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MANUSCRIPT

MONGOLIC DORSALS ARE TRULY EPENTHETIC

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Many of the modern Mongolic languages display alternations between /g/ and zero. These cases are among a very small number of putative dorsal stop epenthesis patterns known in the phonological literature, and epenthesis of these consonants is considered in some theories to be highly marked or even impossible (see e.g. Lombardi 2002, de Lacy 2006, Uffmann 2014). In recent years, multiple accounts of these /g/-zero alternations (GZA) have been proposed, some of them attributing the observed patterns to allomorphy (de Lacy & Kingston 2013) or a phonological process of 'splitting' (Staroverov 2014) rather than true epenthesis. In the present work, we describe GZA from both diachronic and synchronic perspectives with the aim of documenting its historical development and providing an insightful analysis of the process as it occurs synchronically in Khalkha Mongolian. We argue that GZA arose diachronically from reanalysis of the lenition and eventual loss of intervocalic *g*, which took place prior to the breakup of Common Mongolic. We establish that GZA should not be characterized as a synchronic process of /g/-deletion, though it arose from the aftermath of such a process historically. We further detail the shortcomings of describing GZA in terms of allomorphy, as well as the theoretical and empirical problems with treating consonant-zero alternations as

splitting rather than insertion. We conclude that the Khalkha pattern is most insightfully described as epenthesis of a phoneme /g/ with varied surface manifestations. Since both markedness-based and splitting-based accounts face difficulties with GZA and other patterns of its type, these patterns may require a return to a constraint-based approach without a fixed markedness hierarchy, or a rule-based account such as the one we present.

Keywords: consonant epenthesis, dorsal, Mongolic, reanalysis

INTRODUCTION[1]

The landscape of epenthetic consonants is of considerable interest for phonologists, as competing theories make significantly different predictions about which consonants should and should not be eligible for insertion by phonological processes. In a rule-based approach (e.g., Halle & Idsardi 1997) or a constraint-based approach without an irreversible markedness hierarchy, insertion of any consonant (henceforth C) is theoretically possible. However, numerous constraint-based approaches have attempted to limit the range of possibilities and predict the identity of epenthetic Cs based on markedness (e.g., Lombardi 2002, de Lacy 2006). These approaches encounter a number of difficulties, which we largely set aside here as they are discussed at length by Vaux & Samuels (2017).

The status of putative cases of "grammatical" C epenthesis (Żygis 2010) is crucial to understanding the landscape of variation, and therefore to deciding among different phonological theories. Grammatical C epenthesis patterns are idiosyncratic, involving a

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number of Cs that may individually be rare in epenthetic contexts but collectively appear to constitute a relatively large class. Also, these cases are typically morphologically restricted to some extent, making morphological alternative explanations attractive. In recent years a variety of competing accounts have emerged, some of which attempt to explain the choice of C in such cases via faithfulness, whereas others reclassify these patterns as allomorphy or deletion. The time is therefore ripe to consider specific cases in detail. Here we focus on Modern Mongolian, which displays an extensive set of alternations between the phoneme /g/ and zero (henceforth "/g/-zero alternations" or GZA) that have traditionally been interpreted as the result of a synchronic process of /g/ insertion. We find Mongolian interesting for a number of reasons: epenthetic /g/ is particularly unusual and difficult to explain through either markedness or faithfulness, several very different accounts of the phenomenon can be found in the recent phonological literature, and its history is relatively well documented. The alternations between /g/ and zero are illustrated by the Khalkha Mongolian patronymics in (1).

(1)   Genitive case suffix dorsal alternations

	Name	Gloss
a.	Цэндийн Нямдорж Tsend-iin Nyamdorj [tsinˈdiːŋ ˈnʲɐmdɔrtʃ]	Patronymic from 'Tsend' + given name 'Sunday thunderbolt'
b.	[tsinˈdiːŋ ˈnʲɐmdɔrtʃ] Khaltmaa-giin Battulga [χałtˈmagiŋ ˌpaʰtəˈɮəq]	Patronymic from 'Khaltmaa' + given name 'solid hearth'

These patronymics are formed by suffixing the genitive case ending to the name of an individual's father. The normal form of the genitive suffix is -ийн [-iŋ], which surfaces as such after C-final stems, as in the patronymic of former Speaker of the Mongolian

Parliament, Tsendiin Nyamdorj (1a). However, when the genitive is added to a stem ending in what is written in Mongolian orthography as a long vowel or diphthong, it surfaces as -гийн [-giŋ]. This can be seen in the patronymic of the current (as of this writing) President of Mongolia, Khaltmaagiin Battulga (1b).[2]

The alternation between -[iŋ] and -[giŋ] in (1) is a typical example of GZA; parallel alternations for the Ablative and Instrumental can be seen in (2a-b) and (2c-d) respectively.[3]

(2) REPRESENTATIVE ABLATIVE AND INSTRUMENTAL GZA IN KHALKHA (MODIFIED FROM SVANTESSON ET AL. 2005:55FF)[4]

			UR	SR	GLOSS
ABLATIVE	a.	C-final stem	/nɔm-As/	[nɔmɔs]	book-ABL
	b.	V-final stem	/nɔxAi-As/	[nɔχɔ(ɛ)ʁɔs]	dog-ABL
INSTRUMENTAL	c.	C-final stem	/ar-Ar/	[arar]	back- INST
	d.	V-final stem	/sana-Ar/	[sanaɢar]	thought-INST

One also finds GZA with stems ending in syllabic consonants in the Mongolic languages that have them. Chinese loanwords ending in syllabic ʐ̩ show this pattern in Khorchin Mongolian, for example: when one adds the Mongolian Ablative -/As/ to tʃaʊʃʐ̩ː 'supermarket', for instance, the result is [tʃaʊʃʐ̩ːgɔːs] (Puthuval 2013:45).

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2 Note that there are two series of labial and dental stops, traditionally termed 'strong' and 'weak,' which are represented in the Cyrillic Mongolian script as voiceless and voiced, respectively. However, Svantesson et al. (2005:12ff) establish that aspiration is the relevant contrast. The 'strong' series are voiceless postaspirated word-initially and voiceless preaspirated elsewhere. The 'weak' series are voiceless unaspirated. Velar, palatalized velar, and uvular stops employ only a single manner of articulation and are typically voiced; they pattern as such phonologically.

3 Capital letters in the underlying representations (URs) indicate vowels that participate in rounding and pharyngeal harmony controlled by the stem. The phoneme /g/ in this position, whether underlying or epenthetic, surfaces (modulo voicing assimilation) as [g] or [ɣ] in non-pharyngeal words or before [i], and as [ɢ] or [ʁ] in pharyngeal words. We discuss the allophonic variation of /g/ further in Section 3.

4 Following standard convention, we write the underlying forms of suffix segments that participate in harmonic alternations with capital letters.

GZA is found in all of the modern Mongolic languages except for the peripheral languages Moghol in Afghanistan and Bonan and Santa in the Gangsu province of China.[5] Another geographical outlier in the family, Kalmyk, spoken on the northwest coast of the Caspian Sea, does display GZA, as does its parent language Oirat, from which it split in the seventeenth century.

The widespread distribution of GZA across the Mongolic family might lead one to conclude, as does Skribnik (2003:107), that it was a feature of Common Mongolic, the shared ancestor of the modern Mongolic languages, which Janhunen (2003) dates to the time of Chinggis Khan (12th-13th century CE). Moghol developed from the language spoken by the Mongol soldiers who were garrisoned in the Khwarizm-Shah state conquered in 1220 by Chinggis Khan and later in part of the satellite Ilkhanid state until the mid-14th century. According to Weiers (2003: 248), this community did not have any subsequent contact with their kin in Mongolia. It is possible, then, that the separation of Moghol may represent a terminus post quem for the development of GZA.

In this paper we provide a diachronic overview and reconstruction of the development of GZA in Mongolian (focusing on the standard variety of Mongolian spoken in Mongolia, Khalkha), followed by a close look at its synchronic manifestations. We then evaluate whether the synchronic pattern can be satisfactorily described in terms of deletion, allomorphy, or 'splitting' in the sense of Staroverov (2014). We conclude that Modern Mongolian GZA is most insightfully characterized as the product of true synchronic phonological /g/ epenthesis, which developed diachronically from reanalysis of a process of intervocalic /g/ deletion.

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5   Moghol employs deletion rather than insertion between long vowels (Poppe 1955); other cases of vowel hiatus insert y or n (Weiers 1970:119). There is no evidence of GZA in Bonan (Chuluu 1994, Hugjiltu 2003) or Santa (Field 1997, Kim 2003).

1 OVERVIEW OF MONGOLIAN PHONOLOGY

Before delving into the nuances of GZA in Khalkha, it will be helpful to review some basic components of Mongolian historical phonology that will be relevant to our discussion. These are summarized in (3), which illustrates the historical developments of the toponym *Ulaanbaatar* and the given name *Battulga*.

(3) SUMMARY OF PHONOLOGICAL DEVELOPMENTS FROM PROTO-MONGOLIC TO KHALKHA

			*ulaɢan 'red'	baɢatur 'hero'	batu-tulɢa 'solid hearth'
a.	Proto-Mongolic				
b.	Preclassical Written Mongolian	Intervocalic spirantization	ulaɣan	baɣatur	--
c.	Common Mongolic	ɣ-deletion	ulaan	baatur	--
d.		V₁V₁ merger	ula:n	ba:tur	--
e.	Mongolian, Buriat, Oirad, Dagur	Deletion of short V in non-initial syllables	--	ba:tr	bat-tulɢ
f.		Reanalysis of V: in non-initial syllables as short	ulan	--	--
g.		V epenthesis	--	ba:tər	bat-tuləɢ
h.	Khalkha	Fricativization	uʤan	--	bat-tuʤəɢ
			[ʊʤan]	[pa:ʰtər]	[paʰtəʤəq]

The consensus view among scholars of the family holds that Proto-Mongolic had no length contrast in vowels, but developed one by the time of the breakup of Common Mongolic (3d), thanks in large part to the loss of intervocalic *g* and *b* under certain

conditions (3c). Two examples of this can be seen in the name of the capital *Ulaan-baatar,* which is preserved in the preclassical written form *Ulaɣan Baɣatur*.

Mongolian and several other languages in the family subsequently deleted short vowels in non-initial syllables (3e), which led to a reanalysis of original long vowels in those syllables as short (3f). A process of vowel epenthesis then inserted new short vowels where required by the phonotactics of the language (3g). These were sometimes in the same location as original short vowels, as in *Baatar*, but other times not, as in *Battulga*, which orthographically still reflects stage (3a) but now has an epenthetic vowel before the <g>.[6]

It is important to note at this point that both of the two main systems used to write Mongolian are highly archaizing. The Uyghur Mongolian script used in Inner Mongolia largely reflects stage (3a), and the Cyrillic script used in the state of Mongolia reflects a mix of stages (3c) through (3e). Because both orthographies predate stage (3f), one will generally see Mongolian forms written with illusory short and long vowels, except in the work of Svantesson and his associates. In the present article we preserve traditional length-based notation in situations where non-shortening languages are included or when a stage prior to (3f) is being discussed.

The final innovation[7] in producing the forms in table (3) is that the Khalkha dialect has fricativized its /l/ phoneme in all positions, as can be seen in both the words for 'red' and 'hearth' in (3h), as well as in the name of the Khalkha dialect, which is pronounced [χaɮχ].

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6   Some Mongolic languages, specifically Khamnigan, Mongghul, and Ordos, have GZA but did not undergo the realignment of the vowel length system described here. They seem to require the traditional analysis of GZA as occurring between long vowels, rather than the simpler account of GZA between vowels proposed by Svantesson et al. (2005). We set this issue aside but note that a number of languages have consonant epenthesis specifically between long vowels, including Gokana (Lombardi 2002), Gondi (Subrahmanyam 1968 apud Srinivas 2010:68), Greenlandic (Kirchner 1995), Guajiro (Mansen & Mansen 1984), Hausa (Halle & Vergnaud 1980), Old Khotanese (Hitch 2016), Plains Cree (1973), and Western Ojibwe (Valentine 1994).

7   We do not include the laryngeal features of orthographic singleton and geminate stops here, as they are not germane to our discussion and are not necessarily innovations.

2 SYNCHRONIC DISTRIBUTION OF DORSALS AND GZA

With these preliminaries in mind, let us now turn to a synchronic characterization of GZA. These alternations between a dorsal consonant and zero are traditionally seen by Mongolists as the result of a process that inserts the phoneme /g/ after a stem ending in a long vowel or diphthong followed by a suffix beginning with a long vowel, in order to avoid vowel hiatus (e.g., Poppe 1955, Rialland & Djamouri 1984, Svantesson et al. 2005, Janhunen 2012). As Beffa & Hamayon put it, "si la base se termine en voyelle longue ou diphtongue, il y a apparition d'un /g/ prothétique devant un suffixe en voyelle longue" [if the base ends in a long vowel or diphthong, prothetic /g/ appears before a long-vowel suffix] (1975:43).

In this traditional analysis the Ablative suffix, for example, consists of a long low vowel followed by /s/:

(4)   ABLATIVE /-AAs/ (IN TRADITIONAL TRANSCRIPTION)

	NOMINATIVE	ABLATIVE	GLOSS
a.	nom	nomoos	'book'
b.	xoino	xoinoos	'north'
c.	odoo	odoo[g]oos	'now'
d.	noxoi	noxoi[g]oos	'dog'

When the Ablative suffix -/AAs/ is added to a stem ending in a consonant or a short vowel it surfaces unchanged, modulo [BACK] and [ROUND] harmony. Stem-final short vowels delete before the long vowel of the suffix, as in *xoinoos* (4b).

However, the traditional characterization does not take into account how the phonological system of modern Mongolian works. Specifically, its vowel inventory and harmony system are organized in terms of [ATR] rather than [BACK] oppositions, and it has

undergone the realignment of vowel length in (3e-f), whereby in non-initial syllables short vowels delete and long vowels become short. The correct representations for the forms in (4) are therefore as in (5):

(5)   ABLATIVE /-As/ (UPDATED WITH PHONETICALLY ACCURATE TRANSCRIPTIONS)

	NOMINATIVE	ABLATIVE	GLOSS
a.	nɔm	nɔmɔs	'book'
b.	χɔɛn	χɔɛnɔs	'north'
c.	ɔtɔ	ɔtɔ[ʁ̩]ɔs	'now'
d.	nɔχɔ(ɛ)	nɔχɔ(ɛ)[ʁ̩]ɔs	'dog'

Reflecting the phonological facts of the modern language allows us to make sense of the epenthesis process in a simple fashion: when a vowel-initial suffix is added to a vowel-final stem, /g/ is inserted to avoid hiatus (Svantesson et al. 2005:55).

The surface manifestations of this /g/ phoneme are rather complicated. Svantesson et al. (2005:55) state that the epenthetic /g/ surfaces as a velar stop in non-pharyngeal harmonic spans and as uvular [ɢ] in pharyngeal spans. This appears to be true in word-initial and word-final positions, as in the form цэрэг [tsiˈɾikʰ] 'soldier', which is produced with a velar stop in a non-pharyngeal span.

Intervocalic /g/ may also surface as a stop, e.g. in [pæxguigeɾ] 'without being' and the name *Khaltmaagiin* [χałtˈmagiŋ]. However, Stuart & Haltod (1957) note that /g/ becomes a voiced dorso-velar lenis fricative [ɣ] intervocalically (cf. Janhunen 2012:52) or when adjacent to the liquids /l/ and /r/. Our native speaker consultant also spirantizes under certain conditions in this context, though (as one expects from Svantesson et al.'s (2005) description of the harmony system) the /g/ surfaces as a uvular in pharyngeal spans, as in зарас /tsaɢs/ [tsaʁəs] 'fish' and болгож [pɔɮˈʁɔtʃ] 'be.CAUS.CNVB'. One also

finds the stop allophone after liquids in some contexts, e.g. суулгах [sʊːɮɢɑχ] 'install.INF', хөдөлгөөн [xʉdəɮˈɡoŋ] 'motion', and өргөн [ʉrˈɡəŋ][8].

Svantesson et al. (2005) and Janhunen (2012) do not discuss the allophony of /g/ in other potentially relevant environments, namely C_V and V_C. Our elicitation revealed that /g/ can surface as a stop or fricative in the C_V context, as in харцгай [ħɑʨsˈɢɛː] 'hawk', хашгирах [ħæʃʁəˈrɐχ] 'scream-INF', Монгол [mɔɴɢɔɫ] 'Mongol', дасгал [tɑsˈɢɐɫ] 'exercise', битгий [pitʰˈx̱iː] 'not', мөнгөн [mʉnˈɡəŋ] 'silver'[9]. In the V_C context underlying /g/ can also surface as a stop or fricative, as in гагнуурчин [ɢɑʁˈnʊrtʃɪn] 'welder', удирдагч [ʊdɪrˈdɐχtʃ] 'leader', бодогдох [pɔdɐɢˈdɔχ] 'think.INF', зөөгч [zoːɣtʃ] 'provider', эмэгтэй [iməx̱ˈtej] 'woman', сэтгүүл [sɪtˈguːɫ] 'magazine'[10]. The conditions under which /g/ surfaces as a stop vs. a fricative in these contexts require further research.

The allophonic distribution of the phoneme /g/ can be summarized as follows:

(6) ALLOPHONES OF /g/ IN MODERN MONGOLIC LANGUAGES (MODIFIED AND AUGMENTED FROM JANHUNEN 2012:52)

SPAN	#_	V_V	C_V	V_C	_{C, #}
[+ATR]	g	ɣ, ɰ̥	g, x	ɣ, x	g, k
[-ATR]	ɢ	ʁ, ʁ̥	ɢ, ʁ	ɢ, ʁ, χ	ɢ, q

When we consider the origins of GZA it may be worth bearing in mind that most or all of the modern Mongolic languages spirantize /g/ intervocalically, and this may preserve the state of affairs that existed in Early Mongolic. It is also worth mentioning at this point that Mongolian does not possess a separate voiced dorsal continuant phoneme /ɣ/

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8   Forms and pronunciations accessed at www.forvo.com, 27 March 2019.
9   Forms and pronunciations accessed at www.forvo.com, 27 March 2019.
10 Forms and pronunciations accessed at www.forvo.com, 27 March 2019.

or /ʁ/; all surface tokens of [ɣ] and [ʁ] are assigned to the phoneme /g/. Thus, when we speak of GZA we refer to the *phoneme* /g/, which in GZA situations is typically realized as a dorsal fricative or approximant by virtue of being intervocalic.

Returning to the distribution of GZA, it appears to be completely general in Mongolian, surfacing with all known vowel-initial suffixes, of which we have been able to identify the 23 shown below in (7) for Khalkha.

(7)   KHALKHA SUFFIXES SHOWING GZA

-(G)AA imperfective   -(G)AAr instrumental
-(G)UUl causative   -(G)AA reflexive, possessive
-(G)AArai 2pers prescriptive/fut imperative   -(G)UUl/r agentive
-(G)AAc/t 2pers precative   -(G)AAs ablative
-(G)UUr/l comitative   -(G)AAd approximative
-(G)AAsai 3pers desiderative   -(G)UUr superessive, directive, prolative
-(G)AAd perfective gerund/converb   -(G)AAx causative
-(G)UUshtai ambivalent non-finite necessitative   -(G)AAd distributive (for numerals)
ppl/converb   -(g)iig accusative
-(G)UUt disjunct terminative concominant converb   -(G)AAguyd dative negative ppl
-(G)UU(dza)i 3pers dubitative   -(g)ii(n) genitive
-(g)iish present imperative   -(G)AA(n) deverbal noun

As Staroverov (2014:280) puts it, "dorsal epenthesis is not morphologically restricted." He gives examples of GZA after nominal and verbal stems and after derivational suffixes, and the suffixes that participate in GZA can be derivational or inflectional.

The one exceptional suffix, as pointed out by Svantesson et al. (2005:75), is the infinitive or future participle, which surfaces as -x after vowels and -əx after consonants. The suffix could be represented as /-əx/, but this would constitute the only occurrence of schwa in an underlying representation in the language. It would also necessitate making

an exception to the GZA process such that forms like *nee* 'to open' do not surface as **neegex* rather than the attested *neex*.

Another apparent exception involves loanwords with what appear to be short vowels, such as *pizza*. On the basis of native alternations like *xoino* 'north' and its ablative *xoinoos*, we might expect the final orthographic <a> of <pizza> not to be pronounced, and for this word to have a paradigm with nominative *pizz* and ablative **pizzaa*. This does happen with some loans, such as *America* with nominative *Amerik* and ablative *Amerikaas*. Other loans, such as *radio, chimpanzee, Congo, Obama,* and *pizza,* retain their final vowel and select the *g*-initial allomorph of the suffixes in (7). In (8) we provide a translation of a Mongolian Pizza Hut advertisement that demonstrates this pattern.

(8) дуртай   пиццагаа   ундсэн   унээр   нь
     durtai   pitstsa-gaa   ündsen   ün-eer   n'
     ˈtɔrhta: pi:tsɐˈʁa: ˈuntsu   uˈneʁ   un
     favorite pizza-poss/refl base   price-instr def
     'enjoy your favorite pizza at the base price'

Our informant produces this sentence with a full final vowel in *pizza*, rather than a reduced one; the orthography just happens to preserve the spelling of the source language. Some archaic words show this effect as well, such as the name of Togtoa, one of the tribal leaders conquered by Chinggis Khan in *The Secret History of the Mongols*. This name has the ablative form *Togtoa-gaas* in the Khalkha translation of the book (Perlee 1958).

As mentioned earlier, one also finds GZA with Chinese loans ending in syllabic consonants in varieties that possess these, such as Khorchin Mongolian, spoken in northeast Inner Mongolia. The speaker of Khorchin consulted by Puthuval (2013) has essentially

the same system of GZA as Khalkha speakers do, but by virtue of this variety possessing Chinese loans with the syllabic retroflex fricative [ʐ̩], it is revealed that consonantal nuclei select the /g/-initial variant of following morphemes as well, as in [tʃaʊʃʐ̩ː-gaːr] 'supermarket-ABL.'

Finally, GZA does not occur in non-derived contexts, contrary to what Karlsson (2005) and some others imply. This is true not only for loans such as *xaos* 'chaos' and *teorem* 'theorem' but also for native forms such as the aforementioned name *Togtoa* (which is not pronounced *Togtoga).

We can now summarize the synchronic behavior of GZA as follows:

(9)   Synchronic behavior of /g/~zero alternations

    a.   The phoneme /g/ can appear, without morphological restriction, whenever morpheme concatenation would otherwise be expected to produce a sequence of a syllable Nucleus followed by another Nucleus. The first Nucleus can be a vowel (which is normally written long but not always, especially in loanwords), a diphthong, or a syllabic consonant. The second Nucleus invariably contains a full vowel that is written as a double vowel. The second vowel is never a diphthong, but this is probably because Mongolian has no diphthong-initial suffixes (though there are suffixes that contain non-initial diphthongs, e.g. possessive -tai).

    b.   GZA is word-bound; it does not appear across word boundaries or with clitics, such as the enclitic question marker -UU, which instead inserts [j] when attached to a vowel-final word.

    c.   The /g/ appears in hiatus configurations regardless of whether the stem is native or borrowed.

    d.   The lone apparent exception is the infinitive suffix -əx, which does not attach directly to vowel-final stems as we would expect if it were underlyingly /x/, and does not trigger appearance of /g/ after vowel-final stems as we would expect if it were underlyingly vowel-initial.

3 Diachronic development of GZA

Having established the synchronic distribution of GZA, we can now discuss how these alternations may have arisen diachronically. We believe that the periodization of the history of Mongolian by Nicholas Poppe (1955, 1959, 1964) contains the key to the origins of GZA. According to Poppe, there were four main stages in the development of Modern Mongolian from Ancient Mongolian, the latter being a language very close to what is reflected in texts written in the Uyghur Mongolian script in the 13th century.

The first stage, which Poppe calls Ancient Mongolian, is characterized by the existence of intervocalic voiced velar consonants, *ɣ and *g, the former appearing in [BACK] contexts such as *aɣula* 'mountain' and the latter in [FRONT] contexts such as *temegen* 'camel.' Poppe confusingly uses the symbol ɣ to denote a voiced uvular stop, IPA [ɢ]. His main reason for assuming that *g* and *ɣ* were stops rather than fricatives at this point seems to have been the existence of early loans from Mongolian into Turkic and Tungusic languages where they surface as stops, even though the languages in question also possessed the corresponding fricatives. This can be seen in the word for camel being borrowed by Evenki as *tĕmĕgẽẽ* and the word for goat (by hypothesis [imaɢan] in Ancient Mongolian) being borrowed by Barguzin Evenki as *imagan*. Poppe also seems to have taken the fact that Uyghur Mongolian script renders the voiced uvular with the Uyghur symbol for *q* rather than its symbol for *ɣ* as evidence that a stop rather than a fricative was being borrowed.

Poppe's next stage, which he calls Proto-Mongolic, involved the spirantization of invervocalic *g and *ɣ (i.e. ɢ) (Poppe 1960:41,46). Many scholars believe that loans from this period can be identified in Chagatay and Persian (e.g., Nagy 1997), such as the word for 'snow and wind storm' *boruɣa(n)*, which appears to have been borrowed both at the spirantization stage as *boraʁan* and at the next stage, where the spirants deleted altogether, in this case giving *borān*.

This third stage, according to Poppe, appears to have been reached by the mid-13th century and involved gradual disappearance of *g and *ɣ and the resultant identical vowels in hiatus contracting into a single long vowel. This stage also characterizes Middle Mongolian, of which *The Secret History of the Mongols* is the most famous representative. Poppe maintains that the intervocalic fricatives disappeared entirely at this stage; if the two vowels brought together in this way were identical they merged into a long vowel as in *temē* 'camel,' but non-identical vowels remained distinct, as in *aula* 'mountain.' During this period, Ilkhanid Mongolian word lists began to appear in Armenian, Persian, and Arabic contexts. For example, in 1241 the Armenian monk

Kirakos Gandzakets'i produced a list of 50 Mongolian words that he had encountered following the Mongol Invasion, which included *tʰaman/tʰamun* 'camel' and *iman* 'goat', both displaying loss of the original intervocalic dorsal consonant. This stage is preserved in the geographically peripheral modern languages Moghol, Santa, and Dagur.

In the languages that progressed to the fourth stage, the remaining vowel sequences merged into long vowels as well.

Many researchers other than Poppe believe, though, that while the western Mongolian of the Ilkhanid state may have completely deleted the reflexes of intervocalic *g/ɢ* by the third stage, back in the homeland, Middle Mongolian maintained a consonant in this position; we return to this issue later in this section. While there are some reasons to believe that this may be true, it is clear that by the time of the breakup of Common Mongolic there was no such consonant left intervocalically, as none of the modern languages preserve a consonant in this position.

The lenition of intervocalic voiced dorsals created paradigmatic alternations that can be seen in Middle Mongolian, as with 'officer', the singular of which is *nojanlig* in *The Secret History*, alternating with the plural *nojanli'ud*,[11] with lenition of the *g* intervocalically. With originally /g/-initial suffixes such as the causative and instrumental there is an interesting inversion: in Middle Mongolian they have /g/ after *consonant*-final stems and zero after *vowel*-final stems, but in Modern Mongolian they show /g/ after *vowel*-final stems and zero after *consonant*-final stems. Cleaves (1982:277) highlights different instrumental forms of 'archer', *učuma'ar* and *učumaɣar*, which suggest that there was synchronic variation in the presence or absence of intervocalic /g/ in Middle Mongolian. This, together, with paradigmatic alternations, could have provided a trigger for reanalysis by learners at the inflection point where GZA in the modern sense first appeared. That is to say, this appears to be the crucial point at which GZA developed. Up to Poppe's third stage, Mongolian did not generally allow vowel hiatus word-intern-

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11   Mongolists represent the mysterious intervocalic reflex of original *g* with an apostrophe.

ally; when morpheme concatenation produced a string of two vowels in Preclassical Written Mongolian, a [j] was typically inserted, so that for example the accusative was -*i* after consonant-final stems but -*yi* after vowel-final stems (Poppe 1964:75). The paradigmatic alternations resulting from this epenthesis were preserved in Middle Mongolian, so again for example, the genitive -*in* added to the name *Tamacha* produced *Tamacha-yin*.

We suggest that, at a certain point in time, some learners were exposed both to outputs of Stage 3 with intervocalic /g/ insertion and to /g/-ful outputs produced by Stage 2 speakers without the deletion rule, and/or to speakers with variable deletion. This is what Bermúdez-Otero (2018) calls "localized bifurcation", where an innovation is undertaken by some speakers within a community but not others. We suggest that some learners at this stage hypothesized that intervocalic /g/ was, in Vennemann's (1972) words, a "hiatus breaker" rather than part of the words to which it historically belonged. The new rule of /g/-insertion would then have generated non-etymological instances of /g/, as in the ablative suffix -*As*. The Ancient and Middle Mongolian ancestor of this suffix was -*ača* and invariably surfaced in vowel-initial form; in Modern Mongolian, -*As* surfaces with initial /g/ when attached to vowel-final stems, as we have seen.

Subsequently, in what is essentially the modern system, we suggest that one or more speakers postulated that the rule of /g/-insertion was restricted to derived environments. In the theories of Lexical Phonology (Kiparsky 1982) and Stratal Optimality Theory (Bermúdez-Otero 1999, Kiparsky 2000), this is an automatic consequence of a process entering the lexical phonology, which is arguably where one would locate /g/-insertion. However, we contend that the original process of intervocalic /g/ lenition, which in traditional terms is post-lexical as it has no exceptions and applies across word boundaries, remains active in the post-lexical phonology throughout all of the stages just reviewed. This is reminiscent of Bermúdez-Otero's version of "rule scattering", in which derivatives of an originally low-level process can move into higher levels of the phonological component (e.g., the lexical stratum) while leaving the original in place.

To summarize, we propose that Mongolic intervocalic /g/-*insertion* arose from an original process of /g/-*deletion* via reanalysis. This sort of development has many parallels cross-linguistically, including with ɣ in many dialects of Modern Greek studied by Newton (1972), as well as with *r* in English (see e.g. Vaux & Samuels 2017).

If our proposal is correct, it has implications for the identity of the mysterious intervocalic consonant represented as ꣖ in Written Mongolian, which in Ancient and Middle Mongolian has variously been proposed to represent **h* (Svantesson et al. 2005:121), **ħ* (Miller 2002, Hill 2009), **x* (Jahnhunen 1999, 2003), **ɢ* (Poppe 1964), **ɣ* (Doerfer 1963), **ʙ* (Shiratori 1929, Hattori 1939, Kobayashi 1954, Street 1957, Miller 2002), **ʕ* (Poppe 1951), or nothing at all (Pelliot 1925; Poppe for Middle Mongolian). If the mystery consonant were *h, x,* or *ʕ*, hypercorrection should have inserted these respectively; we would then be left with no explanation for the development of /g/-insertion. If the Written Mongolian and hPags-pa symbols in question were mere markers of hiatus, as Pelliot suggested, we again cannot explain the rise of /g/-insertion. If the mysterious intervocalic consonants were allophones of /g/, on the other hand, it makes sense that the phoneme /g/ would be chosen for insertion.

4 COMPETING ACCOUNTS OF GZA

GZA has emerged at the forefront of the controversy over C epenthesis (see, e.g., Żygis 2010, de Lacy and Kingston 2013, Uffmann 2014, Morley 2015, Staroverov 2016), since epenthetic dorsals are unexpected on the basis of markedness. In most Optimality Theoretic (OT) approaches, an epenthetic segment is inherently unfaithful and must therefore be relatively unmarked to emerge. However, [dorsal] is considered to be quite marked as a C-place (see, e.g., Lombardi 2002, de Lacy 2006), so the rare cases of epenthetic dorsal Cs in the Mongolic languages have been met with some scepticism (e.g., de Lacy & Kingston 2013; Staroverov 2014, 2016). Some scholars have proposed that GZA is not the product of a synchronic phonological process, but rather involves

suppletion (de Lacy & Kingston 2013, Staroverov 2016). Others have suggested that /g/ is in fact expected as an epenthetic C in Mongolian, based on considerations of prosody (Uffmann 2014) or faithfulness (Staroverov 2014). In this section we discuss each of these proposals in turn, beginning with the possibility that GZA could be analysed as deletion.

4.1 DELETION

An account of GZA in terms of deletion of stem-final /g/ is precluded by the phonological facts of the language. As an example, consider a deletion analysis of the alternation between the nominative [xu:] 'boy' and the instrumental [xu:ger]. One would posit a stem /xu:g/ and suffix /-Ar/, plus a rule that deletes /g/ in some appropriate context. However, finding such a context does not seem to be possible, given that (i) dorsals are permitted word-finally in Mongolian, as in [pag] 'team'; (ii) dorsals are specifically permitted word-finally after long vowels, as in [za:g] 'border' and [ʊ:g] 'may s/he/it drink'; and (iii) dorsals do not normally delete after other Cs, as in /bos-g-Ax/ [pɔsɢəχ] 'stand-CAUS-INF' (Svantesson et al. 2005), and when /g/ appears in a derived -gC# sequence, it triggers vowel epenthesis, as in /udz-g/ [udzək] 'may s/he see.' We conclude that GZA is not obviously amenable to a deletion analysis.

4.2 ALLOMORPHY

It has been proposed by de Lacy (2006) and de Lacy & Kingston (2013) that Buriat GZA constitutes an example of morphological suppletion. They provide two arguments in favor of this analysis, neither of which holds for Khalkha. First, they claim that Buriat GZA is highly morphologically restricted, occurring with only three morphemes (the instrumental, the genitive, and the reflexive possessive). Staroverov (2016) extends this list to ten morphemes. The number of participating morphemes therefore raises suspi-

cions in Buriat, as Morley (2015) notes,[12] and even more so in Khalkha. There are at least 23 morphemes that participate in GZA in Khalkha (recall (6)); it applies with both derivational and inflectional suffixes, and there is only one exception in the whole affix system of the language. Attributing GZA to allomorphy in the Khalkha scenario would effectively be treating the fact that at least 23 morphemes undergo exactly the same alternation as a massive coincidence involving the vast majority of the language's morphemes.

The second argument for a suppletion account of Buriat is that the environments in which the /g/ appears are not the same across the three participating suffixes, and further that the surface realizations of at least the possessive suffix are rather distinct: *-ai* after consonants, *-gai* after long vowels, *-n* after final [i:] and diphthongs, and *-iin* after short vowels. Interestingly, the genitive behaves in a very similar fashion in Khalkha, which Odden (2019) summarizes as follows:

(10)   REALIZATIONS OF /-in/ GENITIVE SUFFIX IN KHALKHA (MODIFIED FROM ODDEN 2019:37)

    a.   Final /n/ ([ŋ]) deletes if the stem ends with /n/; cf. [nɔjɔŋ] 'Mr.', genitive [nɔjɔn-i]

    b.   After anything ending in orthographic <й> (e.g., so-called "long i" and diphthongs), the /i/ of the suffix deletes, as it also does in the accusative /-ig/; cf. [daʤai] 'ocean', genitive [daʤai-ŋ].

    c.   Dorsal-initial form occurs after vowel-final stems, with the above exception; cf. [sana] 'thought', genitive [sanagiŋ].

The phonological similarities between the forms in (10) are obvious, as are the phonological processes required to derive them, so these alternations do not require a suppletion

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12   Morley (2015) provides a number of arguments that Buriat provides a learner with robust evidence for epenthesis, which we will not recap here.

analysis *prima facie*. However, from our perspective there is no problem in principle with suppletion co-existing with consonant epenthesis, so it would not automatically constitute evidence against our proposal if a small number of morphemes with exceptional behaviour (e.g., the Khalkha infinitive *-əx*) exist amidst the landscape of a more general phonological process in which the majority of morphemes participate.

A third argument against an epenthetic account of GZA in Buriat comes from Staroverov (2016), who contends on the basis of data from nine Buriat speakers in a nonce suffixation task that GZA is not productive in this language, and must therefore be morphological rather than phonological. He suggests that GZA may be "represented as a property of affixes (either independently or generally for all of them." If GZA is an individual property (realized in Staroverov's account as a floating feature[13]) of 10+ morphemes in Buriat—or worse yet, 23+ in Khalkha—, again this is a massive coincidence and missed generalization. It is unclear what a "general" GZA property of this class of affixes might be, if not a phonological rule.

Moreover, the results of Staroverov's nonce suffixation task are puzzling and suggest to us that it lacked ecological validity. He asked speakers to produce forms with a nonce "augmentative" suffix of the form /-A:bA:/. Of the nine tested speakers, two predominantly inserted /r/ at the morpheme boundary, one predominantly inserted /l/, one predominantly inserted /g/, and one predominantly inserted /b/; the remainder employed a vowel deletion strategy. There are no processes of /b/, /r/, or /l/ insertion in Buriat, so whatever these four speakers hypothesized, it does not reflect their native phonology. However, as Staroverov notes, many of the training and filler items in the experiment ended in /r/ or /l/, which may explain the three speakers' invention of such an epenthetic C. The /b/ insertion could reflect a copy of the consonant in the nonce suffix. Although the majority of speakers did epenthesize some C in the V_V: context, the results do not

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13 We also note that Staroverov's (2016) account crucially relies on vowels being truly bimoraic due to the ranking MAX-BIMOR >> DEP, because in order for the floating feature to surface, a root node needs to be inserted, and that repair can only be preferred over deletion if MAX-BIMOR is highly ranked. This assumption about the vowel system appears to be incorrect for reasons reviewed earlier.

favor any particular analysis, but instead suggest that the speakers were biased by statistical regularities in the training/filler materials, rather than performing in a naturalistic manner. Moreover, the premise upon which the experiment rests is itself dubious: non-application of a phonological process to a novel suffix does not entail that the process itself does not exist (Pierrehumbert 2006); conversely, an irregular morphological process can be extended by analogy, as in the innovative English irregular past tense forms *dive ~ dove* and *sneak ~ snuck*. We conclude that, at best, Staroverov's results suggest that speakers of Buriat prefer to avoid hiatus. This may be an interesting result for independent reasons, but says little about GZA in Buriat and nothing at all about GZA in Khalkha.

It may be difficult to rule out a suppletion account of Khalkha entirely,[14] though it finds very little support. Once one admits allomorphy as a possible account of this type of pattern, the phonological theory no longer makes predictions about the range of possible epenthetic consonants: if an "impossible" C-Ø alternation is observed, it can simply be treated as allomorphy, and the phonological theory's prediction becomes unfalsifiable (see also Odden 2019:35 on this point).

4.3 SPLITTING

Staroverov (2014) presents an account of GZA in terms of "splitting", which he proposes as an alternative to C epenthesis more generally. In such an account, markedness plays no role in the selection of the output C (in this case, the various allophones of /g/). Rather than being inserted, the hiatus-breaking C "splits" from a neighbouring input vowel, and the identity of output C is driven by IO faithfulness to the neighbouring segments. This theory makes strong predictions regarding the occurrence of epenthetic Cs, since "[t]he inserted [C] will always be featurally the closest available to the input [Vs]

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14 This is in part due to the word-boundedness of the phenomenon. In languages with C epenthesis across words, like English /r/-insertion, more definitive arguments against a morphological account can be made; see e.g. Vaux & Samuels (2017).

…. All [Cs] which are featurally closer to the same [V] must be blocked in the same language" (Staroverov 2014:36).[15]

Splitting theory requires a number of unusual assumptions within Optimality Theory (OT) with Correspondence (McCarthy & Prince 1995, 1999). Most crucially, it is stipulated that GEN does not allow insertion into syllable margins (Staroverov 2014:24), thus making DEP-C redundant since it can never be violated. This elimination of C epenthesis by fiat is not rationalized in any way, which is particularly unsatisfying given that true V epenthesis is still permitted. As such, splitting theory violates "freedom of analysis," or the notion that GEN "applies all linguistic operations freely, optionally, and sometimes repeatedly" (McCarthy 2007:264). If C epenthesis is somehow not a "linguistic operation," again, we are in need of an explanation for this striking asymmetry between Vs and Cs. McCarthy (ibid.) specifically notes in this regard that "complicating GEN with limits on epenthesis is unnecessary, since EVAL puts limits on epenthesis anyway." However, this is the core assumption upon which splitting theory rests.

Splitting is taken to transform an input segment, say $/i_1/$, into multiple corresponding output segments, e.g. $[j_1i_1]$ (Staroverov 2014:27ff). This violates INTEGRITY, and except for homorganic vocalic glides,[16] also violates various IDENT-F constraints. In exchange, violations of markedness constraints such as ONSET or FINAL-C are reduced. The splitting operation that produces faux-epenthetic Cs is taken to be both binary and local; the output correspondents produced by splitting must be only two in number, and must be adjacent to one another (Staroverov 2014:29). However, Staroverov (2014:398ff) later argues that the splitting operation that produces "echo" V faux-epenthesis must *non*-local, as it produces the mapping $/V_iCCV_j/ \rightarrow [V_iCV_iCV_j]$. He claims that the operation

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15 Feature-closeness is defined as follows (Staroverov 2014:67): "Given three segments, α,β,γ such that β differs from α in all and only the values of features from the set $\Theta=\{F1\dots Fn\}$, and γ differs from α in all and only the values of features from the set $\Pi=\{F1\dots Fm\}$, $[\gamma]$ is featurally closer to $[\alpha]$ than $[\beta]$ is iff $\Pi\subset\Theta$.

16 The emergence of vocalic glides and laryngeals (the latter proposed to be [-CONS, +SON] approximants) is taken to represent V epenthesis, not splitting. Consonantal glides and laryngeals (Cs with Glottal place) cannot be epenthetic unless a language lacks dorsal Cs entirely, since otherwise those Cs would be featurally closer to the Vs by virtue of their shared [DORSAL] feature. Note that, in this system, the definition of Onset cannot refer to [+CONS].

of splitting a C into a nuclear position is unattested, and suggests that it may be ruled out by Gen; this entails that splitting of Vs into nuclei is *always* non-local. He adds, rather circularly, that this may be "why true insertion may be available with nuclei but not with margins" (Staroverov 2014:399). None of these V-C asymmetries, which must be universal as part of Gen, are explained.

In order to account for Mongolian GZA specifically, a particular analysis of the Mongolian feature inventory must be assumed, such that allophones of /g/ are able to emerge as the closest featural matches to the input Vs from which they split (Staroverov 2014:269ff). Vs are taken to be [+voice, dorsal], and all glides in the language are assumed to be [+cons]; epenthesis of vocalic glides is prevented by highly ranked *Margin/V. Splitting of input vowels to produce [g, G][17] is achieved via the ranking of Ident constraints in (11); for a more complete ranking, see Staroverov 2014:288). No other Cs share [+voice, dorsal] with vowels, as there are no other non-nasal voiced dorsals in the language. Thus, the dorsals that emerge are the closest in featural specification to the input vowels.

(11)   Khalkha constraint ranking (Staroverov 2014:285)

Ident-[place], Ident-[nasal] >> Ident-[cons], Ident-[sonorant] >> Ident-tongue position (e.g. [high])

Although this ranking may be able to generate GZA in Khalkha, it runs into problems with GZA in the closely related Mongolic language Dagur. Dagur has epenthesis of /g/ in the verbal system but /j/ in the nominal declension, as in (12) below from Nugteren (2011). Note that the glide is not homorganic, but invariant.

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17   Or [ɣ, ʁ]; he remains agnostic as to the exact specification of these Cs.

(12) Dagur epenthesis (Tsumagari 2003)

a.	akaa-AAs	'older brother-abl'	→	akaayaas
b.	shiree-AAs	'table-abl'	→	shireeyees
c.	tulie-AAs	'firewood-abl'	→	tulieyees
d.	coloo-AAs	'stone-abl'	→	colooyaas
e.	oo-AAcing	'one who drinks-part.ag'	→	oogaacing

Staroverov (2014:60-61, 94-96) makes a number of specific predictions regarding glide epenthesis, as shown in (13):

(13) Predictions of the Splitting theory for glide epenthesis in non-high vowel contexts (slightly modified from Staroverov 2014:96)

a. Glide epenthesis next to any non-high vowel violates IDENT-[high]. Therefore if glide insertion is extended to non-high vowels, the epenthesis-motivating markedness constraint (e.g. ONSET) must dominate IDENT-[high].

b. For high and mid vowels one of the inserted glides is more faithful than the other. Consequently, unless some markedness constraint (e.g. *ji/wu) has a blocking effect, glide epenthesis next to high and mid vowels will always be homorganic.

c. Homorganic glide epenthesis next to mid vowels is more faithful than glide epenthesis next to low vowels. Therefore while languages that insert glides next to high and mid vowels are expected, there should be no languages which insert glides next to high and low (but not mid) vowels.

d. For low vowels, none of the glides is more faithful than the other, and therefore we expect to find both [j] and [w] epenthesized in this context.

First, the Dagur pattern illustrates non-homorganic glide insertion next to non-low vow-els, contra (13b).[18] Second, Staroverov follows Levi (2004, 2008) in positing that glides can be either consonantal or vocalic. Let us for the sake of argument assume that Dagur [j] in (12) is consonantal, a position defended by Tsumagari (2003), in which case it is specified as Coronal place whereas all vowels are Dorsal (Staroverov 2014:271). Since the glide is not homorganic in this case, it incurs a number of IDENT violations (see e.g. Staroverov 2014:92). Moreover, it does not share Dorsal place with the vowels, so it should be precluded from generation via splitting given that the language has dorsal Cs. On the other hand, we could posit that the [j] is vocalic. It would then share Dorsal place with Vs, and indeed would be featurally identical with /i/, thus blocking the ap-pearance of any [+CONS] segment via splitting in the same environment (Staroverov 2014:72ff). Since neither of these solutions is viable, the appearance of [j] in the nom-inal declension must be attributed to some mechanism other than splitting, presumably allomorphy, since Staroverov (2014:399) does not allow epenthesis in syllable margins. This results in two very different explanations for two extremely similar processes in the same language, both of them morphologically restricted to similar degrees.

Uyghur, another language with non-homorganic [j] epenthesis, poses a related set of difficulties for a splitting account.[19] Uyghur typically epenthesizes [j] in V_V and CV:_C environments that span a morpheme boundary regardless of the flanking vowels, as in (14).[20] In the CV:_C case, superheavy syllables are avoided via epenthesis of a [+HIGH] vowel.

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18 Similar patterns are found in Argobba (Leslau 1997), St Lucian Creole English (Carrington 1984), Galician (Pi-card 2002, citing Francisco Dubert García (p.c.), Greenlandic (Rischel 1974:101), the Abajero dialect of Guajiro (Mansen and Mansen 1984), Hausa long vowel sequences (Halle and Vergnaud 1980), Mangap-Mbula (Bugen-hagen 1995), Manipuri (Bhat and Ningomba 1997), Menomini (Miner 1975), Central Ojibwa (Rhodes 1976), Eastern Ojibwa (Bloomfield 1956), Eastern Ostyak (Gulya 1966), Pulu Annian (Oda 1977), Ayt Ndhir Tamazight Berber (Abdel-Massih 1968), and Turkish (Underhill 1976:29).

19 Our discussion here closely follows Vaux & Samuels (2017), where we discuss the problems posed by the same set of Uyghur facts for markedness-based theories of consonant epenthesis.

20 There are reasons to believe that this glide is consonantal, which we do not present here; the same argument just outlined above for Dagur would apply if it were vocalic.

(14) UYGHUR [j] EPENTHESIS (HAHN 1991:25)

a.	/oqu-Al/	→	[oqujal]	'to be able to read'
b.	/iʃlæ-Al/	→	[iʃlæjæl]	'to be able to work'
c.	/ju:-b/	→	[jujup]	'wash and'
d.	/su:m/	→	[syjym][21]	'my liquid'

One immediate problem for splitting is that [j] is less faithful to flanking [+ROUND] and [+BACK] vowels than [w] is, and it is also less faithful to [-HIGH, +BACK] vowels than [h, ʔ] would be. Given the presence of /w/ and /h/ in the Uyghur inventory, there is no evidence for *w or *LAR to rule out their emergence via splitting.

A second problem is that the possessive in Uyghur shows free variation between epenthetic [r] and [j]:

(15) UYGHUR POSSESSIVE MARKING (HAHN 1992:90)

	STEM	1.SG /-m/	2.SG /-ŋ/	3.SG /-(s)i/	GLOSS
a.	qɨz-lar	qizlirim	qizliriŋ	qizliri	'girls'
b.	ʔana	ʔanam	ʔanaŋ	ʔanisi	'mother'
c.	baha:r	baharim	bahariŋ	bahari	'spring'
d.	kotʃa	kotʃam	kotʃaŋ	kotʃisi	'street'
e.	sija:	sijajim~sijarim	sijajiŋ~sijariŋ	sijasi	'ink'
f.	toxu:	toxujum~toxurum	toxujuŋ~toxoruŋ	toxusi	'chicken'

This pattern poses significant difficulty for a splitting account, for the same reasons discussed above. The same problem also occurs in Farsi, in which epenthetic [j] and [ʔ] are in variation after mid vowels, as Staroverov (2014:136-137) notes. Furthermore, while

21 The unexpected fronting here is not a typo—see Hahn (1991:25).

the Uyghur pattern is admittedly morphologically restricted, it is not amenable to an analysis in terms of allomorphy. C-initial suffixes attach directly to stems ending in short V, but give rise to a [+HIGH] epenthetic V when attaching to C-final stems. Thus, if the possessive suffixes had C-initial allomorphs, e.g. *-jim/-rim*, we would expect V-final stems like *ʔana* (15b) to surface as **ʔanajim~*ʔanarim*, counter to fact. Additionally, *r*-final stems like *bahar* (15c) never surface with [j] instead of [r]. This process also occurs in Chinese and Russian loans, of which Hahn (1992) provides numerous examples. It should also be noted that the two epenthetic Cs that appear in Uyghur are precisely the ones that optionally delete in coda position (Hahn 1992:77ff). This connection between deletion and insertion occurs frequently, just as we have seen in the history of Mongolian; see Blevins (2008) and Vaux & Samuels (2017) for a number of other examples.

We contend on the basis of its dubious theoretical underpinnings and empirical problems that a splitting account of Mongolian GZA cannot be maintained. Given the problems with potential accounts in terms of deletion and allomorphy described in the previous subsection, we are left with the conclusion that this process is most insightfully described as a true case of C epenthesis.

5 CONCLUSION: GZA IS TRUE CONSONANT EPENTHESIS

In the present work we described Mongolian GZA from both diachronic and synchronic perspectives with the aim of documenting its historical development and providing an insightful analysis of the process as it occurs synchronically in Khalkha. GZA appears to have arisen from reanalysis of the lenition and eventual loss of intervocalic **g*, which took place prior to the breakup of Common Mongolic. Subsequently, several Mongolic languages underwent a major realignment of the vowel system summarized in Section 2. Understanding the outcomes of this realignment, which is not reflected in the orthographic systems used to write the modern languages, is crucial for properly character-

ising the environment in which GZA occurs. It is also important to note that GZA reflects alternations between a *phoneme* /g/ and zero. This phoneme surfaces intervocalically as a spirant in modern Mongolic languages; recall (6). Our account also sheds light on a long-standing question in Mongolian historical phonology, namely the identity of a controversial Written Mongolian character and its hPags-pa counterpart, which we have proposed represented allophones of /g/.

With a description of the phenomenon in hand, Section 5.1 established that the synchronic GZA process should not be characterized as /g/-deletion, though it arose from the aftermath of such a process historically. Numerous other cases of C-zero alternations with similar histories have been documented; see, e.g., Blevins (2008) and Morley (2012). Section 5.2 described the shortcomings of describing GZA in terms of allomorphy. Section 5.3 raised a number of theoretical and empirical problems with treating C-zero alternations as splitting rather than insertion. On this basis we conclude that GZA represents a case of dorsal epenthesis. Vaux & Samuels (2017) provide an overview of why this is unexpected in theories that consider epenthesis to produce 'emergence of the unmarked.'

Synchronically, GZA in Khalkha Mongolian can be captured with a traditional rule-based account in the spirit of Lexical Phonology. We propose specifically that insertion of /g/ occurs between two nuclei in derived environments, i.e., when affixation creates hiatus. This only happens between orthographically "long" Vs because "short" Vs are not yet present when the /g/-epenthesis rule applies, as they are themselves epenthesised later in the derivation. The /g/-epenthesis is followed by [pharyngeal] spreading. The historical /g/-deletion rule is no longer synchronically active, though /g/-lenition is.

We conclude that any descriptively adequate phonological theory must be able to account for the Khalkha pattern of dorsal epenthesis. Since both markedness-based and splitting-based OT accounts face difficulties with GZA and other patterns of its type, these patterns may require a return to a constraint-based approach without the fixed

markedness hierarchies that have been proposed, or a rule-based account such as the one presented here.

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