New perspectives in historical linguistics

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This review of recent trends and developments in historical linguistics proceeds from the empirical to the conceptual, from 'what' to 'how' to 'why'. I begin with new findings about the origins, relationships, and diversity of the world's languages, then turn to the processes and mechanisms of change as they concern practicing historical linguists, continue with efforts to ground change in the acquisition, use, and structure of language, and conclude with a look at ongoing debates concerning the explanatory division of labor between historical and theoretical linguistics and ways to unify historical and theoretical linguistics. The emphasis throughout is on current research rather than on established textbook knowledge.[1]

1 Language relationships

1.1 The comparative method

The most visible face of historical linguistics is the study of language relationships. It has been revitalized in the last few decades by a wealth of new linguistic, historical, anthropological, archeological, and genetic evidence, a better understanding of how languages disperse and change, and innovative computational methods.

For now, the comparative method remains the gold standard for establishing genetic affiliation (Weiss, this volume; Hale, this volume). The persistent superstition that it does not work for unwritten languages or for certain families has been refuted again and again, for Algonquian by Bloomfield (1925, 1946), Haas 1958, Goddard 1979, 1990, Garrett 2004, Berman 2006, and others, and for Pama-Nyungan (Australian) by Hale (1966), O'Grady and Hale 2004, Alpher 2004, Sutton & Koch 2008, Bowern et al. 2011, and Miceli, this volume. The comparative method requires first of all large amounts of reliable data, ideally with morphologically complex cognates rather than only root etymologies. It works best when it can build on prior structural analysis and internal reconstruction (Joseph 2010), with as much partial reconstruction of subgroups and subfamilies as can be done first. On these foundations, serious hypotheses even about remote genetic relationships can be built.[2]

Recent examples of the power of the comparative method are the confirmation the Austric family comprising Austroasiatic and Austronesian by (Blust 1996, Reid 2005, Sidwell & Reid 2021), of Trans New Guinean (Pawley & Hammarström 2017), and of several South American macro-families (Ribeiro and Van Der Voort 2010, Pache 2018, 2023, Nikulin 2023). These long mooted genetic connections are now supported by evidence from sets of lexical and morphological cognates with phonological correspondences. A remarkable discovery is the connection of Na-Dene (Athabascan-Eyak-Tlingit, a securely established family, Krauss 1976) to Yeniseian, a family

[1] This chapter has been revised from the first edition, with new material mostly in sections 1 and 2.

[2] In contrast to glottogonic fantasies such as Atkinson 2011, Duda et al. 2016, and Huybregts 2017 (all published in top science journals!).

whose sole surviving member is Ket, spoken in south central Russia (Vajda 2010a, 2010b).[3] The first clue to the relationship were the homologies between their typologically unusual and areally unique verbal prefix systems, in which some of the corresponding positions are even filled by what appear to be cognate morphemes. The etymological evidence has recently been augmented by the insight that many Yeniseian roots originate as morphologically complex combinations that are preserved in their Na-Dene cognates (Vajda 2022). Tellingly, it turns out that the mere collation of word resemblances does not show this relationship (Brown 2017).

In general, typological and lexical resemblances without regular correspondences are fragile signals of genetic affiliation. Any classification that is solely based on them is vulnerable to false positives due to language contact and even to chance. The comparative method can sort out accidental similarities and shared areal features from inherited ones, and establish reliable subgroupings by distinguishing common retentions from the common innovations that are the most reliable signals of subgrouping. Maximum certainty is obtained when systematic reconstruction reveals inherited nontrivial morphological patterns. Famously, when Hittite was discovered a century ago, its Indo-European affiliation was obvious at once just from the equation *kuenzi* 'he kills', *kunanzi* 'they kill' = Sanskrit *hánti, ghnánti*, from reconstructed IE *$*g^whén$-ti, g^whn-ónti*.

Altaic, the larger Transeurasian, and the even larger Ural-Altaic (Starostin, Dybo, and Mudrak 2003), while undeniably typological and areal groupings, have not been shown to be language families (Janhunen 2001, 2007, 2023, Hübler & Greenhill 2022, but see Robbeets 2020 for an optimistic view). The connection between Uralic and Yukaghir (Piispanen 2013) also seems real, but is generally thought to be due to ancient contact, as is their putative relation to Eskimo-Aleut (Fortescue's Uralo-Siberian hypothesis, 1998, 2022). The Amerind macrofamily, comprising all American languages except Na-Dene and Eskimo-Aleut (Greenberg 1987, Greenberg & Ruhlen 1992), though a priori plausible because it is good fit with population genetics and archeology, is considered unproven by specialists on American languages because it is based only on the flawed method of mass comparison (Campbell and Poser 2008). Proposals to connect Sino-Tibetan to Caucasian (Starostin 2017), Andaman Island languages to Austronesian (Blevins 2007), and Basque to Indo-European (Blevins 2018, Blevins & Sproat 2021) have not gained acceptance because they rely on dubious cognates (Blust 2014, Hualde 2020).

The Nostratic superfamily is a special case in that it actually comprises several distinct and in part mutually incompatible hypotheses, which diverge on what families are included in it, and what the proto-language looked like.[4]

1.2 The new look in historical linguistics

For many language families, binary tree models of subgrouping have recently been replaced by flatter "bush" or "rake" models, which eliminat formerly assumed clades in favor of convergence by independent parallel innovations (homoplasy) and post-split contact. Because flat groupings are a signature of rapid dispersion, they reopen questions about homeland, date, and dispersal (Crevels & Muysken 2020, François, this volume). Uralic has a new look, with no Finno-Ugric clade any more and a new place for Saami (Grünthal et al. 2022).[5] In the Sino-Tibetan family (now renamed

[3] Bradley 2023 argues that Sino-Tibetan is also related to Yeniseian and Na-Dene.

[4] Illič-Svityč's reconstruction prioritizes Uralic, which does show striking counterparts to Indo-European in pronouns, inflectional endings, and basic vocabulary (Dybo 1989), whereas Bomhard's reconstruction focuses on the relationship between Indo-European and Afro-Asiatic (Bomhard 2018) and is largely based on weaker root etymologies.

[5] See further K. Häkkinen 1984, Itkonen 1998, Carpelan, Parpola & Koskikallio 2001, Salminen 2002, J. Häkkinen 2012a, 2012c.

Trans-Himalayan), Tibeto-Burman is no longer a separate clade (Blench & Post 2014, DeLancey 2021). What once was grouped into the Formosan branch of Austronesian is now split into nine separate co-ordinate branches again (Blust 1999), the tenth being the giant Malayo-Polynesian family, itself flattened by the dissolution of its previously posited Western and Oceanic branches (Donohue & Grimes 2008, Pawley 2011, Smith 2017 vs. Blust 2009, 2019, 2020). Rake models have also been launched for Austroasiatic (Sidwell, 2020, 2021, this volume), Bantu (Ehret 2001, Grollemund et al. 2015, 2023), Western Numic (Babel, Garrett, Houser & Toosarvandani 2013), Tupí-Guaraní (Gerardi & Reichert 2021), and for Greenberg's four African super-families, three of which have themselves been called into question (Güldemann 2008, 2018; Hyman 2011).

Computational phylogenetics (Dunn, this volume) has tended to yield earlier time lines than archeology and comparative reconstruction. For Indo-European, early phylogenetic studies indicated a date of 7000–6500 BCE for the protolanguage (Gray & Atkinson 2003 and Bouckaert et al. 2012). This supported the farming model of Indo-European population spread, which assumes relatively slow expansion from Anatolia (Renfrew 1987, 1999, 2000, 2001, 2003), against the pastoralist model, which posits a more rapid expansion from the Pontic-Caspian steppes beginning around 4500–4000 BCE (Mallory 1989, Mallory and Adams 2006, Anthony 2007, Anthony and Ringe 2015). Linguistics favors the pastoralist model and a more northerly steppe homeland by arguments from subgrouping (Darden 2001, Anthony 2007) and by evidence for a rich reconstructible IE vocabulary of wheeled vehicles and animal domestication, and for early contacts in the north between Indo-European and Uralic (Carpelan, Parpola & Koskikallio 2001). The phylogenetic findings were vigorously chellenged (Häkkinen 2012b, Pereltsvaig & Lewis 2015, Ringe 2022). More recently Heggarty et al. 2023 proposed a hybrid hypothesis that posits multiple origins, which again was rejected on archeological and linguistic grounds by Kroonen and Kristiansen (2023), and on paleogenetic grounds by Lazaridis et al. 2024.

A methodologically significant study by Chang et al. 2015 showed that factoring in the known ancestry relations, the observed rates of change, and the convergence of lexical traits (homoplasy) reconciles the phylogenetic findings with the steppe hypothesis. By the same token, it reveals that without prior knowledge of those confounds, currently available phylogenetic methods do not yield accurate timelines, though work on remedying the problem is underway (Maurits et al. 2020). In any case, the steppe hypothesis is well established by now (Lazaridis et al. 2022). The debate around it has raised and clarified the issue of reconciling outcomes from phylogenetic methods with genetics, archeology, and historical linguistics (see Drinka 2013, 2022 for Indo-European, and Miceli & Bowern 2023 for Australian).[6]

1.3 Language contact

The study of language contact has blossomed into a vast and diverse field, much of it directly relevant to diachrony, well represented in handbooks (Darquennes 2019, Hickey 2020, Grant 2020, Adamou & Matras 2021) and surveyed by Joseph 2022 and Hawkins & Filipović 2024.

Thanks to advances in archeology, geochemical fingerprinting, and paleogenetics (Heggarty, this volume, Pakendorf, this volume) prehistoric population movements are becoming better understood, putting contact-based explanations for language change on a firmer footing. Substratum and superstratum hypotheses, long considered a disreputable last resort (Lass 1997, Honti 2007), are being advanced more confidently (Matras & Sakel 2007, Gvozdanović 2012, Güldemann 2008, 2018, Lucas, this volume). Campbell (1997, Ch. 9) identifies 21 linguistic areas in the Americas

[6]Surveys of statistical and computational phylogenetic methods in historical linguistics: Nichols & Warnow 2008, Kessler 2015, Bowern 2018, Jäger 2019, Greenhill, Heggarty & Gray 2020, Ringe 2022.

alone; extensive areal contact relations have shaped the linguistic landscape in South Asia (Masica 1976), Southeast Asia (Enfield 2005, 2017), the Balkans (Friedman 2007, 2017, Friedman and Joseph 2017), Amazonia (Aikhenvald 2002, Epps & Michael 2017), New Guinea (Ross 2017) and elsewhere (see Aikhenvald & Dixon 2006, Hickey 2017). Even the possibility of "excavating" entire layers of lost prehistoric languages through their substratum effects in attested languages has been explored for India (Witzel 1999, Blench 2023) and Europe (Salmons 1992, Schrijver 2001, Aikio 2004, 2006, Stifter 2010, Urban 2019, 2023).

Phonological contact effects come predominantly from substratum languages (languages whose speakers have switched to a dominant language). Schrijver 2011 argues that the High German Consonant Shift in the Rhineland is "the result of speakers of Gallo-Romance switching to Germanic and replacing Germanic aspirated voiceless plosives by voiceless affricates *but only in the phonetic positions in which these affricates occurred in Gallo-Romance"* (p. 243), and that Northwest Germanic phonology was affected by a Saami substratum.[7] Fennists are increasingly inclined to accept Posti's old theory that certain Proto-Finnic sound changes were caused by contact with Baltic and Germanic (Kallio 2000, cf. Aikio 2006).[8]

Substratum languages can not only be the source of borrowed features, but also the cause of retention of conservative features. For example, the quantitative contrasts of Germanic were preserved in Fenno-Swedish under Finnish influence (Kiparsky 2008), and in medieval Swedish and Norwegian in those areas where Saami was spoken, a language with a similar quantitative system. Contact with Saami and Finnish, which themselves have no pitch accents, may even have contributed to retaining the quantitative system that was the precursor of the original Scandinavian two-peak pitch accent systems (Kiparsky 2012b) — a more unusual role for contact in tonogenesis than the one that is familiar from Southeast Asia and elsewhere.

Positing contact-induced change has become more respectable in syntax and semantics as well. Western Uralic innovations such as finite *that*- and *Wh*-clauses, SVO word order, and prepositions are very likely due to contact with Indo-European; North Russian syntax in turn has a Western Uralic substratum. Kroch, Taylor, and Ringe 1995 attribute basic word-order changes in early English to Scandinavian influence on Northern dialects. Filppula 2013 summarizes evidence for the Celtic source of syntactic innovations such as *it*-clefting. Filppula & Klemola 2020 provide a concise review of recent research on external influences on English.

Large-scale persistent contact can even change the whole typology of a language. Ross (1996, 2001, 2007) has described cases of such METATYPY, most impressively the massive structural borrowing by Takia (Oceanic) from Waskia (Papuan). Stilo 2004 treats Iranian as a "buffer zone" of Arabic and Turkic traits imposed on an Indo-European base.

Since Thomason & Kaufman (1988: 215-22), the Greek spoken in Asia Minor has been widely cited as an instance of the most intensive degree of contact, resulting in metatypy. The influence of the speech of the Turkish-speaking majority was strongest in Cappadocia, where Greek was already

[7]Schrijver's (2009) proposes to explain several sound changes of English on the basis of a Celtic substrate, curiously enough of the Irish rather than British Celtic type, though Laker 2018 demurs. An even more radical rethinking of Old English historical phonology English is Versloot 2021.

[8]This would be an unusual case of superstratum influence in phonology (the opposite of the one mooted by Schrijver). But it might be understood in the context of the considerable mobility now revealed by the archeological record (Sjögren et al. 2020) and by the documented practice of making the elite of client populations send children to be raised by the patrons as hostages (**geislo*-, OIcel. *gīsl*, cf. OIr. *giall*, Finnish *kihla*), eventually returning as fully acculturated speakers of the dominant language. Moreover, there is population-genetic support for prehistoric language shifts from Germanic to Finnic (Sajantila & Pääbo 1995).

on the verge of extinction.[9] Noun morphology was refurbished in agglutinative style, with separate plural and case endings (Janse 2009), and the syntax acquired postpositions, final auxiliaries, and even the option of a final complementizer borrowed from Turkish (Sampanis 2023). Interestingly, though, these borrowings were prefigured by earlier endogenous features: sound changes had already invited agglutinative noun inflection by causing reanalysis of the stem-suffix boundary (Janse 2019), and the nucleus of head-final auxiliaries was a biclausal construction of native origin where verb-finality by focus movement had long been an option (Neocleous & Sitaridou 2022, Sitaridou 2022). It seems that the Cappadocian changes were the result of a complex interplay of causes, first enabled by internal developments and then triggered by intensive language contact and language attrition.[10] Even in this bilingual contact setting, "data from the source language can only trigger change if they are to some extent compatible with a structure which already exists in the recipient" (Sitaridou 2022: 39). Where Turkish provided no model, or when the model was incompatible with Cappadocian, nothing happened. The tense/mood and person/number portmanteaux in the verb morphology were not unpacked. Articles remained prenominal, since Turkish does not have any (assuming *bir* 'one' is a numeral). The result was a dialect with largely agglutinative nominal morphology but largely unchanged verb morphology, head-final PPs and TPs, head-initial VPs and NPs, and CPs with initial native complementizers and a new final complementizer *dei* (from Turkish *deyi*). Even in its terminal state Cappadocian preserved the archaic medieval clitic system and syntactic features that were lost in most dialects and the standard language (Condoravdi and Kiparsky 2004). Cappadocian remained a dialect of Greek; it never really lived up to its reputation among linguists as a "Turkish–Greek hybrid" (McWhorter 2018:124).

Another remarkable case is Mednyj Aleut. It has mostly Aleut vocabulary, derivational morphology, and noun inflection, with Russian verb inflection, negation, and sentential complementation. According to Chlenov 2022, it originated among Russian-speaking former inhabitants of the Kuril Islands, predominantly Kodiak Eskimos, with perhaps several Ainu and Aleuts, who, after suffering eleven years of miserable exile in Kamchatka, were resettled in 1888 to Medny (Copper) Island, where the existing dominant population spoke Aleut. Their interaction resulted in a creole with a Russian substrate and an Aleut lexifier, which was soon adopted as the vernacular on the island. So the unexpected distribution of Russian and Aleut elements in the creole arose because Russian was the "indigenous" substrate language and Aleut the lexifier.

The extent and nature of contact-induced change also depends on demographic factors. Languages spoken over a large area by many speakers are thought to be particularly prone to simplification.[11] And within a language, it is often the most widespread variety, such as Mandarin Chinese, standard Persian, and Malay, that eliminates some of the complexity retained in its more confined sister languages.[12] Large heterogeneous communities may have a larger proportion of adult L2 and heritage speakers, who introduce simplifications by imperfect acquisition, and these can moreover spread more easily in such languages because of their reduced function of marking social identity.

[9]Dawkins (1916) reports that in Ferték the Greek men already spoke Turkish with each other, but still understood the dialect (though "not very freely"), and at Ulaghátsh even women were talking Turkish to their children. The more viable Asia Minor dialects of Greek were threatened not so much by Turkish as by standard Greek, which for the most part replaced them in the communities that were resettled in Greece after 1922.

[10]On language attrition and death, see Simpson, this volume, Bousquette & Putnam 2019, Bowern 2022, Mooney 2024.

[11]Thomason & Kaufman 1988, McWhorter 2007, Lupyan & Dale 2010, Trudgill 2011, Montrul 2022, Berdicevskis & Semenuks 2022, Kauhanen, Einhaus, & Walkden 2023, Wichmann, this volume. Doubts: Raviv, de Heer Kloots & Meyer 2021, de Smet, Rosseel, & Van de Welde 2022, Shcherbakova et al. 2023.

[12]But Owens 2023 (Ch.10, 11) finds that standard Arabic's "core morphosyntactic categories showed no change whatsoever".

Ross 2003 distinguishes three sociolinguistic/demographic types of speech communities (closed, open tightknit, open looseknit) which differ in the kinds of contact-induced and endogenous linguistic change they typically undergo and how likely they are to result in language shift (see also Heine & Kuteva 2005, Trudgill 2011, Winford 2013, Donohue 2015, and Greenhill, this volume).

Linguistic complexity figures in many theories of language acquisition, use, and change. But there is no consensus on how to define, quantify, and measure it. The consensus is that languages do differ significantly in complexity, contrary to an earlier myth, though with obvious trade-offs in complexity between components of a grammar. It is also clear that complexity in language use involves a trade-off between the amount of storage space and the time and effort expended on computation. Recent works have investigated complexity mostly in morphology (Dahl 2004, Miestamo, Sinnemäki & Karlsson 2008, Sampson, Gil & Trudgill 2009, Miller 2012, Baerman et al. 2015, Mithun 2020 and other articles in Arkadiev & Gardani 2020, and Hawkins & Filipović 2024.) Polinsky, Putnam & Salmons (forthcoming) review a range of alternatives and conclude that complexity (and change) resides mainly at the syntax/morphology and discourse/syntax interfaces (Catasso, Bastiani & Coniglio 2022).

For purposes of understanding analogical change and creolization we need a concept of *arbitrary* ("ornamental") complexity, not just richness of available structure or of expressible content. OT has made available a promising new metric introduced by Riggle (2010) that is inspired by work on variation (Anttila 1997, 2007). The *r(anking)-volume* of a language *l* under *k* constraints is the number of rankings that generate *l*, divided by *k!*. It is essentially a measure of the probability of a language under a given constraint system. *r*-volume turns out to be a good predictor of the direction of change, especially of long-term drift, and it is consistent with a formal learning theory according to which the learner prefers the most probable language consistent with previously encountered data.

2 Mechanisms and trajectories: how languages change

This section surveys the basic empirical landscape of interest to the working historical linguist at the ground level, leaving some theoretical issues for sections 3 and 4.

2.1 Language contact

2.1.1 Contact-induced change

Some items are more likely to be borrowed than others, depending on their category and place in the system (Curnow 2001, Aikhenvald 2006, Matras 2009, Gardani, Arkadiev & Amiridze 2015). This is important to know in assessing the evidence for genetic relationships. Comparativists value shared irregularities and exceptions as reliable indicators of common descent, for they are relatively rarely borrowed. Loanwords, on the other hand, are the most frequent type of borrowed item. Languages may be unreceptive to loanwords because of structural incompatibility or for sociolinguistic/ideological reasons. Bound morphemes are more rarely borrowed (Johanson & Robbeets 2012) — derivation more often than inflection (Gardani 2008), and number more often than case (Gardani 2012). The reason derivational morphology appears to be comparatively easily borrowed may be simply that it can be imported through loan vocabulary that contains it, and can then spread from there into the native layer of word formation. This is not strictly speaking borrowing of morphemes, of course. Dozens of suffixes such as *-ess, -ee, -esque, -ette, -oid, -nik* that have come into English with loanwords from Romance and other languages are now productively added to native words. Hindi-Urdu extends the suffix *-dān* 'container' from its Persian loans to native words, e.g. *pīk-dān* 'spittoon'. Among grammatical markers, it is naturally the ones closer

to the stem, such as number and gender, that piggy-back on loanwords in this way. The plural Persian (ultimately Arabic) ending *-āt* has been nativized in Urdu, so that it can now be added even to words of Indic origin, e.g. *janglāt* 'forests'. Case morphemes, on the other hand, are normally imported only by bilingual code-switchers in more intimate contact settings.[13]

2.1.2 Loan phonology

The stratified morphology-phonology association posited in Lexical Phonology and Morphology and Stratal OT predicts a corresponding borrowing hierarchy for phonology. Much of English stem-level (morpho)phonology has been smuggled into English in Romance loanwords. The Romance stress rule penetrated even the native vocabulary in Early Modern English (Dresher & Lahiri 2005, Dresher 2013). Finnish, with fixed word-initial stress, has a productive system of quantitative alternations that reflect the donor languages' stress alternations, as in *politiikka* 'politics', *poliitikko* 'politician', *poliittinen* 'political' (Austerlitz 1965). The introduction of such phonological contraband with loanwords is more common than borrowing of low-level (word-level and postlexical) phonology, which typically occurs in a substratum situation.

The borrowability of an item depends not only on the contact situation but also on the item's place in the linguistic system, its regularity, productivity, and its lexical or postlexical status. For this reason contact hypotheses have to be anchored in solid grammatical analyses.

Loanword adaptation is a balancing act between PHONETIC APPROXIMATION and PHONOLOGICAL/MORPHOLOGICAL INTEGRATION.[14] In order to preserve as much as possible of a loanword's phonological content, phonotactically difficult sequences are dealt with preferentially by epenthesis rather than deletion, unless epenthesis would require additional repairs, in which case deletion is resorted to (Paradis & LaCharité 1997). For example, Finnish preserves word-final consonants by epenthesis, but deletes all but the innermost consonant in initial clusters, e.g. Swedish *skruv* [skrʉ:v] 'screw' → *ruuvi*. The reason is that epenthesis into initial clusters would produce either exceptional non-initial stress (**sekrúuvi, *eskerúuvi*) or, if the stress were moved, a further distortion of the original's phonological content (**sékruuvi, *éskeruuvi*). The color of the epenthetic vowel may either copy a neighboring vowel (usually high or front) or consonant (usually coronal and labial) or be determined by default, as in the case of Finnish *-i* (Uffmann 2012).

In time, loanwords are integrated by making their stems inflectable and morphophonologically regular. In the earliest literary Finnish, foreign words ending in consonants were usually left unchanged, or adopted with various added final vowels, but the modern language generally nativizes them with final *-i*, even when they end in coronals, which are licit word-final consonants in the native vocabulary: *Japani* 'Japan', *tunneli* 'tunnel', *Inkeri* 'Inger'. Although **Japan, *tunnel, *Inger* are pronouncable (cf. the native *hapan* 'sour', *kannel* 'Finnish harp', *penger* 'ledge', 'embankment'), -V stems are preferred in nativization because they are not subject to the morphophonological alternations of -C stems, such as consonant gradation, and in any case inflectable stems arguably all end in a vowel. Polysyllabic verb stems are usually nativized by substituting a Finnish suffix for the foreign one, e.g. *-oi* for Swedish *-era* (English *-ize, -ate*), e.g. *standard-is-oi-* from Swedish *standard-is-era-* 'standardize', and more recently *standard-oi-*. Because /-oi-/ cannot go on a monosyllabic root, verbs like *lynch* instead get the native suffix /-at-/, with final stops underlyingly geminated and degeminated by consonant gradation if the following syllable

[13] Under exceptional sociolinguistic situations, two languages can become completely intertwined, like chimeras in biology. Michif (Cree verbs and French nouns) was spoken by descendants of native American women married to French fur traders (Bakker 1997).

[14] Cf. LaCharité & Paradis 2005, Kang 2010a, 2010b, Uffmann 2015.

is closed: /lynkk-at-taK/ *lynkata* (inf.), /lynkk-at-V/ *lynkkaa* (3.Sg present), /lynkk-at-i/ *lynkkasi* (3.Sg past).[15] Even voiced stops follow the same pattern, though geminate stops do not exist in the native vocabulary, as in 'dub' /dubb-at-taK/ *dubata*, /dubb-at-V/ *dubbaa*, /dubb-at-i/ *dubbasi*.

The closer the contact, the more systematic the rendering becomes, and the more morphophonology and morphology overrides simple phonetic similarity. The way in which borrowed items are adopted can therefore provide clues to the date and degree of contact and layering of loanwords (Haspelmath & Tadmor 2009, Wohlgemuth 2009, Shaw & de Smet 2022). For example, early Germanic loanwords neutralized voicing (Finnish has no voiced stops), while later ones transposed the voicing contrast into the Finnish gemination contrast, e.g. /d/ → /t/, /t/ → /tt/ (Steinitz 1964).

Another ingenious pattern of phoneme substitutions which reveals extensive contact is seen in the adaptation of foreign /f/ in Finnish. Depending on the phonological context it is rendered as:[16]

(1)
1. *hv* intervocalically within a foot: *kaffe* → *kahvi* "coffee", *biff* → *pihvi* "steak", *soffa* → *sohva* "sofa", *giráff* → *kirahvi* "giraffe".
2. *p* before *s*: *tofs* → *tupsu* 'tuft'
3. *h* before other consonants: *saffran* → *sahrami* "saffron", *saft* → *sahti* "table beer".
4. *v* elsewhere: *(1)* word- and foot-initially: *fiská:l* → *viskaali* "prosecutor", *färg* → *väri* "color", *unifórm* → *únivòrmu* "uniform", *ingefä́:ra* → *ínkivàäri* "ginger", and *(2)* after a consonant: *konfékt* → *konvehti* "candy", *asfalt* → *asvaltti* "asphalt".

Heinämäki (1976) noted that *f*'s basic replacement is *hv*, which unpacks its features into two adjacent segments, and that its other replacements are regular accommodations of *hv* to the phonotactic constraints of Finnish. These exclude tautosyllabic clusters and foot-final **-h*. So, with the nativized stress in place and final codas supported by an epenthetic vowel, *hv* is syllabified as a coda and onset to the extent that phonotactics allows, and any unsyllabifiable consonant is dropped: *konhvehti*, *sahvrami*, *unihvormu*. *-fs-* cannot be accommodated as **vs* or as **hs* since neither cluster is permissible. This does not mean that *hv* was first added in full and later reduced to accommodate the syllable structure requirements. Rather, *hv* is an abstract target that the language approximates as best it can.

In cases of conflict, borrowing seems to privilege salient features over less salient ones. Because Mandarin has only one phonemic low vowel /a/, pronounced [æ] before /n/ and [ɑ] before /ŋ/, it cannot render the English four-way contrast /æŋ/ : æn/ : /ɑŋ/ : ɑn/. By a sort of "reverse engineering", Mandarin gives up the /n/ : /ŋ/ contrast in loanwords in order to maintain the more salient [æ] : [ɑ] contrast, even though it is allophonic in Mandarin (Hsieh, Kenstowicz, & Mou 2009).

(2)
1. *Dan:Don* → [dæn]:[dɑŋ]
2. *sang:song* → [sæn]:[sɑŋ]
3. *ban:bang* → [bæn]:[bæn]

[15] Note also the lack of vowel harmony ofter roots in *y, ö*, which is regular in this type.

[16] I give Swedish source words, in standard orthography except that vowel length and non-initial stress are marked.

2.1.3 Creole origins

A wealth of research on the nature and variety of pidgin and creole languages has as yet produced few consensual generalizations about them (Bakker 2017, Jourdan 2021). The questions that are most immediately relevant to language change are how creoles originate and what common typological properties they might have as a result of these origins, epitomized in the contentious issue of "creole exceptionalism".

Obviously the human language faculty is the same everywhere. But some creolists argue that creoles are a categorically distinct *type* of language, with characteristic features due to their origins as pidgins by "broken" transmission. Others hold that creoles are just languages, and that they arise and are transmitted by ordinary first and second language acquisition in language contact situations.

A prominent argument for the pidgin origin of creoles is that creoles have properties that do not come from either the lexifier language nor the substrate, and therefore must originate in the acquisition process itself. Its extreme form is Bickerton's bioprogram hypothesis, according to which *all* structural properties of creole languages are due to unmarked parameter settings supplied by Universal Grammar. But contrary to what the bioprogram hypothesis predicts, creole languages vary widely and reflect many features of their lexifier and substrate languages. There is no set of traits, indeed not even a single trait, that is shared by all creoles.

Although the bioprogram hypothesis is now discredited for this reason, an intriguing argument for it is worth recalling. Berbice Dutch is strictly VO, like almost all creoles, even though both its lexifier Dutch and its substrate Kalaḅarị Ijo are OV — a seeming confirmation of the bioprogram under Kayne's (1994) hypothesis that VO is the universal base order. Zeijlstra & Godard 2017 however argue that Berbice VO results from Ijo L2 learners' reanalysis of Dutch V2 in finite main clauses, perhaps reinforced by object extraposition. VO is also harmonic with head-initial CP, DP, and PP in Dutch. Still, it is not clear *why* Ijo learners would have misanalyzed Dutch as VO, when even two-year old native Dutch learners acquire OV as the basic order, often as the *only* order. Moreover, Dutch infinitive and participle VPs, which are uniformly OV, would have been particularly common in the reduced bare infinitive clauses of L2 speakers that Ijo learners typically encountered. So while the Berbice data is inconclusive, the claim could still be confirmed or refuted by a creole formed by two rigidly OV languages, if any were found.

The weaker notion of a creole *prototype* may still be viable, however. McWhorter (2007, 2018) claims that all creoles in their initial state lack paradigmatic case and agreement inflection, lexically distinctive tone, and semantically opaque morphology — what he deems "ornamental" rather than communicatively necessary features, which perhaps are hard to acquire (Good 2012). More positively phrased, the claim would be that any language which encodes grammatical relations only by word order, and has a vanilla segmental phonology without tone, and builds vocabulary only by semantically transparent means (usually compounding and reduplication) is a creole, or at least once was one.[17] Bakker et al. (2017) defined a creole prototype by assembling 94 typical features of creole languages, and doing a phylogenetic network analysis. They found that every creole they examined has more of those features, in aggregate, than any non-creole does. This finding justifies a creole prototype, in the sense that every creole is closer to the prototype

[17]Being natural languages, creoles may diverge from the prototype by ordinary language change, and eventually many do. They are then still *called* creoles if the traditional sociohistorical definition is prioritized over the controversial prototype definition. For example, Nubi is historically a "radical creole" which has acquired a "fairly robust" morphology due to a diglossic relation with Arabic (similar to that of Haitian Creole with French), and could reasonably be called a dialect of Arabic (Owens 2014).

than any non-creole. Also, to the extent that the prototype features are explainable as a result of pidginization, it supports the hypothesis that creoles pass through a pidgin stage.

Critics of creole exceptionalism object that the prior selection of structural features considered typical of creoles creates an ascertainment bias (Aboh & DeGraff 2016: 428); it just "gives back what the field holds to be true" (Meakins 2022). But this seems merely a contentious way of conceding that the study empirically *confirms* what the field holds to be true, at least if creoles are independently defined by sociohistorical criteria. A random unnatural class could not be defined in this manner.

The conterclaim to the hypothesis that creoles originate as pidgins, or by any sort of radical break in transmission, is that they arise by ordinary language acquisition when learners acquire a target language based on a mixed input from non-native L2 speakers of it (DeGraff 2001, 2003, Mufwene 2001, Aboh 2015). An argument for it is the absence of evidence for the hypothetical pidgin antecedent in the historical record of many creoles. Still, as long as there is no evidence of its absence it is reasonable to postulate such a stage for all creoles in so far as it explains their characteristic structural properties. Another issue is that a categorical structural distinction between creoles and non-creoles is undermined by intermediate "creoloid" languages (Trudgill 2009: 99) and by "semi-creoles" (McWhorter 2018), such as Afrikaans and even English. But since such languages involve no radical simplification, they need not have a pidgin source and can be assumed to have arisen by ordinary language contact.

The idea that creoles are "simple" has been called a residue of racist colonial discourse, and the creole prototype and the prototype features labeled "discursive constructs" which "have perpetuated the normative Western European gaze, whether it is the conscious agenda of creolists or not" (Meakins 2022). This objection is probably based on the misconception that simple grammars are somehow defective. McWhorter and others actually claim that the simplicity of creoles is a desirable absence of "junk" and "baroque profusions", and they celebrate creoles' renewal of expressive resources by grammaticalization.

2.2 Sound change

2.2.1 The Neogrammarian Hypothesis

All empirical and theoretical work on historical phonology must come to grips with the questions in (3).[18]

(3)
1. *The constraints problem*: are sound changes always natural, or can they be arbitrary? Is the direction of sound change predictable?
2. *The regularity problem*: Is sound change always regular, or can it be sporadic?
3. *The implementation problem*: is sound change abrupt or gradual? What is the role of lexical frequency in sound change?

To be convincing, the sound changes posited in historical analyses should be natural, which is not always easy to achieve (Blust 2005, Blevins 2007, 2008b). Naturalness must be grounded in typology, phonetics, and phonology (Kümmel 2015). Naturalness has been a central theoretical concern of Natural Phonology (Donegan & Nathan 2015), later pursued also in formal generative phonology by markedness, feature geometry, and models of the phonetics–phonology interface.

[18] 'Sound change' is here used in its technical sense, not in the pretheoretical sense "change involving sounds" (see the chapters by Garrett and Hamann in this volume.

Interest in the typology of phonological processes grew further with Optimality Theory, whose commitment to the perceptual and articulatory grounding of constraints and to intrinsic typological predictions attracted many phonologists to phonetic issues under the heading of Laboratory Phonology. Recent empirical and theoretical work has dealt with consonant fortition and lenition (Cho 1999, Cser 2003, Barnes 2006, Smith 2005, Kümmel 2007, Bybee & Easterday 2019), vowel shifts, harmony, and metaphony (Hajek 1997, Labov 1994 & Walker 2011, van der Hulst 2018, van der Hulst & Ritter 2024), consonant harmony (Hansson 2010), stress (Lahiri, Riad & Jacobs 1999, Lahiri 2015, Ladd & Arvaniti 2023), tonogenesis (Hombert, Ohala, & Ewan 1979, Thurgood 2002, 2020, Riad 2003, Ratliff 2015, Michaud & Sands 2020), metathesis (Blevins & Garrett 2004), consonant epenthesis (Blevins 2008b). Overviews: Blevins 2008c, Cser 2015, Yu 2020.

The other main reality check on sound changes is that they should be regular. An even stronger requirement, the NEOGRAMMARIAN HYPOTHESIS, is that sound changes are exceptionless, and conditioned only phonologically. The best argument for the Neogrammarian Hypothesis is that phonemes don't split spontaneously. Rather, new contrasts arise when the conditioning environment of allophones is obscured by other sound changes (SECONDARY SPLIT). As Bloomfield noted, if the hypothesis were false, then languages would have incoherent phonological inventories, littered with stray sounds and clusters left over from sporadic or non-phonetically conditioned sound changes at various stages of their history, e.g. laryngeals, pitch contrasts, [ç], [β], [b^h], [œ], /d^hg^{wh}-/, /mn-/, /kn-/ in English.[19]

The Neogrammarian Hypothesis nevertheless continues to be questioned on the basis of two sorts of phenomena. The first is based on variable phonetic realization. The second is based on word by word phoneme replacement. We take them up in turn.

2.2.2 Phonetic processes

High-frequency words tend to have reduced pronunciations (Jurafsky et al. 2002, Gahl et al. 2012; Kahn & Arnold 2012). This has been taken as evidence that sound change proceeds faster in frequent words, and that lexical representations encode phonetic detail, which diffuses through the vocabulary (Pierrehumbert 2002, Bybee 2012, Kapatsinski 2018). But the same frequency effects are observed in stable variation as well, where there is no ongoing change (Sanker 2022). For example, vowel reduction in English is favored in high-frequency lexical items (Fidelholtz 1975), even though vowel reduction is no longer a sound change but a synchronic rule of the language. Bell et al. 2003 showed that frequent function words are more likely to be shorter and more reduced in natural speech. Experimental studies reveal the same effect (Pluymaekers, Ernestus, & Baayen 2005).

That frequency effects are intrinsic to variation in speech is also true of fortition, which is not favored in high-frequency words, but on the contrary in rare words. Experimental evidence shows fortition and hyperarticulation of low-frequency words independently of any sound change in progress (Zhao & Jurafsky 2009, on Chinese tone realization).[20] This study also shows that hyperarticulation increases with the level of ambient noise. The conclusion is that frequency effects do not arise through different rates of sound change, but are an intrinsic feature of speakers' frequency-sensitive productions in language use.

The contrary behavior of lenition and fortition has a rather natural speaker-based explanation,

[19]Irregular sound developments can arise through spelling pronunciations (Sloos 2013), effects of word associations, and taboos (Newman 1996).

[20]The observation that unfamiliar words tend to be hyperarticulated antedates the experimental literature; recall Hockett's contrast *We have several Thais* vs. *We have several ties*.

namely that speakers can afford reduced pronunciations of frequent words because they are more predictable, and resort to clearer pronunciations of rarer words when there is a risk of being misunderstood (Jurafsky et al. 2001). That is why high-frequency words *appear* to lead in historical lenition processes, and they *appear* to lag behind in historical fortition processes.[21] In reality the variation pattern governed by frequency and other factors remains constant as the change advances across the board (Fruehwald, Gress, & Wallenberg 2013). Thus there is no contradiction between the frequency effects observed in language use and the Neogrammarian Hypothesis, the Constant Rate Hypothesis, and the categorical lexical representations for which theoretical linguistics provides evidence.

Bybee (2007) argues on the basis of data like (4) that the syncope of unstressed medial vowels is a sound change that spreads through the lexicon of English, frequent words first:

(4)

High frequency word:	*every*	[∅]
Mid frequency word:	*memory*	[∅ ∼ ə]
Low frequency word:	*mammary*	[ə]

Phillips (2006: 97-98) also relates the frequency of syncope to word frequency, so that *opera, salary, camera, memory, history* tend to syncopate more often than the relatively less frequent *broccoli, gasoline, grocery, surgery, chocolate*.

But these data have nothing to do with sound change. Syncope was an Old English sound change, and none of the cited words underwent it. *Every* is from OE *æfre ylc*, not **æfere ylc*, and the others were not yet in the language: *memory* is a 13th c. borrowing from Anglo-Norman, *mammary* is a 17th c. learned borrowing from Latin, and there was no *opera, broccoli, gasoline* or *chocolate* in Old English. The Old English sound change was phonologically conditioned by stress and syllable weight, and conformed perfectly to the regularity hypothesis (Sievers-Brunner 1965: 158–159, Campbell 1983). It resulted in a productive variable synchronic syncope process, which has existed in the grammar for a millennium.

The words in which syncope has become fully established are not necessarily the most frequent ones. Rather, they are the ones where morphology, to some extent supported by spelling and phonotactics, continue to provide a cue for the presence of an underlying medial vowel. So *marshal, parchment, poultry, butler, chaplain, apron, dropsy, chimney, remnant, damsel, partner, captain, laundry*, *fancy* and *curtsy* (from *fantasy* and *courtesy*), are now simply underlying disyllables, whereas syncope remains synchronically operative in *cursory, nursery, operative, summary, temporal, cidery, buttery, cobblery, clownery, cookery, buffalo, cabinet*.

Phonetic realization is sensitive not only to frequency, but also to other factors. Syncope is inhibited when it causes a stress clash, e.g. *gén'rative* vs. *géneràtion*, when it produces disfavored clusters that involve gestural overlap, such as *-nm-* in *enemy, economy* vs. *emery, refectory* (trumping frequency), before word-level as in *centering* (vs. *central*). The variation is also sensitive to morphological and phonological factors, style, social class, gender, etc. All this is entirely compatible with the Neogrammarian Hypothesis. But structured variation in phonetic realization is not in itself sound change; it can be stable for centuries and even millennia, or become phonologized.

The expected opposite frequency effects in fortition processes are rarely documented, but Hay et al. (2015) have found a small but robust one in the New Zealand vowel shift. In this unusual

[21] A different attempt to resolve the contradiction is put forward by Todd et al. 2019.

chain shift, where the short vowels are apparently tense, they are raised more in low-frequency words at all stages, just as our proposal predicts.

I conclude that frequency-sensitive phonetic realization does not justify specifying phonetic detail in lexical representations, and it is consistent with regular sound change. In fact, the *predictability* of the variation patterns actually supports the Neogrammarian Hypothesis. Sociolinguistically aware field work on ongoing sound change (Labov, Rosenfelder & Fruehwald 2013) supports this conclusion.

2.3 Analogical change

The neogrammarians recognized three types of language change: regular sound change, borrowing, and — the most problematic of them — analogy, which they modeled by four-part proportions of the form A : B = C : X, where A, B, C are existing memorized utterances (possibly themselves generated by analogy), and X is new. The proportions served them as proxies for grammatical structure, and were assumed to be the engine of langage acquisition, perception, and production. For linguistic theories that posit richer grammatical structure, the neogrammarian view of analogical change makes for a worrisome discrepancy between diachrony and synchrony, which becomes an issue not just for historical linguistics but for general linguistics.

Unfortunately the discussion of that issue in the 1970s took off on the wrong foot because of a terminological ambiguity. The term *analogy* refers both to a type of change, and to the four-part proportional schema by which it is commonly represented and theorized. Criticism of the theory was mistaken for denial of the phenomenon. It was as if an account of how the earth's rotation causes the apparent movement of the sun were portrayed as an "attack on sunrise".[22] Of course it was was not the existence of analogical change that was questioned, but the neogrammarian conception of it. The topic was certainly never "banned" or declared "illegitimate", but on the contrary raised afresh in the footsteps of Kuryłowicz (1949).

The roots of the discussion go back to the neogrammarians, who struggled with fitting non-proportional but analogy-like phenomena such as folk etymology, blends, contamination, and leveling into their typology of change. Research in the 20th century added grammaticalization and lexical diffusion, which seem even more out of place in the neogrammarian triad. The question whether they are independent "mechanisms", or related to the already established ones, remains unresolved.

Fertig (2013, 2015, 2016, 2020) distinguishes two types of analogical innovations according to the mental processes that may be assumed to cause them: (a) "forms produced by speakers on the basis of patterns they have discerned across other forms belonging to the same system", which can be modeled as proportional analogy, and (b) "forms whose phonetic makeup is influenced by forms that are (or are perceived to be) semantically or grammatically related to them", due to non-proportional analogy such as folk etymology, blends, and contamination. It is fair to ask whether a coherent concept should have a disjunctive definition, and how the armchair psycholinguistics to which it appeals can be spelled out and empirically tested.

Kiparsky (1974 et seq.) also recognizes that analogical changes are formally diverse. But he seeks to unify them in terms of their grammatical motivation, defined in linguistic terms without any commitment to particular mental processes. Historical linguists know from experience that analogical changes render the vocabulary and structure of a language more perspicuous or regular

[22] Mattiello (2017) still asserts that I (along with others) "expressly banned" the topic of analogy — in an article that was *about* analogy and even bore the title "Remarks on analogical change" (1974)!

(Cowgill 1967:28). The idea is to promote this insight from a guiding methodological principle to the defining and motivating property of analogical change, namely that analogy optimizes grammar by reducing arbitrary complexity. The complexity of a language corresponds in principle to the amount of information specified in its complete OT grammar (including lexicon, morphology, syntax, phonology, and semantics) and it is quantifiable in terms of *r*-volume., as outlined in section 1.3. The more constraint rankings converge on a grammar, the more probable and the easier to learn it is.[23] Although the proportional schema then becomes redundant, it remains useful in many ways: as an intuitive visualization of analogical changes, as a heuristic tool, and to avoid commitment to a specific morphemic segmentation.

Let's review some ways in which this grammar-baded approach might contribute to modeling and understanding analogical change. Since bound stems and affixes play a role in grammar, the prediction is that they should play a role in analogical change, contrary to the neogrammarian requirement that the terms of a proportion must be actual utterances, that is, free forms. This is a welcome result, as illustrated by an example that the neogrammarians themselves discussed: the spread of the Latin Gen. Sg. ending *-ī* from the second declension first to the first declension and then to the fourth declension: *familiās* > *familiae* (/familiā-ī/ [familiai]), and *senāt-ūs* > *senāt-ī* (Morpurgo-Davies 1978), see (5).[24]

(5)

	2. decl.	1. decl.	4. decl.
Nom.Sg.	anim-us	familia	senāt-us
Gen.Sg.	anim-ī	familiā-s > familiā-ī	senāt-ūs > senāt-ī

The new analogical genitive *familiae* cannot be derived by a proportion, for the solution to *animus : animī = familia : X* is ill-defined. But since Latin nominals are inflected by adding case endings to stems, the natural analysis is that gen.sg. *-ī* is first generalized from second declension stems (/anim-ī/) to first declension stems (/familiā-s/ → /familiā-ī/), and then further to fourth declension stems (/senāt-ūs/ /senāt-ī/).[25] The analysis now makes it clear that the two changes are just episodes of the spread of gen.sg. *-ī* in nominals, which in turn is part of a much larger process of dismantling the arbitrary distinction between declensions.[26]

Another type of analogical change that speaks for the grammar-based approach, conventionally classified as "contamination", introduces a novel pattern into the language by simplification of a complex alternation and/or by the generalization of an alternation to contexts in which it becomes modified by interaction with previously existing processes. Both are seen in the following example.

[23]That analogical change is optimization does *not* mean that learners, implausibly, "first correctly acquire the target grammar (so they can evaluate its complexity), and then … replace the acquired grammar with a simpler one … despite the fact that some of the speakers in the environment do have such grammars", as Reiss (2003: 150) speciously claims. Actually it is just based on the uncontroversial assumption that learners prefer simpler grammars and that they move from simpler grammars to more complex ones to the extent needed to home in on the target language. Change occurs when this process does not go to completion and some aspect of the target language is never acquired.

[24]The older endings survived in fixed expressions: *-ās* in *pater familiās* 'father of the family', *-ūs* in *senātūs consultum* 'decision of the senate').

[25]We can also assume *-u-*, *-ā-* and *-ū-*stems, with high vowels deleted before *-ī*. The analysis remains the same. Hill (2020) claims that "the only securely established mechanism of analogical change in inflection is replacement of whole word forms by new forms created on the pattern of a preexisting model." He addresses the change *senātūs* > *senātī*, which works proportionally, but not the critical *familiās* > *familiae*.

[26]Bloomfield (1933) likewise noted the role of bound forms in morphology, illustrating it with the 1920s neologism *chorine* "chorus girl", where the otherwise word-based feminine suffix *-ine* is extended from words like *heroine, Pauline* to the bare stem *chor-* of *chorus, choral*, again the generalization of an affix that is not representable by a proportion.

Sanskrit had inherited an ablaut process by which root-final /-am-/ was replaced by /-ā-/ in the weak grade, e.g. pp. /kram-tá/ → **krātá* 'stride'). The synchronically arbitrary *am* ∼ *ā* alternation was simplified to *-am-* ∼ *-ām-*, e.g. /kram-tá/ → **krāmtá* 'stride' (pp.), realized as *krāntá* by place assimilation. The innovation does not extend an existing morphophonological pattern, but modifies it to create a new one, so it cannot be modeled by a four-part proportion. In Fertig's typology, *-ān-* would be a *blend* of *-ā-* and *-am-*, though at an abstract morphophonological level (in the lexical phonology), to which place assimilation apples. From the grammar-based perspective, it is again a reduction of arbitrariness, formally a simplification in that the original process of lengthening the root vowel and deleting the *m* the weak grade has been streamlined to just lengthening. As a process of stem-level phonology, it is automatically accompanied by word-level place assimilation.

The more structure words have, the easier to parse and the more memorable they are, other things being equal. Morphological decomposition is desirable, even if the parts combine non-compositionally or have no meaning at all. So-called folk etymologies are the ultimate manifestations of this analytic imperative. *Cockroach, artichoke, mandrake, penthouse* were borrowed into English from Romance languages as unanalyzable end-stressed simplex words, and reshaped into formal compounds regularly stressed on the first member, in some cases even as "cranberry" compounds with interpretable second members (cf. *roach, choke* 'the heart of an artichoke'). The same thing sometimes happened with words that had opaque affixes, whether native or borrowed, such as *andiron, headlong, tuberose, outrage, mushroom*. *Female*, originally *femélle*, was stress-shifted and reshaped into a "cranberry" compound paired with its antonym *male*. Back-formation removes arbitrary morphological restrictions by making bound stems free: *mixed* was originally an adjective that *looked* like the participle of a bound verb stem *mix*, which then became a regular verb; the verbs *burgle, peddle, sculpt, analyze, obsess* were liberated from agent and action nouns.

From the grammar-based perspective it is immaterial whether the source of such innovations is associative interference in perception and/or analysis (Fertig 2013: 57), production error, wordplay, hypercorrection, or some other "mechanism" or combination thereof. The point is that they take root in the language because they add structure ("relative motivation" in the Saussurian sense), and thereby facilitate retrieval and processing.

The nature of leveling is much contested. Fertig add new evidence showing that it requires no anti-allomorphy or paradigm uniformity constraints (see also Garrett 2008), and argues that it is non-proportional analogy, somwhow akin to contamination and folk etymology.[27]

Fertig (2013: 94) makes the interesting claim that synchronic phonology and regular sound change are in some sense analogy, whereas lexical diffusion, contrary to Schuchardt (1985) and Kiparsky (1995), is not. He does not engage the regularization/accommodation of loanwords (e.g. *garáge* > *gárage*), which in the latter work is also subsumed under analogy.

While the failure of proportional schemas mostly involves undergeneration, they also generate impossible analogical changes. This is not a problem if we just want to use them as a notation for actual analogical changes, but it is a problem if we want to use them as a model or theory of analogical change. For example, in some dialects of English the predicative possessive pronoun forms *yourn, hisn* have arisen by analogy with *mine* as in (6a). But when a possessive form was created for originally indeclinable *it* in the 16th century, it was not **mit* on the analogy of *my* as in (6b), but *its* on the analogy of the nouns.

[27] I do not agree that blends like *smog, brunch, motel, chunnel* are instances of "contamination" or any type of analogical process for that matter (Fertig 2013: 66). They result from a productive prosodic compounding process by which the onset of the first member replaces the onset of the second, (McCarthy & Prince 1993).

(6) a. An actual change: *my : mine = your : X* (X = *yourn*)

b. An impossible change: *I : my = it : X* (X = **mit*)

The reason (6b) is impossible is that analogical innovations are situated within a grammatical system, and a genitive prefix *m-* would break the mold of English, where all inflection is suffixal, and prefixes are syllabic and used only for derivation. The grammar-based theory predicts out of the box that innovations fit the existing grammar. Supplementing proportional schemata with constraints to prevent overgeneration (Kuryłowicz 1949, Wurzel 1989) shifts much of the interesting content of the theory to those constraints. The ones proposed by Kuryłowicz 1949, as well as the natural morphologists' principles of preferred morphological organization (system-congruity, uniformity of inflection classes, avoidance of allomorphy, compositionality, and coincidence of formal marking with morphosemantic markedness proposed by Wurzel 1989, are largely derivable from the grammar-based theory (Kiparsky 2000a).

The biggest headache for the grammar-based approach is that changes that simplify the language at completion can pass through quite messy intermediate stages. For example, the reduction of a complex and arbitrary morphological subsystem of phrasal co-ordination to ordinary compounding passes in Sanskrit through some *even more complicated* intermediate stages before reaching its simple goal (Kiparsky 2010). Such "bumpy rides" challenge the proposal that analogy is an optimizing or regularizing process. Some of them can be explained by undoing the idealization that acquisition is instantaneous, and recognizing that innovating learners may internalize existing forms of the language as exceptions within their new grammar, and that conservative learners may internalize their own "wrong" analogical outputs as exceptions within the non-innovating grammar they eventually acquire. It is virtually inevitable that an integrated subsystem of grammar cannot be dismantled in one fell swoop, but only in minimal steps. To some extent these steps can be reconstructed in Lexical Morphology and Stratal OT by the modular level-ordered organization in which morphology and phonology are interacting subsystems. Change can then be modeled as the promotion of constraints within grammatical subsystems through a series of local optima. Although this works well for many cases of long-term drift which follow a similar "complex → even more complex → simple" path, such as the Sanskrit case just mentioned, there remain recalcitrant cases.

2.3.1 Lexical diffusion

Lexical diffusion in the narrower sense is the word-by-word redistribution of phonemes in the vocabulary (Chen & Wang 1975, Labov 1994: 542). It typically eliminates marked values of marginally contrastive features (Bermúdez-Otero 2007). In that respect, it is arguably a type of optimization (Kiparsky 1995), and like ordinary analogical change, affects low frequency words first because their idiosyncratic properties are less entrenched.[28]

The spread of "diatonic pairs" from nouns such as *tórmènt* and *rébel* (derived from *torménd, rebél*) to new cases, such as *áddìct* from *addíct*, often cited as a case of lexical diffusion, is certainly the analogical extension of an alternation that dates back to Old English prefixed forms (Minkova % Zhou 2022). The spread of accent retraction in *nonderived* nouns like *mustache, garage, massage, cocaine*, which does not extend an alternation, but still regularizes the word's stress pattern, *is* lexical diffusion, which can be *nonproportional* counterpart of the same analogical process. For example, after [məˈstæʃ] is replaced by [ˈmʌsˌtæʃ], its exceptional primary stress need no longer

[28] Some instances of lexical diffusion cited in the literature, however, are not changes at all, but frequency effects on variable synchronic reduction processes as discussed in section 2.2.2, and can be explained the same way.

registered in its lexical entry, which simplifies the word's lexical representation. Like the generalization of accent retraction in deverbal nouns, it removes individual exceptions to the rule that nouns bear main stress on a heavy penult, much as the morphological regularization of *kine* to *cows* removes an individual exception to the plural rule.

Even a regular sound change can produce what *looks* like lexical diffusion. If it results in sounds that already exist in the language and fit into its phonotactics, they can be lexicalized in individual words while the process than introduces them is still variable. For example, if you hear *mashed potatoes* pronounced as *mash' potatoes* due to *-t -t-, -d*-deletion, you may add *mash potatoes* to your vocabulary. This looks superficially like sporadic sound change, or lexical diffusion of *-t-, -d*-deletion. But obviously it is nothing of the sort: *mash potatoes* lexicalizes a reduced pronunciation produced by the variable but across the board process of *-t-, -d*-deletion.

2.4 Grammaticalization and semantic change

Grammaticalization is morphosyntactic and semantic change that is endogenous, but which, unlike analogy, is not based on any pre-existing patterns in the language, and gives rise to new grammatical categories (Narrog & Heine 2011). The innovations can express new functional content, or constitute new formal categories, possibly for old functional content, as when postpositions turn into case endings, or fixed word order replaces morphology as the mark of grammatical relations. I'll refer to the two kinds of grammaticalization as FUNCTIONAL ENRICHMENT and FORMAL RENEWAL, respectively. They often coincide (new form for new function), as when free pronouns turn into pronominal clitics and end up as agreement affixes. It can be seen as a type of analogical change in that it optimizes the grammatical system, but (unlike ordinary analogy) not just by regularizing its existing patterns, but by implementing acquisition- and production-based preferences (Kiparsky 1995). Combinations of analogical change and grammaticalization are common.[29]

Like sound changes and analogical changes, grammaticalization processes have a characteristic directionality: "lexical categories become grammatical and grammatical categories become more grammatical" (Kuryłowicz 1965, Hopper & Traugott 2003:xv). Functional enrichment depletes lexical items of their semantic and interpreted features and eventually reduces them to purely functional elements with only uninterpreted features (Roberts and Roussou 2003, van Gelderen 2011, this volume). Formal renewal results in reduced segmental content and/or tighter prosodic bonding. These generalizations amount to the famous unidirectionality hypothesis. Changes in the reverse direction obviously occur, such as the extension of the genitive suffix *-s* to a clitic in English and continental Scandinavian. Some researchers dispute their relevance to the unidirectionality hypothesis, on the grounds that they are instances of analogical change, in that don't create new categories or constructions but generalize already existing ones (Plank 1995, Kiparsky 2012a). For example, since English and continental Scandinavian have no other nominal case suffixes, but do have clitics, the change of the genitive suffix *-s* to a clitic in them is a morphological regularization; it systematizes the morphology of the language. This is not a mere terminological reclassification but a substantive analysis, which explains why the "degrammaticalizations" take place in English and continental Scandinavian, where genitive is the *only* non-nominaive case in nouns, and not in Icelandic or German, which have a richer nominal case system. Two-case systems usually have accusative rather than genitive as their second case (Malchukov 2015), and the shift of the genitive in English and continental Scandinavian is therefore a typological normalization.

[29] As when adpositions or pronominal clitics are respectively grammaticalized as a second layer of case inflection and agreement in languages that already have one (Donohue 2003).

I conclude that the unidirectionality hypothesis is viable, *pace* Ramat 1992, Harris and Campbell 1995: 336-338, Joseph 2001, Newmeyer 2001, van der Auwera 2002, and Norde 2009; cf. Börjars & Vincent 2011 for discussion), and that the development of the Germanic genitive actually *supports* it, lending credence to Plank's view that grammaticalization is non-exemplar based optimization, while degrammaticalization is always exemplar-based.

Grammaticalization is akin to analogical change in the generalized sense of optimization. While its kinship to analogy has always been recognized, it is not proportional, since by definition it introduces new categories and constructions into a language. Rather, a new structure is projected from existing components by UG rather than by language-specific rules or constraints (Kiparsky:2012b).

That grammaticalizations aligns with pre-existing morphosyntax is demonstrated by Goldstein (2022) with the development of articles in Indo-European.[30] In Goldstein's words: "grammatical change does not happen in a vacuum".

The exciting thing about grammaticalization is that it reveals the language faculty at work. Formal renewal engenders new categories that conform to cross-linguistic generalizations regardless of their source. Complementizers work like complementizers whether they come from prepositions, pronouns, or verbs. Aspects work like aspects whether they come from adverbs, prepositions, or auxiliaries. Functional enrichment follows particular pathways (Heine & Kuteva 2002, Narrog & Heine 2011, Kuteva et al. 2019) which invite semantic and pragmatic explanation (Deo, this volume). In SUBJECTIVIZATION processes, extensively studied by Traugott, deontic modals (such as *will, must*) acquire epistemic uses, as do verbs (*it promises to rain*), and expressions for objective facts become subjective descriptions of beliefs, attitudes, perceptions and evaluations, e.g. *apparently* 'plainly, openly' → 'to all appearances' → 'as far as I can tell', *surely* 'certainly' → 'I should think so', (Traugott 1989; Schwenter & Traugott 2000, Traugott & Dasher 2002, Traugott 2003). The grammaticalization of modality is explored in Sweetser 1990, Bybee et al. 1994 Romaine 1995, Traugott 2006, Breitbarth 2015.

Also remarkable are the pathways to tenses (Nicolle 2012, Deo 2015a). *Go*-type verbs are recruited as intentional/agentive futures, and *come*-type verbs as unintentional/nonagentive futures, both of which may then be bleached into ordinary futures (Hilpert 2008). Another trajectory goes from location to present tense: expressions denoting location are the source for focalized progressives (e.g. Finnish *olin lukemassa kirjaa*, literally 'I was in-reading the book'), which denote a point of time, and therefore are incompatible with stative predicates, and cannot be modified by phrases denoting extent of time (Bertinetto et al. 2000). These become ordinary progressives, as has happened in English. Progressives in turn become imperfectives (Fuchs 2020), and these finally end up as present tenses. The denotation at each stage is a superset of the denotation of the preceding stage (Deo 2009, 2012, 2015b). In a parallel trajectory, resultative markers generalize to markers of perfective aspect, perfect tense, and finally past tense (Bybee, Pagliuca & Perkins 1994; Dahl 1985, 2000, Condoravdi & Deo 2008, Schaden 2012). Each case involves stepwise semantic generalization from richly specified to simple meanings.

The diachrony of argument marking has come under renewed study, with focus on typologically and syntactically interesting aspects such as oblique subjects (Allen 1999, Witzlack-Makarevich & Seržant 2018), differential object marking (Onea & Mardale 2020, Hill & Mardale 2021, Seržant 2021), and valency alternations (Lavidas 2009, Luraghi & Roma 2021), among others.

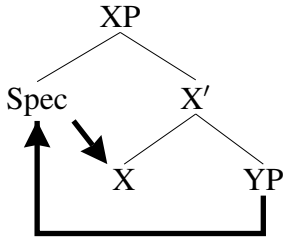
[30] On the rise of definite articles see also de Mulder 2011, Simonenko & Carlier 2020, Flick & Szczepaniak 2020. Indefinite articles: Crisma 2015, Schaden 2020.

A unified explanation for grammaticalization, especially for functional enrichment, has proved a tall order. Several avenues, partly competing, partly addressing different aspects of the phenomenon, are being pursued. *Pragmatic* approaches were prefigured by Meillet's idea that grammaticalization is due to the renewal of the expressiveness of speech forms, which has an intrinsic direction because it is a constant factor in ordinary language use. Eckardt (2006, 2011) sees grammaticalization as a type of reanalysis in which hearers/learners who correctly grasp the intended meaning of an utterance arrive at a novel compositional derivation of it, either by redistributing the semantic content over its constituents, or by reassigning the force of a pragmatic inference of the original state to an overt linguistic element in the innovative state, first by way of conventional implicature, then as semantic content. The scenario seems plausible, but would need to be enhanced with an account of which bits of pragmatic interpretation get semanticized and why, and why grammaticalization is unidirectional.

The *semantic* approach of Condoravdi and Deo (2008, 2014) characterizes the resultative-to-past and progressive-to-present paths as successive stages of semantic generalization. Semantic generalization, alomg with phonological simplification, could also be seen in evolutionary perspective as optimization in the course of language acquisition and use (Kiparsky 2012). *Syntactic* accounts were pioneered by Roberts & Roussou's (1999, 2003) parameter resetting model, according to which a learner faced with ambiguous evidence for a parameter setting reverts to its default value, causing a lexical category to raise to a functional head position and to become reanalyzed as base-generated there.[31]

In the same spirit, van Gelderen (2011, 2024) postulates that Late Merge drives elements to higher functional heads, either from a lexical head or from a lower functional head,[32] and Feature Economy requires minimizing semantic and interpretable features in the derivation, motivating the reanalysis of specifiers as heads. For example, pronouns can lose their interpretable person and number features and turn into agreement morphemes, bearing only uninterpretable features. The result is a cycle schematically represented in (7):

(7)



Traugott & Trousdale (2013) reconceive grammaticalization as "constructionalization" within a Construction Grammar approach (see also Bergs & Diewald 2008, Trousdale 2012, Traugott 2018, 2022).

The loss and renewal of grammatical and semantic categories is a long-term cyclic process in language change (van Gelderen 2009, 2011, 2024), e.g. Latin *cantabo* > *cantare habeo* > French *chanterai* > *je vais chanter* 'I'll sing'. In pragmatically triggered "inflationary" change, overuse of affective or emphatic elements causes their semantic "bleaching". Well-explored cases include the renewal of hypocoristics, polite forms of address, and negation (JESPERSEN'S CYCLE, Kiparsky

[31] For developments of this approach see the articles in Batllori et al. 2005 and Galves et al. 2012.

[32] As in Longobardi's 2001 formal analysis of the origin of the French preposition *chez* from the noun *casa* 'house'.

& Condoravdi 2006, Schwenter 2006, van der Auwera 2008, Breitbarth 2009, 2013, Willis 2012, Romero 2012, Biberauer 2012, Chatzopoulou 2015, Ahern & Clark 2017, Wallage 2017, Breitbarth, Lucas & Willis 2020, Ledgeway & Schifano 2023).

There appears to be a similar cycle on the affirmative side. Early English had two versions of 'yes' and 'no', depending on whether the question was affirmative or negative:[33]

	Affirmative answer	Negative answer
Affirmative question	yea	nay
Negative question	yes (orig. 'yea+is')	no ('nay+ay')

The more forceful *yes, no*, historically formed from *yea, nay* with a strengthener, have replaced the plain affirmation and negation.

A more global long-term kind of cyclic development seems to affect a language's predominant morphological type. The trajectory goes from isolating to agglutinating to fusional morphology, and from there back again to isolating morphology (an idea that goes back at least to Gabelentz 1901). For example, English is close to isolating, its Germanic ancestor was fusional, Indo-European was agglutinative, and internal reconstruction from Proto-IE suggests an antecedent more isolating stage.

2.5 Syntactic change

The development of explicit models of syntax and historical corpora has made it possible to track the time course of change with new precision, bringing the actuation problem in syntax closer to a solution.[34]

It is widely observed that the spread of a linguistic change through a speech community follows an S-shaped curve: innovations spread slowly at first, then fast, then go slowly again to completion. But how does change spread in the grammar? The weakest hypothesis would be that innovations spread independently in each context. Many scholars have taken for granted the natural assumption that innovations originate in favoring contexts and spread more quickly in them, reaching the least favoring contexts last. But surprisingly, corpus studies of syntactic change show that "when one grammatical option replaces another with which it is in competition across a set of linguistic contexts, the rate of replacement [...] is the same in all of them" (Kroch 1989: 200). As Kroch notes, the natural explanation for this CONSTANT RATE EFFECT is that "contexts change together because they are merely surface manifestations of a single underlying change in grammar. Differences in frequency of use of a new form across contexts reflect functional and stylistic factors, which are constant across time and independent of grammar." (On alternative mathematical and empirical interpretations of the Constant Rate Effect see Kauhanen & Walkden 2018 and Kauhanen 2023).

Given that innovations spread at the same overall rate across all contexts, the question arises which contexts are favored, and what causes the spread. The actualization of change is probably determined by multiple factors, of which two likely ones are SALIENCY and FUNCTION (for a review of other proposed candidates, notably markedness, see de Smet 2012).

[33] "*No* answereth the questyon framede by the affyrmatyue... yf a man sholde aske..is an heretyke mete to translate holy scrypture into englyshe..he muste answere *nay* and not *no*. But and yf the questyon be asked..Is not an heretyque mete to translate holy scripture into englysh. To this questyon..he muste answere *no* & not *nay*." (Thomas More, 1532, cited from the OED). The affirmative contrast is illustrated by this example from the OED: Thynk ȝe not he is worthy to day? ȝys! ȝys! ȝys! Alle we saye he is worthy to day, ȝa! ȝa! ȝa! (1450)

[34] For historical syntax in general, see the chapters by Frajzyngier, van Gelderen, and Barðdal in this volume.

The SALIENCY HYPOTHESIS states that actualization is most frequent in those innovating forms that are most like the old ones (Naro 1981, Scherre & Naro 2010. The actualization is "constrained by more or less superficial generalizations based on similarity to established usage" (de Smet 2012). Esentially the same effect has been long known to govern the course of morphological analogy; Hermann Paul observed that Verner's Law consonant alternations are leveled first in those verbs where they are not accompanied by vowel alternations; e.g. OHG **sluoh : sluogun* is leveled to *sluog : sluogun* 'hit' (3Sg./3Pl.), whereas *zõh : zugun* 'drew' retains the alternation (Kiparsky 1992, Garrett 2008).

The FUNCTIONAL HYPOTHESIS states that actualization begins with those contexts where the innovation confers the maximum processing advantage, normally understood as parsing efficiency (minimization of ambiguity, reduction of the burden on short-term memory). Studies of the development of *do*-support in English show that it is most frequent in exactly those cases where it serves to keep the verb and its object together: in transitive questions and transitive negative declaratives, with NP objects more than with sentential objects , and more in adverbial Wh-questions and yes-no questions that in Wh-questions with fronted objects (Kroch 1989). All these asymmetries follow directly from the parsing hypothesis. For example, verb-object adjacency favors *Whither dost thou take it* over *Whither takest thou it*, but is not a factor in the choice between *Whither dost thou go* and *Whither goest thou*. Warner 2004 suggests that the parsing advantage drives the whole change, with the other contexts being carried along because *do*-support is a single grammatical process, which is plausible since the parsing-based preference actually hardened into a *grammatical* requirement in late Middle English.[35]

The Constant Rate Effect concerns the frequency distribution of competing forms across contexts. It does not exclude the possibility of syntactic change in an orderly sequence of discrete steps, each constituting a possible grammar. Large-scale change of this type is called DRIFT. An instructive miniature-scale example is the reanalysis of the nouns *key* and *fun* as adjectives (de Smet 2012: 624). The new adjective *key* was at first categorically restricted to attributive position (*a key first step*) and began to be used predicatively several decades later (*this step was (absolutely) key*). The new adjective *fun*, on the other hand, was at first categorically restricted to *predicative* position, and became available for attributive use some six decades later.[36] De Smet's explanation is that the reanalyzed adjectives remain favored in the positions where the reanalysis took place, "mimicking the syntactic behavior of [their] source item" (p. 628). He posits a single global (though not necessarily abrupt) noun-to-adjective reanalysis, followed by gradual actualization of the new adjective, beginning with the attributive environment for *key* and the predicative environment for *fun*. The idea that the change is actualized faster in environments that resemble earlier usage contexts is inconsistent with the Constant Rate Effect, and raises the further question how, if *key* and *fun* are just adjectives, they preserve the diachronic "memory" of their locus of origin. But de Smet's insight can be reconciled with the Constant Rate Effect by assuming that the nouns became adjectives in two discrete stages. *Key* first became a obligatorily prenominal adjective, joining the many semantically related members of that class such as *main, prime, premier, princi-*

[35]Other functional advantages might include production efficiency (minimization of speaker effort) and computational efficiency, in Minimalism syntax expressed as a preference for the shortest derivation, minimization of long-distance dependencies by the shortest move, MERGE ≫ MOVE etc.

[36]A search of the *Corpus of Historical American English* and the *Corpus of English Novels* netted as the earliest unambiguously adjectival example *Them air devils threw up their hats 'n' stomped 'n' hollered powerful, es ef 't were mighty fun to see a man cut t' pieces* (in a fictional dialect narrative attributed to a "pure-bred Yankee" in Irving Batcheller's novel *D'ri and I*, 1901), followed by *rather fun* (1907) and *quite fun* (1908). Adjectival prenominal *fun* is first attested in 1959 (*a fun evening).*

pal, chief, cardinal, top, ace, crack. In the second step, it became a regular adjective available for predicative use, though still of the nongradable class (as *prime* had done in earlier British usage, see the OED's sense 1c). *Fun*, on the other hand, first became an obligatorily predicative adjective, such as *alive, alone, unable*. In the second step, it was generalized to a regular adjective. On this view, neither word underwent a single global noun to adjective renalysis followed by actualization in small-scale analogical increments. Both changes took place in two smaller steps (in fact the minimal discrete steps that could be encoded in the grammar without introducing new types of adjectives into it), with across-the-board actualization at each step, consistent with the Constant Rate Effect. At the completion of the change, they quickly acquire a frequency profile typical of adjectives.[37]

These data suggest that syntactic reanalysis looks forward to an available attractor structure — an existing category of the language in cases of ordinary analogy, a potential category provided by UG in cases of grammaticalization. Actualization, on the other hand, is conservative and utilitarian. It begins timidly with minimally salient and maximally useful instances of the new structure and leaves the most radical ones for last. As *key* and *fun* show on a small scale, the Constant Rate Effect makes available a new kind of probe into syntactic structure: different actualization profiles diagnose different grammatical analyses.

3 Causes and mechanisms of change

3.1 Stability and change

Textbooks of historical linguistics begin with the causes of linguistic change, but they don't address the prior question of the causes of linguistic stability. Yet the accuracy of 'normal' language transmission is at least as remarkable as the failures of transmission that result in 'change'. Longobardi's (2001) principle of inertia and Keenan's (2009) dictum that "things stay as they are unless acted upon by an outside force or DECAY" imply a two-part mystery. The first part of the mystery is how a language *can* be acquired at all. It was first posed in its full generality by Chomsky, and remains a focus of formal linguistic theory. The second part is why learners *do* take the trouble to acquire their social and regional dialects so accurately. Saussure was perhaps the first to raise this question. He suggested that the arbitrariness of the sign entails that learners have no particular reason to diverge from the ambient language. But random variation in acqusition would be as consistent with aebitrariness as faithful reproduction is. Moreover, Saussurean arbitrariness is only relative: there *is* a good reason to prefer regular **goed* over irregular *went*, and yet exceptions and seemingly useless complications are ubiquitous and can persist in a language for millennia. An alternative explanation for inertia is that communicative efficiency requires some degree of complexity and/or homogeneity, which together inhibit change. The problem with that is that not all complexity enhances communication, and anyway the complexity of languages, and the linguistic homogeneity of a speech community, exceed any communicative needs: speakers of different regional and social dialects often understand each other perfectly. Perhaps the most plausible explanation appeals to the function of language as a marker of social identity (Milroy 1993:220, Klein & Perdue 1997). The reason complications are maintained, and shared by all members of the community, is that they make good social indicators, the more idiosyncratic, the

[37]There is considerable variance among adjectives, and *fun* falls well into the range. In the COCA Corpus, 29.1% of a total 134 occurrences of *very fun* are preadjectival. For a sample of other adjectives after *very*, the corresponding figures are: *entertaining* 15.0% (107), *amusing* 23.1% (69), *funny* 24.4% (first 1000 hits), *cool* 24.6% (552), *enjoyable* 28.0% (57), *sweet* 29.0% (548), *loud* 40.0% (392), *intense* 49.6% (440), *rough* 64.0% (269). Figures for *rather* and *quite* are similar. Note that examples like *John is fun (to talk to)* are *not* unambiguously adjectival, cf. *John is a nuisance (to talk to*).

better. This also explains why they are unstable in ad hoc contact languages, where the function of marking social bonds is reduced.

But that leads to a third mystery: if learners have both the capacity and the motivation to replicate the language around them exactly, how is change even possible? This has been called (rather misleadingly) the logical problem of language change. It is particularly acute for theories which attribute language change to imperfect learning, particularly those which posit that change arises by covert REANALYSIS of ambiguous structures followed by overt extension of the new to unambiguous new structures. In the covert phase, learners acquire a new grammar (an I-language) that generates an output (an E-language) which is indistinguishable from the old one. The covert phase is followed by an actualization phase in which the new grammar becomes detectable in recognizably novel outputs (Langacker 1977, Harris & Campbell 1995, Roberts 2007). The question then arises how, if the old grammar is indistinguishable from the innovating grammar at the covert stage, the speech community comes to converge first on one, then on the other. Thus reanalysis is not in itself an explanation but at best a description of a type of linguistic change, which would itself require an explanation.[38]

One possible solution is that there is no reanalysis, because change occures in the use of language by fluent speakers, triggered by pragmatic factors, intrinsic variation, and speech errors (Bybee & Beckner, this volume). These are undoubtedly real sources of change. But there are reasons to believe that acquisition plays a major role too: *(1)* Changes involving structural discontinuities are unlikely to be initiated by mature speakers, *(2)* L1 grammars often prefigure possible innovations of the target language,[39] and *(3)* change is accelerated in social situations where the capacity or motivation for accurate reproduction is weakened.[40]

Many proponents of reanalysis theories solve the logical problem of language acquisition by assuming that changes are caused by prior changes in learners' triggering experience. Some locate the trigger in E-language (in line with Saussure's view that change originates in *parole*), and assume that random fluctuations in usage may cause the frequency of a piece of primary linguistic data to drop below a hypothetical learnability threshold, after which it fails to be acquired and disappears, or causes a grammatical parameter to be reset (Lightfoot 1991:67-68, 1999, Clark & Roberts 1993, Hale 1996: 127). The appeal to hypothetical E-language precursors of I-language change is however inconsistent with the discovery that variation (or "grammar competition") is systematic, and is governed by the same constraints that underlie categorical regularities of I-language (Anttila 1997 *et seq.*). Others seek the triggers in prior changes in I-language, which could themselves ultimately be triggered by language contact or perhaps other factors.

Reanalysis theories have been criticized in recent work on syntactic change. Apart from the triggering problem, their weakness is that on a modern understanding of syntax no general syntactic reanalysis (as opposed to minor changes such as those discussed above for *key* and *fun*) can have a covert stage. The new grammar is bound to be detectable in data that is available to learners

[38]Cf. Walkden 2021. However, I don't concur with Walkden that the process of reanalysis is "ontologically weird", or share his objection to referring to types of change as "mechanisms". On stability and pertinacity/renewal, see further Sornicola 2000, Dresher & Lahiri 2005, Kennard & Lahiri 2017.

[39]For example, some languages allow pronominals with coargument antecedents *except when these are quantified* (bound anaphors). This system emerges spontaneously in English child language: some children accept sentences like *Is mama bear washing her?* but reject *Is every bear washing her?* (Grimshaw & Rosen 1990). Yiddish-style syntax, with embedded V2 and Topicalization, emerges spontaneously in German child language (Kroch 2001). On the relationship between phonological acquisition and change see Cook 2006.

[40]For example, when population movements or other situations reduce the amount of exposure and/or the indexical function, as in pidgins and immigrant dialects, rapid simplificatory change ensues (Operstein 2022).

early in the course of normal acquisition. Many standard instances of reanalysis have also been questioned on empirical grounds: nominative experiencer subjects did not arise by reanalysis of the surface dative object as a nominative subject in sentences like *the woman liked those words* (Allen 1995, *contra* Stockwell 1976, Fischer 1987, Harris & Campbell 1995: 63, 83), *for*-infinitivals did not arise by reanalysis of prepositional phrases (Garrett 2012, *contra* Harris & Campbell 1995: 62).[41] Germanic *that*-clauses did not arise by reanalysis of paratactic main clauses (**He said that: They came" > He said that they came*), but, as in the other branches of Indo-European, from a correlative construction; *that* comes from a relativizer and not from a demonstrative pronoun (Axel-Tober 2017)[42]

The predominant kind of syntactic reanalysis is "relabeling", essentially grammaticalization. But these are just the cases where the existence of a covert stage is least plausible. For example, the reanalysis of a relative pronoun as a complementizer, or of a verb as an auxiliary, can hardly take place without detectable effects in the language. De Smet & Markey 2021 examine a case of reanalysis where ambiguous uses were far too infrequent to have provided a basis for ambiguity-triggered reanalysis.

This suggests giving up the postulate that change passes through a covert reanalysis stage, and allowing the innovative grammar to be distinct from the old one from the beginning, if only in non-salient respects. This is done by BIAS-DRIVEN models, which attribute change to learners' creativity rather than to simple learning failure. Change is steered by a set of prior learners' biases which can be strong enough to override evidence to which the learner has been exposed (Garrett & Johnson 2011, Garrett, this volume, Culbertson, Smolensky & Legendre 2012). Each individual seeks to construct an optimal internalized grammar guided by certain biases. These biases may cause learners to converge on "wrong" innovative grammars, which may spread when they have a sufficient advantage over the old grammar. That is why changes can be initiated and persist in spite of accessible counterevidence. In short, instead of Saussurean change-in-*parole*, bias-driven models adopt the Jakobsonian conception of change as an evolutionary process governed by the same principles that constrain language itself.

The basic arguments for bias-driven models of change over purely error-driven reanalysis models are the following: *(1)* Change involves not just loss of old features and categories, but the creation by grammaticalization of new ones that have no pre-existing model in the language. *(2)* Since change is not instantaneous, a causal mechanism is required for its initiation, spread, and completion across environments over many generations — in the extreme case, drift, or long-term unidirectional change. Purely error-driven models would expect Brownian motion rather than directed drift. *(3)* Convergence, i.e. independent parallel change in related or unrelated languages, can be explained by acquisition biases but not by the error-driven view. It is really quite impressive that constraints like the Final-Over-Final Constraint (FOFC, Biberauer, Holmberg, & Roberts 2014) or the Person Case Constraint (PCC, Bonet 1994, Haspelmath 2004, Rezac 2008) emerge and are maintained independently across the languages of the world.

Bias-driven models of change depend on some characterization of relative complexity ("markedness"). As mentioned above, ranking volume turns out to be a good predictor of both typological

[41] I conjecture that it is connected to the late Middle English innovation by which IP becomes an obligatory syntactic projection (Kiparsky 1997). At that point, *to* joins the modals as a nonfinite Infl head (van Gelderen 1993). Being nonfinite, an IP whose Infl is *to* must form a subordinate clause. But a subordinate clause needs a complementizer. This is the function of *for*. Thus the rise of *for-to* infinitives is part of — in fact, *caused by* — a larger syntactic shift.

[42] See also Weiß 2019, who argues that rebracketing does occur, but is driven not by misparsing but by economy principles (minimization of structure, Early Merge).

frequency and the direction of long-term syntactic drift.

3.2 How phonology changes

SPEAKER-ORIENTED theories of sound change locate its origin in the inherent variability of speech. Speakers initiate new reduced variants for rapid and easy articulation and hyperspeech variants to achieve perceptual clarity. In a feedback loop, the target of articulation shifts as speakers accommodate to their own and others' gradually changing outputs (see Wedel 2006 for discussion of possible mechanisms behind this). In this way physical constraints on speech shape sound change and sound systems directly. Abrupt changes such as metathesis are consigned to a different mechanism involving misperception. LEARNER/LISTENER-ORIENTED theories hold that sound change originates when speakers' acoustic signals are misparsed, either by wrongly attributing phonetic effects to the phonological computation, or vice versa (Ohala 1981, 1993, 2012; Blevins 2004, 2006, 2013, Hale, Kissock, & Reiss 2006, 2013). On this view, *all* sound change is inherently abrupt, because of the discontinuity between speaker and hearer/learner, and the physical constraints on speech constrain sound change indirectly because hearers' misparses reflect speakers' implicit understanding of them.

Learner/listener oriented theories posit two types of sound change, HYPOCORRECTION and HYPERCORRECTION. Hypocorrection results from the failure to undo coarticulatory effects. Ohala (1993) illustrates hypocorrection with the schematic example of the rise of phonemic nasalized vowels in (8).

(8)

	Time 1	Time 2
production	/VN/ > [$\tilde{V}$N]	/VN/ > [$\tilde{V}$(N)]
perception	[$\tilde{V}$N] > /VN/	[$\tilde{V}$N] > /$\tilde{V}$(N)/

The nasalization of a vowel before a nasal consonant is the result of physical constraints of the vocal tract. At time 1, a listener 'normalizes' a perceived [$\tilde{V}$N] as intended /VN/. At time 2, the nasal is "weakly implemented", so that the listener may perceive only [$\tilde{V}$], and reconstructs /$\tilde{V}$/ as the intended pronunciation.[43]

Hypercorrection results from the converse misparsing, which occurs when intended features are perceived as coarticulatory, and the results of such misparses then become a new norm. This mechanism is responsible for dissimilation, among others, and explains why dissimilation is restricted to features which are manifested over long temporal intervals (labialization, aspiration, glottalization, retroflexion, pharyngealization, 'glottalization', place of articulation), and does not apply to manner features like 'stop', 'affricate'.[44] Unlike what is the case in assimilation, in dissimilation the conditioning environment can't be lost at the same time (since the listener analyzes it as the trigger of the putative assimilation process that she undoes, i.e. imputing responsibility to it for the imagined perturbation). For similar reasons, dissimilation produces no new phonemes.

As in syntax, it is often assumed that reanalysis begins with a *covert* phase (Andersen 1973, 2001). A new abstract representation is acquired which initially converges on a pronunciation which is perceptually indistinguishable from the old one, and the covert distinction is later enhanced and becomes perceptible. The problem again is how learners can ever converge on the first stage of the innovation. If the two pronunciations sound the same, how can they tell them apart? And what makes learners diverge systematically from the language they actually hear?

[43] Ohala's /. . . / mark"intended pronunciations" not necessarily phonemes.

[44] Ohala does note counterexamples in both directions: *l:r* dissimilation, and the absence of voicing dissimilation.

The schema in (8) avoids this problem by interposing a prior *articulatory* change as a causal factor — the coda nasal is first weakened, and the weakening then triggers the perceptual change that results in distinctive vowel nasalization and complete loss of the nasal. On this variant of the story, the emergence of the phonemic nasal vowel is not simply "the result of an unintended failure of the perceptual process," but a consequence of a prior change in pronunciation. This version of the listener-based account nevertheless differs from a conventional articulatorily driven account of phonologization, where allophones become distinctive when their contextual conditioning is eliminated by sound changes, in that it does not equate sound change with synchronic variation; sound change emerges from variation only when a listener fails to normalize or correct it.

A weakness of perceptual theories is that they do not account very well for neogrammarian sound change. They lead to the unwanted prediction that frequent words should resist sound change because they are heard often enough to prevent misperception (just as frequent words resist analogical remodeling in virtue of being heard often).[45] Hale (2007: 141) addresses this problem by distinguishing between two kinds of misparsing, which we can call MISPERCEPTION and MISANALYSIS. Misperceptions are singular events that happen to specific items on particular occasions, and give rise to sporadic sound change. MISANALYSES are across-the-board reinterpretations which systematically attribute a feature to some other articulatory mechanism than that being used by the source, and give rise to regular sound change. Phonemes cannot split spontaneously by misperception, for learners do not posit new contrasts for the sake of individual misperceived items. So new phonemes must arise by misanalysis. But that actually aggravates the trigger problem: how do learners arrive at a *systematically erroneous* analysis of the language they are exposed to?

A second often noted problem for the perceptual approach is that it provides no basis for the unidirectionality of sound changes, because hypercorrection and hypocorrection are formally symmetrical. For example, there is no intrinsic explanation for the fact that consonants normally palatalize rather than depalatalize before front vowels (i.e. hypocorrection rather than hypercorrection). Ambiguity sets the stage for reanalysis, but something else must explain the directionality of the change. Assimilation and dissimilation are quite different in other ways as well: dissimilation (by hypothesis, hypercorrection) never gives rise to new phonemes, but assimilation (hypocorrection) does. Such intrinsic asymmetries are not predicted by the theory as it stands.

Garrett & Johnson (2013) go a long way towards a solution of both problems by integrating the speaker's and the listener/learner's role in sound change and locating intrinsic asymmetries in the speech chain itself. The core of their theory is that "the structure imposed on the phonetic input to sound change, via the directionality of phonetic variation, is a key source of the typological patterns of sound change." Articulatory and perceptual biases direct sound change via motor planning, aerodynamic constraints, gestural mechanics, and perceptual parsing. Each of these bias factors furnishes the basis of different types of sound change.

4 Reintegrating historical and theoretical linguistics

4.1 Explaining change

Serious work in historical linguistics must be built on some explicit and consistent grammatical framework, for there is no theoretically non-committal way of talking about language. Does the rise and loss of verb-second order in Germanic involve a rule? a constraint? a construction? a word

[45] Of course one could argue that this is counterbalanced on the production side by the increased activation of frequent words that cause them to change more rapidly.

order template? a functional head? Does a language become ergative by acquiring an ergative case marker? an alignment constraint? a parameter setting? all of these things? Such choices are dictated by the linguistic theory one adopts. They matter for understanding the history, and that puts historical linguists in a good position to contribute evidence bearing on these choices. In the past historical linguists tended to opt out of the debate and to regard linguistic theory with some suspicion. This is understandable in view of their long tradition, going back to a time when language was analyzed primarily as an inventory of *items* — categories and constructions — rather than as as a system of interacting rules or constraints. On top of that lies some unexamined structuralist baggage, including the idea that categories are distributionally defined by segmenting and classifying speech, which underlies the classical phoneme and item-and-arrangement morphology. The more complex dynamic view of language offered by morphophonology, generative grammar, and Optimality Theory has had major impact on historical linguistics, and forced some rethinking of change itself. The recent flourishing of historical syntax has gone hand in hand with the development of generative syntax. Generative phonology and OT have renewed historical phonology and morphophonology (Bermúdez-Otero & Hogg 2003, Holt 2003, Bermúdez-Otero 2006, Honeybone & Salmons 2015, Smith 2023).

Let us illustrate these points with examples from phonology. Any causal theory of sound change has to address the connection between change and structure:

(9)
1. *Secondary split*: how and why do new phonemes arise from allophones? Under what conditions does sound change lead to restructuring of the phonological system?
2. *The embedding problem*: how, if at all, is sound change channeled by the phonological system?
3. *Typology and universals*: does sound change explain typological tendencies and universals? And/or do linguistic universals explain sound change?

Bermúdez-Otero (2015) shows that Stratal OT (essentially Lexical Phonology implemented in Optimality Theory) is a good platform for formulating and answering these questions. He shows in particular that the architecture of the phonological component accounts naturally for the life-cycle of phonological processes. A sound change is PHONOLOGIZED when an automatic coarticulation process comes under the control of a phonetic implementation rule. It may then become STABILIZED as a categorical postlexical rule applying across the board in a phrasal domain. The new rule can then rise from the phrase level to higher strata, first to the word level, then to the stem level, acquiring morphological conditioning and lexical exceptions on its way, and eventually exiting into the morphology and the lexicon.

The classical phoneme has turned out to be something of a straitjacket and has not been helpful for understanding the rise and merger of phonological contrasts. Stratal OT offers a perspicuous account of two types of phonologically relevant units which fall short of being full-fledged phonemes and play a crucial role in these processes: NEAR CONTRASTS (near mergers and incomplete neutralization), which are distinguished in production but not in perception (Labov, Karen & Miller 1991, Yu 2007) and QUASI-PHONEMES (Korhonen 1969: 333-335, Harris 1990, Janda 2003, Gordon 2013), such as Russian /ɨ/ and English /ɬ/, which are perceptually salient and specified by categorical feature values but not phonologically distinctive. Classical phonemics equated CONTRASTIVENESS (unpredictable distribution), a *structural* notion, with DISTINCTIVENESS, a *perceptual* notion. Synchronic and diachronic evidence shows that they must be separated, and Stratal OT provides the theoretical tools for doing so. Quasi-phonemes are non-contrastive but

distinctive — they are predictable but perceptually salient. Near contrasts are the fourth case: contrastive but non-distinctive (Kiparsky 2013).

	contrastive	non-contrastive
distinctive	phonemes	quasi-phonemes
non-distinctive	near contrasts	allophones

The conjecture is that all phonemes arise as quasi-phonemes, and that all mergers pass through a near-merger stage.

The move from item-and-arrangement morphology to morphophonology is proving helpful in languages with complex word structure, such as Uralic (Nikolaeva 2000) and some of the Indo-European languages. In the latter, the study of word accentuation had been dominated by a PARADIGM-CENTERED approach which reifies various classes of paradigmatic accent alternation (acrostatic, hysterokinetic, amphikinetic, proterokinetic, etc., see Meier-Brügger 2002/2003 for a summary). The COMPOSITIONAL approach derives the accentuation of words from the lexically specified accentual features of their constituent morphemes, together with a set of general phonological rules or constraints. It allows a unified analysis not only of athematic primary inflection, but of words of arbitrary complexity including derivation and compounding.[46] It is typologically well supported (Dybo 2011, Mamet 2011), and theoretically justified in that accent is a relational property, not a phonological segment (Garde 2011, Good 2012). The locus of morphophonological variation and change are not the word accents themselves but the system which assigns them, comprising the lexically specified accentual properties of morphemes and the phonological rules by which the accent is computed from them.

Against the variationist treatment of quantitative regularities by associating frequencies with outputs, and the structuralist/generative view that variation should be relegated to phonetics, pragmatics, or "performance" (e.g. Newmeyer 2003), OT work situates an important class of variation within grammar (Anttila 1997, 2007), a move justified by two discoveries: that variation is governed by the same factors that govern categorical regularities, and that the frequency of a variant is proportional to the number of fully ranked constraint systems that generate it. A sound change goes to completion when the relevant ranking becomes obligatory.

If we adopt OT, sound change must be constraint promotion, and the effects of the promoted constraint then necessarily depend on the rest of the phonological system. Shockingly, this calls into question the time-honored formulation of sound changes as context-sensitive replacement processes of the form "A changes to B in the context C___D". There are in fact many kinds of cases where that schema is unilluminating. For example, if a tone-bearing vowel is syncopated, the tone is displaced to the right or to the left, *as dictated by the existing constraints of the language.* Sound changes can also be *blocked* from creating surface exceptions to an existing synchronic constraint of the language. For example, Old English syncope fails to take effect just in those cases where it would create a stress lapse or clash, or a prohibited syllable structure. Technically, such conditions on sound changes can be specified as conditioning factors (C___D in the rule schema), but only at the cost of a loss of the generalization that the conditioning factors are manifestations of active phonological constraints of the language.[47]

[46] Slavic: Garde 1976, Zalizniak, Kiparsky & Halle 1977, Dybo 1981. Indo-European: Kiparsky 2010, Kümmel 2014, Yates 2016, 2017, 2019, Rhyne 2016, Lundquist 2015, 2016, 2020, Sandell 2015, among others.

[47] On the Stratal OT model (Bermúdez-Otero 1999, Kiparsky 2000b) constraints must interact this way if and only if they are visible at the same level (e.g. the word-level phonology, or the postlexical phonology). Rule-based generative

OT also accounts for diachronic CONSPIRACIES, the joint satisfaction of a single constraint, typically prosodic/metrical, by diverse segmental and suprasegmental means. The classic example is the enforcement of the CV syllable canon in early Slavic by coda deletion, metathesis, degemination, prothesis of consonants, and coalescence of C+y clusters and V+nasal rhymes. The categorical elimination of contrastive vowel length in much of West Germanic was implemented by multiple changes in each language, most importantly by open syllable lengthening and gemination (Lahiri & Dresher 1999, Page 2007). In North Germanic, 3-mora syllables were eliminated by deletion of *-j-*, by vowel shortening, and by the insertion of anaptyctic vowels, and prevented from arising by restrictions on processes such as syncope that could have created them.

Modern linguistics also calls into question the construal of the comparative method as an algorithm by which phoneme correspondences are sorted into sets by complementary distribution, each set is associated with a proto-phoneme, and the reconstruction proceeds bottom-up from phonology to morphology and finally to syntax. A corollary of the operational approach inherited from American structuralism, it may still have a place in textbooks for pedagogical reasons, but it is as foreign to the practice of historical linguistics as synchronic discovery procedures are to grammatical analysis. In real life the data sets required for phonological reconstruction do not drop from the sky onto the linguist's desk, but must be discovered and augmented throughout the entire process as the analysis grows. New hypotheses emerge at all levels simultaneously. The tables of sound correspondences that students are asked to compile, modeled on synchronic phonemic analysis, can actually be misleading since they ignore the relative chronology of sound changes and their interaction with each other and with analogical changes, which often determines their formulation. A reconstruction is not a product of data-processing operations; it represents a theory, and stands and falls with the historical explanations it provides for the individual languages.

4.2 Historical explanation

In a reversal of the project of grounding the way language changes in its structural properties as outlined in the preceding section, one could view structure as emerging from change. There are broadly two versions of this historicist research program. EVOLUTIONARY LINGUISTICS posits a sparse faculty of language and seeks to derive typological generalizations or universals as emergent outcomes of recurrent historical processes. Another approach starts from a rich faculty of language and limits historical explanation to such properties as overgeneration and frequency (Myers 2002), or to matters of phonetic "substance" (Hale 2007).[48]

Blevins' 2004 articulation of evolutionary linguistics for phonology allows UG to provide only features and categories. Barnes 2002 assumes that there are no restrictions at all on possible phonological systems; their structure is wholly explained by the changes that shaped it. Greenberg attributes typological preferences to the frequencies of different change types: "In general one may expect that certain phenomena are widespread in language because the ways they can arise are frequent and their stability, once they occur, is high. A rare or non-existent phenomenon arises only by infrequently occurring changes and is unstable once it comes into existence." (Greenberg 1978: 75). As Harris (2008: 56) points out, "...this only sets explanation forward one step. Then we must ask why these changes are infrequent, and why this construction is unstable." She suggests that phenomena are typologically rare if they can only arise by a relatively large number of changes, or only under certain conditions (see also Harris 2010, and similarly de Vogelaer & van

theories of sound change could accommodate such interactions descriptively as "rule insertion" (King 1973), but could not explain when they occurred and why.

[48]For a range of view on historical explanation in phonology see the articles in *Linguistic Typology* 2006, Anderson 2005, and Hansson 2008.

der Auwera 2010). Thus, even though all changes and all conditions may be equally common, the more of them come together, the rarer the result.

Parametric and OT approaches already make an analogous prediction on the *synchronic* level: the frequency of a "phenomenon" ("property", "trait") is proportional to the number of parameter settings or constraint rankings that must be fixed for it to be manifested in the grammar (see above on ranking volume). Structural complexity (defined in either of these ways) is probably a *better* predictor of rarity than the complexity or rarity of the originating change. The reason is that complex and rare changes can produce typologically unremarkable and simple structures (for example, some of the pathways to ergative case reviewed in Kiparsky 2008 and McGregor 2017), and conversely, simple and common types of change can produce typologically rare and complex structures. For example, consider the English *rarissima* in the Konstanz database (Plank 2006): non-zero exponent for 3rd person agreement but zero for all other persons (no. 34), neutralization of both case and number restricted to second person (no. 70), V2 in declarative main clauses only if the first constituent is an adverbial with strong negative force (no. 81), relative pronoun as the only target for agreement in animacy (no. 84), and a definite article formally distinct from any pronoun (no. 122). As far as I can tell none of these extraordinary features of English have particularly complex historical origins. In general, *every* language has thousands of "properties", some of which will inevitably be rare or even unique just by statistical necessity.[49]

The strong evolutionary program of deriving actual linguistic universals from change requires showing that no sequence of possible changes can subvert them, i.e. that there can be no historical path to any grammar that violates them. To my knowledge this has never been achieved for any universal, and it is hard to see how it could be. For example, it is easy to imagine banal analogical changes and grammaticalizations that would create exceptions to the inviolable generalizations about pronoun systems presented in Cysouw 2003. Some intrinsic constraints must be preventing them from taking place. Greenberg's and Harris' project of finding diachronic causes for typological tendencies is more promising (Kiparsky 2006).

Another historicist approach appeals to the past to explain apparent anomalies in the present. Heine & Kuteva (2008) claim that the Bulgarian enclitic article (*masa-ta* 'table-the') contradicts "grammatical theories expecting demonstratives and determiners to appear in similar (or even the same) position in a syntactic structure" (prenominal *tazi masa* 'this table'), and they explain the article historically as "frozen" in the former position of the demonstrative. Actually the article is placed after the first inflected head of its DP, a distribution unlike that of any known demonstrative pronoun (Adamson 2022). Heine & Kuteva also explain the Swedish double determiner system as the result of contact with Western European languages with preposed articles. The Swedish system may well have arisen through contact, but it is neither "peculiar", nor violates any putative linguistic universals (Hankamer & Mikkelsen 2005, Schoorlemmer 2012).

Heine & Kuteva (2008) also propose to explain the supposed absence of a 1Pl "we" in Chinese Pidgin English (CPE) by the social context in which CPE developed, in which communication was typically dyadic (Mühlhäusler and Harré 1990: 259). In a social context where "it's always you against me", "why bother about a group *we* — at least as a first person plural inclusive category?" According to Hall (1944), CPE had no plural at all. But this is like classical Chinese and classical Javanese (Corbett 2000: 50-51) and reportedly Mura Pirahã, none of which are known to be limited to dyadic communication. 19th century CPE texts (Li, Matthews, & Smith 2005) present a more

[49]The rare "properties" of pidgins and artificial languages might be the absence of exceptions and the lack of certain expressive resources.

variable and probably more realistic picture, with occasional examples of 'we' (e.g. *we tomorrow makee move* 'we move tomorrow'), 'they', and English-type plural nouns.[50] Here again the first person pronoun patterns with the other pronouns and the nouns with respect to number, a quite normal type of language.[51] Either way, the explanation does not go through, and the first person in any case has no special properties.

In general, for a diachronic fact to count as a nontrivial explanation, it should itself follow from some principle. And this principle should be independent of the synchronic fact to be explained. Otherwise historical explanations run the risk of begging the question by presupposing what they set out to eliminate.

5 Conclusion

More than any other part of linguistics, research on language change needs to connect with neighboring fields such as human genetics, archeology, cultural and physical anthropology, history, and the philologies (see, among others, the chapters by Pakendorf, Heggarty, Epps, and Mailhammer in this volume). Within linguistics, it is situated at a crossroads where almost all its subfields meet. A historical study might draw on processing and pragmatics, morphology and corpus data, sociolinguistics and syntax, phonetics and formal language theory. Such connections raise some of the deepest foundational issues in the field, and at the same time make the results exceptionally interesting and accessible to the public. The Saussurian firewall between synchrony and diachrony has been effectively breached in research practice, and it may be time to recognize that fact in the academic structure of the field as well. This would involve incorporating the historical dimension into regular syntax and phonology courses, and ultimately breaking down the conventional segregation of historical linguistics into a separate discipline within linguistics.

[50] Perhaps significantly, all the inflected plurals that I found are irregular, except for *dishu* 'dishes'. *My* is also used indiscriminately for singular and plural. A third strategy found in the text is periphrasis of the form numeral + *piecee*, and finally inclusive 'we' is expressed as a comitative *my (a)long you*. Hall actually acknowledges plural 'we' and 'they', but dismisses them as 'Anglicisms', though that seems to imply the dubious notion of a "pure" pidgin.

[51] On either description, CPE conforms to Corbett's (2000: 56) generalization that a language's number marking must affect a top segment of the Animacy Hierarchy, which implies that a language that has any plurals at all must have 'we'. Since this generalization has the same explanation as other manifestations of the animacy hierarchy such as split case and split agreement, it is a good candidate for a true implicational universal (Kiparsky 2008).

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