir.

         b.   Da quei temps cantav'jeu   aunc el   chor.   [ROH-S]
               da   quei temps cantavel-jeu aunc en-el   chor
               at   that time   sang-I   also   in-the choir
               At that time, I also used to sing in a choir.

We counted slightly higher numbers of shortened first person verb forms than third person forms in both Tuatschin and Sursilvan. At this stage, we cannot rule out the possibility that this effect could simply be due to the morphotactics between the verbal and pronominal forms: third person pronouns can sometimes be shortened (see 'o'l' for 'o el' *is he* in example (10)); the difference in proportions could simply be a consequence of more systematic sandhi phenomena that can be found in both Tuatschin and Sursilvan, specifically adjacent vowel deletions as in 'cu'l' for 'cu el' *when he* in example (6-b) above.

(10)   a Sedrun o el   duas soras   [ROH-T]
            a   Sedrun o'l   duas soras
            in Sedrun has he two   sisters
            He has two sisters in Sedrun.

The lower numbers for shortened third person forms could also be an artifact of the

orthographic transcriptions: while first person singular pronouns ROH-S *jeu* and ROH-T *ju* start with a glide, the third person singular pronouns *el/ella/i* (M/F/IMPERS) start with vowels in both dialects. In the case of *el* and *ella*, those initial vowels are close enough to the vowel of the verb ending that deciding on orthographic segmentation had led to heated debates among the team of linguists and, even more so, among implicated native speakers when establishing a Tuatschin orthography to be used for Tuatschin documentation work. As shown in examples (11) and (12), depending on the segmentation, the observed shortening can indeed be preceived as a reduced verbal or pronominal form – especially since both phenomena can be independently observed (see example (10) vs. example (9)). Analyzing those forms as reduced pronominal and full verbal forms could potentially artificially decrease the proportion of reduced third person verb forms compared to their first person counterparts.

(11) cura tg'ella   era plé   giuvna cantava'la ain ina anconuschenta band   [ROH-T]
      cura tg'ella   era plé   giuvna cantav'ella ain ina anconuschenta band
      when that-she   was more   young sang-she   in a   renowned   band
      When she was younger, she used to sing in a renowned band.

(12) cul   luvrava giu Cuera veva'l duas soras si Mustér   [ROH-S]
      cul   luvrava giu Cuera vev'el duas soras si Mustér
      when-he   worked down Chur had-he two sisters on Disentis
      When he used to work in Chur, he used to have two sisters in Disentis.

But as will become apparent from the results in section 3.3, the overall difference between 1SG and 3SG forms is in fact confirmed and even reinforced by our corpus study.

Overall, both varieties show strikingly similar patterns. We did, however, note one interesting difference between them.[29]: the numbers for possible dropped first person pronouns were much higher in our Sursilvan data (17.5%) than in our Tuatschin data (3.9%).[30] This observation is of particular interest here, as the first person singular is the one cell where the two varieties differ in the their inflectional paradigmatic structure (see Table 3). This

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[29]Naturally, the limited number of speakers that we tested in this elicitation study does not allow us to make definite predictions about speaker behavior at this point.

[30]P-value in Welch Two Sample t-test: < 2.2e-16.

hints that paradigmatic structure, notably the presence or absence of syncretisms, may be directly linked to the interaction between verb forms (short or long) and mandatory postverbal pronominal subjects, with syncretisms rendering postverbal pronominal subject realization more likely. Stated differently, in a system with diminished affixal discriminability between 1SG and SG, speakers tend to rely more on phrasal markers to encode information about verbal arguments; in a system where affixal markers are fully explicit, phrasal markers are less informative and therefore more likely to be left out. Our fourth study below corroborates exactly these intuitions.

Our results also support an observation by Cathomas (2015) who notes that, in Sursilvan, first person endings and first person pronouns can sometimes be omitted, with a greater likelihood of first person pronouns being absent with full verb forms. As we show in section 3.3, these findings are also corroborated by our quantitative investigation of attested Tuatschin corpus data.

Another interesting result of this study relates to the high proportion of contact between the two varieties: asking Tuatschin speakers to produce alternate sentences without first person subject pronouns would at times incentivize them to resort to the Sursilvan verbal ending. Aside from illustrating the relatively permeable boundary between the two varieties, this also reinforces the hypothesis of an information-driven cross-dependency between affixal and phrasal subject marking. Speakers knew (and, importantly, highly appreciated[31]) that they were being interviewed as native speakers of their specific unwritten and underdocumented variety and that this study was part of a larger study aiming at describing the differences between their variety and the Sursilvan standard they were taught in school. Still, even speakers who would generally highlight alternate patterns that were specific to Tuatschin and deliberately chose to use those, would prefer resorting to using Sursilvan

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[31]The overarching project this study was a part of also collaborated with native speakers in order to devise an orthography that would be suited to the specificities of the language. Speakers were already informally using Tuatschin in text messaging and on social media, as well as in some publications within the local newspaper *La Tutschina*. There was tremendous interest in formally establishing an orthographic standard for the language. Speakers who participated in our studies were among the most enthusiastic about promoting Tuatschin and highlighting its differnces from Sursilvan.

affixal marking strategies rather than to not explicitly mark *information* about verbal arguments (example 3.2.3). In all such cases, we verified that speakers were aware that they were switching during the reviewing process and that they nevertheless rated switching acceptable though not strictly Tuatschin in those contexts.

(13)   [ROH-T]

       a.   c'ju   veva taunta   lavur, er'**ju** schi staunchels tg'ju amblidava adina las
            when-I had so_much work was-**I** so   tired   that-I forgot   always the
            clavs .
            keys
            When I had too much work, I was so confused that I would always forget my keys.

       b.   c'ju   veva taunta   lavur, er**el** schi staunchels tg'ju amblidava adina las
            when-I had so_much work was so   tired   that-I forgot   always the
            clavs .
            keys
            When I had too much work, I was so confused that I would always forget my keys.

Yet, overall we found that speakers still varied in their willingness to produce sentences without first person subject pronouns. Especially, younger Tuatschin speakers seemed to be more willing to drop first singular person pronouns and to insert a borrowed Sursilvan ending instead. This might partly be a consequence of increased mixing across varieties among younger speakers. Our data also confirmed that speakers who are in close contact with speakers of the other dialect, such as the two couples we interviewed, tended to use strategies that were less rigidly confined within their own variety.

3.3   Study 2: Paradigmatic pressures on the use of short forms

In order to test the findings from our elicitation study on natural data, we compared the results from our first study with patterns found in a large corpus of Tuatschin. The difference between our elicitation data and our corpus data is that the elicitation data illustrate what

speakers can be *coerced* into producing (or will be willing to rate as acceptable), while our corpus data attest actual language use, i.e., what speakers spontaneously *chose* to produce.

3.3.1   Method

Data   Our corpus consists of approximately 70 hours of recordings of 75 adult native speakers of Tuatschin. Their age range lies between 30 and 85 years.[32] All speakers had learned Tuatschin at home growing up and were still using it daily as their main language for (personal) communication. Speakers were recorded in various natural settings such as card games, meals, or other informal gatherings. The corpus data were collected as part of a broader documentation project of the language.

Annotation   All data were transcribed, translated, lemmatized, automatically annotated for part-of-speech and morphological features, including tense, mood, person, and number, and fully manually validated.

The annotated corpus comprises just over 154,000 tokens.

Procedure   From our data, we extracted all verb forms, and classified them into verb forms followed by pronominal subjects and verb forms not followed by pronominal subjects. We also classified individual verb form tokens into LONG (with affixal marker) and SHORT forms (without affixal markers). We further broke down that data by morphological features: finite synthetic verb forms for all person-number combinations (1SG, 2SG, 3SG, 1PL, 2PL, 3PL) and other non finite or periphrastic verb forms (indicated as OTHER in Table 6). Since conditional first and third person singular forms do not have overt person-number marking, we always considered them as short forms (i.e., forms without explicit person-number argument marking). We compared the counts and proportions for all distributions of those patterns.

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[32]The speakers interviewed in study 1 are part of the population of speakers recorded in the corpus.

3.3.2 Results

The results of the distribution of the different observable patterns are indicated in Tables 6 and 7.

# / %	SHORT		LONG		TOTAL	
ALL	1,664	6.0%	26,253	94.0%	27,917	100.0%
VERB+PRON	694	22.0%	2,460	78.0%	3,154	11.3%
OTHER	970	3.9%	23,793	96.0%	24,763	88.7%

Table 6: Proportions of shortened and long verb forms in our corpus data; the data are broken down for verbs overall (ALL), verb pronoun sequences (VERB+PRON), where PRON stands for either a personal or expletive pronoun, and verbs not followed by pronominals (OTHER). Conditional 1SG/3SG are all considered short forms.

First, Table 6 shows that short forms (SHORT) only constitute 6.0% of all verbal sequences (ALL) and are therefore very significantly less frequent than full forms.

Second, however, the proportions of short and long verb forms are not equally distributed across verbs with *vs.* without postverbal pronominal markers (respectively VERB+PRON and OTHER). Our results clearly show that shortened verb forms are more likely to occur in contexts with postverbal pronominal subjects compared to the corpus as a whole: in cases where a verb is followed by a personal or expletive pronoun, their occurrences account for 22.0% of the data, which represents a significant increase compared to their mean frequency (6.0%). By contrast, shortened verb forms only account for 3.9% of verbs not followed by pronouns, which is significantly less than their mean frequency. Said differently, short form verbs in sequences where the verb is followed by a pronominal marker correspond to 41.7% of the occurrences of all short verb forms.[33] Such contextually heavily biased distributions have been described in previous literature as instances of *soft exceptions* or *skewed distributions* (Manning, 2003). The skewed distributions in our data are illustrated in Figure 1.

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[33]Conditional 1SG/3SG forms are considered short in Table 6. Yet those forms are the full verb forms and there has been no shortening. If all such forms were to be considered long, the proportions would change, but the skew in the distributions would persist.

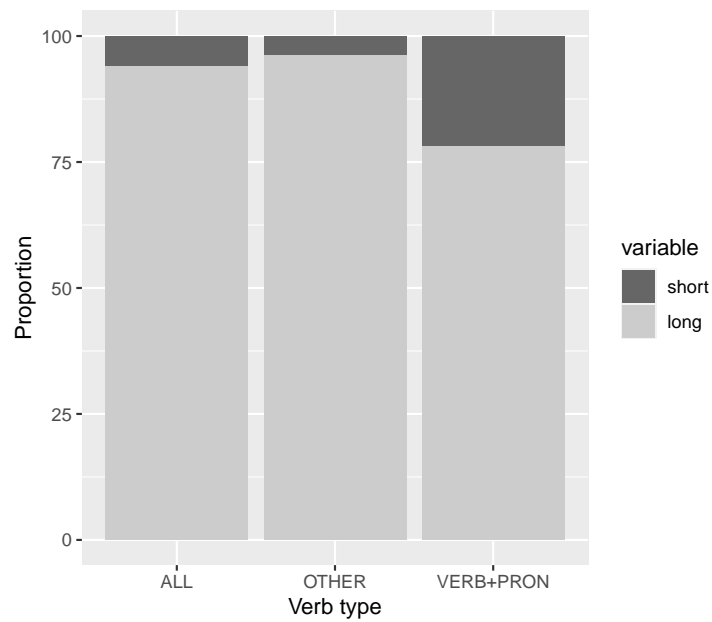| # / %	SHORT		LONG		TOTAL	
ALL	947	3.4%	26,970	96.6%	27,917	100.0%
VERB+PRON	560	17.7.0%	2,594	82.2%	3,154	11.3%
OTHER	387	1.6%	24,376	98.3%	24,763	88.7%

Figure 1: Skewed distribution of short and long verb forms across all verbs compared to verbs followed by either a personal or an expletive pronoun and to other verbs not followed by pronouns: individual bars represent the total amount of verb forms overall (ALL) *vs.* only those followed by pronominal subject markers (VERB+PRON) *vs.* verbs not followed by pronouns (OTHER); dark gray indicates the proportion of short forms, light gray the proportion of long forms.

Third, our corpus data also confirm the major findings from our elicitation study, as illustrated in Table 7.[34] When specifically looking at contexts where verbs are followed by a pronominal subject maker:

- Second person forms are still never shortened.

- First person (singular) forms are shortened more often than third (singular) person forms.

The results in spontaneous corpus data are more marked than in the elicitation study, suggesting that the difference between the first and third person forms is robustly part of the speakers' grammar.

In addition, we find that:

- Generally, the syncretic first and third singular forms are shortened much more often than any of the other forms.

- More specifically, third person singular forms are shortened much more systematically than their corresponding plural forms.

- And no first plural forms are ever shortened.

(in %)	LONG		SHORT		TOTAL	
1SG	480	51.6%	450	**48.4%**	930	100.0%
2SG	442	**100.0%**	0	0.0%	442	100.0%
3SG	584	72.4%	223	**27.6%**	807	100.0%
1PL	371	100.0%	0	0.0%	371	100.0%
2PL	55	**100.0%**	0	0.0%	55	100.0%
3PL	363	95.3%	18	4.7%	381	100.0%
Other	165	98.2%	3	1.8%	168	100.0%
All	2,460	78.0%	694	22.0%	3,154	100.0%

Table 7: Proportions of shortened and long verb forms by person in VERB+PRON sequences (verbs followed by pronominal subject markers).

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[34]OTHER in Table 7 represents non-finite verb forms, including highly frequent participial forms that are part of the periphrastic tenses in Tuatschin.

3.3.3 Discussion

Just like our elicitation data, our corpus findings point towards a strong correlation between verb shortening, i.e., absence of affixal subject markers, and patterns of syncretisms in the verbal paradigm. The two cells within the paradigm for which shortened verb forms are the most frequent are the two forms that are syncretic in all synthetic tenses: the first and third person singular (see Table 3). Since those forms do not discriminate between two forms (1SG and 3SG), their affixal markers are also the least informative across the whole paradigmatic system. The fact that the least informative affixal markers are the most likely to be dropped suggests that it is lack of informativeness that drives the increase of optionality of affixal markers found in 1SG and 3SG contexts.

Inversely, the fact that second person forms are never shortened also further reinforces this hypothesis. Of all forms, second person forms are the ones that most explicitly mark their difference with other persons. Both 2SG and 2PL are marked by an affixal marker ending in *s*, which is present in neither first nor third person forms.[35]

Based on what we can see in the distribution and formal properties of person-number endings, informativeness of affixal markers appears to be inversely related to their optionality. Testing this hypothesis will be the object of our fourth study described below.

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[35]Moreover, 2SG and 2PL also differ from each other in the present tense forms (-*as* in the 2SG and -*ais* in the 2PL). In the past the distinction between singular and plural is neutralized, but the characteristic difference between second person forms in *s* and other forms without *s* remains.

Optionality in pronominal subject marking in the second person also further supports the idea of a strong cross-implicational relationship between affixal subject marking and phrasal subject marking. While second person verb forms are never shortened, postverbal pronominal subjects are very often dropped. Hack and Gaglia attribute the absence of postverbal pronominal subjects to language contact with Swiss German (see example (14)).

(14)   Swiss German   [(Haspelmath, 2013)]

    a.   du gaasch
         you go.2SG
         You are going.

    b.   woane   gaasch?
         whither go.2SG
         Where are you going?

However, Swiss German is not known to display the phenomenon of shortened verb endings found in Tuatschin. Independently of possible contact-induced motivations, the observable distribution of postverbal subjects and shortened verb forms suggest strong cross-implicational patterns in the paradigmatic system of Tuatschin.

Finally, the distribution of short forms across the 1SG and 3SG forms also clearly shows that verb shortening cannot simply be reduced to a purely phonological pattern of sandhi between vowel-final verb endings (-a) and some vowel initial next word. The fact that there are far more short forms for 1SG verbs (450/48.4%) than for 3SG verbs (223/27.6%), indicates differing behaviors across different cells in the paradigm. Moreover this difference goes against a simple phonological explanation reducing the phenomenon to a case of elision of the first of two colliding vowels. In a VERB+PRON sequence, it would be the 3SG sequence that would present a double vowel sequence (an -a ending followed by one of the 3SG pronouns *el, ella*, or *i*) whereas the 1SG sequence would feature a vowel followed by a glide (the -a ending followed by *ju*). If the shortening of verb endings could be reduced to a purely phonological phenomenon, 3SG forms would be the ones expected to undergo elision; yet it

is in the 1SG that verb forms are more frequently shortened.

3.4   Study 3: conditions for shortened verb forms

The goal of our third study is to test whether the cross-implicational pressures observed in our second study can indeed be traced back to paradigmatically motivated pressures on overall informativeness of constructions.

3.4.1   Method

Data and annotation   The data and annotations are the same as in the previous study.

Procedure   In order to determine the strongest predictors for short *versus* long verb forms in our data, we applied a recursive binary partitioning method based on conditional inference trees using the R ctree package (Hothorn et al., 2006). The idea behind the method is that it partitions the data according to the strongest predictor and then sub-partitions each subset according to its own best predictor.

The variables (and their possible values) taken into account in our analysis include:

- token frequency

- lemma frequency

- part-of-speech frequency

- next token frequency

- next lemma frequency

- next part-of-speech

- next part-of-speech frequency

- previous token frequency

- previous lemma frequency

- previous part-of-speech frequency

- previous part-of-speech

- word length

- word ending (vowel or consonant)

- next word onset (vowel or consonant)

- portemanteau word status (multi-token unit: TRUE or FALSE)

- person (1, 2, 3)

- number (singular, plural)

- cell (1SG, 2SG, 3SG, 1PL, 2PL, 3PL, OTHER)

- TAM (present, past, conditional, non-finite)

- VERB+PRON sequence (next token is a pronoun: TRUE or FALSE).

The advantage of this method over a standard multifactorial logistic regression is that it takes into account subset specific factors, which leads to a better representation of context-specific strategies. This allows us to model distributional patterns according to actual form distributions. For example, a form will either be followed by a pronoun or not, by high frequency item or not, by a vowel initial token or not. Speakers are likely to be sensitive to such distributional patterns and context specific strategies.

In our initial partitioning, we included all tenses, aspects, and moods, including the conditional. Yet, all conditional 1SG and 3SG forms do not in fact have person-number endings and had therefore all been categorized as SHORT. COND.1SG and COND.3SG correspond to 717 tokens, i.e., 73.2% of all conditional forms. For those forms, it may be somewhat misleading to apply the term shortening, as no corresponding long form does in fact exist; since shortening would be a misleading way of characterizing almost 3/4 of all conditional forms, we also re-ran the recursive binary partitioning algorithm on a subset of the data that does not include any conditional forms.

3.4.2 Results

The results of our full analysis are illustrated in Figure 3. Each bin at the bottom of Figure 3 shows the relative proportion of short *vs.* long forms for a given combination of features. The features found to condition verb shortening are represented by the nodes and their corresponding values (branches) that form the path from a particular bin to the tree's root. The progressive subsetting of conditioning contexts is illustrated in Figure 2: for example, the third bin in Figure 3 (labeled `node 7`) corresponds to cases where a verb is not in the
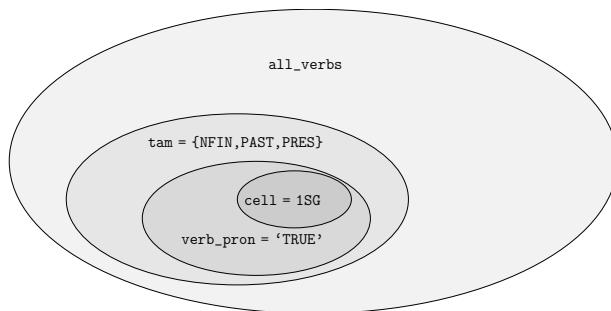
Figure 2: Subsetting contextual features. Example of features conditioning shortened verb forms in the fourth bin of Figure 3: of all verbs, verbs are shortened in such cases where a verb is followed by a pronominal marker (`verb_pron = 'TRUE'`), whose form is either 1SG or 3SG (`cell = '1sg, 3sg'`), and specifically those whose word length is greater than 4 characters (`length = ≥4`).

conditional but in a non-finite, present, or past form (right branch on `node 1`: `tam = {NFIN, PAST, PRES}`); specifically, those forms are followed by a pronominal marker (left branch on `node 5`: `verb_pron = 'TRUE'`) and their form is in the 1SG (left branch on `node 16`: `cell = '1SG'`). Each bin also specifies the number of verbs that are found in that particular context (e.g., `n = 861` for bin 3: `node 7`). Intermediate nodes indicate whether a given conditioning feature is significant by stating the p-value for that feature (`p ≤ 0.001` for all features here). In bins, short verb forms are represented in dark gray, long forms in light gray.

Our results show that when considering all forms, the strongest predictor for short verb forms ('TRUE' label and dark color in Figure 3) is whether or not it is a conditional form (first main branching to the left: `tam = 'COND'`: `node 1`). For those forms, the second best predictor is the cell (`node 2`) a certain form belongs to, with the two syncretic forms (1SG and 3SG) having a 100.0% certainty to be shortened (bin 2: `node 4`).

Aside from conditional forms, where shortening is the only option for all 1SG and 3SG forms, i.e., 73.2% of all COND forms, the third bin (`node 7`) corresponds to the context that is most conducive to verb shortenings in Tuatschin. In other words, the second best predictor is whether or not a form appears within a VERB+PRON sequence (`node 5`): verbs in that context are more likely to be shortened. The third best predictor in that subset is whether
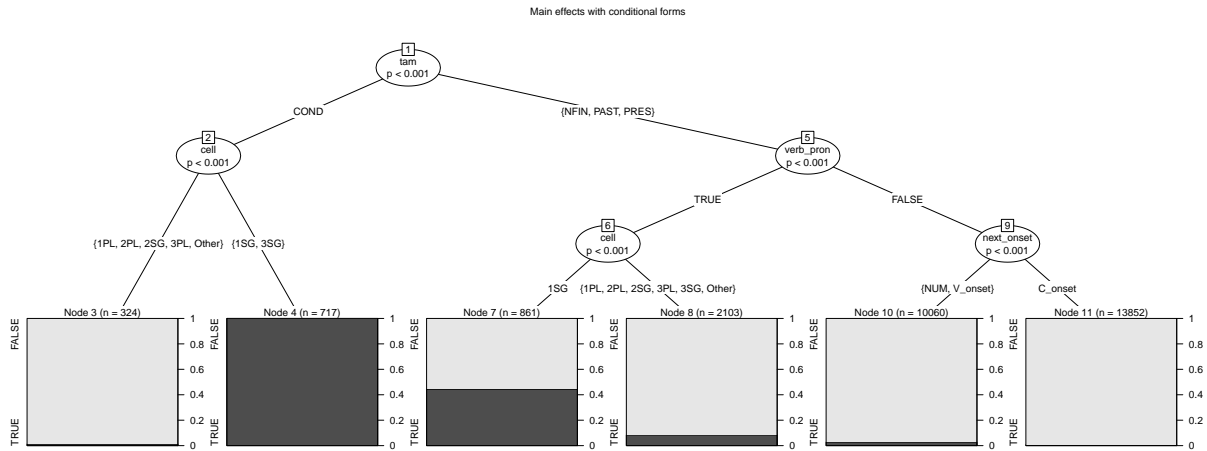
Figure 3: Conditional inference tree representing the first three levels of partitions of all verb data (29,917 tokens) predicting short (TRUE, dark color) versus long (FALSE, light color) verb forms. Each bin at the bottom shows the relative proportion of short *vs.* long forms for a given combination of features, as represented by the nodes, and their corresponding values (branches) linking that particular bin to the tree's root.
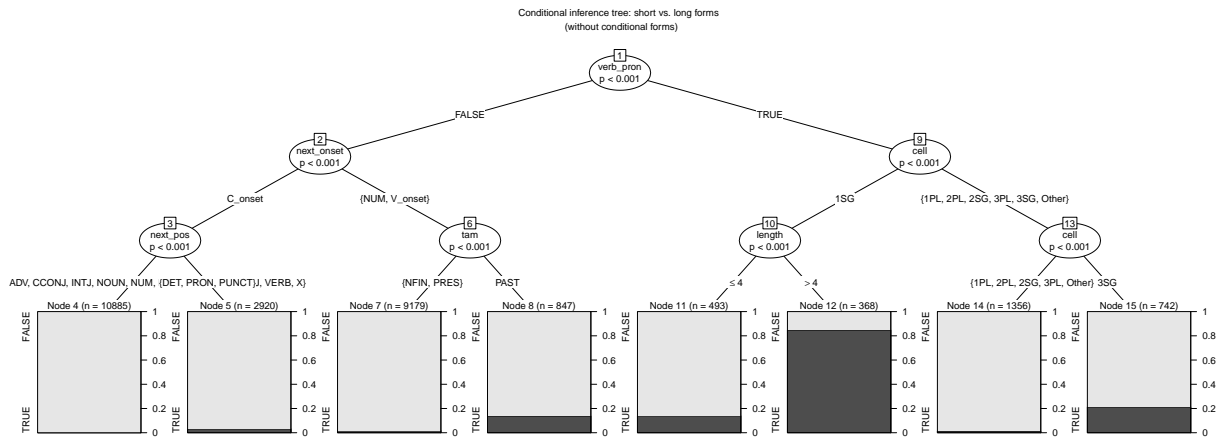

Figure 4: Conditional inference tree representing the first three levels of partitions of all verb data except for conditional forms (26,790 tokens) predicting short (TRUE, dark color) versus long (FALSE, light color) verb forms. Each bin at the bottom shows the relative proportion of short *vs.* long forms for a given combination of features, as represented by the nodes, and their corresponding values (branches) linking that particular bin to the tree's root.

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the form is a first person singular form or not (`node 6`).

Figure 4 shows the primary factors conditioning verb shortening for all verbs except conditional forms. It shows that for forms that are not conditional, but occur in a VERB+PRON sequence (`node 1`) and are not 1SG forms (`node 9`), being a 3SG form, i.e., the other systematically syncretic form, constitutes the fourth most conditioning context (`node 15`).

3.4.3 Discussion

Interestingly, the results point towards paradigmatic properties (being a form that is part of a syncretic set) and syntagmatic properties (being part of a VERB+PRON sequence) as primary conditioning environments for verb shortening. Phonological properties such as the onset of the word following a verb (Figure 3 `node 9`) only constitute the third best predictor for verb forms that aren't already identified as conditional forms nor followed by a pronominal marker.

The results of our third study thus confirm the primarily cross-implicational relationship between affixal and phrasal subject markers: the presence of postverbal pronominal subjects is one of the strongest predictors for shortened verb forms.

The cross-implicational pressures on optionality in argument marking serve as a strong indicator that it is a requirement for minimal information rather than a requirement for systematic formal expression that conditions the presence or possible absence of either type of marking. Because optionality of either marker appears to be locally conditioned, markers cannot be identified as either argument or agreement markers in categorical terms. Depending on the presence or absence of the other, either marker can assume the role of primary argument marker in context. Their status is context-dependent and can only be expressed in probabilistic terms.

The fact that being one of syncretic forms (1SG/3SG) also significantly conditions verb shortening further supports the conclusion that paradigmatic structure (such as the presence of syncretisms) interacts with form realization within a linguistic system. Those interactions

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govern both local phenomena, such as context-specific form shortening, and optionality of related tokens, such as the absence of phrasal subject markers.

More specifically, the fact that syncretic affixal markers are more likely to be dropped further supports the conclusion that optionality is driven by informational pressures: less informative affixal markers are more likely to be absent (1SG, 3SG), while more informative markers tend to be expressed (2SG, 1PL, 2PL, 3PL).

3.5   Study 4: paradigmatic informativeness

The goal of our last study is to test whether verb shortening is sensitive to cell frequency alone or whether paradigmatic properties, such as the existence of syncretisms, correlate more strongly with the likelihood of verb forms to be shortened.

Data and annotation   The data and annotations are the same as in the previous studies.

3.5.1   Procedure

In order to get a more in depth understanding of the interactions between cells and verb shortening, we extracted the counts and proportions for all cells as well as their corresponding counts and proportions of shortened verb forms. We calculated the information content of all CELLs according to their distribution in our data. The information content can be computed using Shannon's (1948) measure of 'self-information' (or 'surprisal') *I(x)* indicated below:

$$I(x) = -\log_2(\tfrac{1}{p(x)}) = -\log_2(\tfrac{count(all)}{count(x)})$$

We then repeated these measures and calculations for distinct person-number endings instead of distinct forms. This second set of calculations conflates all cells that are expressed by the same ending (e.g., PRES.1SG, PRES.3SG, PST.1SG, PST.3SG are marked with -*a*).

Given that COND.1SG and COND.3SG do not have endings that overtly express subject person and number[36], we would not be in a position to specifically compare full and short-

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[36]They are recognizable by their absence of person-number endings.

ened forms for those cells: all forms would have to either be considered short or long. We therefore removed those forms from our evaluation of the relation between cell or ending informativeness and verb shortening.

3.5.2 Results

Table 8 shows the counts, proportions, and informativeness for all cells and all endings in our corpus. For each value of *I*, we also indicate the proportion of shortened verb forms observable in our corpus.[37]

| | | ALL CELLS | | | | | SYNCRETISMS | | | | |
| | | ALL FORMS | | | SHORT FORMS | | ALL FORMS | | | SHORT FORMS | |
CELL	ENDING	#	%	I(cell)	#	%	#	%	I(ending)	#	%
PRES.1SG		2,941	10.53	3.25	381	12.95					
PRES.3SG	-a	7,114	25.48	1.97	178	2.50	11,854	42.46	1.24	843	7.11
PST.1SG		339	1.21	6.36	117	34.51					
PST.3SG		1,460	5.23	4.26	167	11.44					
COND.1SG	-Ø	195	0.70	7.16	195	100.00	717	2.57	5.28	717	100.00
COND.3SG		522	1.87	5.74	522	100.00					
PRES.2SG		2,528	9.06	3.47	1	0.04					
PST.2PL		9	0.03	11.60	0	0.00					
PST.2SG	-as	161	0.58	7.44	0	0.00	2,825	10.12	3.30	1	0.04
COND.2SG		122	0.44	7.84	0	0.00					
COND.2PL		5	0.02	12.45	0	0.00					
PRES.1PL	-ain	1,044	3.74	4.74	0	0.00	1,044	3.74	4.74	0	0.00
PRES.2PL	-ais	221	0.79	6.98	0	0.00	221	0.79	6.98	0	0.00
PRES.3PL		1,612	5.77	4.11	17	1.05					
PST.1PL		167	0.60	7.39	0	0.00					
PST.3PL	-an	411	1.47	6.09	5	1.22	2,325	8.33	3.59	23	0.99
COND.1PL		72	0.26	8.60	0	0.00					
COND.3PL		63	0.23	8.79	1	1.59					
OTHER		8,931	31.99	1.64	80	0.90	8,931	31.99	1.64	80	0.90
ALL		27,917	100.00	0.00	1,664	5.96	27,917	100.00	0.00	1,664	5.96

Table 8: Number (#) and proportion (%) of shortened forms compared to information content *I* of individual cells and endings.

The negative correlation between informativeness of cells and likelihood of verb form shortening is illustrated in Figure 5. The negative correlation between informativeness of endings and likelihood of verb form shortening is illustrated in Figure 6.

The correlation between informativeness of cells and likelihood of verb form shortening

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[37]E.g., 12.95% for PRES.1SG with I(-a)=3.25 or 7.11% for endings in *-a* with I(-a)=1.24.
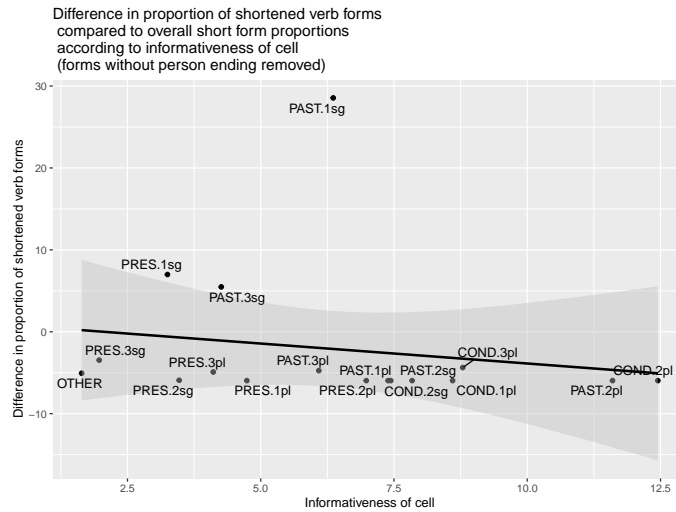
Figure 5: Difference in proportion of shortened verb forms according to informativeness of cell compared to all verbs (forms without person ending removed): best fit represented by black line; the grayed area represents a 95% confidence band (R2=0.02899, F(1,15)=0.4479, p = 0.5135).
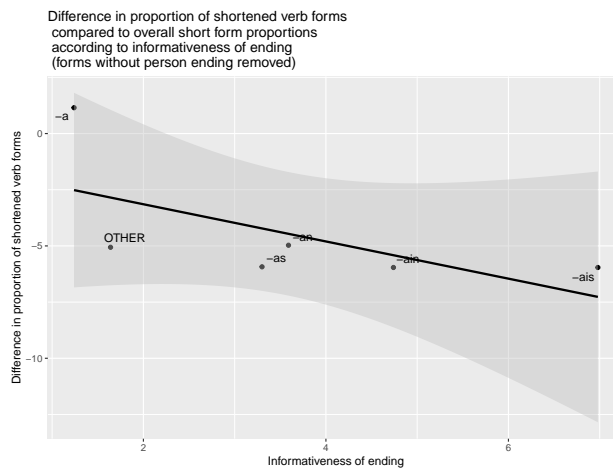

Figure 6: Difference in proportion of shortened verb forms according to informativeness of ending compared to all verbs (forms without person ending removed): best fit represented by black line; the grayed area represents a 95% confidence band (R2=0.5552, F(1,15)=18.73, p = 0.0005981).

does not reach significance levels (R2=0.02899, F(1,15)=0.4479, p = 0.5135). The results for the correlation between informativeness of endings and likelihood of verb form shortening are significant (R2=0.5552, F(1,15)=18.73, p = 0.0005981).

3.5.3 Discussion

Overall, it appears that both cell informativeness and ending informativeness show some interaction with the likelihood of form shortening: the more informative a cell or an ending, the less likely is is to be shortened. Correlations are represented in Figures 5 and 6. We observe that endings constitute much better predictors of verb form shortening than cells. The interaction between ending informativeness and form shortening is significant, while interaction between informativeness of cells and verb form shortening is not. We conclude from this that the morphological interactions between paradigmatic properties (such as syncretisms) and verb form shortening are form and not feature related. In other words, actual paradigmatic form properties are the ones that interact with affixal optionality in Tuatschin.

The results of our fourth study confirm that, in addition to the syntagmatic properties identified in our previous studies, morphological paradigmatic properties, such as syncretisms, are reliable predictors for the optionality of affixal argument markers.

4   General discussion and conclusion

We conducted four investigations into Tuatschin short verb forms and their interaction with postverbal pronominal subjects. The goal of the studies was to (a) determine the contexts in which Tuatschin verbal person-number agreement endings can be dropped and (b) understand the way argument marking is expressed in the language. The marking patterns exhibited by Tuatschin have a range of significant and broad consequences on linguistic theory and linguistic typology.

Argument marking can be cross-implicational. First, as we saw in our elicitation study, affixal and phrasal markers can both in principle be optional. As shown in our third study, the presence or absence of either is largely, but not fully, determined by the presence or absence of the other: being part of a VERB+PRON sequence is one of the strongest predictors of verb form shortening. Both affixal and phrasal markers can be used as stand-alone subject markers, but they can also co-occur. The only immutable requirement is for at least one of them to be expressed. The fact that at least one type of marker has to be expressed illustrates that Tuatschin and Sursilvan argument marking is fundamentally CROSS-IMPLICATIONAL.

In purely categorical terms, there is no clear criterion that would allow us to assign verbal, pronominal, or dual subject marking to a specific context in Tuatschin.

Agreement and argument marking are not categorically distinct. As a consequence, arguments cannot be identified as being primarily marked by either affixal or phrasal markers. Markers can only be categorized as argument or agreement markers based on their local distribution, but they evade categorization in absolute terms. Depending on the presence or absence of the other, either marker can assume the role of primary argument. Their status is context-dependent and can only be expressed in probabilistic terms.

Upholding the traditional categorical divide between argument marking and agreement precludes any successful analysis of the individual elements within the structures they appear in, as they are in fact *functionnally intersubstitutable*. Such patterns rule out the possibility of the clear-cut categorical divide between agreement and argument marking units that underlies major theoretical accounts as well as much of the descriptive and typological literature.

Consequently, theories are not operable if they rely on this distinction as a premise: the untenability of a general distinction between argument and agreement markers entails that theoretical approaches incorporating this distinction, in whatever form, are equally unviable.

Argument marking is information-driven. Moreover, a categorical analysis identifying primary and secondary markers cannot possibly reflect the markers' communicative function. There appear to be no contexts in which affixal, phrasal, or dual marking would be deemed ungrammatical in strict categorical terms by native Tuatschin or Sursilvan speakers. In fact, both language varieties only have one categorical constraint regarding subject marking: a minimal expression, or *minimum information*, constraint, which ensures that one type of marking at least always be expressed. Aside from that, they show remarkable flexibility with respect to whichever type of marker instantiates the subject in any given utterance.

It appears that in Tuatschin and Sursilvan, cross-implicational distribution of argument marking constitutes a gradient phenomenon based on a set of constraints that cannot be expressed in categorical terms. Choices between different subject marking strategies seem to derive from the informativeness of a specific marker in context.

Our fourth study shows that forms that are less informative are shortened more frequently. Second person forms are typically highly informative and are not shortened. Post-verbal second person pronouns, however, are dropped more often than not: their redundancy in marking second person subjects identifies them as decidedly uninformative in a post-verbal context.

On the other extreme, we found that 3SG pronouns were never dropped. Yet those pronouns encode more than simply person and number and are therefore intrinsically more informative than other personal pronouns: there are three different 3SG personal pronouns (*el, ella, i*), which either mark gender (M/F) or an impersonal use, in addition to person and number. This additional information is never expressed by verbal endings. Information expressed by 3SG pronouns is therefore never fully redundant with information expressed by affixal markers – which explains why speakers will resist dropping them.

The existence of a robust minimum information constraint is also further confirmed by the fact that Tuatschin speakers will readily use Sursilvan endings to make up for dropped 1SG pronominal subjects: rather than failing to express a subject, they will borrow a strategy

from another Romansh variety to explicitly mark subject *information* using an unambiguous, albeit borrowed, first person marker.

The patterns we described prove that languages will sometimes require the expression of particular information rather than the presence of specific formal realizations. Acknowledging this fact also helps to account for the stubborn recalcitrance of the empirical challenges faced by accounts that have unsuccessfully attempted to describe cross-linguistic variation in argument marking strategies in terms of a formal argument/agreement distinction. It also opens up new avenues of research that will directly seek out other instances where pressures on information affect contextual formal realizations.

Morphological system properties drive optionality. What we find, is that patterns cannot be explained in isolation by describing the sole distribution of individual units; nor can they be understood independently from the overall structure of the language's morphological verb paradigms.

Interestingly in the cases observed in this paper, there appear to be a range of factors that participate in speakers' actual use of full or short verb forms and of subject pronouns in a given sentence. Among those factors, the syntagmatic context (i.e., being part of a VERB+PRON sequence) appears to be one of the strongest predictors of short verb form usage. But within these types of sequences, our data show that there are paradigmatic differences regarding affixal versus pronominal marking strategies, with different tendencies across different persons and numbers.

Paradigmatic structure seems in fact to be the main driving factor of form length in context. This can likely be explained by the reduced discriminative[38] value of syncretic endings with respect to cell-specific ones. The fact that Sursilvan 1SG is less optional (or more 'robust') than its Tuatschin counterpart can be related to the fact that 1SG and 3SG are syncretic in Tuatschin, but not in Sursilvan.

In return this would also explain the more salient position of the first person post-verbal

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[38]In the sense of Ramscar et al. (2013), among others.

pronominal subjects in Tuatschin, as illustrated by the higher number of first person pronouns in Tuatschin elicitation data compared to the corresponding Sursilvan data. Study 1 found that 1SG/3G syncretisms render postverbal pronominal subject realization more likely in Tuatschin: when affixal discriminability is diminished, speakers tend to rely more on phrasal markers to encode information about verbal arguments; in a system where affixal markers are fully explicit, phrasal markers are less informative and therefore more likely to be left out.

Studies 2 and 3 also confirmed that lower numbers of shortened 3SG forms are systematic and cannot simply be analyzed as an artifact of transcription; they are a property of specific morphological forms.

Additionally, the difference in proportions of short forms between the 1SG and 3SG forms also clearly shows that verb shortening cannot simply be reduced to a case of elision of the first of two colliding vowels. If the shortening of verb endings could be reduced to a purely phonological phenomenon, 3SG forms would be the ones expected to undergo elision, since 3SG pronominal subjects start with a vowel ($el/ella/i$) while 1SG pronouns start with a glide (ju); yet it is in the 1SG that verb forms are more frequently shortened. The difference is morphological.

More generally, we can conclude from our fourth study that form properties, such as ending-specific measures of self-information, rather than cell properties, best account for increased cases of optionality.

Rigid unit-based approaches are doomed to fail in context. The factors that govern affixal *vs.* pronominal marking derive from general system properties of the language, such as syntagmatic structure (the syntactic VERB+PRON context) and morphological paradigmatic properties (the existence of syncretic forms).

The observed interaction between syntagmatic and paradigmatic behaviors also illustrates that unit-based approaches to language are doomed to fail to capture the intricate context-

specific properties of linguistic systems. Instead, what we notice is that argument marking can be context-sensitive and primarily information-driven.

Linguistic theories need to actively confront confirmation biases. The patterns we found in Tuatschin pose irremediable problems for all major theoretical approaches that are based on an agreement/argument marking distinction. Either these approaches make predictions that are falsified by the Tuatschin data, or they evade this result by making no predictions at all. The patterns also highlight the futility of inventive strategies that have been developed within the typological literature for routing around empirical challenges to the traditional argument/agreement marker distinction.

However, no previous studies have actively sought out the type of data that would falsify the – at this point evidently untenable – empirical claim of an agreement/argument marking dichotomy. The arguments and implications presented in this paper provide a useful illustration of the value of confronting confirmation bias by identifying (and actively seeking out) data that would provide true counterexamples to a claim, rather than shoring up established claims by technical or terminological means whenever marginal cases happen to surface.

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