Realis morphology and Chatino's role in the diversification of Zapotec languages

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This paper concerns a semantic change whereby a continuous aspect prefix was reinterpreted as marking realis mood. This change took place in Chatino and then diffused to the Southern Zapotec subgroup, contributing to the genetic diversification of the Zapotec languages. Proto-Zapotecan marked irrealis mood with *k- and did not mark realis. *n- indicated continuous aspect and could concatenate with perfective *ku- to render a resultative reading. A continuous-marked positional verb *n-te later grammaticalized as a progressive prefix in Chatino. As both perfective and progressive refer to (at least partially) realized situations, *n- was reanalyzed as a marker of realis mood that could concatenate with aspectual viewpoint prefixes. The realis prefix is shown to be one of several traits diffused from Chatino which contribute to the creation of the Southern Zapotec clade and its divergence from Monte Albán Zapotec.

Key words: Zapotec; Chatino; realis; irrealis; nasals; language classification; areal diffusion; Mesoamerica; dialectology; mood; modality; aspect

1. Introduction[1]
In recent years, the concept of linguistic areas has been undergoing some deconstruction.

> Every "linguistic area", to the extent that the notion has any meaning at all, arises from an accumulation of individual cases of "localized diffusion"; it is the investigation of these specific instances of diffusion, and not the pursuit of defining properties for linguistic areas, that will increase our understanding and will explain the historical facts. (Lyle Campbell 2017: 27)

This paper investigates the contiguous Sierra Sur and Coast regions of Oaxaca, Mexico from this perspective with a focus on words beginning in nasal-obstruent clusters (which are one of several areal features). Following Campbell's suggestion, this paper focuses on one "individual case of localized diffusion", the realis prefix *n-.[2]

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[1] Cada apartado de este trabajo se explica en español en un video. El video correspondiente a esta introducción se encuentra en https://www.youtube.com/watch?v=Blz_4RW7A0g&t=88s, donde se pueden encontrar las ligas a los otros videos en la descripción.
[2] Except where otherwise noted, reconstructions are the author's own.

Consider the following paradigm in (1) from the San Agustín Mixtepec variety of Miahuatec Zapotec [language 10 below in Figure 1]. The progressive, habitual and perfective forms begin in a nasal but the imperative, potential and definite future do not. The imperative, potential and definite future refer to situations not yet realized, whereas the nasal-marked progressive, habitual and perfective express actualized situations. This paper argues that the initial nasal marks realis mood.

(1)   San Agustín Mixtepec variety of Miahuatec (Southern Zapotec) 'drink'

Progressive	/**ŋ**géjòʔo/
Habitual	/**n**d͡ʒòʔo/
Perfective	/**ŋ**gùʔu/
Imperative	/gùʔu/
Potential	/gŏʔ/
Definite future	/tòʔo/

In §2, I introduce the different genetic subgroups of the Zapotecan family (Otomanguean) and the regions where they are spoken. Section 3 considers both the meaning and the form of the initial nasal in synchronic data from Chatino and Southern Zapotec languages. Section 4 gives background on the Proto-Zapotecan inflectional system and proposes mechanisms by which the continuous aspect prefix *n- may have been reanalyzed as a realis marker in Chatino.

By understanding the realis prefix as an innovation, we can better recognize the implications of the realis isogloss for areal and genetic classification of Zapotecan languages. In §5 I show that after an initial period of divergence from Chatino, Southern Zapotec acquires the realis prefix and other variables from Chatino, leading to divergence from other Zapotec languages. This example from Zapotecan supports claims made elsewhere (Babel et al. 2013) about diffusion being a factor in genetic divergence.

2. Zapotecan subgroups and regions
The languages shown in Figure 1 descend from Proto-Zapotecan, thought to have been spoken in the Central Valleys[3] region of Oaxaca, Mexico (Beam de Azcona 2023). Each language or dialect continuum is shown with a number used to index it throughout the paper, with more details provided in Table 18 in the Appendix. The isogloss for the realis prefix covers the Chatino [1–4] and Southern Zapotec [8–12] subgroups.

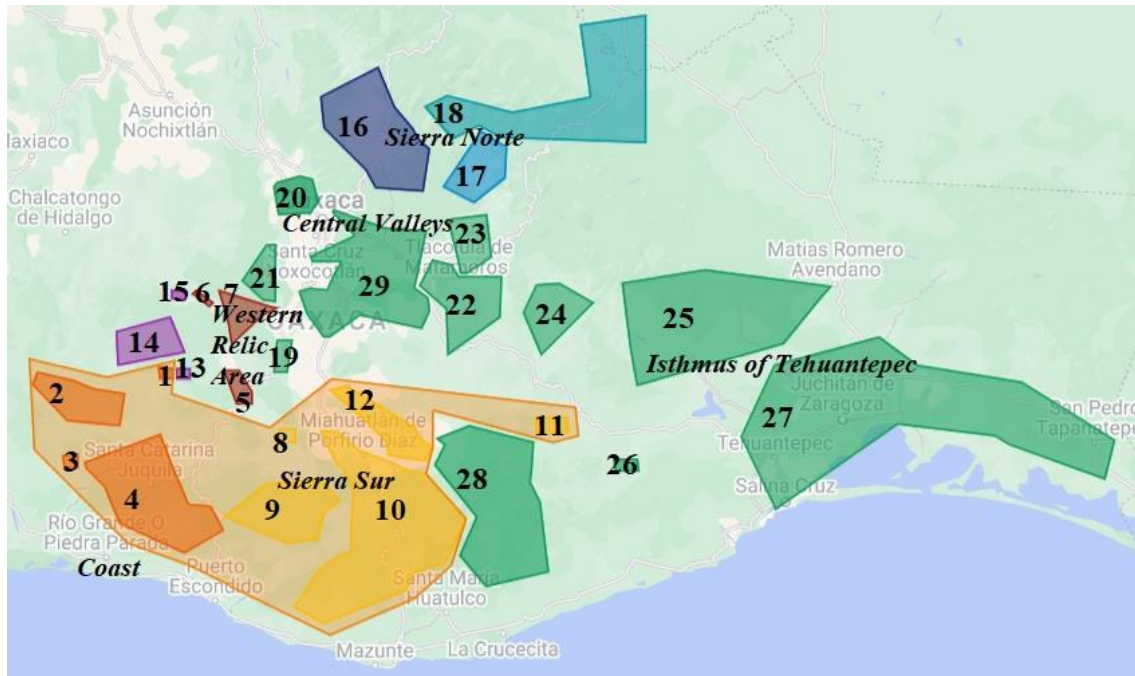[3] Often referred to as "the Valley of Oaxaca" in English.

Figure 1: Realis-marking languages in the Zapotecan family (Map data: Google)

Figure 2 shows the early internal diversification of Zapotecan. This paper mostly concerns diffusion between Chatino and Southern Zapotec, shown in bold.
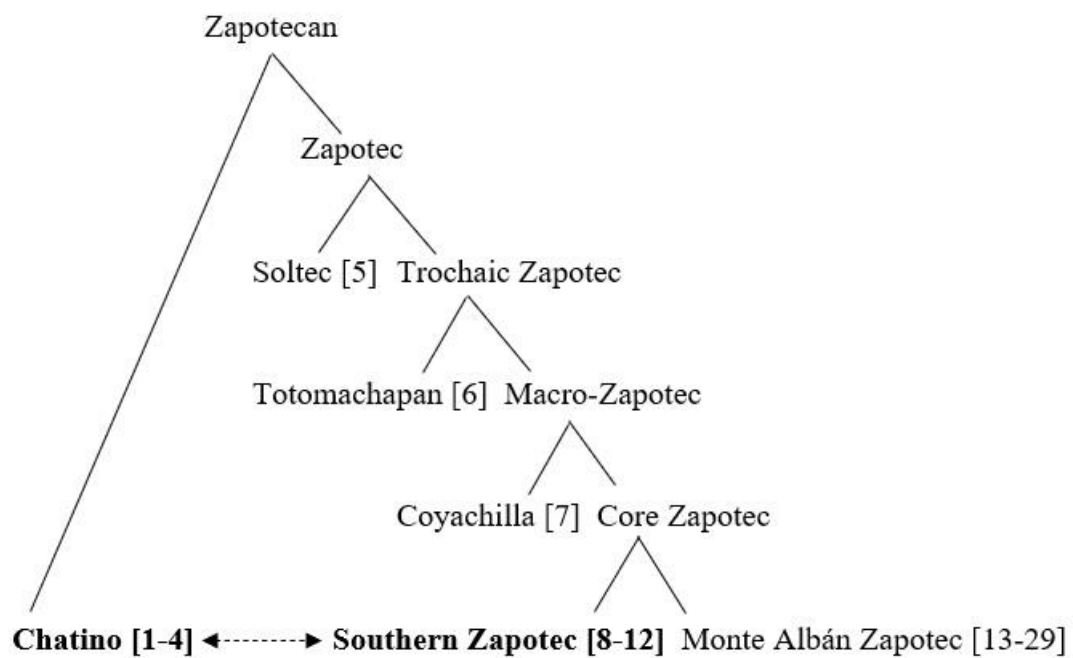
Figure 2: Early diversification within the Zapotecan family

Table 1 lists innovations that underlie the divisions shown in Figure 2. Those shown in bold are covered in this paper.

Table 1: Innovations contributing to early divisions within Zapotecan

Zapotecan → Chatino	***k > 0 / _C (4.3.3)** *ʔ > 0 /_C[-son] (Campbell 2021:377) (These 2 changes reduce non-final syllables, leading to iambic stress) */ku-i-u/ > *[j-u] (Beam de A. in press) **'squat' > PROGRESSIVE (4.3.2)** **Realis *n-**
Zapotecan → Zapotec	*s > *ʃ
Zapotec → Trochaic Zapotec	*CVˈCV > *ˈCVCV ***te- definite future (4.4.1)**
Trochaic Zapotec → Totomachapan	*/ku-i-u/ > *[j-u] (Beam de A. in press)
Trochaic Zapotec → Macrozapotec	*/ku-i-u/ > *[kw-i] (Beam de A. in press) ***[H] potential (4.4.2)**
Macrozapotec → Coyachilla	***kw > *p / {#, V}_ in non-post-tonic σ (4.3.1)**
Macrozapotec → Core Zapotec	*kw > *p except when preceded by tautosyllabic *k
Core Zapotec → Southern Zapotec	*ʔ in 'dough' 'vine,' 'maize,' and 'dance' borrowed from Chatino 3INAN pronoun with front vowel or glide 'steal' as a light verb construction **Counterfactual *ŋ(g)- (4.4.2)** **Realis *n- borrowed from Chatino**
Core Zapotec → Monte Albán Zapotec	*n > 0/ _C (Beam de Azcona 2023)

3. Synchronic description of realis marking

In this section I explore Chatino and Southern Zapotec verbal inflection and propose that these languages have nasal-initial verb forms that can be analyzed as realis. I divide the discussion into the meaning of this initial nasal (§3.1) and the phonological form of the nasal, which displays varying degrees of fusion with aspectual prefixes (§3.2).

3.1 Initial nasals as realis mood

Below realis mood is defined (§3.1.1) and nasal-initial verb forms in Chatino and Southern Zapotec are shown to meet the definition (§3.1.2). I also mention two factors relevant to the typological literature: the redundancy of realis marking in a joint system (§3.1.3) and the interaction between mood and negation (§3.1.4).

3.1.1 Definition and validity of realis mood

A distinction between realis and irrealis moods dates back to at least Sapir (1930). Mithun offers the following definitions:

> The realis portrays situations as actualized, as having occurred or actually occurring, knowable through direct perception. The irrealis portrays situations as purely within the realm of thought, knowable only through imagination. (Mithun 1999:173)

However, some typological literature challenges the assertion that reality distinctions occur in human languages. For example, Cristofaro (2012), echoing earlier concerns by Bybee et al. (1994), argues that "irrealis" may be a convenient descriptive label for linguists but does not necessarily correspond to the semantics of speakers' mental representations, since languages usually don't treat this category uniformly, with different treatment for affirmative and negative clauses and for future situations vs. counterfactuals.

Others (e.g., Palmer 2001:188–191) refute these arguments, and specialists of particular language families do find a reality distinction relevant, as in Oceanic (see François 2009; Lichtenberk 2016; Krajinović 2020 inter alia), Trans-New Guinea (Roberts 1990), the Nyulnyulan family of Northwestern Australia (Bowern 1998, 2012) and some language families of North America (Chafe 1995; Mithun 1995, 1999). These authors offer diachronic and other explanations for variation in the scope of reality marking and defend the terminology. Von Prince et al. (2022) explain some of the inconsistencies by positing a three-way distinction in which irrealis can be divided into potential and counterfactual. Data from child language acquisition also indicates that "reference to realized events developmentally precedes reference to unrealized events, indicating a strong cognitive basis for event realization as manifest in language use from an early age" (Bohnemeyer & Swift 2004:293). Thus, while controversial for some, many linguists do accept the notion that languages may mark reality distinctions.

3.1.2 Realis forms in Chatino and Southern Zapotec

Table 2 shows underlying and surface forms of two verb paradigms in Zenzontepec Chatino [2], where the nasal-marked forms refer to "actualized" situations "knowable through direct perception" whereas inflected verbs lacking initial nasals are "knowable only through imagination".

Table 2: Zenzontepec Chatino paradigms

	'to coagulate, curdle, clot, thicken' /anaʔ/[4]	'to walk' /t̪aʔã/
Continuous	/**n**-anaʔ/ [nãnà̰ʔ]	
Habitual	/**n**-ti-anaʔ/ [ndìnã̰ʔ]	/**n**t̪aʔã/ [n̪d̪ã̰ʔã]
Progressive	/**n**-t͡ʃ-anaʔ/ [nd͡ʒànã̰ʔ]	/**n**te-t̪aʔã/ [ndèt̪ã̰ʔã̰]
Perfective	/**n**-ku-anaʔ/ [ŋgùnã̰ʔ]	/**n**ku-t̪aʔã/ [ŋgùt̪ã̰ʔã̰]
Imperative		/ku-t̪aʔã/ [kùt̪ã̰ʔã̰]
"Potential" (Irrealis)	/k-anaʔ/ [kànã̰ʔ]	/t̪aʔã/ [t̪ã̰ʔã̰]

A nasal appears initially in continuous, habitual, progressive and perfective forms but not in the imperative or potential. Let us consider the meaning of these categories.

Zapotecan *n- marks continuous aspect on change of state and motion verbs. In the Zapotecan literature it has traditionally been called "stative aspect" since more often than not it involves a continuous state (Beam de Azcona 2023), as in (2).

(2)   Continuous aspect in Coatecas Altas, Amatec Zapotec [12] (Juárez Santiago 2018:94)

       /n-zŏb   mæ̀ʔd   ló   jà/

       R.CONT-sit   child face tree

       'The child is sitting in the tree.'

Some Zapotecan languages have a single imperfective category encompassing both habitual and progressive aspects, as in (3), where (a) refers to a habitual event but (b) refers to an event in progress. Other languages have grammaticalized a progressive

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[4] Examples throughout the paper have been transliterated into IPA. Some transcriptions are phonetic, others phonological. I have sometimes made morphological reinterpretations and translated glosses into English.

marker (Smith Stark 2003; Broadwell 2015), e.g., Chatino /n-te-/ in (4) (discussed in §4.3.2).

(3) Imperfective aspect in Coatec Zapotec [9] (Beam de Azcona & Díaz Pacheco 2022)

(a) /nà   læˀ=ʃ   a=lí=kaˀ   **n-d-**jàk   xúnt   tæˀl/

and   TOP=3HD   X=like.this=always   **R-IPFV-**become   meeting   night

'And they would always get together at night.'

(b) /dûb ʃaˀ **n-**kâb   ʃaˀ   ndô t͡sâ=ʃ/

one   3HD **R.IPFV-**answer   3HD   face   companion=3HD

'One person was responding to the other.'

(4) Progressive aspect in Zenzontepec Chatino [2] (Campbell 2014)

/**n-te-**u-lā ʔá   kweʔẽ hiʔĩ hwaā/

R-PROG-CAUS-blow   air   NSBJ   Juan

'The air is blowing on Juan.'

In Zapotecan languages with a dedicated progressive marker, the prefix cognate with the imperfective tends to narrow its meaning to habitual aspect. For Comrie (1976:27–28), habitual aspect describes a situation "characteristic of an extended period of time". This duration is often linked to iterativity (Dowty 1979; van Geenhoven 2004). Boneh and Doron (2008) contrast "gnomic" and "actualized" habituality in Modern Hebrew, the latter being realis and often marked with past tense. In Zapotecan languages that distinguish habitual and progressive morphologically, the habitual is usually iterative and refers to actualized habituals, as in (5). Reference to past habituals, as in (6), is common, and even when the reference is more general to some extended period that is on-going, as in (5), some of the iterations have already taken place.

(5) Habitual aspect in Zenzontepec Chatino (E. Campbell 2017:109)

/hii   **n-ti-**kwiʔ   tī   naa/

ash   **R-HAB-**speak   TOP   1PL.INCL

'*Jii* ('ash') we call it.'

(6)   Habitual aspect in Miahuatec Zapotec [10] (Cruz Santiago in preparation)

/**n-d͡ʒ-**ató   bɛ́l   djɑ̃̀/

R-HAB-rise   flame   there

'The flames used to shoot up there.'

Semanticists have long recognized an "imperfective paradox" whereby telic predicates with imperfective aspect do not entail event realization, but atelic predicates do (Vendler 1967:100; Dowty 1979:133; Bohnemeyer & Swift 2004; inter alia). In Zapotecan this observation is relevant to the broad imperfective category as well as the narrower progressive and habitual. However, whether an activity that is habitual or in progress during topic time (Klein 1994:3-9) is carried out fully to the point of accomplishment, we can still be sure that predicates marked for imperfective aspect (or its subcategories) describe situations that have been initiated and are therefore at least partially realized. The perfective aspect refers to completed events and thus entails event realization to the fullest extent possible.

(7)   Perfective aspect in Zenzontepec Chatino (E. Campbell 2017:108)

/lēʔ   **n-ku-**tijaa   t͡saka   kwihna̰ʔ/

then   **R-PFV-**arrive.there one   mouse

'Then a mouse arrived there.'

In (2–7) there is no doubt as to the reality of the situation; there is a presupposition of "settledness" (Condoravdi 2002). Conversely, the potential and imperative refer to unrealized future events, i.e., unsettled states of affairs, as does the Zapotec definite future.

(8)   The potential in Zenzontepec Chatino (E. Campbell 2017:109)

/**k-**et͡sāʔ=ãʔ   hiʔḭ=wã   t͡soʔō   t͡séʔā/

POT-inform=1SG   NSBJ=2PL   good   precise

'I'll advise you (pl.) very well.'

(9)   The imperative in Zenzontepec Chatino (E. Campbell 2017:113)

/**kw-**e͡tsā́ʔ   hiʔī̄/

IMP-inform   NSBJ[.3]

'Tell him about it.'

(10)   The definite future in Miahuatec Zapotec (Cruz Santiago in preparation)

/**d-**jǎ   ʃaʔ   nagá/

DEF-come   3H   later

'S/he'll come later.'

Returning to Mithun's (1999) definition, the potential, imperative and definite future reference situations "knowable only through imagination", whereas the perfective, imperfective, progressive, actualized habitual and continuous reference situations "knowable through direct perception". The latter all begin with a nasal in Chatino and Southern Zapotec, whereas the former do not.[5] I conclude that the initial nasal is associated with realis mood.

3.1.3 Realis and aspect in the joint system of Chatino and Southern Zapotec
One reason that reality distinctions are controversial is that they may be redundant.

> There are basically two ways in which realis and irrealis markers function. In some languages their main function is to co-occur with other grammatical categories. In others they mainly occur in isolation and are themselves the only markers of specific notional categories…These different functions of realis and irrealis will be distinguished in terms of being "joint" and "non-joint" markers, the joint markers being those that co-occur (obligatorily) with other grammatical markers. (Palmer 2001:145–146)

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[5] I know of the following exceptions. A few Chatino verbs zero-derive imperatives from innovative /nka-/ perfectives (E. Campbell 2017:118). Chatino languages can use the anticausative morpheme *j- as a de facto perfective marker for some causative verbs (Beam de Azcona in press), where no nasal precedes /j/. In the San Juan Quiahije variety of Eastern Chatino [4], some perfective forms lack realis marking due to loss of the pre-tonic syllable (Cruz 2011:212–215). Amatec [12] has borrowed the Central Zapotec progressive prefix without adding the nasal.

The Chatino and Southern Zapotec realis marker is a joint marker. Outside of the continuous prefix (for reasons outlined in §4), the realis prefix always combines with an aspectual marker. Since an initial nasal is always present in perfective, imperfective, habitual and progressive forms (save the exceptions listed in footnote 5), one might argue that a nasal is simply part of these aspectual prefixes. Up until now, none of the literature on Chatino or Southern Zapotec has glossed the realis marker separately from the aspectual prefixes.

3.1.4 Realis and negation

A point of cross-linguistic variation is how mood interacts with negation. The relevant literature is summarized by Cristofaro (2012:16–17). In some languages, irrealis is used for negative clauses, but it is often the case that such marking is not uniform but depends on interaction with the tense-aspect system. This is also a point of variation within Zapotecan.

For events that could have taken place in the past but did not, many Zapotec languages have a special counterfactual form, examined further in §4.4.2. This form arose historically from a construction which combines a negative marker with an irrealis form often glossed as "potential" in the Zapotecan literature, as in (11).

(11)   Counterfactual construction in Tataltepec Chatino [3] (Sullivant 2015:355)

/tʲalá t͡saǎ hjoʔó   ʃtʲaʔǎ́=nãã̀ʔ t͡ʃáʔ **nã́ k-**aku=nãã̀ʔ knʲǎ́/

angry very deceased mother=1SG because **NEG POT-**eat=1SG chile

'My mother was very angry because I wouldn't eat chile.'

In conservative Zapotecan languages, including Chatino and most of Southern Zapotec, perfective clauses cannot be negated.[6] The same is not true of imperfective/habitual clauses.

(12)   Tataltepec Chatino (Pride & Pride 1970:vii)

/**nã́ n-d-**aku   nkuʔ/

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[6] The Miahuatecan languages [10–11], in addition to having a counterfactual form, also allow negative clitics to be used with realis-marked perfective forms, though this seems a recent innovation.

NEG   **R-HAB-**eat   3PL

'They don't eat.'[7]

Throughout Chatino and Southern Zapotec, habitual or imperfective verbs retain realis *n- when negated, with one exception. San Bartolo Yautepec is home to a Southern Zapotec language heavily influenced by contact with Central Zapotec. In this language, verbs in the habitual aspect use the Southern Zapotec marking, complete with realis /n-/, in affirmative clauses, but in negative clauses use the Central Zapotec habitual marker /ɾ-/.

(13)   Habitual forms in San Bartolo Yautepec [11] (Adela Covarrubias, pers. comm.)

        (a)   /**n-d͡ʒ-**ò?n=ná/

                R-HAB-cry=1SG

                'I cry'

        (b)   /**nà=ɾ-**ò?n=d[a]=ná/

                NEG=HAB-cry=NEG=1SG

                'I don't cry'

The history of contact between Central and Southern Zapotec in San Bartolo Yautepec gave speakers access to different habitual markers. That they developed a hybrid system in which the Southern Zapotec realis-habitual string /n-d͡ʒ-/ is used to mark actualized habituals while the Central Zapotec habitual /ɾ-/ is used to mark negated, unrealized habituals, is a clue that speakers historically associated the nasal with realis semantics.

3.2 Interaction between the realis and aspectual prefixes
As mentioned in §3.1.3, Chatino and Southern Zapotec have a system in which the realis prefix co-occurs with an aspect marker. The historical template for realis-marked verbs appears in (14), and (15) illustrates this template with an example from Chatino.

        (14)   REALIS-ASPECT-VERB STEM

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[7] Translation and part of the gloss based on Sullivant (2015:258).

(15)   Zenzontepec Chatino [2] (Campbell 2014:136)

[n-]REALIS PREFIX [ti-]ASPECTUAL PREFIX [ʔe]VERB STEM

R-HAB-go.down

All aspectual prefixes were consonant-initial in Proto-Zapotecan and remain so in Chatino and Southern Zapotec. This means that in conservative examples, like (15), the realis prefix occurs before a consonant. However, many modern languages, including all of Southern Zapotec and at least the Teotepec variety of Eastern Chatino, display fusional morphology, where the realis and aspectual prefixes may be combined in a single segment, as in (16).

(16)   San Vicente Coatlán Zapotec [8] (Klotz 2019)

/**m-**tek/

R.PFV-bend.over

The fusion of the realis and aspectual prefixes results from two processes: nasal place assimilation (§3.2.1) and reduction of complex NCC clusters (§3.2.2).

3.2.1 The variability of the nasal prefix
Historically, and in environments where no deletions occur, realis *n-* precedes the consonant of an aspectual prefix, to which it assimilates, as shown in (17).

(17)   Place assimilation of the nasal prefix in Coatec [9] (Southern Zapotec)

(a) /**n-d-**ùn/
        R-IPFV-do

(a)   /**ŋ-gw-**ðiʔð/
        R-PFV-hug

(a)   /**m-b-**jàk/
        R-PFV-heal

There is some debate over how to characterize the nasal contrast that is the phonological substance of the realis marker. The author's analysis is that it is an underspecified [nasal] contrast in terms of Archangeli (2011). One reviewer prefers to analyze it as

coronal /n/, which undergoes place assimilation. After consulting with several other linguists, the author finds support for both analyses. A more detailed analysis can be addressed in future work, but what is important to understand is simply that the realis prefix is always realized with the place of articulation of a (historically or synchronically) following consonant.

3.2.2 Reduction of NCC clusters
In Zapotecan languages which retain unstressed vowels, syllabic prefixes are unstressed when added to consonant-stems (which comprise 80–90% of verbs). In most varieties of Southern Zapotec, pre-tonic vowels have reduced or deleted, creating initial clusters, like /ŋgwð/ in (17b) or /mbj/ in (17c). The data in (18) show two Miahuatec varieties, one in which the full cluster is preserved and the realis and perfective prefixes remain segmentable, and another in which the post-nasal consonant of the aspectual prefix deletes when preceding obstruent-initial stems. The result is a single, initial segment with the [nasal] feature of the realis but the place features of the aspectual category (plus further developments in individual languages).

(18)   Miahuatec [10] (Southern Zapotec)
       (a)   Consonant cluster retention in San Agustín Mixtepec
             /m-b-déʔes/
             R-PFV-hug

       (b)   Consonant cluster reduction in San Bartolomé Loxicha
             /m-dèʔz/
             R.PFV-hug

Varieties of Southern Zapotec languages thus differ as to whether they reduce NCC consonant clusters, resulting in fusional realis-aspect markers, and sometimes further assimilation.

4. The origin of the realis prefix
I now turn to the etymology of realis *n-. Section 4.1 introduces Proto-Zapotecan inflectional prefixes. Section 4.2 establishes the realis prefix as an innovation. Kaufman (2016) says of Chatino, "it seems likely that the COMP" (i.e., the perfective), "HAB, and PROG markers all have procliticized n+ < pOM *na# 'now.'" I instead propose in §4.3 that the continuous prefix is the etymon of the realis prefix. Section 4.4 tests the realis hypothesis by examining two innovative Zapotec modal prefixes.

4.1 Verbal inflection in Zapotecan

In a cross-linguistic study of realis and irrealis, Mithun (1999:173) observes:

> Sometimes only one member of the opposition is overtly marked. In these
> cases, the marked member is usually (though not always) the irrealis.

Proto-Zapotecan had the more common kind of system mentioned by Mithun, where the irrealis was overtly marked but realis was not. Table 3 shows the Proto-Zapotecan inventory of inflectional morphology.

Table 3: Proto-Zapotecan verbal inflection

Mood	Aspect	Meaning/Function
Irrealis *k- (§4.4.2; Beam de Azcona in press)		Future events, polite commands, prohibitives, exhortatives, directives, clausal complements, event modality, future conditionals, negative future (combined with negation), counterfactuals (combined with negation)
Realis (unmarked)	Continuous *n- (Beam de Azcona 2023)	Continuous states and motions
	Imperfective *tʲe- (Operstein 2012)	Habitual and progressive events
	Perfective *kw- / _*i/*e *ku- / _*C (Beam de Azcona in press)	Completed events, blunt commands, stative participles

As shown in Table 3, the presence or absence of *k- distinguished between irrealis and realis moods. *k- covered a range of unrealized situations in Proto-Zapotecan. This is unsurprising, considering, as pointed out by Elliot (2000:81):

> There are many more possibilities of what may constitute a hypothetical
> or imagined world than what constitutes the real world. This leads to a
> greater number of specific semantic contexts which are likely to attract
> irrealis marking, than there are semantic contexts for realis.

The use of the irrealis for non-canonical imperatives, like those shown in Table 3, is covered thoroughly by Eric Campbell (2017). In contrast, Proto-Zapotecan used the perfective for blunt commands. Van der Auwera et al. (2009) found that languages may mark imperatives as perfective because they are "typically…result-oriented". Mithun

(1995:377) points out that "many languages contain two options: a polite imperative, classified as Irrealis, and a strong imperative, classified as Realis". Indeed, we can reconstruct a Proto-Zapotecan system in which polite commands were rendered with the irrealis whereas more direct imperatives used the perfective. In modern Zapotec languages without realis marking, a single form is used with an overt subject when perfective, but without a subject in an imperative construction, as in (19).

(19)   S. Pedro Mixtepec, Cisyautepecan Zapotec [28] (Antonio Ramos 2015:278)

(a)	/**gw-èj**	**lù**	kàn	rò	kjé+ʃũl/
	PFV-go	**2SG**	DIST	mouth	rock+blue

'You went over there to the blue rock.'

(b)	/**gw-èj**		kàn	rò	kjé+ʃũl/
	IMP-go		DIST	mouth	rock+blue

'Go over there to the blue rock.'

The realis nature of the perfective in Proto-Zapotecan probably contributed to the pragmatic force of this type of command vs. the more polite irrealis commands. However, modern languages with the realis prefix mark it on true perfectives but not on perfective-derived imperatives,[8] e.g., Miahuatec [10] perfective /m-b-ɾòʔ/ 'left' vs. imperative /b-ɾòʔ/ 'leave!', suggesting that the latter form has been reinterpreted as irrealis.

On motion and change of state verbs (including positionals), *n- indicated continuous aspect e.g., 's/he is sitting,' whereas the imperfective of the same verb could express a habitual change of state, e.g., 's/he comes in every day and sits down.' In other semantic classes, *n- was unavailable and the imperfective could have both habitual and progressive meanings, e.g., 's/he dances' and 's/he is dancing,' though these could be disambiguated syntactically (§4.3.2).

Thus, in Proto-Zapotecan the realis mood had no dedicated marker of its own but was an implicit part of three different aspectual categories that existed in paradigmatic opposition to the irrealis mood, marked with *k-. Of these various inflectional prefixes

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[8] An exception is a Chatino perfective *nka-,* which keeps the nasal in the imperative. Eric Campbell (2017:118) relates this to its status as an innovation. It may also indicate that realis morphology is losing its transparency.

reconstructed for Proto-Zapotecan, the continuous prefix *n- is phonologically identical to the realis prefix identified for Chatino and Southern Zapotec languages in §3.

4.2 Realis marking is an innovation, not a retention

Evidence that the realis prefix is innovative includes its absence in some languages which preserve Proto-Zapotecan preconsonantal nasals (§4.2.1) and the lack of an initial nasal in most Southern Zapotec participles derived from historical perfectives (§4.2.2).

4.2.1 Preconsonantal nasals in the Western Relic Area

In separate work I have argued for an early sociolinguistic division between the Monte Albán Zapotec genetic subgroup and an early linguistic area I call the Southern Trade Network (Beam de Azcona 2023). The Monte Albán Zapotec subgroup is defined by a sound change, illustrated in Table 4, which deleted preconsonantal nasals. The verb 'lie down' has a vowel-initial stem and preserves the continuous prefix *n- in all languages that retain this lexical item. The verbs 'stand' and 'sit' are consonant-initial stems and have the *n- prefix in all languages except the Monte Albán subgroup. The retention of preconsonantal nasals may be contact-related. The contiguous Southern Trade Network includes all Chatino and Southern Zapotec languages, as well as the languages of the Western Relic Area (Beam de Azcona 2023), here represented by Totomachapan [6] and the Lachixío variety of Coyachilla [7].

Table 4: Deletion of preconsonantal *n in Monte Albán Zapotec

		CONT-lie.down	CONT-stand	CONT-sit
Proto-Zapotecan		*ˈ**n-**assũ	***n-**tũː	***n-**tuˈkwa

Chatino			Zenzontepec [2]	**/l**-asiˈja/⁹	**/n**-tõː/	**/n-tu**ˈkwa/
Zapotec	Core Zapotec	(Western Relic Area)	Totomachapan [6]	[ˈ**n**-aʃu]	[**n**-du]	[ˈ**n**-duku]
			Lachixío [7]	/ˈ**n**-oʐo/	**/n**-zo/	/ˈ**n**-zoko/
		Southern Zapotec	Coatec [9]	**/n**-àʃ/	**/n**-zô/	**/n**-zŏb/
			Amatec [12]	**/n**-àʃ/	**/n**-zo/	**/n**-zob/
			Miahuatec [10]	**/n**-àʃ/	**/n**-do+li/	**/n**-dób/
		Monte Albán Zapotec	Papabuco [13–15]	**/n**-aʃ/	/zu/	/zub/
			Sierra Juárez [16]	--	/du/	[ˈduːani]¹⁰
			Cajonos [17]	--	/zó/	/ʐoa/
			Tlacolulita [26]	**/n**-áʃ/	/zó/	--

Since all languages with realis marking also preserve preconsonantal nasals, and the languages which deleted preconsonantal nasals lack realis marking, one might wonder whether the realis prefix could be reconstructed for Proto-Zapotecan. The languages of the Western Relic Area were the earliest Zapotec languages to diverge. Table 5 shows that Totomachapan and Lachixío, unlike Zenzontepec Chatino and Coatec Zapotec, have imperfective and perfective forms that lack initial nasals. Since preconsonantal nasals are retained in Totomachapan and Lachixío, as shown in Table 4, one would expect these languages to retain the realis prefix if it existed in Proto-Zapotecan.

Table 5: Lack of realis marking in languages of the Western Relic Area

Gloss	Zenzontepec	Totomachapan	Lachixío	Coatec
IPFV-stink	/ntiljaʔa/	[ʎaʔa]	[l̠jà]	/ndjaʔ/
PFV-hear /be.heard	/nkwene/	[weɲe]	[ojene]	/mbjên/

Although the isogloss for the retention of preconsonantal *n largely coincides with the isogloss for realis marking, the two are not identical. Figure 3 shows both isoglosses.

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⁹ In Zapotecan it is common to find a lateral reflex of *n where *n occurred before an oral vowel. Here the /l~n/ correspondence between Chatino and Zapotec may have to do with differentstress patterns in the two branches and changes in each which confined nasalization to the stressed syllable.

¹⁰ This verb has incorporated a *ni* morpheme following the verb root, which deleted intervocalic /b/.
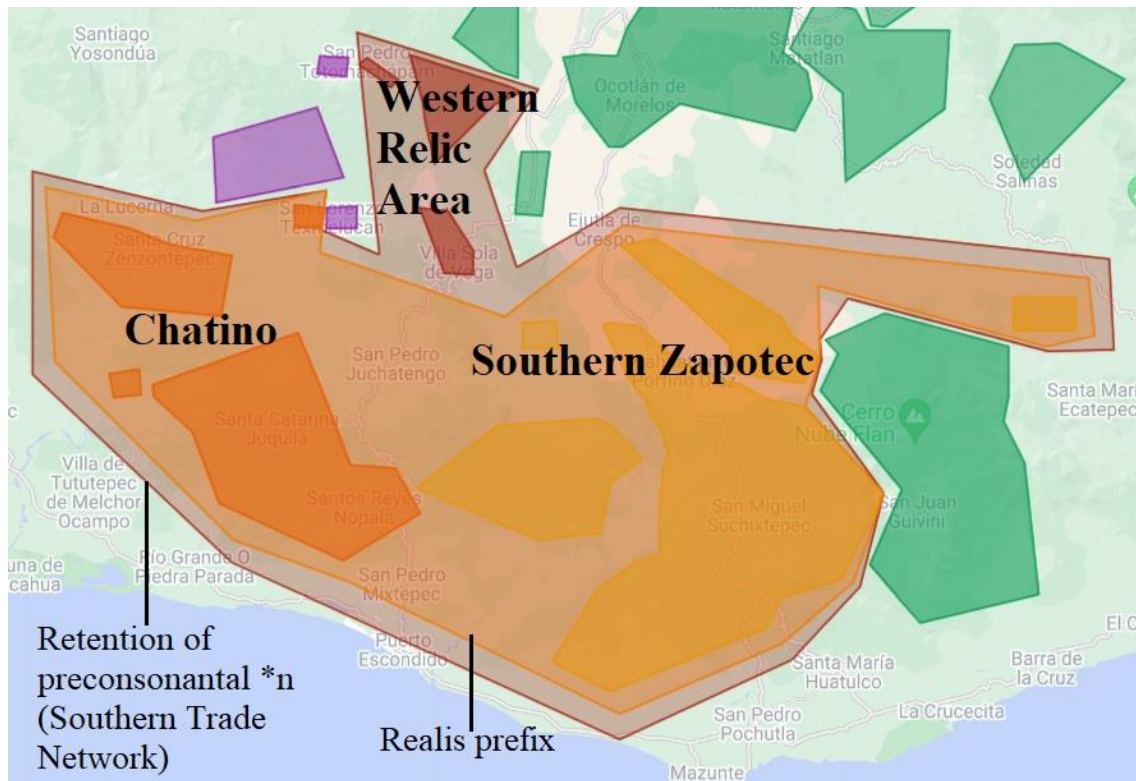
Figure 3: Realis marking and the retention of preconsonantal *n (Map data: Google)

The imperfective and perfective forms without initial nasals in the languages of the Western Relic Area suggest that in Proto-Zapotecan through Proto-Macrozapotec (see Figure 2) realis mood was not marked with *n-. However, given that Chatino and Southern Zapotec languages are among those that retain preconsonantal *n, the concatenation of realis *n- with consonant-initial aspectual prefixes would have been phonotactically consistent with NC sequences elsewhere in these languages. For example, a continuous-marked auxiliary verb in Miahuatec Zapotec [10], /n-dó/, is segmentally identical to the realis-marked imperfective form of 'drink' in Coatec Zapotec, /n-d-ò/. This may have facilitated the diffusion of realis marking in Chatino and Southern Zapotec.

4.2.2 Southern Zapotec participles
Many Zapotecan languages use the perfective form as a stative participle (Operstein 2015a:335). In Southern Zapotec, all perfective forms are nasal-initial, but not all participles are. Table 6 lists perfective-derived words classified as adjectives in Coatec (Beam de Azcona in preparation) and Miahuatec (Cruz Santiago & Beam de Azcona in preparation).

Table 6: Perfective forms occurring as participles in Coatec and Miahuatec

	m(b)-	*ŋ(g)*[round]-	*b-*	*go-*	*w-*	*kw-*
Coatec	5	--	15	3	40	13
	Nasal-initial: 7%		No initial nasal: 93%			
Miahuatec	19	11	54	6	15	--
	Nasal-initial: 29%		No initial nasal: 71%			

The nasal-initial forms on the left in Table 6 are identical to modern perfective forms with realis marking whereas the forms on the right look like perfective forms without the realis prefix. In both languages, participles lacking the nasal prefix far outnumber those with it. Realis-marked participles may be underrepresented in the Coatec dictionary. If we consider the more extensive Miahuatec dictionary, largely compiled by a native Miahuatec-speaking linguist, we have roughly 30% realis-marked to 70% realis-unmarked perfective-derived participles. One way to interpret this is that still today speakers can use modern perfective forms *ad hoc* to attribute a state or quality to a noun, but that many participles were formed prior to the diffusion of the realis prefix and were not updated with the nasal prefix, perhaps because speakers were already treating them as adjectival lexical items separate from their verbal etyma.

The /kw-/ prefix in Coatec may be a Chatino loan. Section 4.1 identified the Proto-Zapotecan perfective allomorphs as *kw- and *ku-. Zapotec languages usually reflect *kw as a bilabial consonant and voice or delete the *k in *ku-. In Chatino languages /kw/ is a possible reflex of both *kw and *ku, e.g., the Zenzontepec verb 'inform' with the perfective /n-kw-et͡saʔ/ and imperative /kw-et͡saʔ/. Coatec borders Chatino and a possible explanation is that some Chatinos shifted to Zapotec.[11] Chatino speakers may have used some of their native perfective forms as participles when speaking Zapotec, with enough such forms being borrowed that /kw-/ can now be analyzed as a derivational prefix in Coatecan.

If these *kw*-initial participles in Coatec were borrowed from Chatino, this would indicate that at the time of borrowing the realis prefix was not marked on perfective forms used as participles in Chatino. This contrasts with modern Chatino forms which have nasals whether used as regular perfective forms or as participles, such as Zenzontepec Chatino [2] /n-ku-t͡suʔ/, which serves both as the perfective of 'rot' and the participle 'rotten'. That nasal-initial perfective-derived participles are more generalized in Chatino than in Southern Zapotec may suggest that the realis prefix has been in Chatino for longer.

The hypothesis that an earlier form of Chatino is the source language for Coatec *kw*-initial adjectives, combined with the fact that most perfective-derived adjectives in

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[11] Zapotecan cultures are generally patrilocal. If many Chatino women moved to Zapotec communities, learning Coatecan as an L2 and raising their children in this language, Coatec could have a Chatino substrate.

Southern Zapotec lack nasals, suggests that the realis prefix was not generalized on perfective forms at some earlier stage in prehistory. That is, non-nasal perfective-derived participles indicate that the realis prefix is not original to Proto-Zapotecan, a hypothesis supported by the lack of a nasal realis prefix in Zapotecan's sister families of Popolocan and Mixtecan, nor in the Western Relic Area comprised of Soltec [5], Totomachapan [6] and Coyachilla [7] (which includes Lachixío).

4.3 The placement of continuous *n- preceding other aspect prefixes
One difference between the continuous and realis prefixes is their degree of productivity. Continuous *n- was/is only used with verbs whose sense may render a continuous state or motion, whereas the realis prefix marks virtually all verbs in Chatino and Southern Zapotec. Another difference is the form of the stem to which these prefixes attach. Table 7 shows two positional verbs in a variety of Miahuatec [10]. The continuous prefix is added to a stem that contains no other inflectional morphology, whereas the realis prefix attaches to a stem that includes aspectual marking. On the vowel-stem 'lie down,' the realis prefix is added to stems that include habitual /dʒ-/ and perfective /go-/, whereas the continuous prefix is added to a stem that is segmentally identical to the verb root (albeit with suprasegmental differences). On the consonant-stem 'sit,' the initial /m/ of the perfective form has the [nasal] feature of the realis and the [labial] feature of the perfective prefix /b-/, which has deleted before the obstruent /d/. Habitual aspect is here marked with palatalization of the root-initial consonant, so the realis prefix is added to the palatalized habitual form /djób/, compared to the continuous prefix which concatenates with the unpalatalized verb root /dób/.

Table 7: Continuous and realis forms of positional verbs in San Bartolomé Loxicha [10]

	'lie down'	'sit'
(bare root)	/àˀʃ/	/dób/
Perfective	[ŋ-gò-ˀʃ]	/m-dób/
Habitual	/n-d͡ʒ-àˀʃ/	/n-djób/
Continuous	/n-âʃ/	/n-dób/

If the continuous prefix is the etymon of the realis prefix, the positioning of the realis prefix in a different morphological environment (preceding aspect markers) requires explanation. The following sections describe the concatenation of the continuous prefix with the perfective prefix in conservative Coyachilla Zapotec (§4.3.1), and with a positional verb that became a Chatino progressive prefix (§4.3.2). In §4.3.3 I propose that the ability of the *n- prefix to concatenate with these two aspectual categories enabled its reinterpretation as a realis marker, leading to its combination with the habitual form as well.

4.3.1 The continuous prefix applied to perfective forms in Coyachilla

As seen earlier in Table 3, Proto-Zapotecan had the perfective allomorphs *ku- and *kw-. In Coyachilla Zapotec [7], word-initial velar consonants have been lost. This has rendered the perfective prefix as [u-] or [o-] in most Coyachilla verbs. However, some verbs have a nasal preceding the perfective prefix, and as a result preserve the velar in forms beginning in [ŋgu-, ŋgo-, ŋgw-]. Consider the meanings of the verbs with and without an initial nasal in the Coyachilla varieties listed in Table 8:

Table 8: Perfective forms in the Coyachilla Zapotec dialect continuum

	Lachixío	San Mateo Mixtepec	San Pedro el Alto	San Antonino el Alto
'PFV-sit'		[uzukwa]		
'PFV-urinate'	[onit͡se]	[unit͡se]		[unet͡se]
'PFV-abandon'	[ot͡saʔna]	[ut͡sana]		[uzaʔnə]
'PFV-squeeze'	[ot͡siʔ]	[ut͡siʔ]		
'PFV-hear'	[ojenɛ̌]	[uwenɛʔ]		
'PFV-take.out'	/olǎ/	[uβa]		
'PFV-seek'	[oβaʔna]	[ukwaʔna]		
'PFV-twist'	[ojǫ́ʔlá]	[ujaʔla]		[ujaʔla]
'PFV-dig'	[oðaʔniː]	[uðaʔni]		
'PFV-steal'		[uβanːa]		
'PFV-knit'		[uðikwa]		
'PFV-get.wet'	[ŋgut͡sa]	[ŋgut͡sě]	[ŋgôt͡s]	
'PFV-rot'	[ŋgut͡sæʔæ]	[ŋguʔt͡ʃeʔe]	[ŋgoʔt͡sa]	
'PFV-wash'		[ŋgwecʲe]		
'PFV-kill'			[ŋgwitˑe]	[ŋgwitːi]
'PFV-burn'	[ŋgoròlo]			
'PFV-ripen'	[ŋgujeʔe]			
'PFV-cry'		[ŋgwiɲa]	[ŋgon]	[ŋgwiʔʲina]
'PFV-get.old'	[ŋgoʂo]	[ŋguʂo]	[ŋgoʂ ᵊ]	
'PFV-die'	[ŋguti]			

The nasal-marked verbs in Table 8 involve a change of state, whereas most of those without an initial nasal do not. The nasal-initial perfective forms refer to completed events that have resulted in a continuous state, such as being wet, clean, or ripe. As described in §4.1, the Zapotecan prefix *n- indicates continuous aspect. Though this prefix is not known to concatenate with inflectional prefixes in other Zapotec languages, it appears to concatenate with the perfective in Coyachilla. Condoravdi and Deo (2015) discuss a cross-linguistic trajectory whereby "morphological markers denoting resultative aspect diachronically generalize to denote the perfect, including the

resultative perfect, and later to encompass the perfective". They look specifically at the *-ta* marker which shows this trajectory in Indo-Aryan. Hypothesizing that "result states are expected to be more easily accessible with change of state verbs", they examine *-ta* forms attested in the Ṛgveda and find that "the *-ta* participial form is attested for 80% of verb roots encoding change of state but only for 10.5% of simple verb roots. This distribution of *-ta* strengthens the case for its being associated with a resultative aspect at this stage." However, by the time of Late Vedic *-ta* had acquired a "universal perfect" reading and had extended to "lexical predicates which do not encode a change of state". The change in distribution of *-ta* between Early Vedic and Late Vedic is comparable to the way in which nasal-initial perfective forms are limited to change of state verbs in Coyachilla but are more generalized in Chatino and Southern Zapotec, where a new realis reading of the nasal has emerged.

The Coyachilla nasal-initial perfective forms are not realis-marked. First, only a limited number of lexical items have this marking in Coyachilla. Second, those change of state verbs that do have nasal-initial perfectives do not have nasal-initial habituals. In Table 9, a nasal marks realis in Zenzontepec and Coatec but a continuous state in Coyachilla.

Table 9: Paradigmatic forms of 'get old' with and without nasals

'get old'	Zenzontepec	Coatec	Lachixío (Coyachilla)
Potential	/kāsúʔ/	gǎʃ	óʂo
Habitual	**n**dīsúʔ	**n**dàʃ	ɾoʂo
Perfective	**ŋ**gūsúʔ	**ŋ**gòʃ	**ŋ**goʂo

Continuous-marked perfectives in Coyachilla are either a retention from Proto-Zapotecan or an innovation. In favor of the innovation hypothesis, Totomachapan Zapotec, shown earlier in Table 4 to retain preconsonantal nasals, lacks nasal-marked perfective forms. For example, the Totomachapan perfective of 'get old' is [uʂu]. In favor of the retention hypothesis is the fact that continuous-marked perfectives must have existed in Coyachilla before the diffusion of a change called develarization, which transformed *kw into *p. Because this change is reflected to some extent in all Zapotec languages, it was previously thought that develarization occurred near the beginning of the word prior to the Proto-Zapotec stage (Smith Stark 2007). Table 10 shows several words lacking initial nasals that underwent develarization in Coyachilla the same as in other Zapotec languages, along with three nasal-initial perfective verb forms, which did not develarize in Coyachilla but did in other Zapotec languages.

Table 10: Application and non-application of develarization in initial syllables

Gloss	Proto-Zapotecan (phonetic)	Coyachilla		Southern	Monte Albán
		San Mateo Mixtepec	San Antonino el Alto	Coatec	Tlacolulita
'meat'	*kweʔˈnã̌ʔ	[βél:à]		/bæʔl/	/pàl/
'snake'	*ˈkwèʔnnã̌	[βèl:á]	[βæʔlə]	/mbæʔl/	/mbàʔl/
'coyote'	*kweˈweʔju	[bitʃĩʷu:]	[beɟi]		/mbiɟiʔku/
'honey'	*kwet͡siˈnã̌ʔ		[biʒin]	/mbz�̀ìn/	
'necklace'	*kweˈkaʔ	[beʔka]			/bagà̌ʔ/
'comb'	*kweˈku	[bik:e]		/bě/	/păw/
'PFV-cry'	*ˈ(ŋ?)kwjù̌ʔnã̌	**[ŋgwiɲa]**	**[ŋgwiʔⁱina]**	/mbiʔn/	/piʔɲ/
'PFV-kill'	*ˈ(ŋ?)kjuʔθθi		**[ŋgwit:i]**	/mbìθ/	/bigàt/
'PFV-wash'	*ˈ(ŋ?)kwjaʔtⁱẽ	**[ŋgwecⁱe]**		/mbjàt/	/bjaɾ/

The data in Table 10 reveal that, rather than applying uniformly in a homogenous Proto-Zapotec, develarization diffused when Coyachilla already existed as an independent variety. Either Coyachilla had innovated continuous-marked perfectives not found elsewhere, or else other contemporaneous varieties also had continuous-marked perfectives but only Coyachilla treated them as exceptions to develarization.

If the original Proto-Zapotecan system allowed the combination of the continuous and perfective aspect prefixes, the subsequent loss of the continuous prefix from perfective forms in Totomachapan could have been motivated by its redundancy. The perfective of a change of state verb like 'get old' would always connote a resulting continuous state, whether marked morphologically or not. I favor the retention hypothesis, but even under the innovation hypothesis nasal-marked perfectives could have been shared areally between Coyachilla and Chatino, as were some other traits (Sicoli 2015:193). Under either scenario, Coyachilla provides an example of continuous *n- concatenating with the perfective prefix, just as the realis prefix concatenates with aspectual prefixes in Chatino and Southern Zapotec.

4.3.2 The grammaticalization of the progressive construction
Cross-linguistic evidence suggests that Proto-Zapotecan lacked progressive aspect morphology but could indicate progressivity via a serial verb construction that consisted of a continuous-marked positional verb in combination with another verb indicating the event in progress (Smith Stark 2003). This syntactic construction has become bound in many languages, including Southern Zapotec. Examples (20–23) show the bound version in the San Bartolomé Loxicha variety of Miahuatec [10]. The continuous form of 'be stuck on' /n-kæ/ in (20) is cognate with the verb form that has grammaticalized as

the Central Zapotec progressive prefix (Broadwell 2015; Smith Stark 2003). However, this variety of Miahuatec can use any positional verb in its progressive construction, as in (21–23).

(20)   Progressive with 'be stuck on' in Miahuatec (Cruz Santiago in preparation)

/**n-kæ+ʃàʔl**   máʔ   rò   jó/

CONT-be.stuck.on+INF\open animal   mouth   house

'It was opening the door.'

(21)   Progressive with 'sit' in Miahuatec (Beam de Azcona et al. 2013)

/ʃĩθ   **n-dób+g-ô**   ʃàʔ   biʃtĭl   jêk   ʃàʔ/

between   **CONT-sit+INF-put**   3H   soap   head   3H

'While she was shampooing her hair…'

(22)   Progressive with 'be placed' in Miahuatec (Cruz Santiago in preparation)

/**n-d͡zí+lí**   ʃàʔ   fjèst/

CONT-be.placed+INF\do   3H   party

'They were having a party.'

(23)   Progressive with 'stand' in Miahuatec (Cruz Santiago in preparation)

/diɲě   **n-du+wìʔ**   góʔ   jŏl=ǎ̃/

even.though   **CONT-stand+INF\watch**   2RES   POT\burn=1SG

'Even though you are watching I'm going to burn myself.'

In neighboring Coatec Zapotec [9], the imperfective can render a progressive meaning, as in (24), but progressive aspect is often indicated by the same bound construction found in Miahuatec, as in (25).

(24)   Progressive reading of imperfective, Coatec (Beam de Azcona et al. 2013)

/ʃe-mód=baʔ   **n-d-âtʃ͡**   ŋgwziʔ/

INTE-way=MED   **R-IPFV-crack**   Lightning

'How can Lightning be thundering so?'

(25)   Progressive construction, Coatec (Beam de Azcona et al. 2013)

/n-zǒb+j-ùn+beʔj   ár   ʃe-mód   g-ǔn   ár/

CONT-sit+INF-do+thought   3FAM   INTE-way   IRR-do\POT   3FAM

'He was sitting thinking how he would do it.'

In the Coatec construction the auxiliary verb -*ê* occurs most frequently, as in (26).

(26)   Progressive construction with -*ê,* Coatec (Beam de Azcona et al. 2013)

(a)   **/n-d-ê+j-âtʃ͡**   ŋgwziʔ   ndô   bæʔ/

      CONT-RPL-AUX+INF-crack   lightning   face   sky

      'Lightning was thundering in the sky.'

(b)   **/n-d-ê+lâ**   tǒp   ʃì   kolór/

      CONT-RPL-AUX+INF.go.down   two   drinking.gourd

color

      'Two painted gourds are coming down.'

When not semantically bleached in the progressive construction, /ê/ is a positional verb with the lexical meaning 'squat,'[12] as in (27).

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[12] This is the original 'sit' verb in Zapotecan as well as Popolocan. Pre-Columbian cushions and stools were lower to the ground than European chairs and Mesoamericans in codices and *lienzos* are depicted sitting with their knees as high as their chests. Another positional verb, originally meaning 'to be placed upon something' has taken on the meaning 'sit (in a chair or on a higher surface)' and appears in Table 44 and (25).

(27)   /-ê/ as 'squat' in Coatec

/bâ   **w-t-ê**/

MED   **IMP-RPL-squat**

'Squat over there!'

The verb /ê/ belongs to a partially suppletive conjugation called "class D" (Beam de Azcona 2004, 2009, 2019; Campbell 2011; Kaufman 2016; Pérez Báez & Kaufman 2017). This class has vowel-initial roots but forms inflectional stems with consonantal prefixes called "replacives". Chatino has lost class D morphology (Campbell 2011). Table 11 shows that *ndê* is merely one of several paradigmatic forms in Coatec.

Table 11: 'Squat' in Coatec

	'to squat'	/-ê/
Realis	Continuous	/n-d-ê/
	Imperfective	/n-b-ê/
	Perfective	/ŋ-w-t-ê/
Irrealis	Imperative	/w-t-ê/
	Potential	/kw-é/

The continuous form of 'squat' in Coatec is phonetically identical, at least segmentally, to what Campbell (2011:227) reconstructs as a Proto-Chatino progressive prefix */nte-/ ([nde-]). Although in Coatec this form seems to be grammaticalizing, it is still understood as a verb rather than a prefix. In one elicited example, a Coatec speaker translated Spanish *estuvieron peleando* ('they were fighting') as /ŋ-w-t-ê+jò=ḿ/, using the perfective of 'squat'. Though I haven't found similar examples in spontaneous speech, the fact that the speaker chose this form to calque a Spanish past progressive, reveals synchronic awareness of /ê/'s status as a verb rather than a fixed prefix.

When other positional verbs are used in the progressive construction, such as 'sit' above in (25), the subject is often understood to be physically in the position indicated by the verb, but when the 'squat' verb is used in the progressive construction this is often not the case. When a progressive sentence is elicited without much context, Coatec speakers are more likely to form the construction with this verb, because it is becoming a generic marker of progressive aspect, bleached of positional semantics. An example is the aforementioned 'they were fighting.' This example, elicited out of context, was translated with 'squat' even though the activity of fighting seems unlikely to take place in this position.

Coatec is in close contact with Chatino and it is unsurprising that it should grammaticalize the same positional verb to mark the progressive. That the process is further along in Chatino than in Coatec suggests that Chatinos innovated the grammaticalization of this form and Coatec speakers are following their lead. However, the synchronic behavior of this verb in Coatec provides insights into the etymology of the Chatino progressive prefix.

4.3.3 The reinterpretation of the continuous prefix as realis

In §4.3.1 I proposed that in Proto-Zapotecan it may have been possible to concatenate continuous *n- with the perfective prefix on change of state verbs, whose perfective forms are resultative. In §4.3.2 I argued that Campbell's (2011) Proto-Chatino progressive prefix *nte- can be analyzed as continuous *n- attached to *te 'squat' (etymologically composed of replacive *t and verb root *e). Table 12 compares the inflectional system before and after the grammaticalization of the progressive prefix. Here I also include a sound change which deleted *k before consonants in Chatino, leaving the irrealis unmarked except for those cases where it preceded a vowel-stem. Though the relative chronology of these two changes is unknown, both contribute to the environment in which the realis prefix developed.

Table 12: The emergence of progressive aspect morphology in Chatino

Proto-Zapotecan			Early Chatino		
Mood	Aspect		Mood	Aspect	
	Position 1	Position 2		Position 1	Position 2
Realis (unmarked)	Continuous *n-	--	Realis (unmarked)	**Continuous *n-**	--
		Perfective *ku-, *kw-			**Progressive *te-**
	Non-continuous(unmarked)				
		Imperfective *tʲe-			Perfective *ku-, *kw-
			Irrealis *k- /_V *0- / _C	Non-continuous (unmarked)	Habitual *ti-
Irrealis *k-		--			--

In Proto-Zapotecan, continuous *n- only occurred with verbs whose lexical semantics involved a change of state or a motion. On these verbs it could concatenate directly with

the bare verb stem to indicate a continuous state or motion. On change of state verbs it could also concatenate with the perfective prefix to mark a resultative reading. The 'squat' verb could take *n- in Proto-Zapotecan because it was a change of state verb. When progressive aspect had been indicated syntactically, speakers may have understood that the subject was simultaneously in the continuous state indicated by the positional verb and progressively performing some activity. When *n-te- grammaticalized and was bleached of its positional semantics, the verb being inflected was no longer 'squat' but the verb that followed it, which could perhaps be any dynamic verb. By the Early Chatino stage, *n- marked a continuous *state* when attached to a bare verb stem or to the perfective marker but marked a continuous *action* when attached to the progressive prefix. Morphologically, *n- could now combine with two different aspectual viewpoint prefixes. Lexically, *n- expanded its distribution from the limited set of motion and change of state verbs to the large set of dynamic verbs compatible with progressive aspect.

In Early Chatino, *n- always concatenated with the progressive prefix but only sometimes concatenated with the perfective. Over time, speakers may have analogically extended the use of *n- to perfective forms of verbs that did not denote changes of state. Table 13 represents this hypothetical stage as "Intermediate Chatino". As mentioned in §4.1, the perfective form in Proto-Zapotecan was used as a blunt imperative. However, verbs with resultative perfectives may have differentiated the two forms, marking the perfective but not the imperative with *n-. Many change of state verbs like 'get old,' 'ripen' and 'rot' tend not to be used as commands and so speakers may not have had a strong association between *n*-marked forms and the imperative function. When *n- extended to perfective forms of eventive verbs, the perfective and imperative became morphologically distinct. If Intermediate Chatino marked *n- on most or all continuous, progressive and perfective forms, this may have created ambiguity as to the meaning of *n-, since not all perfective forms result in continuous states, but we can note that all three categories refer to situations that a speaker typically considers settled parts of the real world. Both the presence of *n- on forms referring to realized situations and the absence of *n- on the imperative and irrealis forms may have contributed to the reinterpretation of *n- as a realis prefix which could then be applied to the former imperfective marker, which had now narrowed its sense to (actualized) habituality. An analogy between habitual *ti- and the semantically and phonologically similar progressive *n-te- may have also been a factor. As a result, by Late Chatino an initial nasal appears only on forms referring to situations "knowable through direct perception", as in Mithun's (1999:173) definition of the realis.

Table 13: The emergence of realis marking

Intermediate Chatino		Late Chatino	
Position 1	Position 2	Mood	Aspect-Modality
	Continuous *n-	Realis.Continuous *n-	
*n-	Progressive *te-	**Realis *n-**	Progressive *te-
	Perfective *ku-, *kw-		Perfective *ku-, *kw-
---	**Imperative *ku-, *kw-**		
	Habitual *ti-		**Habitual *ti-**
		Irrealis	Imperative *ku-, *kw-
	Irrealis *k- /_V *0- /_C	*k- /_V *0- /_C	Potential & Counterfactual (un-marked)

This repurposing of *n- to mark realis mood could have repaired an inconsistency that resulted from the loss of pre-consonantal *k in Chatino. Since the irrealis prefix *k- only survives in Chatino before vowel-initial stems, which comprise 10–20% of the verbal lexicon, most verbs in Early and Intermediate Chatino lacked overt mood marking, though forms lacking an aspectual prefix would have still been understood as irrealis. Late Chatino reinforces the mood distinction by overtly marking the realis.

4.4 Zapotec modal morphology: A test for the realis hypothesis
Cross-linguistically, while some languages have a binary contrast between realis and irrealis mood, there is growing evidence that many languages make a tripartite distinction between three "modal-temporal domains": the actual (past and present), the counterfactual and the possible future (von Prince 2017, 2019; von Prince et al. 2022; Phillips 2021). The actual is equivalent to realis mood whereas the irrealis can be divided into possible futures vs. counterfactuals. Proto-Zapotecan morphology only made the binary distinction, but Zapotec languages developed additional inflectional categories, not found in Chatino, that distinguish the counterfactual from the possible future. The potential, definite future and counterfactual all interact with irrealis morphology and help to subcategorize imaginary situations according to whether they are possible and/or likely. Since these newer Zapotec categories are irrealis, we would not expect them to be nasal-initial in Southern Zapotec, given the hypothesis that an initial nasal marks the realis. In §4.4.1 I show that the definite future passes this test.

The counterfactual presents as a possible counterexample that requires explanation. The potential, marked with floating high tone *[H] (Beam de Azcona in press) since at least Macrozapotec, interacts with both the irrealis and the definite future, but its lack of interaction with the counterfactual helps to reveal it as a separate morpheme from irrealis *k- in §4.4.2.

4.4.1 The Zapotec definite future lacks a nasal and is irrealis

The definite future expresses certainty on the part of the speaker as to the likelihood of a future situation (Munro 2007). I reconstruct the Proto Trochaic Zapotec form as *te-, with modern reflexes /te-, t͡ʂe-, se-, t-, d-, s-, z-/. A possible source for *te- is some earlier auxiliary verb, and its similarity to the causative auxiliary is notable, but beyond the scope of this paper. Proto-Zapotecan irrealis *k- causes fortition of a following consonant, in modern languages often reflected as voicelessness. Zapotec varieties vary as to whether the definite future is realized with a voiceless consonant. For example, in Miahuatec the definite future is /d-/ in San Bartolomé Loxicha but /t-/ in San Agustín Mixtepec. Historically, the definite future may have also been marked with potential *[H], as languages which preserve pre-tonic vowels have a high tone on the definite future prefix, as in Lachixío /t͡ʂé-zibì?/ 'definitely will serve' (Sicoli 1998).

Although the definite future indicates a high degree of certainty, it still references a situation that is not yet realized. No Southern Zapotec language begins the definite future in a nasal. Furthermore, many or most Zapotec languages begin future forms in a voiceless consonant, suggesting earlier concatenation with the irrealis marker, *k-te-. The correspondence between the non-nasal phonological form and irrealis meaning in the definite future is consistent with the realis hypothesis.

4.4.2 The Southern Zapotec counterfactual is irrealis but nasal-initial

The Southern Zapotec counterfactual poses a challenge to the realis hypothesis because it is semantically irrealis but begins in a nasal. Table 14 shows fuller paradigms, now including the counterfactual forms, for the same verbs shown earlier in Table 7.

Table 14: Paradigms including counterfactual forms in San Bartolomé Loxicha (Miahuatec)

Mood	Inflectional categories	'lie down'	'sit'

		/àˀʃ/	/dób/
Realis	Continuous	**/n**-â͡ʃ/	**/n**-dób/
	Habitual/Imperfective	**/n**-d͡ʒ-àˀʃ/	**/n**-djób/
	Perfective	[ŋ-gò-ˀʃ]	**/m**-dób/
Irrealis	Imperative	/gò-ˀʃ/	/b-dób/
	Potential	/g-àʃ/	/djòb/
	Definite future	/d-àˀʃ/	/dób/
	Counterfactual	[ŋg-àˀʃ]	**/n**-dób/

In Table 14, all forms that refer to realized situations begin in a nasal. Four forms refer to situations that can only be imagined. These all lack a nasal except for the counterfactual. The argument that *n- was reanalyzed as a realis marker cannot explain the nasal-initial counterfactual form, since it is irrealis. One could argue against the realis proposal, and instead claim that all nasal-initial inflected forms result from some common process, e.g., a sound change (as in Hernández Luna 2014). Likewise, a competing semantic hypothesis would be to analyze *n- as a non-future tense marker (see Matthewson 2006). For the realis proposal to be correct, the counterfactual must have a separate etymology. Here I argue that it does.

Example (11) above illustrated the counterfactual construction in Tataltepec Chatino which combines a negative marker [nã̌] with the "potential" form of a verb to reference a situation that could have taken place in the past but didn't. The same construction occurs in Zapotec. Table 15 shows that in the Lachixío construction the cognate negative particle /nê ~lâ/ is followed by a form segmentally identical to the potential, but without the tone and phonation changes that occur in the potential.

Table 15: Suprasegmental differences between Lachixío potential and counterfactual

	'erase'	'eat'
Potential form 'will X'	/t͡ʃǐla/	/akǒ/
Counterfactual construction 'did not X'	/{nê ~lâ} t͡ʃilaˀ/	/{lâ ~nê} ako/
Perfective form 'Xed'	/o-t͡ʃilaˀ/	/o-d-ako/

Texmelucan (Papabuco) Zapotec [13] has developed a morphological counterfactual, shown in Table 16. The Texmelucan counterfactual adds a nasal prefix to a form segmentally identical to the potential. Speck and Pickett transcribe phonation but not tone. The two 'come' verbs are laryngealized but have a modal vowel in the potential. As in Lachixío, the Texmelucan counterfactual lacks the suprasegmental changes of the potential.

Table 16: Paradigms for motion verbs in Texmelucan Zapotec (Speck & Pickett 1976)

	'go₁'	'go₂'	'come₁'	'come₂'

perfective	/b-ja/	/gw-a/	/b-jḛd/	/b-i̱d/
imperfective	/r-ja/	/rz-a/	/r-jḛd/	/r-ji̱d/
potential	**/g-ja/**	**/t͡ʃ-a/**	**/g-jed/**	**/k-id/**
counterfactual	**/n-g-ja/**	**/n-t͡ʃ-a/**	**/n-g-jḛd/**	**/n-k-i̱d/**

The Southern Zapotec counterfactual is realized as [ŋg-] before stems beginning in vowels and the approximants /j, w, l/, as in Coatec 'didn't say' /ŋg-àb/. When the stem begins in an obstruent or nasal, the prefix reduces to [ŋ] in most Southern Zapotec varieties (see Beam de Azcona 2004; Riggs 2020), as in 'didn't learn' /ŋ-tèʔed/ in the San Agustín Mixtepec variety of Miahuatec ('sit' in Table 14 involves further assimilation). The segmental marking common to both potential and counterfactual contexts in Chatino, Lachixío and Papabuco can be traced to Proto-Zapotecan *k-, which also explains the Southern Zapotec velar. The best label for a category that includes both potential and counterfactual situations is "irrealis", though *k- is often mislabeled as "potential", including in (11) above.

In Chatino, irrealis forms used in potential vs. counterfactual contexts are identical, whereas Lachixío, Papabuco and Southern Zapotec all have suprasegmental changes in the potential but not the counterfactual, as shown in Tables 14–16. Von Prince's (2017, 2019; von Prince et al. 2022) division of irrealis into possible (i.e., "potential") and counterfactual domains has explanatory power here. By the Macrozapotec stage,[13] a tonal suprafix *[H] emerged that distinguished the potential from the counterfactual, which remained tonally unmarked. This resolved an earlier ambiguity between negative future and counterfactual clauses.

The Texmelucan and Southern Zapotec counterfactual forms result from the loss of the vowel from the negative particle *nǎ=, and the fusion of the nasal with the irrealis-marked verb. This change in Papabuco post-dates the Monte Albán Zapotec period, since the counterfactual forms did not feed into preconsonantal nasal deletion, shown earlier in Table 4. The Southern Zapotec counterfactual may be a parallel innovation due to drift. While both Texmelucan and Southern Zapotec have nasal-initial counterfactuals, only Southern Zapotec has nasal-initial realis forms.

Because the counterfactual form can be explained separately, its existence does not threaten the analysis of *n- as realis. One could argue that an initial nasal should no longer be considered a realis marker in Southern Zapotec synchronically, because of the existence of the nasal-initial counterfactual, but this does not negate the historical analysis, nor does it apply to Chatino, which lacks a morphological counterfactual.

5. Divergence and convergence of Chatino and Southern Zapotec
Section 3 showed that Chatino and Southern Zapotec have a realis prefix. Section 4 argued that the realis prefix was a Chatino innovation. Because these neighboring subgroups do not form a clade, it follows that Southern Zapotec borrowed the prefix

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[13] There is no tonal data available for the dormant Soltec language, and Totomachapan requires research.

from Chatino. This section considers the areal and genetic implications of the realis. After an early period of divergence from Chatino via shared innovations with Central Valleys varieties (§5.1), Southern Zapotec later partially converges with Chatino, and in the process becomes distinct from Central Valleys topolects (§5.2).

5.1 Divergence of Zapotec and Chatino through the Core Zapotec period
By correlating the linguistic and archaeological records, we might date the division of Zapotec and Chatino to ca. 2500 BP. The evidence for a long-term, large-scale Chatino presence in the lower Río Verde Valley becomes robust in the Charco phase (700–400BCE), around the time that Monte Albán is founded in the Central Valleys ca. 500 BCE (Joyce 2010:128, 180). Social factors in the Central Valleys may have led to both the foundation of Monte Albán and the population increase on the Coast. The pan-Zapotec change of *s > *ʃ may have taken place after this split, shown in Figure 4.
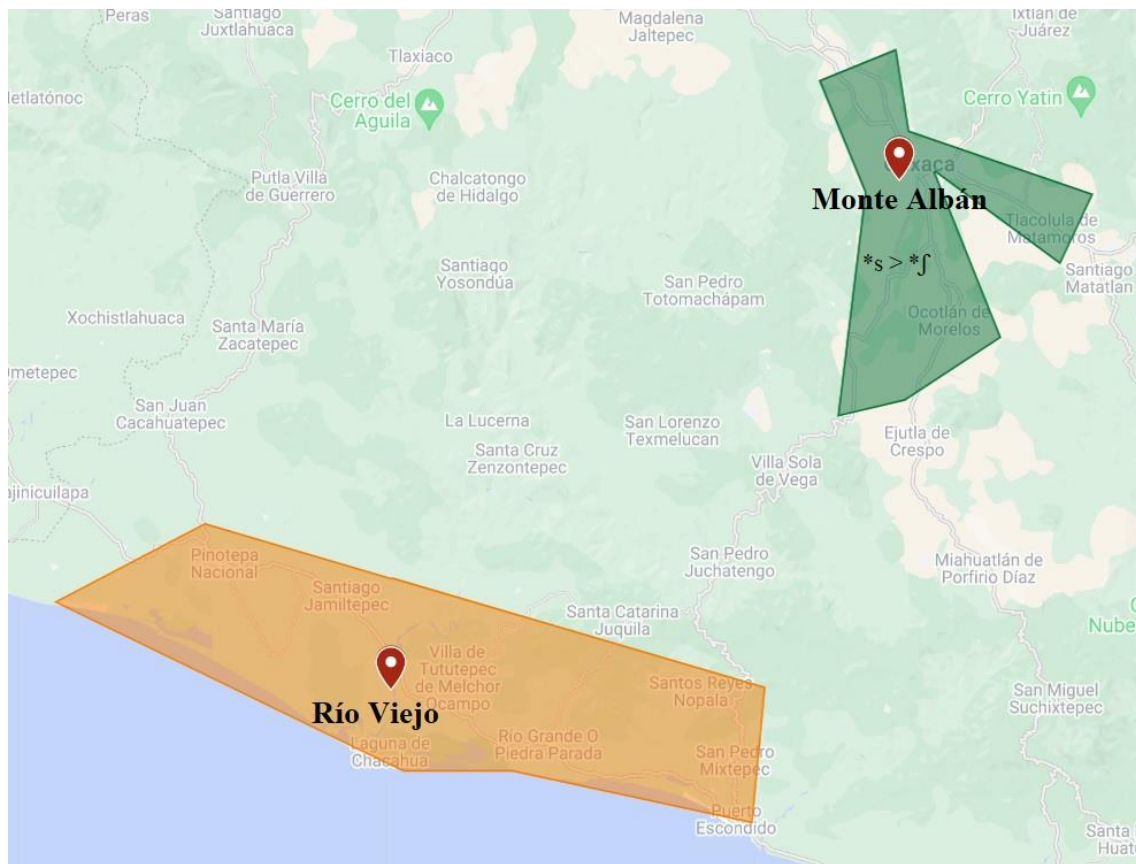
Figure 4: Major Zapotecan population centers ca. 400 BCE (Map data: Google)

Within a few centuries, Monte Albán emerged as a state (Spencer & Redmond 2004), and began expanding its territory. To the south, major settlements were established along two important routes to the coast that are still in use today. These sites are marked

in Figure 5. Balkansky (2002:37, 85–86) dates the colonization of the Sola Valley, part of the Western Relic Area, to the century 300–200 BCE. While earlier small settlements exist in Ejutla (Feinman & Nicholas 2013:183), large scale settlement in the Ejutla and Miahuatlán Valleys begins in the Late Formative (400–100 BCE, see Markman 1981; Badillo 2019:35). All three subgroups of Southern Zapotec (see Table 18 in the Appendix) are spoken in the Miahuatlán Valley, and two Southern Zapotec languages, Amatec and San Vicente Coatlán Zapotec, are spoken around the adjacent Ejutla Valley. The Late Formative settlers of Ejutla and Miahuatlán may comprise the founding populations for what became Southern Zapotec.
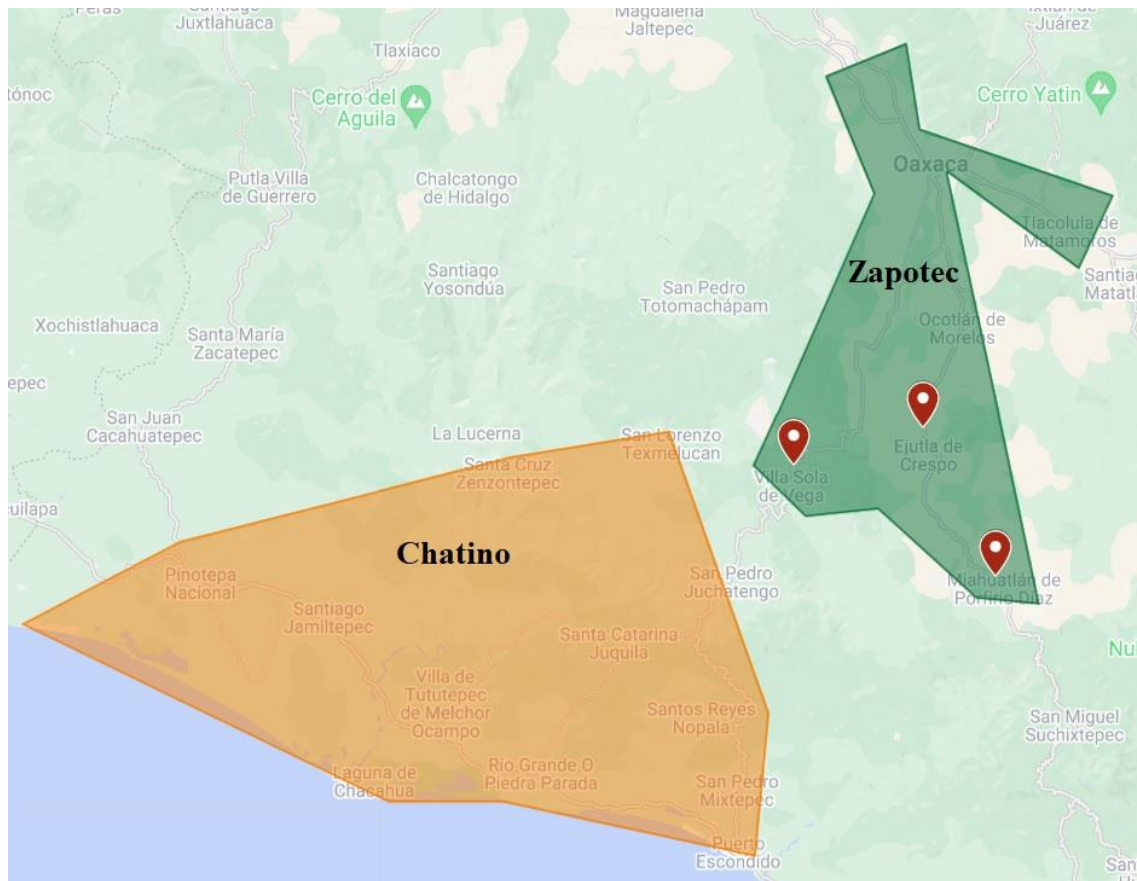
Figure 5: Expansion along trade routes by 100 BCE (Map data: Google)

According to the archaeological literature, the Soltec and Southern Zapotec settlements could have occurred simultaneously, or one could have preceded the other by as much as two centuries. This leaves some ambiguity when early innovations are reflected in parts of the Southern Trade Network but not others. A given isogloss could be due to the relative chronology of migration, or a change could have diffused to only some of the settlements that existed at the time.

Linguistically, Soltec is the earliest Zapotec language to diverge from the rest (Smith Stark 2007). Philological evidence indicates that it may not have participated in a change that shifted prominence from the ultima of some words to the penult. Figure 6(a) reflects the hypothesis that this change took place before the Southern Zapotec migration, whereas Figure 6(b) illustrates the idea that the early Southern Zapotec settlements continued to form part of the same social network as the Central Valleys.

Figure 6: Stress shift (a) prior to or (b) following the Southern Zapotec migration (Map data: Google)

Chatino influence in parts of the Western Relic area predates the diffusion of Chatino variables to Southern Zapotec. Though Soltec cognates are lacking, the morphological sequence */ku-i-u/ reduces to [j-u] in Chatino and Totomachapan but to *[kw-i] in all other Zapotec languages (Beam de Azcona in press). Figure 7(a) depicts the hypothesis that these reductions took place before migrations to Coyachilla and Miahuatlán, whereas Figure 7(b) shows the reduction to *[kw-i] diffusing from the Central Valleys as far west as Coyachilla and as far south as Miahuatlán.
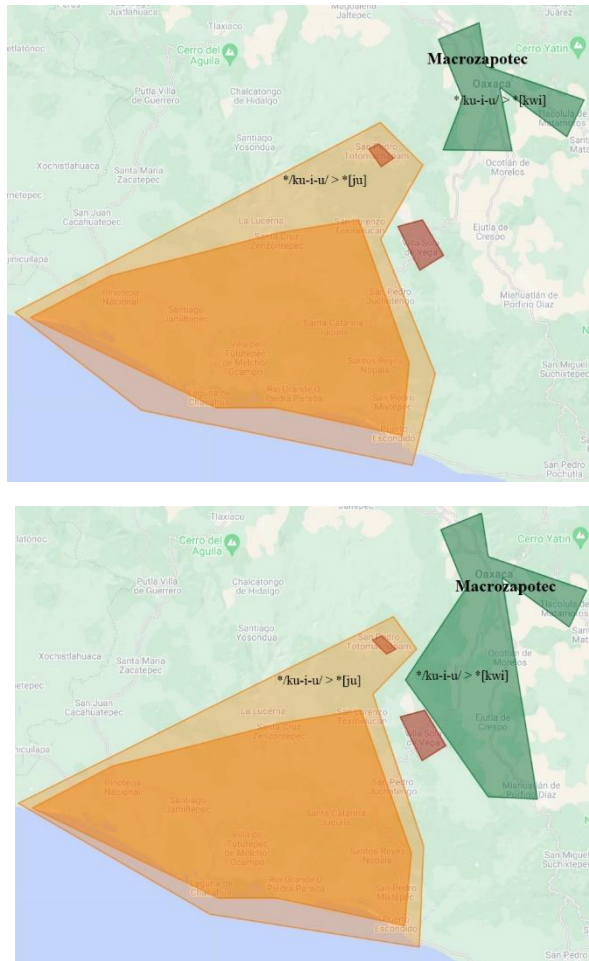
Figure 7: Reduction of */ku-i-u/ (a) before or (b) after Coyachilla and Southern Zapotec expansion (Map data: Google)

In §4.3.1 I showed that the perfective prefix *kw- did not develarize to *p when preceded by continuous *n- in Coyachilla, revealing that develarization diffused after Coyachilla was a distinct variety. Zapotec develarization was previously divided into "pre-tonic" and "post-tonic" phases (Smith Stark 2007; Beam de Azcona 2023) in order to capture in a tree model the fact that languages of the Western Relic Area don't develarize in the final syllable. The new data from §4.3.1 show that even at the beginning of the word, develarization applied in a more restricted environment in Coyachilla vs. Core Zapotec, therefore it is no longer economical to posit develarization as two separate changes. Instead, develarization can be understood as a geographically diffused change that applied in different environments in different topolects. Though data from Totomachapan and Soltec are scant, it appears that develarization took place in slightly different environments in these languages compared to Coyachilla, suggesting that the three Western varieties were distinct when this change diffused. Speakers of ancestral forms of Southern Zapotec, perhaps already located in Ejutla and Miahuatlán, adopted the change in the same environments where it took place in the

Central Valleys. A third person animal pronoun reconstructable as *kwaʔ is reflected in the same languages that have have develarization in post-tonic syllables, i.e. Core Zapotec, as shown in Figure 8.

Figure 8: Zapotec develarization in different environments (Map data: Google)

Some Zapotec innovations were likely carried to the Southern Trade Network by early migrants, but others diffused after the diversification of new varieties. Zapotec speakers who settled in the Ejutla and Miahuatlán Valleys maintained social ties with the Central Valleys to a greater degree and/or for longer than did the early Zapotecs of the Western Relic Area, whether due to a later migration, social factors post-migration, or both.

5.2 Southern Zapotec converges with Chatino and diverges from Monte Albán Zapotec
Both §5.1 and Figure 2 showed that varieties ancestral to Southern Zapotec had diverged from Chatino and were sociolinguistically aligned with Central Valleys

varieties through the Core Zapotec stage. Core Zapotec later split into Southern Zapotec and Monte Albán Zapotec. The realis prefix is one variable involved in this divergence.

Figure 9 shows how both the adoption of the realis prefix in Southern Zapotec and the loss of preconsonantal nasals in Monte Albán Zapotec (recall Table 4) are factors in the division of Core Zapotec into these two groups. The emergence of the realis prefix in Chatino and Southern Zapotec significantly increased the number of initial NC clusters that occur in speech, whereas such clusters were completely eliminated in the Central Valleys. The two changes may have come about coincidentally, but it's also possible that the sound change could have been motivated by sociolinguistic symbolism, if speakers of Monte Albán Zapotec perceived (an increase in) initial NC clusters as emblematic of varieties of the Southern Trade Network. The result is areal polarization relating to nasality.
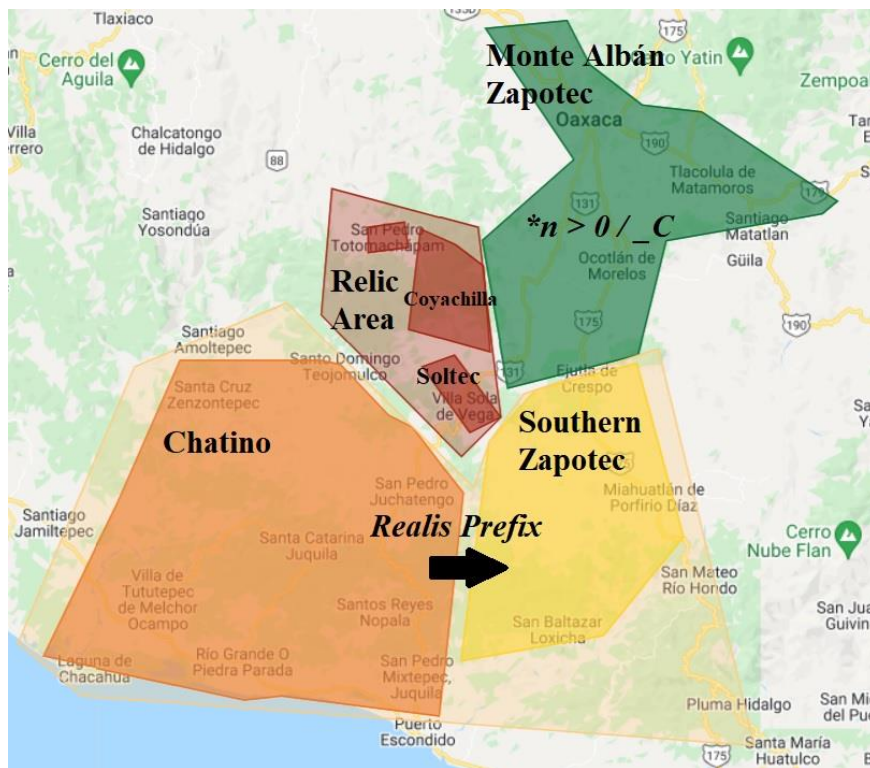

Figure 9: Diffusion of the realis prefix between Chatino and Southern Zapotec, preconsonantal nasal deletion in Monte Albán Zapotec, and no change in the Western Relic Area (Map data: Google)

Table 17 shows initial nasals in bold in paradigmatic forms from twenty varieties of Zapotecan, divided into major subgroups. All languages with the realis prefix are adjacent to one another except for San Bartolo Yautepec [11]. Smith Stark (2007) classifies Yautepec as belonging to a Miahuatecan subgroup of Southern Zapotec. This

classification has been questioned (Beam de Azcona 2018; Hernández Luna 2019) due to numerous Central Zapotec traits found in Yautepec. However, the isogloss for the realis prefix supports Smith Stark's inclusion of Yautepec within Southern Zapotec. The realis prefix is found in all languages of the Chatino and Southern Zapotec clades. Outside these two subgroups, no language nasalizes the habitual form and there are only two languages that have nasal-initial perfectives with any regularity: the change of state verbs of Coyachilla varieties (§4.3.1) and the Xanica variety of Cisyautepecan (Central Zapotec), which borrowed Miahuatec nasal perfective forms to disambiguate the perfective and imperative.

Table 17: Nasal-initial perfective and imperfective in major divisions of Zapotecan

		'get wet'			'die'		
		IRR/POT	HAB	PFV	IRR/POT	HAB	PFV
Chatino	Zenzontepec [2]	/kaˈt͡saʔ/	**/n**tiˈt͡saʔ/	**/n**kuˈt͡saʔ/	/kaˈha/	**/n**tiˈhi/	**/n**kuˈhwi/
	Tataltepec [3]	/kaˈt͡sá?/	**/n**t͡ʃá?/	**/n**kwt͡sà?/	/kaˈha/		**/n**kuˈhwi/
	Zacatepec [4]	/kaˈt͡saʔ/	**/n**tiˈt͡ʃaʔ/	**/n**kūˈt͡sāʔ/	/kaˈha/	**/n**tiˈhi/	**/n**kajūˈhwī/
	Teotepec [4]	/kt͡saʔ/	**/n**t͡ʃaʔ/	**/m**t͡sâʔ/	/kha/		
Relic	Soltec [5]						<coti>
	Totomachapan [6]				[ˈaʂi]		[ˈuʂi]
	Lachixío [7]		[ˈɾat͡ʂa]	[ˈŋgut͡ʂa]	[ˈat:i]	[ˈɾat:i]	[ˈŋgut:i]
Southern Zapotec	Coatec [9]	/gâz̻/	**/n**dâz̻/	**/ŋ**gôz̻/	/gâθ/	**/n**dâθ/	**/ŋ**gùθ/
	Miahuatec [10]	/gàz/	**/n**d͡ʒáz/	**[ŋ**góz]	/gàθ/	**/n**d͡ʒáθ/	**[ŋ**gúθ]
	San Bartolo Yautepec [11]	[gàs+nìt]	**[n**d͡ʒàs+nìt]	**[ŋ**gòs+nìt]			
	Coatecas Altas [12]	[gáz̻]	**[n**d͡ʒàz̻]	**[ŋ**gòz̻]	[gât]	**[n**d͡ʒât]	**[ŋ**gût]
Monte Albán Zapotec	Xanica [28]		[ɾaʔat͡s]	**[ŋ**goʔot͡s]		[ɾæʰt]	**[ŋ**gujʰt]
	San Blas Atempa [27]	[ˈgad͡ʒe]	[ˈɾad͡ʒe]	[ˈgud͡ʒe]			
	Santo Domingo Petapa [25]		[ˈɾjad͡za]	[ˈbjad͡za]			
	Santo Tomás Mazaltepec [20]				[ˈwăʔti]		[ˈuti]

Asunción Tlacolulita [26]				/kàt/		/kùt/
Tanetze de Zaragoza [18]				/wát/	/ɾát/	/gút/
Nigromante [17]				[gat]		[got]
Sierra Juárez [16]				[ˈgat:i]	[ˈɾat:i]	[ˈgut:i]
Zaniza [14]				/gat/		/gut/

In §4.2.2 and §4.3.2 I argued that the reinterpretation of *n- as realis happened first in Chatino. This paper's account of realis morphology is part of a larger argument that the sociolinguistic influence of Chatino on Southern Zapotec contributes to the internal division of Core Zapotec. Babel et al. (2013) argue that apomorphic taxa, i.e., groups of varieties which differ from an ancestor due to shared innovations, often include diffused traits among their defining innovations. Table 1listed eight lexical and morphosyntactic variables that define Southern Zapotec as an apomorphic taxon. Half of these, including the realis prefix, are diffused from Chatino.

Figure 10 shows 89 superimposed isoglosses. Orange was assigned to variables present in Chatino, purple to those present in multiple Zapotec subgroups, or a grouping as large as Monte Albán Zapotec. Smaller subgroups were assigned other colors. Visibly, all Southern Zapotec languages share variables with Chatino.
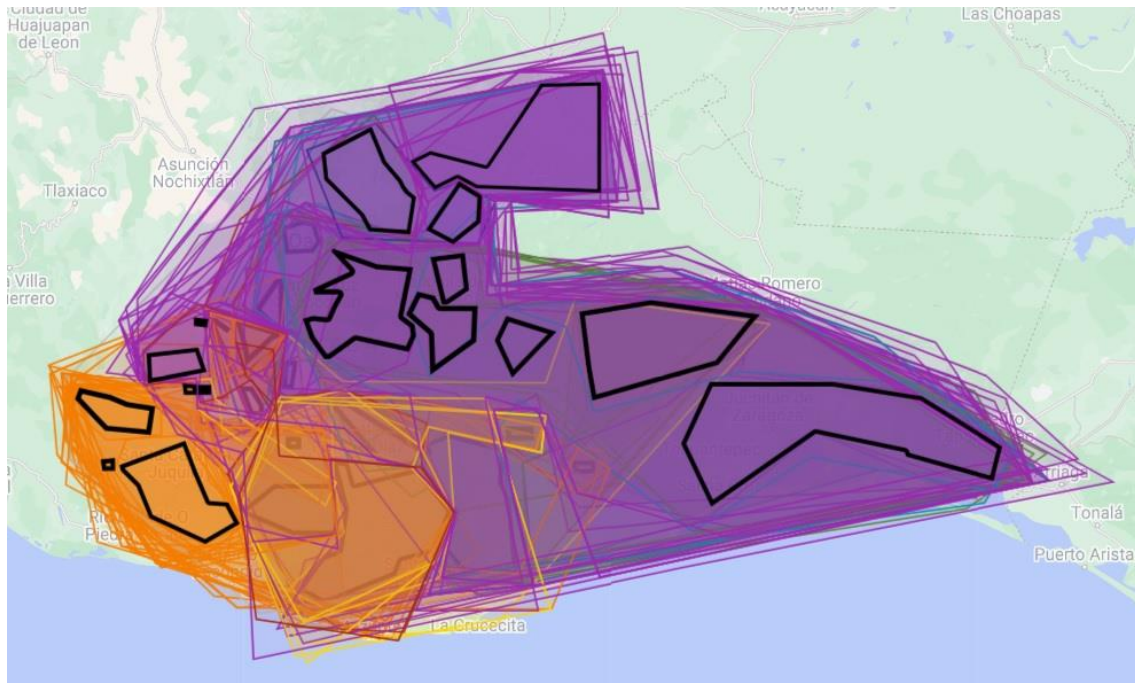
Figure 10: Accumulation of 89 isoglosses (Map data: Google)

Figure 11 shows only the 23 variables shared between Chatino [1–4] and nearby
Zapotec languages. With the exception of San Bartolo Yautepec [11], which has
migrated further east and replaced some Southern features with Central Zapotec
traits, the Southern Zapotec languages [8–12] show greater evidence of contact
with Chatino than do the languages of the Western Relic Area [5–7]. Sicoli
(2015:193) hypothesizes, "West Zapotec was likely adjacent to Chatino before
the intrusion of Papabuco as it shares several areal features". Indeed, today the
Papabuco languages [13–15], which descend from Monte Albán Zapotec (Beam
de Azcona 2023), intervene geographically between Chatino and the Western
Relic Area. The Papabucos' relatively late arrival in the region may have
interrupted or reduced contact between Chatino and the Western Relic Area,
whereas Southern Zapotec continues to border Chatino. All the Zapotec
languages in the southwestern part of the Sierra Sur region, including Papabuco,
show some degree of contact with Chatino. However, the greater number of
shared variables between Chatino and Southern Zapotec may be because these
two subgroups have shared the longest period of uninterrupted adjacency. Within
Southern Zapotec, diversification of different languages and subgroups also
correlates with the degree of contact with Chatino. Coatecan languages [8–9] are
known to share at least 22 diffused traits with Chatino, whereas 15 have been
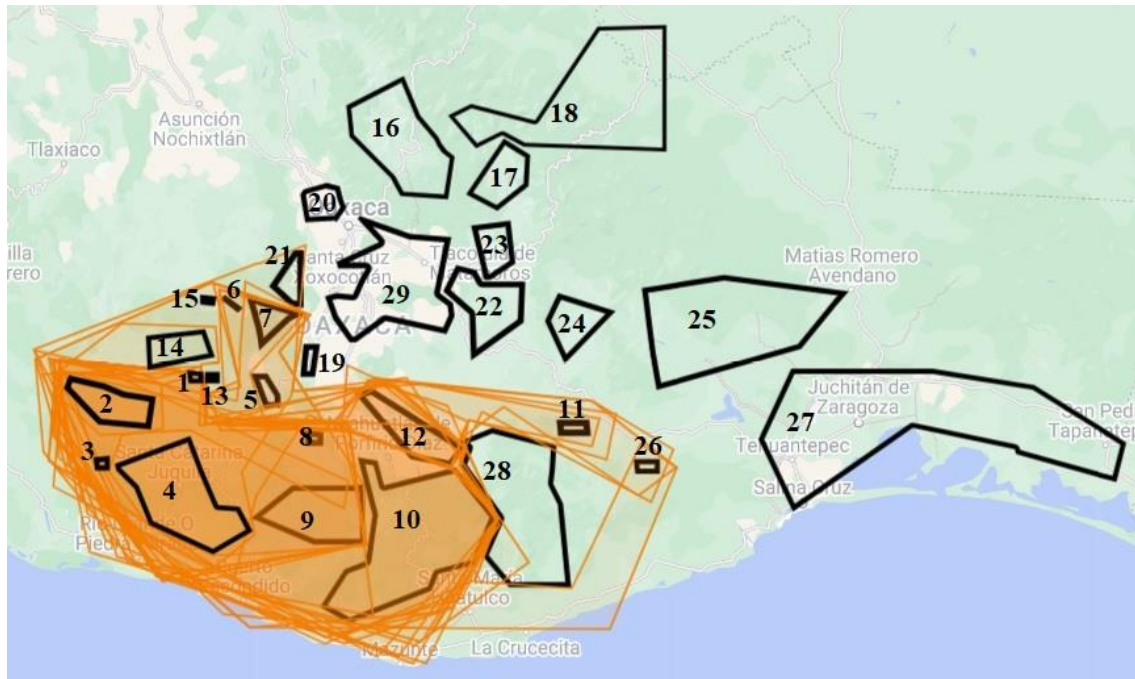registered for Miahuatec [10], 13 for Amatec [12] and 4 for San Bartolo Yautepec
[11].

Figure 11: Contact in the Sierra Sur and Coast regions (Map data: Google)

The genetic and typological similarity between Zapotec and Chatino must have facilitated the borrowing of inflectional morphology in the form of the realis prefix. Given the archaeological correlations proposed in §5.1, Chatino and Southern Zapotec may have become neighbors as little as zero to six centuries following their initial separation. We don't know when realis morphology emerged or was borrowed, and we don't know all the social and linguistic factors that eventually made these neighboring Zapotecan varieties unintelligible with one another. Therefore, we don't know whether realis morphology was borrowed at a time when Chatino and Southern Zapotec were "dialects of the same language". Indeed, Mufwene (2001:14) asks, "How much sense does it make to speak of language contact as a separate phenomenon from the contact of idiolects?"

Up until the Mexican government's hispanization policies of the twentieth century, which led to language shift and widespread bilingualism while simultaneously stigmatizing indigenous languages, perhaps all of Zapotec, if not the whole Zapotecan family, could be considered a network of idiolects, as speakers of neighboring varieties were exposed to and accommodated each other's differences. Today most speakers of Zapotec languages switch to Spanish when interacting with people outside their own communities, but less than a century ago this was not the case. In the twenty-first century, Zapotec-Spanish diffusion is more salient, and better represented in the literature (for example, most chapters in Dakin et al. 2017) than contact between

Mesoamerican languages, but studies like this one can help us consider a greater time depth.

6. Conclusions

Though there had previously been speculation, by this author and Eric Campbell (2017:118), about nasal-initial verbs being marked as realis, this was the first study to address the question systematically, and to establish the genetic and areal limits of this marking. The idea that this initial nasal comes from the continuous aspect prefix is also new.

Key to the proposal surrounding the origin of the realis prefix is the argument that the continuous prefix *n- could concatenate with the perfective prefix in Proto-Zapotecan, as suggested by Coyachilla data in §4.3.1. This bolsters an earlier claim by Operstein (2015a:336) that "the ability to use the completive", (i.e., the perfective) "as a stative participle may be an archaic remnant of the earlier, statal semantics of this form". In §4.3.2 I proposed that the Proto-Chatino progressive prefix *nte- comes from the continuous form of the positional verb 'squat'. With continuous *n- co-occurring with two types of aspectual viewpoints that describe (at least partially) actualized situations, it became possible for *n- to be reinterpreted as a realis marker.

By uncovering the likely etymology of the Southern Zapotec counterfactual prefix and appealing to von Prince's (2017, 2019; von Prince et al. 2022) trichotomy of actual, possible and counterfactual situations, a conflict in terminology found a historical resolution such that *k- can be understood as the Zapotecan irrealis marker, with Zapotec *[H] restricted to potential situations. These morphemes had previously been thought of as marking the same category, which some glossed "potential" (Kaufman 2016; Beam de Azcona 2004; Campbell 2011; Cruz 2011; Operstein 2014; McIntosh 2015; Pérez Báez 2015; Sicoli 2015; Sullivant 2015; Villard 2015; Antonio Ramos 2015; Woodbury 2019; Alonso Ortiz 2020; Gutiérrez Lorenzo 2021) and others "irrealis" (Munro 2007; Broadwell 2015; Galant 2015; López Nicolás 2016; Foreman & Lillehaugen 2017). By considering the segmental and suprasegmental morphology separately, it was revealed that both irrealis and potential marking interact with the Zapotec definite future, whereas the counterfactual is irrealis-marked but not potential-marked. The reconstruction of earlier Zapotecan systems thus supports the controversial binary distinction between realis and irrealis mood, but also von Prince's division of the irrealis into possible situations on the one hand and counterfactual ones on the other.

Mithun (1999:173) observed that if one of the moods is unmarked, it is most likely to be the realis. I proposed that this was the case in Proto-Zapotecan, which overtly marked irrealis but not realis. Chatino came to have the less common inverse of this pattern. First, a sound change eliminated the irrealis prefix *k- on consonant-stems (80–90% of Zapotecan verbs). These forms were still distinguishable from other inflected forms, but

now lacked an overt marker. The mood distinction was reinforced when the continuous aspect prefix was reinterpreted as a realis prefix.

In §5 I showed that varieties ancestral to Southern Zapotec were synchronized with Central Valleys norms at a time when the Western Relic Area was already showing variation, including some influence from Chatino. However, Southern Zapotec has experienced sustained contact with Chatino for longer. This correlates to the fact that Southern Zapotec and Chatino share more (documented) diffused variables with each other than either does with any other subgroup. I argued that the realis prefix originated in Chatino and was borrowed into Southern Zapotec. Some of the other variables are known to have the same directionality, whereas others have not been investigated. Future work could look at the directionality of additional diffused variables and propose sociolinguistic explanations.

The realis isogloss specifically has the potential to make clearer certain points of controversy in the classification of Southern Zapotec languages. Smith Stark's (2007) Southern Zapotec included Coatecan, Amatec, Miahuatecan (including San Bartolo Yautepec), Cisyautepecan and Tlacolulita. Operstein (2012) excluded the Coatecan languages [8–9] from Southern Zapotec. Both Beam de Azcona (2018) and Hernández Luna (2019) questioned whether San Bartolo Yautepec should be classified with Southern Zapotec or Central Zapotec, though without reaching a firm conclusion. In Beam de Azcona's (2023) classification, Southern Zapotec includes Coatecan, Amatec and Miahuatecan (inclusive of San Bartolo Yautepec) and excludes Cisyautepecan and Tlacolulita. Among Zapotec languages, the realis isogloss corresponds precisely to this version of Southern Zapotec, but not to Smith Stark's, since the realis is lacking in Cisyautepecan and Tlacolulita, nor to Operstein's, since the realis is found in Coatecan. Babel et al. (2013) observed that "diffusion plays a greater role in language diversification than is usually recognized". The realis prefix is an example of how diffusion from Chatino contributes to the formation of a Southern Zapotec clade.

The realis prefix increased the number of NC clusters that one would hear in Chatino and Southern Zapotec speech. This stands in contrast to Monte Albán Zapotec which deleted preconsonantal nasals. From the Middle Formative period through at least the Early Postclassic, the areas where these two changes originated were the two seats of power in the Zapotecan world. No archaeological site in Sola, Ejutla or Miahuatlán can compete with the grandeur of either Monte Albán in the Central Valleys or the sites of the Lower Río Verde Valley on the Coast. From the Middle Formative site of Charco Redondo, which was "one of the largest in Oaxaca at the time" (Joyce 2010:180), to the emergence of the urban center of Río Viejo in the Terminal Formative, whose massive acropolis was "one of the largest structures in prehispanic Oaxaca" (Joyce 2010:189), Chatinoland was not a backwater but a thriving civilization when the first southern migrations of Zapotec speakers took place, as was the Monte Albán state in the Central Valleys from whence these settlers came. Sandwiched between these powerful polities,

Southern Zapotec shows an early sociolinguistic affinity (whether pre- or post-migration) with the Central Valleys, but later rejects Central Valleys innovations like preconsonantal nasal deletion while acquiring Chatino innovations, like the realis prefix. These patterns suggest that over perhaps more than 2,000 years Chatinos have been socially important innovators that helped establish a linguistic area in the adjacent Sierra Sur and Coast regions, in the terms of Lyle Campbell (2017) "an accumulation of individual cases of 'localized diffusion.'" This has been a study of just one such case.

Abbreviations
1SG   1st person singular
2SG   2nd person singular
2RES   2nd person respectful
3FAM 3rd person human familiar
3H   3rd person human
3HD   3rd person human stranger

3INAN 3rd person inanimate
AUX   auxiliary verb
CAUS   causative
CONT   continuous
DEF   definite future
DIST   distal
HAB   habitual
IPFV   imperfective
IMP   imperative
INF   infinitive
INTE   interrogative
IRR   irrealis
MED   medialNEG   negative
NSBJ   non-subject marker
PFV   perfective
POT   potential
PROG   progressive
R   realisRPL   replacive (a derivational stem-forming prefix)
TOP   topicalizer
X   unknown gloss

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Appendix
Table 18 shows the genetic affiliation of varieties mentioned in this paper, indexed with the numbers in Figure 1.

Table 18: Affiliation of and data sources for varieties mentioned in the text

Genetic Classification				Language names used in this paper	Varieties mentioned in the text	Data sources
Chatino (Campbell 2013; Sullivant 2016)			1	Teojomulco Chatino	Santo Domingo Teojomulco	(Sullivant 2016)
	Core Chatino	Coastal Chatino	2	Zenzontepec Chatino	Santa Cruz Zenzontepec (Zen.)	(Campbell & Carleton in press)
			3	Tataltepec Chatino	Tataltepec de Valdés	(Sullivant 2015)
			4	Eastern Chatino	San Juan Quiahije	(Cruz 2011)
					Santa LucíaTeotepec	(McIntosh 2015)
					San Marcos Zacatepec	(Villard 2015)
Zapotec	Trochaic Zapotec	Macrozapotec	5	Soltec	Santa María Sola	(Archivo de parroquia 1607)
			6	Totomacha-pan	San Pedro Totomacha-pan	Recordings of Zapotecan survey (Sicoli & Kaufman 2010)
			7	Coyachilla Zapotec dialect continuum	Santa María & San Vicente Lachixío	(Sicoli 2020; Sicoli & Kaufman 2010; Sicoli 2015; Molina Sánchez et al. 2002)
					San Antonino el Alto	Recordings of Zapotecan survey (Sicoli & Kaufman 2010)
					San Mateo Mixtepec	
					San Pedro el Alto	

						#	Language	Location	Source
Core Zapotec				Southern Zapotec	Coatecan	8	San Vicente Coatlán Zapotec	San Vicente Coatlán	(Klotz 2019)
						9	Coatec Zapotec	San Baltazar Loxicha	Collaboration w/ Lázaro Díaz Pacheco
					Miahuatecan	10	Miahuatec Zapotec	San Agustín Mixtepec	Collaboration w/ Edmundo Palomec Hernández
								San Bartolomé Loxicha	(Cruz Santiago & Beam de Azcona in preparation)
						11	Yautepec Zapotec	San Bartolo Yautepec	Adela Covarrubias Acosta (pers. comm.)
						12	Amatec Zapotec	Coatecas Altas	(Juárez Santiago 2018)
	Monte Albán Zapotec				Papabuco	13	Texmelucan (Papabuco) Zapotec	San Lorenzo Texmelucan	(Speck 2012)
						14	Zaniza (Papabuco) Zapotec	Santa María Zaniza	(Operstein 2015b; Sicoli & Kaufman 2010)
						15	Elotepec (Papabuco) Zapotec	---	
		Nuclear Zapotec				16	Sierra Juárez Zapotec	San Juan Atepec	(Nellis & Goodner de Nellis 1983; Bartholomew 1983)
			Eastern Zapotec			17	Cajonos Zapotec	Nigromante	Collaboration w/ Jorge Beltrán
						18	Rincón Zapotec	Tanetze de Zaragoza	Collaboration w/ Nelson Martínez Pérez

								19	Ayoquezco Zapotec	---	
								20	Etla Zapotec	Santo Tomás Mazaltepec	Colllaboration w/ Luisa Cruz Victoria & Teodoro López
								21	Zimatlán Zapotec	---	
								22	Mitla Zapotec	---	
								23	Albarradas Zapotec	---	
								24	Quiatoni Zapotec	---	
							Central Zapotec	25	Trans-yautepecan Zapotec dialect continuum (TY)	Santo Domingo Petapa	Recordings of Zapotecan survey (Sicoli & Kaufman 2010)
								26	Tlacolulita Zapotec	Asunción Tlacolulita	Collaboration w/ Roque Julián de la Rosa
								27	Isthmus Zapotec	San Blas Atempa	Recordings of Zapotecan survey (Sicoli & Kaufman 2010)
								28	Cis-yautepecan Zapotec dialect continuum	San Pedro Mixtepec	(Antonio Ramos 2015)
										Santiago Xanica	Collaboration w/ Sara Cruz García
								29	Central Valley Zapotec dialect continuum	---	

Resumen

Este trabajo trata un cambio semántico en que un prefijo que marcaba aspecto continuo fue reinterpretado como un marcador de modo realis. Este cambio tomó lugar en chatino primero, antes de difundirse al subgrupo zapoteco del sur, así contribuyendo a la diversificación genética de las lenguas zapotecas. El protozapotecano marcaba el modo irrealis con *k- y no marcaba el realis. *n- indicaba aspecto continuo y podría concatenarse con el perfectivo, *ku-, para una lectura resultativa. Un verbo posicional con marcación de aspecto continuo, *n-te, se gramaticalizó como un prefijo progresivo en chatino. Como tanto el perfectivo como el progresivo se refieren a situaciones (por lo menos parcialmente) realizadas, *n- se reanalizó como un marcador de modo realis que se podría concatenar con prefijos de punto de vista aspectual. El prefijo realis se revela como uno de varios rasgos difundidos del chatino que contribuyen a la creación del zapoteco del sur y su divergencia del zapoteco de Monte Albán.

Résumé

Le présent article décrit un changement sémantique consistant en la réinterprétation d'un préfixe marquant l'aspect continu en un marqueur du mode realis. Ce changement historique s'est produit en Chatino avant de se propager au groupe zapotèque du sud, contribuant ainsi à la diversification des langues zapotèques. Le proto-zapotécan marquait autrefois le mode irrealis avec *k-, sans marquer le realis. *n- indiquait l'aspect continu et le même préfixe, combiné au préfixe perfectif *ku-, donnait un sens résultatif. En chatino, la combinaison d'un verbe de position avec le préfixe continu (*n-te) s'est ensuite grammaticalisée en préfixe marquant le progressif. Parce que le perfectif et le progressif font tous deux réference à des situations effectives (du domaine realis), le chatino a grammaticalisé *n- comme un préfixe de realis, que l'on peut associer à des préfixes aspectuels. Le préfixe réalis est l'un des nombreaux traits d'origine chatino qui contribuent à la formation du zapotèque du sud comme un clade à part entière, et le distinguent du zapotèque de Monte Albán.

Zussamenfassung

Dieser Artikel behandelt einen Fall von semantischem Wandel, durch den ein kontinuatives Aspektpräfix als Realismarkierung reinterpretiert wurde. Dieser Wandel fand im Chatino statt und breitete sich später über den Südzapotekischen Zweig aus, wodurch er zur genetischen Diversifizierung der Zapotekischen Sprachen beigetragen hat. Das Proto-Zapotekische markierte den Irrealis mit *k-; der Realis war unmarkiert. Das Präfix *n- drückte kontinuativen Aspekt aus und verband sich mit dem perfektiven *ku- zur Bezeichnung resultativer Lesarten. Ein kontinuativ-markiertes Positionsverb *n-te grammatikalisierte später zu einem Progressivpräfix im Chatino. Da sich sowohl Perfektiv als auch Progressiv auf realisierte Situationen beziehen, wurde *n- reanalysiert als eine Markierung des Realis, die mit Aspektpräfixen kombiniert werden konnte. Das Realispräfix erweist sich als eines von mehreren Merkmalen, die vom

Chatino ausgehend diffundierten und zur Bildung der Südzapotekischen Klade und ihrer Divergenz vom Monte Alban Zapotek beitrugen.

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