Base-driven leveling in Yiddish verb paradigms

Adam Albright
MIT

Draft: November 2006

1 Introduction

A noteworthy feature of Yiddish present tense verbal inflection is that, unlike many other Germanic languages, Yiddish has virtually no irregular stem vowel changes. Whereas Middle High German (the source language for Yiddish verbal inflection[1]) had numerous subclasses of verbs with different patterns of present tense vowel alternations, Yiddish verbs have the same vowel for all persons and numbers:

(1)   Present tense vowel alternations in Middle High German (MHG)

Infin.	*traːgen* 'carry'	*kriegen* 'get'	*gëben* 'give'	*dürfen* 'need'	wizzen 'know'
1SG	*traːge*	*kriuge*	*gibe*	*darf*	*weiʒ*
2SG	*treːg(e)st*	*kriug(e)st*	*gi(be)st*	*darft*	*weist*
3SG	*treːg(e)t*	*kriug(e)t*	*gi(be)t*	*darf*	*weiʒ*
1PL	*traːgen*	*kriegen*	*gëben*	*dürfen*	*wiʒʒen*
2PL	*traːg(e)t*	*krieg(e)t*	*gëb(e)t*	*dürfet*	*wiʒʒ(e)t*
3PL	*traːgen(t)*	*kriegen(t)*	*gëben(t)*	*dürfen*	*wiʒʒen*

---

[1]There is controversy concerning whether the development of the Yiddish language as a whole should be viewed in terms of monogenesis from Middle High German, or polygenesis from a set of source languages; see (Jacobs 2005, chapter 2), for an overview of the issues involved. This paper focuses specifically on verbal inflectional morphology, which can be traced back almost exclusively to a German source. The data discussed comes from modern eastern Yiddish, and except where noted, hold of all three major dialect areas (Northeastern, Central, and Southeastern). In order to keep the discussion as dialect-neutral as possible, Yiddish forms are cited using the standardized YIVO system of transliteration (http://www.yivoinstitute.org/yiddish/alefbeys_fr.htm), with the following modifications: I use <ə> for schwa (YIVO <e>); <ən, əl, ər> for syllabic sonorants (YIVO <n, l, r>); and <ɔ> for the back non-high rounded vowel (YIVO <o>). In addition, where relevant, I explicitly transcribe phonological processes such as voicing assimilation (e.g., *krikst* 'get-2SG'), where YIVO transliteration prefers the morphophonemic underlying value (*krigst*). I use the symbol '∼' to indicate synchronic alternation, '→' to indicate grammatical derivation, '>' to indicate regular sound change, and '⇒' to indicate replacement by an analogically rebuilt form.

(2) Invariant stem vowels in Yiddish (MHG *aː* > Yid. ɔ by regular sound change)

Infin.	*trɔgən*[2] 'carry'	*krigən* 'get'	*gebən* 'give'	*darfən* 'need'	*visən* 'know'
1SG	*trɔg*	*krig*	*gib*	*darf*	*veys*
2SG	*trɔkst*	*krikst*	*gi(p)st*	*darfst*	*veyst*
3SG	*trɔkt*	*krikt*	*gi(p)t*	*darf*	*veys(t)*
1PL	*trɔgən*	*krigən*	*gibən*	*darfən*	*veysən*
2PL	*trɔkt*	*krikt*	*gi(p)t*	*darft*	*veyst*
3PL	*trɔgən*	*krigən*	*gibən*	*darfən*	*veysən*

In (1), we see that MHG present tense paradigms sometimes had a distinct vowel in the 2/3SG (*tragen* 'carry': *trage*, *tregest*, *treget*) or in the entire singular (*geban* 'give': *gibe*, *gibest*, *gibet*). In Yiddish, all of these alternations have been eliminated, leaving a uniform vowel in all present tense finite forms. Note that alternations outside of the present tense paradigm are often retained: the infinitive of 'give' is *gebən* (not **gibən*), and the infinitive of 'know' is *visən* (not **veysən*). That is, leveling has reduced stem alternations specifically within the present tense inflectional paradigm, while leaving alternations outside the present tense relatively intact.

As is often the case with paradigm leveling, the changes in (2) suggest a wide variety of possible interpretations. The choice of *trɔg-* over *treg-* in the verb 'to carry', for example, might be attributed to the fact that it was the majority allomorph, occurring in 4 out of 6 present tense forms. The choice of *gib-* in 'to give' could conceivably be connected to the fact that it occurred in (among other forms) the 3SG, which is not only the most frequent part of the paradigm, but is also frequently thought of as the featurally least marked form. One might even wonder whether the choice of *darf* in the paradigm of 'to need' could have been motivated by a phonological dispreference for the high front rounded vowel [y], which has been eliminated in Yiddish (though normally by a regular sound change of unrounding to [i], not by paradigm leveling). Indeed, all of these factors seem plausible, and have been argued to play a role in cases of paradigm leveling in other languages (see, e.g., Hock 1991 chapters 10–11 for discussion, and §3 below). Frequently, it is not possible to disentangle these factors, because each individual change is compatible with multiple explanations. As we will see below, however, the Yiddish data is unusually revealing, since it involved the leveling of as many as ten different patterns of alternation—each with its own distribution throughout the paradigm. This lets us pinpoint the source of the prevailing allomorphs in far greater detail than is normally possible. I will show that when all classes of verbs are considered, the only generalization that covers all of them is that the form found in the 1SG always prevails, regardless of frequency, markedness, or the pattern of alternation. The empirical claim is that Yiddish verbs have been remodeled on the basis of the 1SG form, and that this statement alone is sufficient to account for the direction of leveling for each individual verb type.

A question that immediately arises is why the 1SG should have played such a privileged role in the history of Yiddish. This consistent directionality is surprising, under the widely held view that the direction of leveling can be influenced by numerous competing factors, in some way that is not fully deterministic—particularly since the Yiddish change runs counter to the more usual dominance of the more frequent and less marked 3SG form (Kuryłowicz 1947; Mańczak 1958; Mańczak 1980; Bybee 1985; Hock 1991). Furthermore, the consistency of the Yiddish changes is even more striking when viewed in relation to the closely related dialects of New High German (NHG). As we will see in section 4.1, NHG dialects have

---

[2]The infinitive suffix /-ən/ is realized in many contexts as a syllabic nasal: [trɔgn̩], [lebm̩]. For discussion, see Jacobs (1990), pp. 92–97, and section 3.3 below.

also undergone analogical change, but they have generally either extended alternations, or leveled to forms other than the 1SG. Thus, the question in a broader perspective is the following: why does Yiddish show a cross-linguistically unusual leveling to the 1SG, while other, morphologically very similar languages do not?

The goal of this paper is to show that this difference is not an accident, but follows from a deeper morphological difference in how verbal paradigms are organized in Yiddish. To preview the major claims, I will argue below that the direction of leveling is determined by the grammatical structure of the language, rather than by some non-deterministic competition between multiple factors. In particular, I argue for a model of paradigm structure in which one member of the paradigm is designated as a privileged base form, and the remaining forms are computed with reference to the base (Albright 2002a).[3] The contrast between Yiddish and German shows that the choice of base must be allowed to vary from language to language, and that the base selection procedure must for some reason consistently favor the 1SG for Yiddish, but not for German. I claim that the choice is made via an optimizing procedure that selects the base form that displays as many unpredictable contrastive properties of the lexical item as possible, using an algorithm to be described below. I argue that the contrast between Yiddish and German follows from a small but important difference between the two languages: in German, verb roots must end in a consonant or a full vowel, while in Yiddish, they may also end in a schwa (e.g., *shayn-* 'shine' vs. *taynə-* 'argue'). This difference seems inconsequential, but it means that Yiddish learners face an additional challenge of determining which verbs have stem-final schwa. This property is not trivial to recover, since stem-final schwas are frequently obscured by phonological processes that merge them with suffix-initial schwas. It turns out that the 1SG is the form in Yiddish that most clearly reveals the presence of stem-final schwa, as well as other lexically idiosyncratic properties of the verb stem. As a result, the 1SG is uniquely informative about lexically contrastive properties in Yiddish, but not so in German. Thus, the model predicts that inflectional paradigms should be organized differently in the two languages, which may in turn lead to differences in the directionality of leveling.

The paper is organized as follows: first, I present the data of Yiddish verb paradigms, comparing the form of modern present tense stems with their possible Middle High German sources. In every case, we will see that the modern form is identical with the expected 1SG form, consistent with the claim that the 1SG acted as the pivot of the observed analogical changes. Since this is, to the best of my knowledge, a novel empirical claim about the history of Yiddish, I will go through the various changes in some detail to establish the correctness of the generalization. Having done this, I then show that the 1SG is also revealed more lexically idiosyncratic contrasts than any other form, making it the maximally informative member of the Yiddish inflectional paradigm. Finally, I contrast the Yiddish change with facts from selected German dialects, showing that differences in informativeness correlate with differences in the directionality of leveling, precisely as predicted by the proposed model of paradigm organization.

---

[3]Existing proposals within Optimality Theory that make reference to privileged bases in paradigms include BASE IDENTITY (Kenstowicz 1997a)and Transderivational Correspondence Theory (TCT; Benua 1997). In those theories, the role of the base is strictly to enforce surface identity (output-output correspondence). The model laid out below is similar in spirit, but it also allows arbitrary (non-identity) correspondence relations to be established.

2   The shape of Yiddish present tense verb stems

The inflectional morphology of verbs in Yiddish can be traced back straightforwardly to some form of Middle High German (MHG).[4] In standard literary MHG, present indicative verbs were inflected with the person and number suffixes in (3) (Paul, Wiehl, and Grosse 1989, p. 241, §239). The italicized forms on the left represent standardized MHG orthography, and the remaining columns give a morphological breakdown and an approximate phonetic realization (Paul, Wiehl, and Grosse 1989, chapter 3).

(3)   MHG present tense inflection: *singen* 'to sing'

1SG	*singe*	/zɪŋg+ə/	[zɪŋgə]	1PL	*singen*	/zɪŋg+ən/	[zɪŋgən]
2SG	*singest*	/zɪŋg+(ə)st/	[zɪŋg(ə)st]	2PL	*singet*	/zɪŋg+(ə)t/	[zɪŋg(ə)t]
3SG	*singet*	/zɪŋg+(ə)t/	[zɪŋg(ə)t]	3PL	*singen(t)*	/zɪŋg+ən(t)/	[zɪŋgən(t)]

In Yiddish, the present tense suffixes have been preserved almost unchanged. In fact, there are only two differences, both of which were well underway already in late Middle High German and are shared with most New High German dialects: the reduction of 3PL *-ent* to *-en*, and a widespread loss of [ə] in final syllables. Note that in the 2SG, 3SG, and 3PL, the loss of the [ə] brought the final consonant of verb stem into contact with a voiceless coda obstruent, triggering regressive voicing assimilation. This assimilation is not systematically reflected in MHG or Yiddish orthography, but for clarity, I will indicate it here in transcriptions of Yiddish.

(4)   Yiddish present tense inflection: *zingən* 'to sing'

1SG	*zing*	/zɪŋg+∅/	[zɪŋg]	1PL	*zingən*	/zɪŋg+ən/	[zɪŋgən]
2SG	*zingst*	/zɪŋg+st/	[zɪŋkst]	2PL	*zingt*	/zɪŋg+t/	[zɪŋkt]
3SG	*zingt*	/zɪŋg+t/	[zɪŋkt]	3PL	*zingən*	/zɪŋg+ən/	[zɪŋgən]

Not all aspects of MHG verb inflection are preserved so faithfully in Yiddish, however. In particular, although MHG had a number of different patterns of vowel alternation within the present tense paradigm, Yiddish has no such stem vowel alternations, as already illustrated in (2) above. In the following sections, I review the various patterns of MHG stem alternations, considering the Yiddish outcome for each.

In inferring events in the history of Yiddish, I make the starting assumption that if an alternation was found in MHG but the regularly expected corresponding alternation is not seen in Yiddish, it has been eliminated through analogical change—either within Yiddish itself, or within some dialect or sociolect of German prior to the development of Yiddish. This seems like a simple assumption, but it is potentially controversial, because it goes against current scholarly practice that avoids defining Yiddish in relation to German (e.g., Jacobs 2005, p. 4); therefore, it merits some brief discussion. This assumption could be incorrect if, for example, Yiddish had developed as a contact language whose speakers had incomplete access to the full set of MHG alternations. If this were the case, then the loss of alternations could be

---

[4]The source language for German components in Yiddish was almost certainly not identical to the literary language of "classical" Middle High German (Landau 1895; Weinreich 1973, vol 4, pp. 117–118), but as far as verbal affixes are concerned, there are no significant differences that would require us to assume a more subtle starting point. We will see a case in which more careful dialect comparison is needed in section 2.3.2 below.

due not only to the system that speakers impose on the data (analogical forces), but also to the accidental lack of certain types of data in the input due to the contact situation (environmental forces). There are reasons to believe, however, that the loss of alternations in Yiddish cannot be attributed to incomplete data about the patterns of alternation in the source language. First, it is worth noting that early Yiddish texts do show essentially the full range of alternations seen in MHG, meaning that at least in the Western dialect region, Jews spoke a language that had inherited them. (Examples will be cited below as relevant.) Another argument for this position comes from the fact that when we look beyond present tense paradigms, even modern (eastern) Yiddish faithfully reflects the full set of MHG alternations in the past participle:

(5)   Preservation of alternations in the past participle

MHG infinitive, past participle	Yiddish infinitive, past participle	Gloss
b[iː]*ʒen* ~ *geb*[i]*ʒʒen*	*b*[aɪ]*sən* ~ *geb*[ɪ]*sən*	'bite'
sch[iə]*ʒen* ~ *gesch*[o]*ʒʒen*	*sh*[i]*sən* ~ *gesh*[o]*sən*	'shoot'
tr[i]*nken* ~ *getr*[u]*nken*	*tr*[ɪ]*nkən* ~ *getr*[ʊ]*nkən*	'drink'
h[ɛ]*lfen* ~ *geh*[o]*lfen*	*h*[ɛ]*lfən* ~ *geh*[o]*lfən*	'help'

Of more immediate relevance, Yiddish also preserves traces of many of the expected present tense stem allomorphs when they occur in forms outside the present paradigm. For example, as seen already in (2) above, the verb 'to give' has lost the allomorph *geb-* in the plural, but retains it in the infinitive (*geben*). Similarly the verb 'to know' retains the form *vis-* everywhere except the plural present tense. Some examples of this are given in (6); further examples are discussed below, in connection with the relevant alternation patterns. Forms that are not expected through regular sound change are in boldface. In each case, we see that although alternation has been eliminated within the paradigm, the very same expected allomorphs have been retained in the infinitive or some other related form.

(6)   Preservation of stem allomorphs outside the present paradigm (bold = unexpected)

		Infin.	1SG	3SG	1PL	Related
MHG	'give'	*g*[ɛ]*ben*	*g*[i]*be*	*g*[i]*bet*	*g*[ɛ]*ben*	*g*[aː]*be* 'gift'
Yiddish		*g*[e]*bən*	*g*[i]*b*	*g*[i]*(p)t*	**g[i]bən**	*g*[ɔ]*b*
MHG	'know'	*w*[ɪ]*ʒʒen*	*w*[eɪ]*ʒ*	*w*[eɪ]*ʒ*	*w*[ɪ]*ʒʒen*	*w*[ɪ]*ʒʒec* 'conscious'
Yiddish		*v*[ɪ]*sən*	*v*[eɪ]*s*	*v*[eɪ]*s(t)*	**v[eɪ]sən**	*v*[ɪ]*sik*
MHG	'carry'	*tr*[aː]*gen*	*tr*[aː]*ge*	*tr*[eː]*get*	*tr*[aː]*gen*	*tr*[eː]*ger* 'carrier'
Yiddish		*tr*[ɔ]*gən*	*tr*[ɔ]*g*	**tr[ɔ]kt**	*tr*[ɔ]*gən*	*tr*[e]*ger*

Taken together, the forms in (5) and (6) show that Yiddish displays the full range of stem allomorphy found in MHG. This strongly suggests that modern Yiddish verbal inflection did in fact develop from a language with more or less the full complexity of the MHG verbal system. The major difference between the two languages concerns whether alternations are permitted within the present tense paradigm. The task of the next few sections will be to determine which vowel was favored when alternations were eliminated.

2.1 Leveling of vowel length

MHG is generally believed to have had vowel length alternations conditioned by syllable structure: roughly, short vowels lengthened in open syllables (open syllable lengthening; OSL) and long vowels shortened in closed syllables (closed syllable shortening; CSS) (Paul, Wiehl, and Grosse 1989, §45; Russ 1982, §45–§47). Since some present tense suffixes began with vowels and others began with consonants (at least in later MHG), this had the potential to create length alternations within the present tense paradigm. This is illustrated for the verbs *lëben* 'to live', *sagen* 'to say', *haben* 'to have', and *stôʒen* 'to push' in (7):

(7) Vowel length alternations in late MHG

Infin.	l[eː]ben	s[aː]gen	h[aː]ben	st[oː]ʒen
1SG	l[eː]be	s[aː]ge	h[aː]be	st[oː]ʒe
2SG	l[e]bst	s[a]gst	h[a](b)st	st[o]st
3SG	l[e]bt	s[a]gt	h[a](b)t	st[o]st
1PL	l[eː]ben	s[aː]gen	h[aː]ben	st[oː]ʒen
2PL	l[e]bt	s[a]gt	h[a](b)t	st[o]st
3PL	l[eː]ben(t)	s[aː]gen(t)	h[aː]ben(t)	st[oː]ʒen(t)
Past part.	gel[e]bt	ges[a]gt	geh[a](b)t	gest[oː]ʒen

This pattern of alternation is still found in many Bavarian dialects (Zehetner 1985, p. 95). It has generally been eliminated in Yiddish, but small traces of it remain, showing that it was once present. For example, the infinitive of the verb 'to have' is *hɔbən* by regular sound change from *haːbən* (*aː* > *ɔ*), while the past participle is *gehat*, with the reflex of short [a] due to closed syllable shortening. Similarly, the MHG verb *slagen* 'to strike' survives in Yiddish as *shlɔgən* (< *slaːgen*), but the related noun is *shlak* (MHG *slac* with short [a]). Even more telling, some dialects of Northeast Yiddish retain length alternations within the inflectional paradigm of a single high-frequency verb: *reydən* 'to speak': *reyd*, *retst*, *ret*, *reydən*, *ret*, *reydən* (David Braun, p.c.; Weinreich 1990, p. 406). These frozen alternations help confirm that there was indeed a process of closed syllable shortening in the history of Yiddish, which should have resulted in widespread length alternations (see also Weinreich 1973, vol. 4, §132). The expected pattern of alternations is shown in (8), alongside the attested uniform paradigms. Comparing the expected and actual forms, we see that there has been leveling to the long ([ɔ], [ɔɪ]) form, with the 2SG, 3SG, and 2PL being rebuilt to match the remaining forms (the infinitive, 1SG, 1PL and 3PL). Here and throughout, unattested forms that are expected by regular sound change are marked with an asterisk, while unexpected (analogically rebuilt) forms are in boldface.

(8) Loss of length alternations

a. MHG [a] ~ [aː] ⇒ invariant [aː] (> Yid. [ɔ])

	Late MHG	Expected Yid.	Actual Yid.
Infin.	s[aː]gen	zɔgən	zɔgən
1SG	s[aː]ge	zɔg[5]	zɔg
2SG	s[a]gst	*zakst	**zɔkst**
3SG	s[a]gt	*zakt	**zɔkt**
1PL	s[aː]gen	zɔgən	zɔgən
2PL	s[a]gt	*zakt	**zɔkt**
3PL	s[aː]gen	zɔgən	zɔgən

b. MHG [o] ~ [oː] ⇒ invariant [oː] (> Yid. [ɔɪ])

	Late MHG	Expected Yid.	Actual Yid.
Infin.	st[oː]ʒen	sht[ɔɪ]sən	sht[ɔɪ]sən
1SG	st[oː]ʒe	sht[ɔɪ]s	sht[ɔɪ]s
2SG	st[o]st	*sht[ɔ]st	**sht[ɔɪ]st**
3SG	st[o]st	*sht[ɔ]st	**sht[ɔɪ]st**
1PL	st[oː]ʒen	sht[ɔɪ]sən	sht[ɔɪ]sən
2PL	st[o]st	*sht[ɔ]st	**sht[ɔɪ]st**
3PL	st[oː]ʒen	sht[ɔɪ]sən	sht[ɔɪ]sən

A question that immediately arises is why the forms with short vowels were lengthened, rather than the other way around. One possible line of explanation, inspired by the Optimal Paradigms approach (McCarthy 2005), would be to look for a phonotactic reason why lengthening would be preferred—that is, to find some high-ranking markedness constraint that hypothetical 1SG *zag*, 1PL *zagən* would have violated, making attested *zɔgst*, *zɔgt* a more harmonic choice. The original MHG alternation was motivated by two converse markedness constraints (the ban on short vowels in open syllables, and a ban on long vowels in closed syllables), so either direction of leveling would have violated the canonical distribution of vowel length. Is it possible that the ban on short vowels in open syllables was stronger, favoring leveling to long vowels?

Unfortunately, apart from the direction of leveling, there is no direct evidence for the relative strength of open syllable lengthening vs. closed syllable shortening. Even in MHG, the canonical distribution of vowel length had exceptions in both directions. There is indirect evidence, however, which suggests that if anything, closed syllable shortening was enforced more strongly than open syllable lengthening. As the paradigms in (8) show, the loss of the 1SG -ə suffix created closed syllables with long vowels (CVːC)—though never "doubly-closed" long vowels (*CVːCC). Conversely, the MHG lengthening in open syllables was complex and irregular, and failed to apply in many contexts (MHG *wazzer* > Yid. *vasər*/*vɔsər*; MHG *tasche* > Yid. *tash*/*tɔsh*; MHG *hamer* > Yid. *hamər*/*hɔmər*; etc.). Moreover, words from other source languages introduced additional short vowels in open syllables, further weakening the tendency for open syllable shortening. As a result, there would already have been a fair number of words with short vowels in

---

[5]Although the 1SG contains a syllable closed by a single consonant, the expected form contains the reflex of a long vowel because of the effect of the 1SG suffix -ə (*zaːgə*), which was subsequently deleted by apocope (> *zaːg*). The fact that lengthening remained even after apocope can be seen from the development of (formerly) schwa-final nouns: *gaːbə* > *gɔb* 'gift'). A parallel opaque interaction of lengthening and apocope is also found in New High German dialects that have lost 1SG -ə (Zehetner 1985, p. 95). It is also worth noting that final apocope interacted opaquely with other processes as well, such as final devoicing; see King (1980) for discussion.

open syllables. Thus, although neither direction of leveling is ruled out absolutely on phonotactic grounds, it appears that if anything, shortening should have been favored, since there were already quite a few short vowels in open syllables (parallel to hypothetical *zagən*) but no long vowels in doubly closed syllables (parallel to *zaːgt*, *zaːgst*).

In the absence of a clear-cut phonotactic preference for long vowels, various other possible explanations suggest themselves. Perhaps the [zaːg] allomorph won out because it occurred in the infinitive, which is the citation form for Yiddish verbs. Perhaps it won out cause it occurs in the 1SG, which has no overt suffix, and is thus a substring of all the other forms. Perhaps it was favored because it occurred in a slim majority of forms (3 inflected forms + infinitive, as opposed to 3 inflected forms alone), or because the forms with [zaːg] had higher token frequency than the forms with [zag]. The literature on paradigm leveling contains numerous proposals for tendencies that guide the direction of leveling (Kuryłowicz 1947; Mańczak 1958; Bybee 1985; Hock 1991), and as is often the case, the data from this particular change is compatible with many of them. The claim of this paper is that long vowels prevailed because they were found in the 1SG, and that this form was privileged not because it lacked an overt suffix, but rather, because it was the part of the paradigm that contained the most information about unpredictable properties of verbs. Given the ambiguity of the data, however, this claim is impossible to motivate based on the leveling of any individual alternation. My strategy in these sections, therefore, will be to present data from a number of different levelings, in order to show that leveling to the 1SG is the only account that unifies all of the attested changes, and provides an explanation based on the grammatical structure of the language.

2.2   Leveling of umlaut alternations

Another salient difference between MHG and Yiddish concerns morphophonemic vowel changes in the 2/3SG, which were common in MHG and are even more abundant in Standard New High German, but are completely lacking in Yiddish (Faber and King 1984, p. 398; Manaster Ramer and Wolf 1997, p. 19; Jacobs 2005, p. 216). In many MHG verbs, a process known as UMLAUT changed the stem vowel /a/ to [e] in the 2/3SG: *trage*, *tregest*, *treget* 'carry-1/2/3SG'. The development of this alternation is illustrated in (9). Originally, the change of *a* to *e* was triggered by a following [i] in the 2/3SG suffixes in OHG; these vowels were subsequently reduced to schwa (orthographic *e*), which was eventually deleted altogether. Umlaut alternations affected two classes of verbs: those traditionally known as strong class VI (e.g., *tragen* 'carry', *varn* 'travel', *laden* 'load', *waschen* 'wash', *backen* 'bake'), and also (variably) in strong class VII (e.g., *halten* 'hold', *vallen* 'fall', *slâfen* 'sleep', *blâzen* 'blow') (Paul, Wiehl, and Grosse 1989, §§251–253). In Yiddish, these alternations have been eliminated from the present tense paradigm, yielding consistent [ɔ] or [a] depending on whether the root vowel was in a lengthening or shortening context.

8

(9) Loss of umlaut in Yiddish

a. Leveling to [ɔ]

	OHG	Late MHG	Expected Yid.	Actual Yid.
Infin.	*tr*[a]*gan*	*tr*[aː]*gen*	*tr*[ɔ]*gən*	*tr*[ɔ]*gən*
1SG	*tr*[a]*gu*	*tr*[aː]*ge*	*tr*[ɔ]*g*	*tr*[ɔ]*g*
2SG	*tr*[e]*gis(t)*	*tr*[e]*kst*	**tr*[e]*kst*	***tr*[ɔ]*kst***
3SG	*tr*[e]*git*	*tr*[e]*kt*	**tr*[e]*kt*	***tr*[ɔ]*kt***
1PL	*tr*[a]*gên*	*tr*[aː]*gen*	*tr*[ɔ]*gən*	*tr*[ɔ]*gən*
2PL	*tr*[a]*get*	*tr*[a]*kt*	**tr*[a]*kt*	***tr*[ɔ]*kt***
3PL	*tr*[a]*gent*	*tr*[aː]*gen(t)*	*tr*[ɔ]*gən*	*tr*[ɔ]*gən*

b. Leveling to [a]

	OHG	Late MHG	Expected Yid.	Actual Yid.
Infin.	*h*[a]*lten*	*h*[a]*lten*	*h*[a]*ltən*	*h*[a]*ltən*
1SG	*h*[a]*ltu*	*h*[a]*lte*	*h*[a]*lt*	*h*[a]*lt*
2SG	*h*[e]*ltis(t)*	*h*[e]*lt(e)st*	**h*[e]*ltst*	***h*[a]*l(t)st***
3SG	*h*[e]*ltit*	*h*[e]*lt(et)*	**h*[e]*lt*	***h*[a]*lt***
1PL	*h*[a]*ltên*	*h*[a]*lten*	*h*[a]*ltən*	*h*[a]*ltən*
2PL	*h*[a]*ltet*	*h*[a]*lt(et)*	*h*[a]*lt*	*h*[a]*lt*
3PL	*h*[a]*ltent*	*h*[a]*lten(t)*	*h*[a]*ltən*	*h*[a]*ltən*

As mentioned above, there are indications that Yiddish (or some immediate ancestor of Yiddish) did once have umlaut alternations. Outside of verbal paradigms, stem allomorphs with umlaut [e] abound: e.g., *trɔgən* 'carry' ~ *tregər* 'carrier', *shlɔfən* 'sleep' ~ *shlefik* 'soporific', *vashən* 'wash' ~ *vesh* 'laundry'. Within noun paradigms, umlaut remains a relatively robust form of plural marking (*hant* ~ *hent* 'hand-sg./pl.'), and has even been extended to a number of words that did not standardly have alternations in MHG (*tɔg* ~ *teg* 'day-sg./pl.'). Most telling, there is one former umlaut verb which has leveled to [e] instead of [a]: *gefelən* 'be pleasing' is related etymologically to *falən* 'fall', but shows the expected umlaut [e] of the 2/3SG. The backwards direction of leveling in this particular case is no doubt due to the fact that this verb is used primarily in the 3rd person in an impersonal construction (e.g., *es gefelt mir* 'I like it'),[6] and shows that 3SG forms with umlaut must have existed at one time. This confirms our expectation that Yiddish should have vowel alternations in the 2/3SG (third column of (9)), and strengthens the conclusion that these alternations were actively eliminated through analogical change.

As with vowel shortening, it is important to ask whether the choice of uniform [a]/[ɔ] instead of [e] could be motivated by phonotactic considerations. Paradigms with uniform [e] have always been legal in Yiddish (e.g., *fregən* 'to ask'[7]: *freg, fregst, fregt*), so there is certainly no absolute ban on forms like hypothetical *treg, tregst, tregt*. Could it nevertheless be possible that paradigms with invariant [e] were statistically dispreferred, making leveling to [e] an unlikely choice? To answer this question, we would

---

[6]This phenomenon is discussed by Tiersma (1982), who refers to it as LOCAL MARKEDNESS. It should be noted that this cannot merely be an effect of the 3SG being more frequent than the other forms, since the same is true of most verbs of Yiddish, though admittedly to a lesser extent. I surmise that the backwards leveling in this one verb—which is the only such example I have found in the entire language—can happen only in extreme cases where the remaining forms are practically non-existent.

[7]Readers who are familiar with the cognate verb *fragen* in modern German may wonder whether the [e] in Yiddish is also the result of leveling to an umlaut form, like *gefelən*. In fact, it is not (or at least not directly): MHG had a variant *vrëgen*, which is almost certainly the source of the modern Yiddish form.

ideally produce counts from a lexicon of MHG or early Yiddish verbs, comparing the relative numbers of [a] vs. [e] verbs. Lacking such a database, I turned to the CELEX corpus of Standard New High German (Baayen, Piepenbrock, and van Rijn 1993) to provide a rough approximation. Specifically, I took the set of all verb roots with final stressed syllables,[8] and counted the number of roots containing each vowel. Overall, the number of verbs containing the root vowel *a* and its umlaut counterpart *ä* are quite evenly matched (132 and 130, respectively). In fact, if one includes also verbs with *e* (which was a distinct vowel, written *ë*, in some MHG dialects, but which merged with umlaut *ä* in Yiddish), then a preference for *e* emerges (132 *a* vs. 184 *e*). Based on these counts, it seems unlikely that there was any statistical dispreference against front vowels that could have driven the selection of [a]/[ɔ] over [e] in leveling.

The forms that were rebuilt in the leveling of umlaut (the 2/3SG) are a proper subset of the forms that were rebuilt in the leveling of length alternations. For this reason, many of the same hypotheses advanced at the end of the preceding section (citation form, majority form, etc.) could equally well apply here. Once again, the data is ambiguously compatible with many different hypotheses about the directionality of leveling. Crucially, however, the change is consistent with the claim that the source of the modern Yiddish present stem is always the 1SG. The force of this claim will be strengthened over the next few sections, in which we will see that when all changes are considered, the 1SG is the only form that has remained constant in Yiddish.

2.3   Leveling of singular ∼ plural alternations

MHG present tense paradigms had another salient pattern of alternation, involving the entire singular vs. the plural. Singular ∼ plural differences were found in two unrelated types of verbs: in some the alternation traces back to a morphologically conditioned singular/plural distinction in Proto-Germanic, while in others the alternation was created by a phonologically conditioned sound change in Old High German. Both of these patterns have been leveled in parallel fashion in Yiddish, but since each involves its own complications, they are discussed separately.

2.3.1   Leveling of preterite presents

In a small handful of Germanic verbs, the present tense forms derived ultimately from Proto-Germanic preterite forms, and hence are called "preterite presents" (Prokosch 1939, §65). For these verbs, a singular/plural vowel alternation normally found only in the preterite was found also in the present tense. MHG had approximately ten preterite present verbs, which exhibited several different vowel correspondences between the singular and plural present forms (see Paul, Wiehl, and Grosse 1989, §§269–275). For example, the MHG verb *wiʒʒen* 'to know' had singular present forms with the vowel [eɪ] (*weiʒ*, *weist*, *weiʒ*), but plural forms with [ɪ] as in the infinitive (*wiʒʒen*, *wiʒʒ(e)t*, *wiʒʒen*)—a pattern that is still preserved in New High German. Distinct plural vowels are also found in early Yiddish texts: Eliah Levita's *Bovo-bukh* (Isny, 1541)

---

[8]The set of relevant verb roots was found by taking all of the verbs listed as morphologically underived in the German portion of CELEX; this includes simplex forms (e.g., *tragen* 'carry', *leben* 'live'), and also prefixed forms based on bound roots (e.g., *vergessen* 'forget', which has no free-standing base **gessen*). I then removed verbs with non-final stress (not eligible for umlaut), verbs derived with the stressed derivational suffix *-íeren* (learned, and often modern formations), and verbs with a frequency count of zero. This left 767 verb roots, of which 262 had stressed *a* or its umlaut counterpart *ä* as the final vowel. Of course, not every verb in this NHG corpus exists in identical form in MHG or Yiddish, but this set of basic roots provides a reasonable estimate.

shows 3SG *mag* (stanza 507, line 8) vs. 3PL *mugn* (introduction, line 9), and 3SG *darf* vs. 2PL *durft* (stanza 246, line 2). In modern Yiddish, on the other hand, the singular and plural have the same vowel: *veys* ∼ *veysən* 'know-1SG/1PL', *darf* ∼ *darfən* 'need-1SG/1PL'. This is shown in (10a). Note that the infinitive retains [ɪ] (*visən* 'to know'), and from this and related forms (*vɪs-ən* 'knowledge', *vɪs-ɪk* 'conscious', *ge-vɪs-ən* 'conscience'), it is possible to determine that stem alternations for these verbs were once present in the language and have been eliminated specifically within the present tense paradigm. In many cases, alternations have been eliminated even outside the present tense paradigm, so no traces of the previous plural/infinitive vocalism remain (10b).

(10) Leveling in preterite presents

 a. Leveling within present tense paradigm only

MHG			Expected Yiddish			Actual Yiddish		
Inf.	Sg.	Pl.	Inf.	Sg.	Pl.	Inf.	Sg.	Pl.
w[i]ʒʒen	w[eɪ]ʒ	w[ɪ]ʒʒen	v[ɪ]sən	v[eɪ]s	*v[ɪ]sən	v[ɪ]sən	v[eɪ]s	**v[eɪ]sən**
	w[eɪ]st	w[ɪ]st		v[eɪ]st	*v[ɪ]st		v[eɪ]st	**v[eɪ]st**
	w[eɪ]ʒ	w[ɪ]ʒʒen		v[eɪ]s	*v[ɪ]sən		v[eɪ]s(t)	**v[eɪ]sən**

 b. Leveling of all forms, including infinitive

MHG			Expected Yiddish			Actual Yiddish		
Inf.	Sg.	Pl.	Inf.	Sg.	Pl.	Inf.	Sg.	Pl.
d[u]rfen[9]	d[a]rf	d[u]rfen	*d[u]rfən	d[a]rf	*d[u]rfən	**d[a]rfən[10]**	d[a]rf	**d[a]rfən**
	d[a]rf(s)t	d[u]rft		d[a]rfst	*d[u]rft		d[a]rfst	**d[a]rft**
	d[a]rf	d[u]rfen		d[a]rf	*d[u]rfən		d[a]rf	**d[a]rfən**
t[u]rren	t[a]r	t[u]rren	*t[u]rən	t[ɔ]r	*t[u]rən	**t[ɔ]rən**	t[ɔ]r	**t[ɔ]rən**
	t[a]r(s)t	t[u]rt		*t[a]rst	*t[a]rt		**t[ɔ]rst**	**t[ɔ]rt**
	t[a]r	t[u]rren		t[ɔ]r	*t[u]rən		t[ɔ]r	**t[ɔ]rən**
t[u]gen	t[oʊ]c	t[u]gen	*t[u]gən	t[ɔɪ]g	*t[u]gən	**t[ɔɪ]gən**	t[ɔɪ]g	**t[ɔɪ]gən**
	t[oʊ]c(s)t	t[u]ct		t[ɔɪ]gst	*t[u]gt		t[ɔɪ]kst	**t[ɔɪ]kt**
	t[oʊ]c	t[u]gen		t[ɔɪ]g	*t[u]gən		t[ɔɪ]g	**t[ɔɪ]gən**
s[u]ln	s[o]l	s[u]ln	*z[u]ln	z[ɔ]l	*z[u]ln	**z[ɔ]ln**	z[ɔ]l	**z[ɔ]ln**
	s[o]lst	s[u]lt		z[ɔ]lst	*z[u]lt		z[ɔ]lst	**z[ɔ]lt**
	s[o]l	s[u]ln		z[ɔ]l	*z[u]ln		z[ɔ]l	**z[ɔ]ln**

In all cases, the vowel of the singular has been preserved, replacing the vowel of the plural (and often the infinitive, as well). If we consider further the expected effect of vowel shortening, we see from the paradigm of *tɔrən* 'be allowed to' that it is specifically a long vowel that is extended, rather than the shortened vowel

---

[9]The MHG verbs in (10b) also show infinitive/plural variants with umlaut: *dürfen*, *türren*, *tügen*, *sülen*. Numerous hypotheses about the source of this vowel have been proposed in the literature; see Gaeta (2002) for summary and discussion. For present purposes, it is sufficient to note that Yiddish shows no trace whatsoever of the infinitive/plural stem allomorphs of these verbs, umlauted or not.

[10]Herzog (1965, p. 143) attributes the [a] in all forms of *darfən* to a sequence of sound changes: [dyrfən] > [dirfən] (unrounding) > [darfen] (lowering before *r*; cf. *Kirschen* > dial. *karshən* 'cherries'). As Herzog himself shows, however (pp. 192–194), this lowering process is not only lexically restricted, but also subject to considerable dialect variation. The [a] in *darfən* is found even in dialects that have [e] in *kershən*, so attributing it to the same sound change that produced *karshən* is problematic. In fact, the extension of [a] in *darfən* is fully parallel to the changes seen in other preterite present verbs, and need not be attributed to an exceptional sound change.

that would have resulted from the addition of suffixes. Note that unlike the paradigms discussed in section 2.1, in preterite present verbs the 3SG had no overt suffix, so the 1/3SG had only a singleton coda: *tar*. Monosyllables with singleton coda *r* appear to have undergone lengthening in MHG and Yiddish,[11] which should have led to length alternations: *taːr*, *tarst*, *taːr*. Thus, the Yiddish vocalism in these verbs can be traced specifically to the first and/or third singular form. This is rather different from the pattern seen in the previous two sections, in which the allomorph found in the infinitive/plural was extended. In fact, the only thing that all of these changes have in common is that the 1SG form has consistently emerged unchanged.

A different pattern is seen for the MHG verbs *magen*/*mugen* and *kunnen*, both meaning 'be able to'. For both of these verbs, Yiddish has invariant [e], which does not seem to correspond to either the singular or the plural.

(11)   Unexpected leveling to [e] in *megen*, *kenen*

MHG			Expected Yiddish			Actual Yiddish		
Inf.	Sg.	Pl.	Inf.	Sg.	Pl.	Inf.	Sg.	Pl.
m[a/u]*gen*	*m*[a]*c*	*m*[a/u]*gen*	**m*[ɔ/u]*gən*	**m*[a]*g*	**m*[ɔ/u]*gən*	***megən***	***meg***	***megən***
	m[a]*cst*	*m*[u]*g(e)t*		**m*[a]*gst*	**m*[u]*gt*		***megst***	***megt***
	m[a]*c*	*m*[u]*gen*		**m*[a]*g*	**m*[ɔ/u]*gən*		***meg***	***megən***
k[u]*nen*	*k*[a]*n*	*k*[u]*nen*	**k*[u]*nən*	**k*[a]*n*	**k*[u]*nən*	***kenən***	***ken***	***kenən***
	k[a]*nst*	*k*[u]*n(e)t*		**k*[a]*nst*	**k*[u]*nt*		***kenst***	***kent***
	k[a]*n*	*k*[u]*nen*		**k*[a]*n*	**k*[u]*nən*		***ken***	***kenən***

What could be the source of Yiddish [e] in these two verbs? As noted by Brenner (1895) and Behaghel (1928, p. 438), umlaut of /a/ to [e] was triggered not only by suffixal [i] (e.g., 2/3SG in section 2.2), but also by enclitic function words: forms like *mag ich* > *meg ich* 'may I' have been attested since OHG times (see Gaeta 2002 for discussion). In principle, umlaut across words could have been triggered by any function word with the vowel [i], but in practice the most common triggers would have been cliticized subject pronouns, as in *meg ich*, *ken ich* 'can I'. The nominative pronouns with high front vowels included *ich* 'I', *siu*/*si*/*sie* 'she', *wir* 'we', *ir* 'you-pl' and *sie*/*si* 'they'. Among these, the plural pronouns are irrelevant, since they would have followed forms with root vowel [u] (*k*[u]*nen wir* > *k*[y]*nen wir*), and could not have led to new allomorphs with [e]. The 3SG feminine pronoun *sie* did follow forms with [a] (*mag sie* > *meg sie*; *kan sie* > *ken sie*), but these 3SG feminine forms would have competed with non-umlauted 3SG masculine (*mag er*) and neuter (*mag es*) forms.[12] The only part of the paradigm that would have consistently undergone umlaut due to the presence of a following pronoun is the 1SG: *meg ich*, *ken ich*. The fact that this effect is restricted to just these two modal forms and did not permanently affect, say, *trag ich* > *treg ich* is probably due to the especially strong tendency for pronouns to cliticize to modal verbs in German, as can be seen quite clearly by examining the striking degree of modal + pronoun coalescence found in dialectal forms (Schirmunski 1962, pp. 548–550). Under this account, the semantic similarity of *megen* and *kenen* is also

---

[11]Other examples include MHG *gar* > *gaːr* > Yid. *gɔr* 'complete', and MHG *tor* > *toːr* > Yid. *toyər* 'gate'. An equivalent lengthening did not take place in syllables with multiple coda consonants: MHG *hart* > Yid. *hart* 'hard'. See Paul, Wiehl, and Grosse (1989, §45 note 2 and §46β) for discussion of parallel facts in New High German.

[12]It is not even clear how strong of an effect the pronoun *sie* would have had, since the diphthong [iu]/[iə] did not trigger primary umlaut, and clusters like [ks] also tended to inhibit it (c.f. *wahsit* 'grows', *hagsizza* 'witch' (NHG *Hexe*); Sonderegger 1987, p. 145f), making *mag siu* > *meg siu* a somewhat uncertain change. Raising of *a* > *e* did occur in these contexts under a later, "secondary" umlaut process, which also been argued to apply across word+clitic boundaries (Gaeta 2002, p. 8), but the evidence for this is thinner and may be restricted to certain German dialects.

not accidental, since these verbs are very often used in 1SG contexts: "can I..."/"I can...", "may I..."/"I might...". Thus, a very likely source for the [e] in *megen* and *kenen* is the spread of umlaut from the 1SG, where the [e] is in fact attested in MHG.[13]

It should be noted that the vowel in these verbs is problematic not just in Yiddish, but also in standard NHG, where the plural unexpectedly shows umlaut: *mögen*, *können* (Schirmunski (1962, p. 554); Gaeta 2002). This suggests a possible alternative line of explanation, attempting to collapse the [e] in *megən* and *kenən* with a parallel mystery in German: could Yiddish have undergone a similar change, adopting [œ] in the plural, which was subsequently unrounded to [e] and leveled to the remainder of the paradigm? Of course, this account would have the drawback that it cannot explain why leveling favored the plural in just these two verbs, but it also has some *a priori* appeal because of the apparently clean sound correspondence between NHG *mögen*, *können* and Yiddish *megən*, *kenən*. Unfortunately, this correspondence is not as straightforward as it looks. The mid front rounded vowel in standard NHG *können* evidently developed through two distinct changes: first, the unexpected umlaut of modals (*kunnen* > *künnen*; see fn. 9), and then lowering of high round vowels before nasals (*künnen* > *können*). The sound change lowering vowels before nasals occurred in late MHG, and is seen also in words like MHG *sunne* 'sun', *sumer* 'summer', *gewunen* 'won' > NHG *Sonne*, *Sommer*, *gewonnen* (Paul, Wiehl, and Grosse 1989, §50). Crucially, Yiddish did not participate in this change: *zun*, *zumer*, *gevunən*. Thus, late MHG *künnen* should correspond to Yiddish **kinən*, with unrounding but no lowering, rather than attested *kenən*. Thus, the plural of *kenən* would not have even had an [e], making it an unlikely source of [e] for these verbs. This favors the explanation put forward above, based on umlaut of *mag ich*, *kan ich* > *meg ich*, *ken ich* and subsequent leveling to the 1SG.

In sum, the preterite present verbs all appear to show leveling to the singular in Yiddish. Consideration of expected vowel length alternations suggests that leveling favored the 1/3SG form in particular ((10) above). Furthermore, if the explanation advanced here for the [e] in *megən* and *kenən* is correct, then the base of leveling must have been specifically the 1SG form, since this is the only part of the paradigm where umlaut would have consistently occurred. This is compatible with what we have seen in the preceding sections, in which leveling favored the form found in the 1SG, 1PL, 3PL, and infinitive. In all of these changes, the 1SG has remained constant and the remaining forms have been systematically rebuilt to match it. In the next few sections, I will argue that the same can be said for all other MHG patterns of alternation, as well.

2.3.2   Loss of singular ∼ plural Wechselflexion

A second type of MHG singular ∼ plural alternations were the result of a sound change in Old High German caused by the vowels in the present tense suffixes: stem vowel *ë* raised to *i* when there was a following high vowel: *gëbu* > *gibu* 'I give', *gëbit* > *gibit* 'he gives', but *gëban* ≯ **giban* 'we give'. Since all of the present singular endings contained high vowels (*-u*, *-is*, *-it*) and none of the plural ones did (*-êm*, *-et*, *-ant*), this raising created *i* ∼ *e* singular/plural alternations. These alternations are sometimes known as singular ∼ plural *Wechselflexion* ('alternating inflection') (Paul, Wiehl, and Grosse 1989, §§31–35), and it is found in strong class II (*ie* ∼ *iu*), as well as IIIb, IV, and V (*ë* ∼ *i*). For the MHG verb *gëben*, we see in (12) that Yiddish once again shows leveling within the present tense paradigm.

---

[13]The influence of enclitic pronouns has also been proposed for unexpected umlaut in German modals, both in the plural forms (*kunnen* ⇒ *künnen*, *durfen* ⇒ *dürfen*) and also in dialectal singular forms (*darf* ⇒ *därf*). For possible alternative accounts of the German facts, see Schirmunski (1962, p. 554), Gaeta (2002). Neither of these changes is relevant for Yiddish.

(12) Leveling to singular [ɪ]: *gebən* 'to give'

	OHG	Late MHG	Expected Yid.	Actual Yid.
Infin.	g[ɛ]*ban*	g[e]*ben*	g[e]*bən*	g[e]*bən*
1SG	g[i]*bu*	g[i]*be*	g[ɪ]*b*	g[ɪ]*b*
2SG	g[i]*bis(t)*	g[i]*(p)st*	g[ɪ]*(p)st*	g[ɪ]*(p)st*
3SG	g[i]*bit*	g[i]*(p)t*	g[ɪ]*(p)t*	g[ɪ]*(p)t*
1PL	g[ɛ]*bên*	g[e]*ben*	*g[e]*bən*	**g[ɪ]*bən***
2PL	g[ɛ]*bet*	g[e]*(p)t*	*g[e]*(p)t*	**g[ɪ]*(p)t***
3PL	g[ɛ]*bent*	g[e]*ben(t)*	*g[e]*bən*	**g[ɪ]*bən***

The pattern for *gebən* is essentially the same as for *vɪsən* in (2) above: the infinitive still shows the etymologically expected infinitive/plural allomorph, while the forms within the present tense paradigm have been rebuilt to match the vowel of the singular. As with the leveling of umlaut in section 2.2, this effect is not likely to be due to a statistical preference for [ɪ]: as a rough comparison, verb roots with [e] actually slightly outnumber those with [i] in NHG (108 to 90, according to the calculations described in fn. 8). A similar pattern is also seen in the verb *kumen*/*komen* 'come', which was not subject to the original OHG change, but which subsequently developed singular plural alternations in MHG by analogical remodeling: MHG 1SG *kume*/1PL *kommen* ⇒ Yid. *kum*/***kumən***.

When we move beyond the verbs *gebən* and *kumən*, however, we encounter a complication. In fact, most verbs with MHG *e* ∼ *i* alternations show leveling to plural *e* in Yiddish; an example is *nemən* 'to take', shown in (13). In addition, all class II verbs with the *ie* ∼ *iu* alternations show leveling to plural *ie*, as shown in (14). Additional verbs like *nemən* include *helfən* 'help', *zen* 'see', *trefən* 'meet', and *esən* 'eat'. Additional verbs like *krixən* include *tsiən* 'pull', *gisən* 'pour', *shlisən* 'close', and *fardrisən* 'annoy, sadden'.

(13) Leveling to plural [e]: *nemən* 'to take'

	OHG	Late MHG	Expected Yid.	Actual Yid.
Infin.	n[ɛ]*man*	n[e]*men*	n[e]*mən*	n[e]*mən*
1SG	n[i]*mu*	n[i]*me*	*n[ɪ]*m*	**n[e]*m***
2SG	n[i]*mis(t)*	n[i]*mst*	*n[ɪ]*mst*	**n[e]*mst***
3SG	n[i]*mit*	n[i]*mt*	*n[ɪ]*mt*	**n[e]*mt***
1PL	n[ɛ]*mên*	n[e]*men*	n[e]*mən*	n[e]*mən*
2PL	n[ɛ]*met*	n[e]*mt*	n[e]*mt*	n[e]*mt*
3PL	n[ɛ]*ment*	n[e]*men(t)*	n[e]*mən*	n[e]*mən*

(14) Leveling to plural [i]: *krixən* 'to crawl'

	OHG	Late MHG	Expected Yid.	Actual Yid.
Infin.	kr[io]*chan*	kr[iə]*chen*	kr[i]*xən*	kr[i]*xən*
1SG	kr[iu]*chu*	kr[y]*che*	*kr[aɪ]*x*	**kr[i]*x***
2SG	kr[iu]*chis(t)*	kr[y]*chst*	*kr[aɪ]*xst*	**kr[i]*xst***
3SG	kr[iu]*chit*	kr[y]*cht*	*kr[aɪ]*xt*	**kr[i]*xt***
1PL	kr[io]*chên*	kr[iə]*chen*	kr[i]*xən*	kr[i]*xən*
2PL	kr[io]*chet*	kr[iə]*cht*	kr[i]*xt*	kr[i]*xt*
3PL	kr[io]*chent*	kr[iə]*chen(t)*	kr[i]*xən*	kr[i]*xən*

14

Comparing (12) against (13) and (14), there appears to be an irreconcilable contradiction: in some verbs leveling favors the vowel of the singular, while in others, it favors the plural. One possibility is to admit that not all leveling followed the same direction, and that the modern Yiddish vocalism is the result of an inconsistent set of different changes. I believe this conclusion is premature, however, since it is based on expectations that are derived too narrowly from the patterns of "classical" (literary) MHG. It has long been recognized that it is unreasonable to expect Yiddish to correspond exactly to the literary language of MHG texts. For the patterns discussed above, MHG does not show substantial dialect differences, and a more nuanced understanding of possible start states is not necessary. The singular $\sim$ plural alternation found in these classes of verbs requires particular care, however, since it (unlike, say, the alternation in preterite presents) showed considerable dialectal and diachronic variation. Thus, it is worth considering whether it is possible to provide a more realistic model for early Yiddish paradigms.

Unfortunately, this is difficult to pinpoint, because even if we had ample evidence about spoken MHG in all dialect areas through all historical periods, there is no consensus as to when or where we should look to as a model for the primary sources of Yiddish verbal inflection. In general, Yiddish appears to be most closely affiliated with two dialect areas: the Eastern Central German dialects, and the Upper German (southern) dialects of Bavaria (Weinreich 1973, vol. 4, pp. 142–149; Faber and King 1984; Jacobs 2005, pp. 15–17).[14] As it turns out, verbs such as *nëmen* and *kriechen* exhibited several different patterns of alternation in these dialect areas. The "canonical" singular $\sim$ plural pattern seen in the second columns of (12)–(14) is mainly confined to Upper German (= southern) dialects of MHG. In Central German dialects, a different pattern is typically found, in which the 1SG has the same vowel as the plural, and the 2/3SG alone have raised [i]; this is shown as Pattern B in (15), and can be contrasted with Pattern A, the Upper German pattern. Furthermore, in late MHG, both of these patterns began to face competition from a completely leveled distribution (Pattern C).

(15)   Three different distributions of alternation

	Pattern A		Pattern B		Pattern C	
Infin.	*nemen*	*kriechen*	*nemen*	*kriechen*	*nemen*	*kriechen*
Imperative	*nim*	*kriuch*	*nim*	*kriuch*	***nem***	***kriech***
1SG	*nime*	*kriuche*	***neme***	***krieche***	***neme***	***krieche***
2SG	*nimst*	*kriuchst*	*nimst*	*kriuchst*	***nemst***	***kriechst***
3SG	*nimt*	*kriucht*	*nimt*	*kriucht*	***nemt***	***kriecht***
1PL	*nemen*	*kriechen*	*nemen*	*kriechen*	*nemen*	*kriechen*
2PL	*nemt*	*kriecht*	*nemt*	*kriecht*	*nemt*	*kriecht*
3PL	*nemen*	*kriechen*	*nemen*	*kriechen*	*nemen*	*kriechen*

The change from Pattern A to Patterns B and C involved substantial dialectal, idiolectal, and verb-by-verb variability (Dammers, Hoffmann, and Solms 1988; Fertig 2000). In brief, Pattern A is found in OHG texts (Sonderegger 1987, p. 145f), and is also the standard in Upper German texts in later periods (including present day Bavarian and Swiss German). Starting in the 12th century, Pattern B began to appear in Central German MHG manuscripts, and by the fifteenth century, it had become a typical Central German dialect feature (Weinhold 1883, §347, §355; Paul, Wiehl, and Grosse 1989, §242, note 1; Besch 1967, p. 305; Philipp 1980, p. 66). The change seems to have proceeded gradually and on a verb-by-verb basis

---

[14]Weinreich (1973) also presents extensive comparisons with Western Central German dialects, in pursuit of the hypothesis that the earliest Yiddish speakers were in the Rhine/Alsace region; see also Manaster Ramer and Wolf (1997).

(Kern 1903, pp. 47–60, Geyer 1912, §31–§32), taking hold earlier in the east than in the west (Dammers, Hoffmann, and Solms 1988, §148.4). First singular forms with [i], [iu] (Pattern A) did persist sporadically in Central German, but they are generally interpreted as relics of the older pattern A (Nordström , p. 5; Dammers, Hoffmann, and Solms 1988, §148.4).[15] Furthermore, during the 14th and 15th centuries, the completely leveled pattern C also began to appear sporadically in Upper German dialects, and in the second half of the 15th century, it crept into Central German as well (Ebert, Reichmann, Solms, and Wegera 1993, p. 256). This change was earlier, more widespread, and more aggressive in class II (*ie* ~ *iu*) than in classes IIIb, IV, V (*e* ~ *i*),[16] though non-alternating *e* also occurred fairly often in certain verbs, including *nemen* 'take', *brechen* 'break', *befelen* 'order', *treffen* 'meet', and in Upper German also *messen* 'measure' and *sehen* 'see'; Dammers, Hoffmann, and Solms 1988, §148.5. Standard NHG categorically shows non-alternating Pattern C for class II (e.g., *kriechen*: 1SG *krieche*, 2SG *kriechst*, 3SG *kriecht*) but retains the 1 vs. 2/3SG Pattern B for classes IIIb, IV, V (e.g., *nehmen*: 1SG *nehme*, 2SG *nimmst*, 3SG *nimmt*). The conclusion that emerges from all of these facts is that for this class of verbs, expectations based solely on literature MHG (Pattern A) are likely to be overly simplistic. This is of particular importance given the hypothesis that the 1SG acted as the pivot of leveling, since there were multiple changes underway in late MHG that affected the 1SG.

So what is a more realistic assumption about the input to the Yiddish change? One thing that would help in determining this would be a hypothesis about which dialect area to look to as a model. As noted above, Yiddish verbal inflection does share several affinities with modern Bavarian, including the loss of umlaut (section 2.2 above), the loss of the 1SG suffix through apocope of final schwas (and opaque interaction with final devoicing and closed syllable shortening), fusion of the 3SG suffix to dental-final stems (Bav. [aːvət], Yid. [arbət] vs. Standard NHG [arbaɪtət] 'work-3SG'), along with (dialectally restricted) use of the 1PL suffix *-mər* (Herzog 1965, p. 147) and 2PL *-ts*. Yiddish also has affinities with Central German that set it apart from Bavarian, however, including loss of vowel length alternations (section 2.1 above), loss of root-final [h]/[x] through leveling,[17] and loss of alternations in class II (*ie* ~ *iu*) verbs. As with other aspects of Yiddish phonology and morphology, it is not possible to use shared innovations to isolate a single German "source" dialect for verbal inflection (Prilutski 1917, p. 289; Herzog 1965, p. 272). It is entirely possible that the input to modern Yiddish was some combination of patterns, including not only pattern A (conservative Upper German), but also pattern B (Central German) and pattern C (variants of both Upper German and Central German). Crucially, this suggests a high rate of occurrence of the "plural" vowels (*e*, *ie*) in the 1SG. Thus, the levelings to [e] in *nemən* and [i] in *krixən* do not necessarily require a plural base form, since these vowels were beginning to occur in the singular as well—and especially the 1SG, as in standard NHG.

---

[15]The introduction of [iə], [e] in the 1SG is usually attributed to analogical influence of the "umlaut" pattern (section 2.2), which also had a 1SG vs. 2/3SG alternation. Alternatively, Joesten (1931) argues that the [u] vowel of the 1SG suffix never conditioned raising at all, and that pattern B is actually the etymologically expected one for OHG. If this is right, then the 1SG [e], [iə] of Pattern B are the original pattern, and Pattern A in Upper German is analogical. Either way, 1SG forms with [e], [iə] appear to have gained prominence in the literary record during the late MHG and early NHG period, and can be assumed to be part of the spoken language of the time, as well.

[16]For example, Fertig (2000) documents verb-by-verb changes in the Upper German dialect of Nuremberg, showing that singular *eu* vs. *ie* for class II were in stiff competition by the end of the 16th century. In fact, it appears that even in Upper German, singular *eu* may have become obsolete in the spoken language earlier than in written sources, where it was consciously preserved by Catholic authors as reaction against the "Lutheran" Central German pattern (Dammers, Hoffmann, and Solms 1988, §144.2, and references therein).

[17]MHG *s*[iː]-*e* ~ *s*[ix]-*st* ~ *s*[ix]-*t* 'see-1/2/3SG' ⇒ Bavarian *s*[iəx] ~ *s*[iək]-*st* ~ *s*[iək]-*t* (Zehetner 1985), but Central German and Standard NHG *s*[eː]-*e* ~ *s*[iː]-*st* ~ *s*[iː]-*t*, Yid. *z*[eɪ] ~ *z*[eɪ]-*st* ~ *z*[eɪ]-*t*.

If this is on the right track, it helps resolve the mystery of why the singular ~ plural *Wechselflexion* verbs mostly leveled to the vowel that was etymologically expected only in the plural (i.e., why *nemən* and *krixən* leveled to the [e] and [i], rather than to [ɪ] and [aɪ]). However, we are still faced with the quandary of why the verb *gebən* went in the opposite direction, leveling to [i] ((12) vs. (13)). Interestingly, Dammers et al. do not list *geben* among the verbs with frequent pattern C variants in early NHG. This may possibly be linked to its exceptionally high token frequency, which may have had the effect of preserving the high vowel in the 1SG as an irregular relic form (*gibe*) longer than for other verbs. Of course, there are other high-frequency *e* ~ *i* verbs as well, such as *sehen* 'see' and *nemen* 'take', and we might expect these to have retained 1SG *i* as well. However, CELEX counts reveal that at least in written Standard NHG, *geben* is rather more frequent,[18] so perhaps it was simply the very last hold-out in a nearly-completed change to Pattern B or C. This leads to a consistent scenario for the development of these verb classes in Yiddish, in which the shift to pattern C was complete for class II (*ie* ~ *iu*) verbs as in Standard NHG, while the shift to pattern B for class IIIb, IV, and V (*e* ~ *i*) verbs was nearly but not fully complete, leaving just two very high frequency verbs with high vowels in the 1SG (*gib* and *kum*).

To summarize, it seems quite likely that apparent inconsistencies in the outcome of these verbs were due to pre-existing complications in the distribution of the singular ~ plural *Wechselflexion* alternation within German. Although I know of no direct evidence for the details of the scenario laid out here, the underlying assumption that it is based on—namely, that Yiddish derives from a mix of different dialect patterns—is at least as well-founded as the assumption that Yiddish should be derived from a solely literary/Upper German model (pattern A alone). The claim of this section is that the outcome for these verbs is consistent with what we have seen in the previous sections—namely, that the source of modern Yiddish vocalism can always be traced to the 1SG form. The payoff, if this is correct, is that the development of Yiddish verbs can be viewed not as some mix of levelings in arbitrary directions, but rather, as a straightforward and consistent change based on the 1SG. As we will see in section 3, there is more to be gained than simply an elegant historical story; in fact, this direction of reanalysis can be seen to follow from the grammatical structure of the language, making it a more predictive analysis.

2.4 Leveling of epenthetic [ə] in *rm* clusters

A small but regular sound change in the history of Yiddish involved epenthesis of [ə] into coda $rm]_\sigma$ clusters: MHG *warm* > Yid. *varəm* 'warm', *sturm* > *shturəm* 'storm, assault', *schirm* > *shirəm* 'umbrella', *form* > *fɔrəm* 'form', *turm* > *turəm* 'tower'. This change did not affect intervocalic *rm* clusters: *varmes* 'warm food', *shturmish* 'stormy, violent', *shirme* 'screen', *fɔrmən* 'form-pl', *turmə* 'prison'. In verbs, this sound change should have created [ə] ~ ∅ alternations, since in some parts of the paradigm a stem-final *rm* cluster would be intervocalic, while in other forms it would be part of a coda cluster. In modern Yiddish, such alternations have been eliminated in favor of [ə] throughout: *varəmən* 'warm up', *shturəmən* 'assault', *bashirəmən* 'shield', *furəmən* 'form', *turəmən* 'tower'.

---

[18]Token frequency: *geben* 'give' 10290, *sehen* 'see' 6987, *nehmen* 'take' 4867, *sprechen* 'speak' 3598, *gelten* 'be valid' 1907, *treten* 'step' 1686, *treffen* 'meet' 1523, *helfen* 'help' 1225, *werfen* 'throw' 902. The only member of this class that is more frequent is *werden* 'become', which curiously is one of the first verbs to show leveling (Fertig 2000). This could possibly be an independent sporadic phonological lowering effect caused by the following [r]; cf. MHG *stirne*/Yid. *shtern* 'forehead'.

(16) Leveling of [ə] ∼ ∅ alternations: *shturəmən* 'storm, assault'

	Late MHG	Expected Yid.	Actual Yid.
Infin.	*sturmen*	**shturmen*	***shturəmən***
1SG	*sturme*	*shturəm*	*shturəm*
2SG	*sturmst*	*shturəmst*	*shturəmst*
3SG	*sturmt*	*shturəmt*	*shturəmt*
1PL	*sturmen*	**shturmen*	***shturəmən***
2PL	*sturmt*	*shturəmt*	*shturəmt*
3PL	*sturmen*	**shturmen*	***shturəmən***

For verbs like *shturəmən* and *varəmən*, it is natural to wonder whether the [ə] could be attributed to derivationally related noun or adjective forms (*shturəm* 'storm (n.)', *varəm* 'warm (adj.)'). This alone is not a sufficient explanation, however, since there are also verbs that are related to *-rəm* nouns, but which nevertheless do not carry over the schwa to the verb: *alarəm → alarmirən* (**alarəmirən*) 'alarm', *refɔrəm → refɔrmirən* 'reform'. All of these verbs are related to a noun or adjective in *-rəm*; the difference is that for verbs created with the derivational suffix *-ir-*, the /rm/ is always intervocalic (*reformir, reformirst, reformirt*) so there is no need for epenthesis anywhere in the verbal paradigm. The only verbs that have *-rəm-* instead of *-rm-* are those that would require epenthesis somewhere within the verbal paradigm. The fact that epenthesis in a related noun or adjective is irrelevant can also be seen in another way from the verb *derbarəmən* 'pity', which has consistent *-rəm-* but is not based on a based form **(der)barəm*. The conclusion, then is that leveling of *-rəm-* occurred just in case epenthesis already happened somewhere within the present tense paradigm.

As above, we must ponder whether the choice of invariant *-rəm-* could be due to phonotactic pressure. For this change, unlike the previous cases we have examined, phonotactic constraints seem like an immediately plausible explanation, since the hypothetical paradigm *shturm, shturmst, shturmt* would involve extra violations of the **rm]$_\sigma$* constraint.[19] Although this phonological consideration could have helped to favor leveling towards [ə] (overapplication of epenthesis) in verbs, it is interesting to note that for nouns, there is a tendency in the opposite direction. When a singular noun ends in *-rm* and the plural form has the suffix *-ən* (*fɔrəm/fɔrm-ən* 'form-sg/pl'), epenthesis is not extended to the plural (**fɔrəmən*). Strikingly, in these cases singulars without epenthesis are possible as alternate variants: *fɔrm* alongside *fɔrəm*. This variability is not allowed for nouns that do not have intervocalic *-rm-* in the plural: *vɔrəm/vɔrəms* 'worm-sg/pl', *shvɔrəm/shvɔrəms* 'swarm-sg/pl' do not have singular variants **vɔrm, *shvɔrm*. Thus, although the **rm]$_\sigma$* constraint has relatively few exceptions in Yiddish, it appears that it is not strong enough to determine the direction of leveling—in fact, we see that verbs and nouns go in opposite directions with respect to the very same phonotactic constraint.

There is, of course, another possible explanation for the choice of *-rəm-*: it extends the form that is found in the singular, and specifically in the 1SG. This explanation makes no commitment to the direction of leveling for other parts of speech, so the difference between the direction of leveling for verbs and nouns poses no particular problem for this account. What is crucial for this account is that all verbs go in the same direction—and this is indeed consistent with all of the other changes seen so far in previous sections.

---

[19]Recent loanwords like *sharm* 'charm' and *farm* 'farm' have reintroduced *rm]$_\sigma$* sequences, at least for some speakers—but this has not necessarily eliminated the dispreference for *rm]$_\sigma$* altogether. In fact, Weinreich (1990) also lists at least one borrowing with deletion: *zhandar* 'gendarme'.

2.5 Leveling of other verb-specific patterns

There are several other idiosyncratic patterns that have affected one or two verbs each, but which provide additional suggestive evidence in support of the idea that Yiddish verbs always show leveling to the 1SG.

2.5.1 Unexpected [z] in *muzən*, *lozən*

All of the changes discussed up to this point involve vowels, but there is one small set of verbs which have unexpected root-final consonants in Yiddish: *muzən* 'must' and *lozən* (cf. Standard NHG *mü*[s]*en*, *la*[s]*en*).[20] In MHG, these verbs had a coronal strident written <ʒ> (or <ʒʒ> after short vowels), often thought to have been a voiceless dorsal fricative (Joos 1952, p. 226).[21] At some point during the MHG period, the place distinction between dorsal ʒ and apical *s* was lost, though the two phonemes remained distinct intervocalically because *s* voiced to [z] (MHG *blâsen* > NHG [blaːzən], Yid. *blozən* 'blow'), while ʒ did not (MHG *haʒʒen* > NHG [hasən], Yid. [hasən] 'hate'). MHG *müeʒen* 'must' and *lâʒen* 'let' should have yielded Yiddish *mi*[s]*ən*, *lo*[s]*ən* (cf. MHG *vüeʒe* > Yid. *fis* 'feet', MHG *mâʒe* > Yid. *mɔs* 'measured amount') with voiceless [s]. In sum, the voicing in *muzən*, *lozən* cannot be explained by any regular sound change.

Although there were no MHG processes that would have voiced these words, there is a relevant fact about Yiddish: many proclitic function words that historically ended in /s/ have become voiced: *biz* 'until' (cf. MHG *biʒ*, NHG *bis*), *bloyz* 'only' (MHG *blôʒ*), *iz* 'is' (MHG *ist* > *is*), etc. This voicing may be related to a more general process of regressive voicing assimilation that would have had the effect of voicing *s* before a voiced obstruent (*is gut* > *i*[z] *gut* 'is good'), at least in many dialects (Katz 1987, pp. 30–31; Jacobs 2005, pp. 120–121). There is no tendency to reanalyze other final obstruents as voiced in proclitics, however (e.g., *mit* 'with' ≯ **mid*), leading King (1980, p. 411) to argue that the voicing of /s/ must have been an independent process that affected word-final /s/ under "tertiary and weak stress", which is where these proclitic elements typically occur.[22] This means that the uniform [z] in the paradigms of *muzən* and *lozən* must be from somewhere in the paradigm in which there was no overt ending (that is, where the root-final /s/ was also word-final, and susceptible to voicing). For *muzən*, that could have been either the 1SG or 3SG ((17)). For *lozən*, however, it could only have been the 1SG; the 3SG can be ruled out as a source of leveling because the *-t* suffix would have enforced regressive devoicing ([lɔst]) ((18)). Note that vocalic alternations also support the 1SG as the basis of leveling for these verbs: *muzən* takes the vowel of the singular, like other preterite presents (section 2.3.1), while *lozən* has a long, un-umlauted vowel (sections 2.1–2.2). These developments are summarized in (17)– (18). Since the inflection of 'let' was idiosyncratic and variable in MHG, a number of possible outcomes are give in (18); asterisks mark those forms in which Yiddish shows none of the possible expected outcomes.

---

[20]In some dialects *visən* 'know' also occurs with voiced [z]: *viz ən*.

[21]Penzl (1968) argues for a more generic 'lenis/fortis' characterization of the *s*/ʒ contrast; see Paul, Wiehl, and Grosse (1989, p. 164) for additional references.

[22]Sapir (1915, p. 256) suggests that voicing occurred specifically when the final /s/ of a proclitic elements occurred intervocalically: *is a man* > *iz a man* 'is a man', but I know of no evidence that would suggest that voicing occurred only in this restricted context.

(17) Leveling of [z] from 1SG/3SG: **muzən** 'must'

	Late MHG	Expected Yid.	Actual Yid.
Infin.	*müeʒen*	**mizən*	***muzən***
1SG	*muoʒ*	*mus/muz*	*muz*
2SG	*muost*	*must*	*mu*[s]*t*
3SG	*muoʒ*	*mus/muz*	*muz*
1PL	*müeʒen*	**mizən*	***muzən***
2PL	*müest*	**mist*	***mu*[s]*t***
3PL	*müeʒen*	**mizən*	***muzən***

(18) Leveling of [z] from 1SG: *lɔzən* 'let'

	Late MHG	Expected Yid.	Actual Yid.
Infin.	*lân/lâʒen*	**lɔn/lɔsen*	***lɔzən***
1SG	*lân/lâʒe*	*lɔn/lɔs/lɔz*	*lɔz*
2SG	*lâst/læst*	*lɔst/lest*	*lɔ*[s]*t*
3SG	*lât/lâst/læt/læst*	*lɔt/lɔst/lest*	*lɔ*[s]*t*
1PL	*lân/lâʒen*	**lɔn/lɔsen*	***lɔzən***
2PL	*lât/lâst*	*lɔt/lɔst*	*lɔ*[s]*t*
3PL	*lân/lâʒen*	**lɔn/lɔsen*	***lɔzən***

In sum, the most plausible explanation of voicing for the final [z] in these two verbs is that they very frequently occur in unstressed/proclitic positions, where the 1SG would have been subject to voicing of word-final *s*. This development is fully parallel to the account of *meg* and *ken* given in section 2.3.1 above, and lends further support to the idea that the modern form of Yiddish verbs can always be derived from the expected 1SG form.

2.5.2 Loss of [d] in *verən*, *gefinən*

Another unexpected difference between late MHG and modern Yiddish concerns the verbs 'become' and 'find', both of which had stem-final /d/ in MHG (*wërden*, *(ge-)finden*) but do not in Yiddish (*verən*, *gefinən*). This change is most likely related to the fact that /d/-final clusters have been reduced in high frequency words in Yiddish—e.g., MHG *und(e)* > Yid. *un* 'and', MHG *mannes bild* > *man(t)sbil* 'man'. Evidence about this change is unfortunately rather limited, because MHG happens not to have had all that many high frequency words with /nd/, /ld/, /rd/ clusters—and this is particularly true word-finally because many of the relevant words reanalyzed to /nt/, /lt/, /rt/ during a period of final devoicing. (On the relation between this reduction and the loss of final devoicing, see Sapir (1915, pp. 258–260), Sadock (1973, pp. 792–795), and King (1980, pp. 383–385)). Deletion of /d/ seems to have affected word-final clusters more systematically than medial clusters, which are sometimes retained even in very high frequency words: *ander* 'other', *bazundersh* 'especially'. However, even medial clusters appear to have been affected in some cases: *gestanden* > *geshtanən* 'stood', *geworden* > *gevɔrən* 'became'. CELEX counts reveal that *werden* and *finden* are both among the twenty most frequent verbs in modern German,[23] and would therefore be quite likely to undergo

---

[23]These are: *sein* 'be', *werden* 'become', *haben* 'have', *können* 'can', *müssen* 'must', *sagen* 'say', *sollen* 'should', *wollen* 'want', *geben* 'give', *kommen* 'come', *machen* 'do', *gehen* 'go', *sehen* 'see', *stehen* 'stand', *lassen* 'let', *nehmen* 'take', *bleiben* 'stay', *finden* 'find', *liegen* 'lie', *wissen* 'know'.

/d/-deletion. This means that loss of stem-final /d/ is expected especially in the 1SG/2SG/3SG/2PL, where it occurred in coda position, and perhaps to a certain extent also in the 1PL/3PL/infinitive, where it was intervocalic.

(19) Loss of stem-final /d/: *finən* 'find', *verən* 'become'

	Late MHG	Expected	Actual		Late MHG	Expected	Actual
Infin.	*findən*	*(ge)fin(d)ən*	***gefinən***	Infin.	*werdən*	*ver(d)ən*	*verən*
1SG	*finde*	*(ge)fin*	*gefin*	1SG	*werd(e)*[24]	*ver*	*ver*
2SG	*find(ə)st*	*(ge)fin(t)st*	*gefinst*	2SG	*wir(d)st*	**vir(t)st*	***verst***
3SG	*find(ə)t*	*(ge)fint*	*gefint*	3SG	*wirt*	**virt*	***vert***
1PL	*findən*	*(ge)fin(d)ən*	***gefinən***	1PL	*werdən*	*ver(d)ən*	*verən*
2PL	*find(ə)t*	*(ge)fint*	*gefint*	2PL	*wer(də)t*	*vert*	*vert*
3PL	*findən*	*(ge)fin(d)ən*	***gefinən***	3PL	*werdən*	*ver(d)ən*	*verən*

Because there are so few parallel words to compare, the expected forms here are not as certain as in the previous sections, and the Yiddish outcome is compatible with a wider variety of sources of leveling. We see from the tables in (19) that due to vowel alternations, it is incompatible with leveling from the 2SG or 3SG, but otherwise it is broadly consistent with a number of possible sources—including, crucially, the 1SG.

2.5.3 The verb *tɔn*

Another verb in Yiddish that shows an effect of paradigm uniformity is *tɔn* 'do', which has the stem *tu-* in all present tense inflected forms (*tu*, *tust*, *tut*, *tuən*, *tut*, *tuən*), but the vowel [ɔ] in the infinitive (at least in some dialects): *tɔn*. There is no apparent MHG basis for this difference, since the infinitive, 1PL, and 3PL were all identical in MHG: *tuo-n*. This should have yielded [u] by regular sound change in Yiddish (cf. MHG *guot* > Yid. *gut* 'good', MHG *huon* > Yid. *hun* 'chicken', MHG *suon/sun* > Yid. *zun* 'son'). It is not clear to me whether there was a irregular [u] > [ɔ] change affecting just this one high frequency word, or whether there was a leveling from the past participle (MHG *getân* > Yid. *getɔn*). In either case, it is clear that the 1/3PL have been exempted from this change, and retain the [u] that is found also in the singular and 2PL. Thus, although this form provides only weak evidence about the directionality of paradigm leveling, it does further demonstrate the point that uniformity has been enforced to a greater extent within the inflected forms of the present tense paradigm than outside of it.

2.5.4 Unexpected [n] in *binst*

The only Yiddish verb to retain significant stem alternations within the present tense paradigm is *zayn* 'to be', which standardly has the inflected forms: *bin*, *bist*, *iz*, *zaynən/zenən*, *zayt/zent*, *zaynən/zenən*. Even in this extremely high frequency verb, however, a reanalysis is found in some NEY dialects extending the [n] of 1SG *bin* to create 2SG *binst*. This change is easily understood if the analysis that is imposed on the 2SG is

---

[24]See fn. 18 regarding the early change from *wird* to *werd*.

21

that it should be identical to the 1SG plus the addition of the -st suffix.[25] Although leveling in this case has not been as complete as with other verbs, the limited restructuring that has occurred is clearly based on the 1SG, consistent with all changes found in previous sections.

2.6 Processes that did not cause leveling or reanalysis

Before concluding the discussion of levelings, it is useful to review a few phonological processes that are retained in modern Yiddish, and which did not trigger analogical change. The fact that certain logically possibly levelings did not take place is significant, because it forces us to consider whether there is any principle that could explain why some alternations are permitted, while others are eliminated completely.

The first concerns voicing alternations caused by regressive assimilation in clusters created by the 2SG/3SG/2PL affixes. As noted in example (4), for verbs that end in voiced obstruents, the suffixes -t and -st have the potential to create clusters with voicing disagreements. These are resolved by regressive devoicing: /zɔg+t/ → [zɔkt].

(20) Non-occurring levelings of voicing alternations

	Underlying	Expected/Actual	Unattested A	Unattested B
Infin	/zɔg+ən/	zɔgən	zɔgən	*zɔkən
1SG	/zɔg+∅/	zɔg	zɔg	*zɔk
2SG	/zɔg+st/	zɔkst	*zɔgst	zɔkst
3SG	/zɔg+t/	zɔkt	*zɔgt	zɔkt
1PL	/zɔg+ən/	zɔgən	zɔgən	*zɔkən
2PL	/zɔg+t/	zɔkt	*zɔgt	zɔkt
3PL	/zɔg+ən/	zɔgən	zɔgən	*zɔkən

The fact that leveling has not undone voicing assimilation (*[zɔgst], *[zɔgt]) can be explained by the fact that voicing agreement in final obstruent clusters is an inviolable principle of Yiddish, so would be strongly disfavored on general phonotactic grounds. The fact that voicing assimilation has not overapplied through leveling (*[zɔkən]) is not so readily explained, since medial voiceless stops are perfectly legal in Yiddish (cf. bakən 'bake', drukən 'print', mekən 'erase'). If we look just at levelings based on the 1SG, however, an answer immediately suggests itself: the 1SG preserves voicing ([zɔg]), so there is no pressure to level to the voiceless value. Under this account, there would be pressure to level to the voiced value (unattested column A), but this is prevented by an even stronger phonotactic of voicing agreement in obstruent clusters. Thus, a restriction to only those levelings that could be based on the 1SG helps to explain why leveling has not caused voicing assimilation to overapply.

In addition to voicing agreement, the suffixes -st and -t also trigger a set of phonological reductions that delete stem-final /s/'s and /t/'s (details in section 3.2 below). For example, the 3SG of the verb raytən 'ride' is underlyingly /rayt+t/, but is pronounced with a single [t]: rayt. This means that in principle, we might expect possible reanalyses of t-final verbs as vowel-final: /rayt-t/ ⇒ /ray-t/. Such a reanalysis would

---

[25]Zaretski (1926, p. 153) also expresses the opinion that binst is not unexpected, though he does not say why: "The popular form binst is more regular than the literary bist; it should not be considered illegal in literary use".

22

be supported by the analogical influence of genuinely vowel-final verbs, such as *shrayən* 'cry' (3SG *shrayt*, 1SG *shray*), of which there are many. The only case that could possibly be analyzed in this way is *gefinən* 'find' (2SG *gefinst*, 3SG *gefint*), but as was shown above in section 2.5.2, this is not the only possible analysis of this particular case. Unambiguous cases of the removal of stem-final *t* by reanalysis are unattested. This, too, can be easily explained if the pivot of reanalysis was always the 1SG, since in this form the difference between /t/-final and V-final verbs is clearly visible.

A similar alternation can be seen in the 1PL, 3PL, and infinitive, where stem-final schwa is deleted when it comes before the schwa of the suffix: /blɔnkə-ən/ → [blɔnkən] 'wander aimlessly'. (This process is discussed in more detail in section 3.3 below.) In theory, forms like *blɔnkən* are ambiguous, since they could be segmented either as *blɔnkə-n* (with stem-final schwa) or *blɔnk-ən* (with the schwa in the suffix). It appears that there have been few, if any, reanalyses of this sort, however. Thus, presence or absence of stem-final schwa is another relatively stable property of Yiddish verbs that continues to condition alternations.

Frequently, it is suggested that the difference between leveling vs. maintaining a process can be linked to how productive or automatic the processes are (Hoenigswald 1960, pp. 107–109). This might lead us to speculate that regressive devoicing has always been very automatic, while closed syllable shortening at some point became less so. This only pushes the problem back, however, because now we must explain why certain alternations become unproductive or morphologized. I argue here that the most important distinction is that the processes that leveled in Yiddish caused neutralizations in the 1SG, while the processes that remained active caused neutralizations elsewhere in the paradigm (if at all).

2.7   Discussion and summary of changes

In this section, I have argued that the changes affecting Yiddish present tense paradigms are unified by a common property: in every case, a process that affected the 1SG has been extended to the remainder of the present tense paradigm. For some verbs, the processes in question involved frozen morphophonological alternations; these included umlaut verbs, preterite presents, and singular ∼ plural Wechselflexion. For other verbs, alternations were due to regular phonological processes, either within words (e.g., open syllable lengthening, epenthesis in $rm]_\sigma$ clusters) or as sandhi phenomena (umlaut before the 1SG pronoun *ich*, voicing of *s* in proclitics). This is summarized in Table 2.7, in which it is clear that all of the attested changes (top half of the table) extend neutralizations found in the 1SG, while there are no changes that alter the 1SG by extending neutralizations that occurred elsewhere (bottom half of the table).

It should be emphasized that for most of these changes, the 1SG is just one of several potential sources of the allomorph that was extended. Nothing in the data precludes the possibility that Yiddish has undergone a series of unrelated restructurings, each based on a different part of the paradigm (or combination of parts of the paradigm). Therefore, based on these data alone, the main argument in favor of the unified 1SG-based account would be its simplicity: it can cover all of the differences between Yiddish and MHG verb paradigms with a single change, rather than positing an array of independent changes with no explanation for why different changes go in different directions. There are, however, two additional reasons to favor a 1SG-based account.

The first reason to prefer the unified account is that it is more restrictive. It not only captures the attested changes, but it also rules out a large number of logically possible but unattested changes. To see why,

Table 1: Summary of possible sources of leveling of alternations

		1SG	2SG	3SG	1PL	2PL	3PL	Infin.
Leveled	Open syllable lengthening (§2.1)	✓			✓		✓	✓
	Umlaut (§2.2)	✓			✓	✓	✓	✓
	Preterite presents (§2.3.1)	✓	✓	✓				
	megən, *kenən* (§2.3.1)	✓						
	Sg. ∼ pl. *Wechselflexion* (§2.3.2)	(✓)			✓	✓	✓	✓
	gebən, *kumən* (§2.3.2)	✓	✓	✓				
	Epenthetic ə / r___ m (§2.4)	✓	✓	✓		✓		
	Voicing in *muzən*, *lɔzən* (§2.5.1)	✓						
	Loss of /d/ in *verən*, *gefinən*	✓			(✓)	✓	(✓)	(✓)
	[n] in 2SG *binst* (§2.5.4)	✓						
Not leveled	Devoicing by assimilation (§2.6, §3.1)		✓	✓		✓		
	Deletion of stem-final /s/ (§2.6, §3.2)		✓					
	Deletion of stem-final /t/ (§2.6, §3.2)		(✓)	✓		✓		
	Deletion of stem-final /ə/ (§2.6, §3.3)				✓		✓	✓

suppose that leveling could have proceeded in a variety of different directions and was not always based on the 1SG. Under such a scenario, the combination of changes in Table 2.7 would be just one of many possible outcomes for Yiddish. For example, it would have been conceivable for the the vowel of the 3SG to be extended in umlaut verbs, for short vowels to prevail in the leveling of length alternations, or for the plural form to win out in preterite presents. Furthermore, we could have seen reanalyses based on the 3SG, such as loss of stem-final /t/ or /d/ (*rayt* 'hold-3SG' ⇒ **ray* 'hold-1SG'). In fact, all changes of this sort are unattested—but under the less restrictive account, this would be purely accidental. Such a coincidence is rather unlikely, though of course not totally impossible. Under the 1SG-based account, on the other hand, the fact that properties of the 1SG are always preserved and never altered is anything but coincidental, since it just one of a small handful of possible changes. Thus, the claim that the 1SG has consistently acted as the pivot of leveling is not just a more economical statement, but is also part of a more constrained theory, which predicts all of the attested changes and none of the unattested ones.

In the next section, I will argue that there is yet another, even more important argument in favor of leveling to the 1SG: not only is it a more constrained account of the observed changes, but it is also precisely the direction of change that is expected under a predictability-based model of paradigm organization (Albright 2002a). The claim, then, will be that the changes discussed in this section are not just some of the many possible changes, but in fact they are the only changes that could have taken place in Yiddish. Under this analysis, Yiddish exhibits all and only the changes that could possibly have occurred.

Table 2: Applicability of proposed tendencies to the direction of Yiddish changes

	V length (§2.1)	Umlaut (§2.2)	Sg. ∼ pl. diffs (§2.3)	*muzən*, *lɔzən* (§2.5.1)	2SG *binst* (§2.5.4)
1. Majority rule	(Tie)	Yes	No	No	No
2. Most frequent (=3SG)	No	No	Yes (exc. *meg*, *ken*)	No	No
3. Default person/number	No	No	Yes (exc. *meg*, *ken*)	No	No
4. Unsuffixed form	(Tie)	(Tie)	(Tie)	(Tie)	(Tie)
5. Phonotactic markedness	No	No	No	No	No
6. Predicability	Yes	Yes	Yes	Yes	Yes

3 Predicting the directionality of leveling in Yiddish

The directionality of analogical change has been a topic of intense investigation in historical linguistics. Over the years numerous generalizations have emerged about which forms tend to act as the base, or pivot, of analogical restructuring: they are often the forms that occur in the most slots of the paradigm (majority rule), they tend to have high token frequency (Mańczak 1958), they often occur in certain privileged "unmarked" (or default) slots such as the 3SG (Kuryłowicz 1947), and they are often the forms that are unsuffixed or have the least overt morphology (Bybee 1985, pp. 50–52). (See Hock 1991, chapters 10–11 for an overview.) Within Optimality Theory (Prince and Smolensky 1993/2004), work on paradigm uniformity has also emphasized the role of unsuffixed isolation forms (Kager 1999; Kenstowicz 1997a) and of phonological well-formedness in determining the outcome of leveling (see especially Kenstowicz 1997b, McCarthy 2005), with the problem viewed as a global optimization to find the most harmonic paradigm. Unfortunately, none of these principles has been sufficient to describe all known cases of leveling, and the general conclusion has been that no single principle can correctly characterize every change, but rather, that there are multiple conflicting tendencies. Under a tendency-based account, paradigm leveling is the result of several independent (though similar) mechanisms: a pressure for all forms in the paradigm to match the most frequent one, a pressure for all forms to match an unsuffixed form, etc. Under this view, it is impossible to predict the outcome for any particular case, since different principles tend to favor different forms. In the case of Yiddish, for example, token frequency might favor leveling to the form found in the 3SG, while occurrence in the broadest range of slots would tend to favor the plural/infinitive form. Leveling to an unsuffixed form might favor the 1SG, but there is also competition from two other unsuffixed forms, which are not always the same as the 1SG: the imperative, and the "root" (*shtam*) form, which is identical to the infinitive minus the *-ən* suffix. If we view leveling as the result of a collection of possibly conflicting tendencies, then we must accept that different principles are operative not only across different languages, but even within the same language. The difficulty of finding a single principle that captures all of the Yiddish changes is illustrated in the first five rows of Table 2. What we see, then, is that a probabilistic tendency-based approach cannot explain why a particular principle would be consistently favored in a given language—both by a single speaker across different verb classes, and also across different speakers.

In contrast to the tendency-based approach, Albright (2002a) proposes that all instances of leveling should be seen as grammatical overregularization: the replacement of irregular forms with those that would be expected, according to the regular synchronic grammar of the language. For example, the loss of umlaut

alternations in the development of Yiddish (*trɔg*, *trekst*, *trekt* ⇒ *trɔg*, *trɔkst*, *trɔkt*; section 2.2) could be taken as evidence that at the time of leveling, umlaut was no longer a grammatically productive process of the language, and the regular way to derive 2/3SG forms involved simple affixation without umlaut (/trɔg/+/t/ → [trɔkt]). Under this analysis, umlaut in forms like *trekt* could only have been produced by knowing that this verb was irregular, with the irregular form blocking the grammatically expected one (Aronoff 1976). If a speaker of Yiddish prior to leveling happened to forget (or not know) that *trɔgən* was exceptionally an umlaut verb, then blocking would fail, and the grammar would produce an overregularization "error". The idea that analogy is nothing more than regularization is certainly not new. Hermann Paul (1920, chap. 5) argued that analogy involved the replacement of irregular relic forms with synchronically regular ones, though he did not have an explicit model of what made a pattern synchronically regular. Within the generative tradition, Kiparsky has extensively argued extensively that analogy should be seen as grammatical regularization, either by eliminating exceptional forms, or by simplifying the grammar itself (Kiparsky 1968, 1974, 1978). A grammar-based account has the potential to explain the direction of analogy, since a formalized grammar constitutes an explicit claim about which patterns are governed by productive rules and which are exceptional. In order to be predictive, however, the grammatical formalism must be suitably constrained so that it actually favors the attested change. In the case of pre-leveling umlaut verbs, for example, the analysis of leveling requires that the underlying form of 'carry' be /trɔg/ (and not /treg/), and that existing umlaut verbs be treated as irregular exceptions. The challenge in pursuing the "analogy as regularization" hypothesis is to develop a grammatical formalism that correctly forces us to classify all rebuilt forms as exceptions, and can analyze all innovative analogical formations as grammatically expected regular outputs. In the case of Yiddish prior to leveling, our task is to answer the following two questions: why were verbs with alternations classified as exceptions, and why did the grammar always extend the form found in the 1SG?

We do not need to look far to find the answer to the first question, since for the most part, it is clear that MHG stems alternations would qualify as irregular exceptions under just about any intuitive notion of what counts as a regular, productive pattern. Patterns like 2/3SG *umlaut* and singular ~ plural alternations affected just a small number of high frequency verbs which were greatly outnumbered by non-alternating verbs with either vowel, and the same is true for lexically idiosyncratic patterns like 1SG umlaut (*meg*, *ken*) or voicing (*muz*). Vowel length alternations conditioned by syllable structure were more pervasive, but as noted above, closed syllable shortening had already developed numerous exceptions, both because of the opaque interaction with apocope, and because of competing lengthening tendencies in certain contexts and certain lexical items. A formal system for deciding what counts as a productive process will be described in section 3.6, but for the moment, it should be sufficient to observe that non-alternation (uniformity) would have been by far the most common pattern in MHG/early Yiddish, and it is not hard to see why verbs alternations with alternations should have counted as exceptions.

The greater challenge is to understand why, in the case of exceptional verbs, regularization should always have involved extending the allomorph found in the 1SG. Since leveling to the 1SG is not a universal tendency, this question actually involves two sub-parts: (1) why should regularization always favor a particular form in the paradigm, and (2) why was that form specifically the 1SG in Yiddish? To answer the first question, Albright (2002a) proposes a formal restriction on possible grammars, such that they always have the structure in Figure 1. According to this hypothesis, one form in the paradigm is designated as basic, and the grammar involves a set of rules that define the remaining forms in relation to the base. Under this account, the fact that leveling obeys a consistent directionality is a natural consequence of the fact that the grammar is unidirectional, deriving all output forms from the same basic input form for all lexical items. To answer the question of why the directionality differs from language to language, it is hypothesized that the base is selected during acquisition by an optimizing procedure: learners attempt to identify the form that
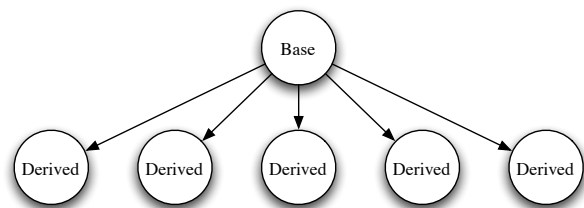
Figure 1: Paradigm structure defining all paradigm members with respect to a designated base

is maximally informative with respect to the remaining forms in the paradigm. Since different languages exhibit different patterns of phonological neutralizations and different inflectional class systems, the optimal (=maximally informative) base form may also differ from language to language. This means that languages may have very different grammatical organizations, depending on what parts of the paradigm are affected by neutralizations. The claim is that these predictability differences, and not chance, are responsible for the observed cross-linguistic differences in the directionality of analogical change.

According to the predictability-based analysis, learners seek out the slot in the paradigm that reveals as much as possible about phonological and morphological properties of lexical items. Ideally, a single part of the paradigm can be found that reveals every property of every word; in this ideal case it is straightforward to write rules that predict every other part of the paradigm, either because they are identical, or predictably different, or can be derived by applying rules that neutralize phonological or morphological contrasts. Frequently, however, there is no single form in the paradigm that reveals every property of every word, since each form is affected by a different set of phonological or morphological neutralizations.[26] For example, consider the language in (21).

(21) Hypothetical neutralizations in two directions

	Sg.	Pl.
a.	*drup*	*drubi*
b.	*sap*	*sapi*
c.	*rat*	*radi*
d.	*fet*	*feti*
e.	*tik*	*tigi*
f.	*gluk*	*gluki*
g.	*zupa*	*zupi*

In this language, there is a process of final devoicing, which creates a neutralization between voiced and voiceless obstruents (*drup* vs. *sap*). For stem-final voicing contrasts, clearly the plural is the more informative part of the paradigm. However, the form in (21f) shows that the language also has a process

---

[26]Within generative phonology, this observation is often taken as evidence that the stored form of a word must be an abstract representation that combines unpredictable information from multiple sources; see Kenstowicz and Kisseberth (1977, chapter 1) for discussion of some relevant cases. The proposal that speakers are restricted to a single surface form is a departure from this assumption, but is similar in spirit to versions of phonology that rely on basic alternants or base-prioritizing output-output relations.

of vowel deletion in hiatus (/zupa+i/ → [zupi]), meaning that the presence of a stem-final vowel cannot be discerned from the plural. Consequently, neither the singular nor the plural contains 100% of the information needed to predict the other. In such cases, it is hypothesized that learner chooses the best available form, even if some contrasts are neutralized in it. Although there are numerous possible ways to define "best", a simple criterion is to choose the form that maintains contrasts for the greatest number of lexical items, since this allows us to construct a grammar with the highest possible overall accuracy. For the language in (21), this criterion would favor the plural as a base, since the stem-final voicing contrast is a robust one, while words with stem-final vowels are relatively rare (just one example). Of course, this choice is not without consequences. Although in this toy language the singular can usually be derived by simply removing the plural suffix *-i* and applying final devoicing, this makes the wrong prediction for the word *zupa*. For words of this type, it would make more sense to derive the plural from the singular—but this is not an option, given the restriction that the same part of the paradigm must serve as the base for all lexical items. Thus, the speaker is forced to analyze *zupa* as an irregular form, which exceptionally takes *a* in the singular. Under this analysis, the word *zupa* would be susceptible to regularization, and might one day acquire an innovative singular form *zup*.

Much of the predictive power of this model comes from the asymmetrical structure of the grammar (Figure 1), which distinguishes between properties that the grammar takes as given (= contrasts that are present in the base), and those that it must attempt to predict (= contrasts that are neutralized in the base). In the previous section, we saw that Yiddish is compatible with this distinction, since all the observed changes have left the 1SG intact and rebuilt other forms. What remains to be shown is that the 1SG is also the maximally informative form in Yiddish. In this section I will argue that it is, because it suffers from fewer phonological neutralizations than any other part of the paradigm, and therefore maintains distinctions between the greatest number of lexical items. It is important to bear in mind that our interest here is not in the modern language, but rather, in a version of Yiddish prior to leveling. The strategy, then, will be to examine a hypothesized ("expected") version of Yiddish that is derived from MHG by well-established sound changes and no further analogical modification. We will consider the phonological and morphophonological neutralizations that were present in this stage of the language, and what parts of the paradigm they would have affected.

3.1 Voicing agreement

As discussed above, Yiddish, like English, German, and many other languages, disallows sequences of tautosyllabic obstruents that disagree in voicing: *bs]$_\sigma$, *pd]$_\sigma$, etc. As a result, when a suffix consisting of voiceless obstruents (such as 2SG *-st* or 3SG/2PL *-t*) is added to a root ending in a voiced obstruent, there is obligatory voicing assimilation. In Yiddish, as in Middle High German and standard New High German, this assimilation is regressive, yielding a voiceless cluster: /klɔg+t/ → [klɔkt] 'complain-3SG'.[27] This means that in the 2SG, 3SG, and 2PL, voicing assimilation neutralizes the contrast between root-final voiced and

---

[27]In German, the regressive direction of assimilation can be attributed to final devoicing. In Yiddish, however, there is no general process of final devoicing, and the direction of assimilation must be analyzed by some other means; see Baković (1999) for an analysis and discussion.

voiceless obstruents,[28] as shown in (22) for *libən* 'love' vs. *zipən* 'sift', and *klɔgən* 'complain' vs. *brɔkən* 'crumble'.

(22) Voicing assimilation in the 2SG/3SG/2PL

Infin.	*libən*	*zipən*		*klɔgən*	*brɔkən*
1SG	*li*[**b**]	*zi*[**p**]		*klɔ*[**g**]	*brɔ*[**k**]
2SG	*li*[p]*st*	*zi*[p]*st*		*klɔ*[k]*st*	*brɔ*[k]*st*
3SG	*li*[p]*t*	*zi*[p]*t*		*klɔ*[k]*t*	*brɔ*[k]*t*
1PL	*li*[**b**]*ən*	*zi*[**p**]*ən*		*klɔ*[**g**]*ən*	*brɔ*[**k**]*ən*
2PL	*li*[p]*t*	*zi*[p]*t*		*klɔ*[k]*t*	*brɔ*[k]*t*
3PL	*li*[**b**]*ən*	*zi*[**p**]*ən*		*klɔ*[**g**]*ən*	*brɔ*[**k**]*ən*

This neutralization affects all obstruent pairs with a voicing contrast, of which there are seven in Yiddish (*p/b*, *t/d*, *k/g*, *f/v*, *s/z*, *ʃ/ʒ*, *t͡ʃ/d͡ʒ*). Note, however, that under the current approach, the seriousness of a neutralization is measured not in terms of the number of segments that are affected, but rather, in terms of how many lexical items are affected. The rationale for this is that the learner is seeking to be able to produce all forms of all words, and the penalty for choosing a neutralizing base form is there may not be enough information to do this with 100% accuracy. Thus, what we really need to know for each neutralization is how many Yiddish verbs would be ambiguous when the process applied.

Unfortunately, it is not possible to construct a corpus of early Yiddish, but as mentioned above (fn. 8), a reasonably good estimate of the set of Yiddish verb roots can be gotten by comparing equivalent counts in German.[29] I searched the German portion of CELEX for all verb lemmas that had a token frequency of 1 or greater (i.e., verbs that actually occurred in the corpus), and were not "compound", in the sense of having a separable initial element (separable prefix, incorporated object, or adverb). This left a total of 4877 verb lemmas. Among these, I then searched for verbs whose phonological form would be ambiguous under regressive voicing assimilation—that is, any verb that ends in an obstruent that contrasts for voicing in German. Note that because this count was restricted to contrastively voiced obstruents (the 7 pairs listed above), only a subset of obstruent-final verbs were included (e.g., [x], which has no phonemically voiced counterpart [ɣ]). Out of the 4877 non-compound verb lemmas, 1988, or 41% end in potentially voiced obstruents. That means that if a speaker were to use only whatever information was available in the 2SG, 3SG or 2PL to derive the remainder of the paradigm, there would be potential ambiguities concerning voicing in just under half of the verbs of the language. Of course, in practice the true level of ambiguity may not be quite so high, since among those 1988 verbs, speakers could potentially predict voicing at better than chance levels if they could use a more sophisticated guessing strategy based on statistical correlations with other

---

[28]A number of studies in recent years have shown that voicing neutralizations of this type may not always be complete, and that the contrast may potentially be preserved through secondary cues, such as preceding vowel length, in some languages (German: Port and O'Dell 1986; Catalan: Dinnsen and Charles-Luce 1984), but not in others (Turkish: Kopkalli 1993; Russian: Chen 1970, pp. 135-137; Italian: Baroni 1998). I assume here that the neutralization caused by devoicing is complete in Yiddish; nevertheless, even if it turned out to be only a partial neutralization, it would be possible to argue that a surface form with no devoicing at all is still a better source of information about the underlying voicing status of final obstruents than a form with partially neutralizing devoicing.

[29]This is not to say that the influx of words from Slavic and Hebrew/Aramaic has not introduced any phonological differences between the make-up of Yiddish vs. German verb roots. For example, Yiddish has some verb roots ending in /d͡ʒ/, which is not found in German, as well as a sizable number of verbs ending in /v/, which is rare in German. The existence of words from other sources has influenced the Yiddish nominal vocabulary substantially more than the verbal vocabulary, however, and for lack of any better searchable database, CELEX counts from German provide a first approximation.

contingent properties of the verb, such as the place or manner of the obstruent, the quality of the preceding vowel, and so on. Indeed, Ernestus and Baayen (2003) have shown that such correlations do occur in Dutch (a language that has significant etymological overlap with German and Yiddish), and that speakers are able to make use of them in guessing about unknown words. Nonetheless, even if stem-final obstruent voicing is somewhat predictable using these indirect sources of information, it is still a relatively serious neutralization, and given a choice, it would clearly be easier and more accurate to simply memorize the correct value by referring to a part of the paradigm that is not affected by voicing assimilation.

3.2 Degemination and t-deletion

In addition to banning voicing disagreements, Yiddish also has numerous restrictions on possible place and manner combinations in coda clusters. Of particular interest to verbal inflection is a ban on two consecutive coronal stops (*tt]$_\sigma$, *dt]$_\sigma$) or two anterior stridents (*ss]$_\sigma$, *zs]$_\sigma$). When a suffix starting with /t/ or /s/ is added to a stem ending in a similar consonant, the two segments fuse into a single voiceless segment through a process of degemination (Jacobs 2005, p. 216). This process was also found quite regularly in Middle High German (Paul, Wiehl, and Grosse 1989, §53d), and is also preserved in some German dialects. In the last form of (23b), we see that at least in present day Yiddish, this process affects not only /s+st/, but also /st+st/.

(23) Degemination/fusion of *t*, *s*

　　a. Coronal stops

　　　　/rayt+t/　→　[rayt]　　‘ride-3SG/2PL’
　　　　/red+t/　→　[ret]　　‘speak-3SG/2PL’
　　　　/hust+t/　→　[hust]　　‘cough-3SG/2PL’

　　b. Anterior stridents
　　　　/heys+st/　→　[heyst]　　‘be called-2SG’
　　　　/vayz+st/　→　[vayst]　　‘show-2SG’
　　　　/hust+st/　→　[hust]　　‘cough-2SG’

Jacobs (2005, p. 129) argues that the degemination of /st+st/ is related to a more general tendency to delete /t/ when it comes in the middle of a cluster of three or more consonants[30]: /vɔlt+st/ → [vɔlst] ‘want-2SG’, /traxt+st/ → [traxst]. The reduction of /st+st/ to [st] can then be seen as a combination of two independent effects: *t*-deletion (/mest+st/ → *messt*) and degemination (*messt* → [mest]).

Because of degemination and *t*-deletion, one cannot always tell on the basis of a 2SG, 3SG, or 2PL form whether the verb stem ends in a coronal obstruent (*s* or *t*) or not. This ambiguity is shown in (24–25).

---

[30]Specifically, the preceding consonant must be an obstruent or *l*, but not *r* or *n*. Deletion after *l* appears to be less consistent than deletion after obstruents: /halt+st/ → [halst] ∼ [haltst]; (Zaretski 1926, p. 224).

(24) Neutralization in the 2SG

Infin.	*dreyən*	*heysən*	*vayzən*	*haltən*	*hustən*
	'turn'	'call'	'show'	'hold'	'cough'
1SG	*drey*	*heys*	*vayz*	*halt*	*hust*
2SG	*drey*[st]	*hey*[st]	*vay*[st]	*hal*[st]	*hu*[st]
3SG	*dreyt*	*heyst*	*vayst*	*halt*	*hust*
1PL	*dreyən*	*heysən*	*vayzən*	*haltən*	*hustən*
2PL	*dreyt*	*heyst*	*vayst*	*halt*	*hust*
3PL	*dreyən*	*heysən*	*vayzən*	*haltən*	*hustən*

(25) Neutralization in the 3SG/2PL

Infin.	*dreyən*	*tretən*	*redən*
	'turn'	'step'	'speak'
1SG	*drey*	*tret*	*red*
2SG	*dreyst*	*tretst*	*retst*
3SG	*drey*[t]	*tre*[t]	*re*[t]
1PL	*dreyən*	*tretən*	*redən*
2PL	*drey*[t]	*tre*[t]	*re*[t]
3PL	*dreyən*	*tretən*	*redən*

Ambiguities about the presence or absence of a segment are more serious than voicing neutralizations, since in principle, any 3SG/2PL form could involve a "covert" /t/, and any 2SG form could be hiding a deleted *s*, *st*, or often even a *t* (100% neutralization). In practice, it may be possible in some cases to infer that a covert segment is unlikely, since it would create an otherwise unattested cluster—e.g., *kumst* 'come-2SG' is unlikely to correspond to *kumtən, *kumsən or *kumstən. Conversely, in some cases it may be possible to infer that a covert segment is quite probable, because of the quality of the preceding vowel—e.g., *mest* 'measure-2SG' could not be from a verb *meən, though it could be from either (hypothetical) *mesən* or (actual) *mestən*. Similarly, a 3SG form like *glitsht* 'slip-3SG' is very unlikely to have a covert *t* or *d*, since verbs like (hypothetical) *glitshten* or *glidzhdən* are not found. Some examples of sequences that allow this type of indirect inference are shown in (26)–(27). Note that these examples are merely some of the more extreme cases; in point of fact nearly every segmental context has a statistical bias towards one verb type or another, but often this bias is weak and/or based on just a few verbs.

(26) Indirect inference from the 2SG

2SG Context	Likely infinitive(s)	Non-occurring alternatives
…short/lax V̆ *st*	…V̆*sən*, …V̆*zən*	…V̆*ən* (rare), …V̆*stən* (rare)
…labial C *st*	…C*ən*	…C*sen*, …C*ten* (rare), …C*sten* (non-occurring)
…fricative *st*	…C*ən*, …C*tən*	…C*zən*, …C*sən*

(27) Indirect inference from the 3SG/2PL

2SG Context	Likely infinitive(s)	Non-occurring alternatives
…short/lax V̆ *t*	…V̆*tən*	…V̆*dən* (rare), …V̆*ən* (rare)
…labial C *t*	…C*ən*	…C*ten*, …C*den* (rare), …C*sten* (non-occurring)
…t͡ʃt	…t͡ʃ*ən*	…d͡ʒ*dən*, …t͡ʃ*tən*

Because of the possibility of such indirect inferences, it is difficult to measure the actual impact of neutralizations caused by degemination and *t*-deletion. The best way to estimate the ability of a speaker to "recover" covert segments based on the surrounding phonological context would be to use a computational model that can discover such regularities, along the lines of Albright (2002b) or Ernestus and Baayen (2003). Unfortunately, we are once again limited by the lack of a large computerized database of Yiddish verbs. It is safe to say, however, that even if partial predictability means that the ambiguity in these forms is less than 100%, using the 2SG, 3SG, or 2PL to predict the remainder of the paradigm would involve a good deal of uncertainty, and in many cases, incorrect guesses.

3.3 Neutralization of stem-final [ə]

So far, I have focused on neutralizations caused by the 2SG/3SG/2PL suffixes, since the bulk of alternations in Yiddish paradigms are triggered by illegal combinations of obstruents. There is, however, one potentially neutralizing process that is triggered by the schwa-initial 1PL/3PL/infinitive suffix *-en*: if a verb root ends in /ə/, the schwa of the verb root and the schwa of the suffix merge to create a single schwa: /blɔnkə-ən/ → [blɔnkən], not *[blɔnkəən]. As a result, in some cases it is not possible to tell on the basis of the infinitive/1PL/3PL whether the schwa belongs to the suffix (as in *blankən* 'to gleam'), or whether the verb itself has a schwa that should be kept in the remainder of the paradigm (as in *blɔnkən* 'to stray')

(28) Neutralization of verb-final /ə/ in the infinitive/1PL/3PL

Infin.	*blankən*	*blɔnkən*
1SG	*blank*	*blɔnkə*
2SG	*blankst*	*blɔnkəst*
3SG	*blankt*	*blɔnkət*
1PL	*blankən*	*blɔnkən*
2PL	*blankt*	*blɔnkət*
3PL	*blankən*	*blɔnkən*

Verbs like *blɔnkən* are known as "thematic" verbs (Jacobs 2005, p. 213). As with the fusion of stem-final and suffixal *s* and *t*, the merger of adjacent [ə]'s in thematic verbs has the potential to create widespread ambiguity, since verbs of any phonological shape could potentially be thematic, but it is difficult or impossible to determine the status of any particular verb on the basis of the infinitive/1PL/3PL. Thematic verbs are a minority pattern in Yiddish, but there is a not insignificant number of them. Since they have no equivalent in German, it is impossible in this case to use CELEX as a rough estimate of the degree of competition. Instead, I took a sample of verbs from Weinreich (1990), counting all of the verbs that beginning with [l] or [ʃ]. These segments were chosen because words starting with them seem to come from Germanic, Hebrew/Aramaic and Slavic in representative proportions; this avoided biasing the sample by including characteristically Slavic onsets (such as verbs beginning with [x]) or characteristically Hebrew initial sequences like *me-*. I excluded from the counts all verbs created with the derivational affix *-ir-ən* (which is generally used for learned Latinate words). Of the 252 remaining Yiddish verbs (90 [l], 162 [ʃ]), 28 of them, or 11%, are thematic; this proportion holds equally in both contexts (9/90 [l], 19/162 [ʃ]). Thus, it is a contrast that is seen in a relatively large portion of the Yiddish vocabulary, and its neutralization could have serious consequences for being able to inflect verbs correctly. This makes the infinitive/1PL/3PL forms, which have the suffix *-ən*, a less than ideal source of information about properties of a Yiddish verb.

In practice, there are two sources of evidence that speakers could use to determine whether a verb is thematic or not, even on the basis of forms with the -ən suffix: in some cases a subtle phonetic difference is retained, while in other cases, thematic schwa can be inferred from the presence of certain sequences elsewhere in the word. I consider each of these in turn.

The most straightforward source of evidence about thematic /ə/ comes from direct phonetic cues to its presence. In order to understand when these might be available, it is necessary to consider some details of the surface realization of the infinitive suffix that I have been transcribing as -ən. Depending on the preceding context, this suffix is may actually be pronounced as [ən], as a syllabic nasal ([m̩], [n̩] or [ŋ̩]), or simply as [n]. The syllabic allomorph assimilates in place to a preceding stop: hɔb[m̩] 'have', red[n̩] 'speak', zɔg[ŋ̩] 'say', but is otherwise coronal hɔf[n̩] 'hope', lax[n̩]. The distribution is as follows:

(29) Surface realizations of infinitive/1PL/3PL -ən
  a. /ən/ → [n] after
    • Schwa: hulyə-[n] 'rejoice'
    • [ər]: hunger-[n] 'be hungry', farmatər-[n] 'tire out'
    • A few irregular vowel-final verbs: gey-[n] 'go', shtey-[n] 'stand', ze-[n] 'see', tɔ-[n] 'do'
  b. /ən/ → syllabic nasal after
    • Single consonants other than m, n: red-[n̩] 'speak', hɔb-[m̩] 'have', pas-[n̩] 'fit'
    • Clusters other than ŋk, ŋg, and Cl: folg-[ŋ̩] 'obey', merk-[ŋ̩] 'notice', tants-[n̩] 'dance', felsh-[n̩] 'forge'
  c. /ən/ → [ən] after
    • Vowels other than schwa: drey-[ən]³¹ 'turn', fli-[ən] 'fly'
    • m, n: shvim-[ən] 'swim', meyn-[ən] 'mean'
    • ŋk, ŋg and Cl clusters: zing-[ən] 'sing', zink-[ən] 'sink', vikl-[ən] 'wrap', zaml-[ən] 'collect'

The reduction of the -ən suffix means that in some cases the contrast between C-ən and Cə-ən is preserved indirectly, since C-ən may reduce to C[n̩], but Cə-ən always remains C[ən]. This contrast is not always easy to perceive, however, since it requires distinguishing between [n̩] and [ən]. In cases where [n̩] assimilates in place to a preceding stop, the contrast is supported by not only a syllabicity difference, but also a place difference: mek[ŋ̩] 'erase' vs. mek[ən] 'bleat', shlep[m̩] 'drag' vs. tshep[ən] 'mess with'. In the absence of place assimilation, the distinction is not nearly so perceptually clear, if it is made at all: lɔd[n̩] 'load' vs. yad[ən] 'irk', vish[n̩] 'wipe' vs. lish[ən] 'make a racket', ayl[n̩] 'rush' vs. yayl[ən] 'wail', pɔr[n̩] 'pair up' vs. pɔr[ən] 'fuss with', shmɔr[n̩] 'stew' vs. shmɔr[ən] 'snort'.³² The distinction is nearly or completely neutralized after vowels, as well as after consonants and clusters that take [ən]: bray[ən] 'brew' (3SG brayt) vs. bray[ən] 'talk endlessly' (3SG brayət); gefin[ən] 'find' (3SG gefint) vs. pin[ən] 'foam' (3SG pinət).

---

³¹One argument for treating the suffix as underlyingly /ən/ with reduction to [n̩] or [n], rather than as /n/ with epenthesis, comes from its behavior after vowels. If the underlying form of 'to turn' was /drey-n/, there would be no motivation for epenthesis, since dreyn is phonotactically legal (and in fact this sequence is even attested in irregular geyn, shteyn, zen). The fact that the actual surface form is dreyən suggests that the schwa is present underlyingly, and is not merely inserted where necessary. A full analysis of the distribution of surface allomorphs is beyond the scope of this paper; what is important for present purposes is that this suffix does not actually have a surface [ə] in all contexts; see Jacobs (1990) for discussion.

³²The degree of ambiguity between -rən and -rn̩ is greater for speakers who pronounce the /r/ as a trill than for those who pronounce it as [ʁ].

33

It is not easy to quantify the practical consequences of these distinctions for speakers of an earlier stage of Yiddish attempting to infer whether a particular verb is thematic or not on the basis of the infinitive/1PL/3PL. First, we cannot be sure that the reduction of /ən/ to [n̩] with assimilation to [m̩], [ŋ̍] was already in place at the time when the verb levelings discussed in the previous section took place. If the /ən/ suffix was realized optionally or consistently as [ən], then the presence of surface [ə] in these forms would never have unambiguously revealed that a verb is thematic. Second, it is difficult to evaluate how useful a perceptually weak contrast (such as that between [n̩] and [ən]) is in comparison to a much more robust one (such as ∅ vs. [ə] in the 1SG, or [t] vs [ət] in the 3SG). It seems safe to say that even if a remnant of the thematic vs. non-thematic contrast was detectable in the infinitive/1PL/3PL, it would have been only weakly present, and only for some verbs. Clearly, if given a choice, it would be preferable to glean a verb's thematic status from a less ambiguous form, such as the 1SG, 2SG, 3SG, or 2PL.

The other source of information that speakers may use to infer whether a verb is thematic or not follows from the fact that virtually all thematic verbs are of Slavic or Hebrew/Aramaic origin (Weinreich 1973, vol. 4, pp. 330–331; Jacobs 1989, p. 100)—e.g., *lyubə-n* 'caress' from Slavic, and *taynə-n* 'argue' from Hebrew.[33] Frequently, these verbs have identifiable phonological traits that reveal their non-Germanic origins, such as palatalized consonants, or certain consonant clusters. If speakers could notice the correlation between these properties and thematic inflection, they could indirectly guess that particular verbs are extremely likely to involve covert final schwa: e.g., **lyubən** 'caress', **pyeshtshən** 'pamper', **mloyən** 'nauseate', **tliən** 'smolder', **strashən** 'threaten'.[34] In addition, there are two derivational suffixes with final schwa: the verbal suffix *-eve* (e.g., *ratevə-n* 'rescue', *zhalevə-n* 'use sparingly', *bushevə-n* 'rage'), and the mimetic suffix *-ke* (e.g., *shushkə-n* 'whisper', *hafkə-n* 'bark', *kvakə-n* 'quack', *bekə-n* 'bleat', *khryukə-n* 'grunt'). These suffixes contribute a large number of schwa-final verbs, and if a verb ends in unstressed *-kən* or *-evən*, it is extremely likely to have final schwa.

These two facts make it somewhat easier to guess whether a new word should behave like *pɔr-ən* 'match' or *pɔrə-n* 'fiddle with', but it is still far from predictable. Indeed, in addition to *pɔr-ən* vs. *pɔrə-n*, there are a number of other minimal or near-minimal pairs with and without schwa, including *bray-ən* 'brew' vs. *brayə-n* 'talk endlessly', *blank-ən* 'gleam' vs. *blɔnkə-n* 'stray', *kvetsh-ən* 'squeeze' vs. *kvitshə-n* 'squeak', and so on. The upshot is that although it may be possible to guess about the presence of a final schwa in some cases based on correlated properties elsewhere in the word, it would still be easier and more accurate to choose a form that shows it unambiguously, such as a singular form, or the 2PL.

---

[33]Weinreich (1990) does list some Germanic words with stem-final schwa, such as *veyə-n* 'blow' and *knurə-n* 'snarl'; cf. German *weh-en*, *knurr-en*. Lass (1980, p. 266) cites Mieses (1924) in identifying also *zeyə-n* 'sow' and *kreyə-n* 'caw', though Weinreich lists both as having free variation (*zeyə-n* ∼ *zey-ən*).

[34]The problem of how speakers identify members of separate lexical strata is a general one in phonology; see Itô and Mester (1995, 2002) for a discussion of the different phonotactics for different lexical strata in Japanese. Lass (1980) claims that identifying non-Germanic words in Yiddish based on general phonological properties is a "non-starter" (p. 263), based on the fact that there are no systematic differences in their stress patterns. Presumably, he does not consider the possibility of using certain phonemes or phoneme clusters as indicators of non-Germanic status because they do not work 100% of the time; there are plenty of non-Germanic words that by chance happen to be composed of elements that are legal in the Germanic part of the lexicon. We might, however, for the sake of argument suppose that speakers could identify at least a subset of the verbs of Slavic origin, and use this to help predict the occurrence of final schwa.

3.4 Umlaut and singular ∼ plural vowel changes

The neutralizations discussed so far affect forms with overt suffixes—that is, forms other than the 1SG. In fact, the 1SG form would generally not have been subject to such severe neutralizations, since Yiddish does not have very many phonological restrictions on segments in word-final position.[35] This does not mean that 1SG forms would have been completely free from neutralization, however. In fact, there are two properties of verbs that would not have been predictable based on the 1SG form alone.

The first is the occurrence of umlaut alternations in the 2SG, 3SG (*trɔg*, *tregst*, *tregt* 'carry-1SG/2SG/3SG', or *fɔr*, *ferst*, *fert* 'travel-1SG/2SG/3SG'). This property could not have been discerned by looking at the 1SG alone, since there are also non-alternating verbs with the stem vowel /ɔ/: *pɔr*, *pɔrst*, *pɔrt* 'pair up-1SG/2SG/3SG'. Unfortunately, for these verbs, looking at the 2SG or 3SG would have been no more useful, since there were also verbs with non-alternating /e/: *her*, *herst*, *hert* 'hear'. For this reason, umlaut alternations were fundamentally different from, say, voicing assimilation, in that they led to ambiguity in every single part of the paradigm. Kager (in press) refers to this situation as "neutrast": in every position where the alternating umlaut vowels can be distinguished from /ɔ/, they are neutralized with /e/, and also the converse. Neutrasts are symmetrical in a way that the plain neutralizations discussed above are not, and therefore they do not cause any particular part of the paradigm to be more informative than any other part. This can be seen visually in the table in (30), which shows that prior to leveling, in every row, the umlaut verb *fɔrən* would have been amiguous with one type of non-alternating verb of the other.

(30)   Umlaut verbs prior to leveling: neutrast with non-alternating /e/, /ɔ/

Infin.	*fɔrən*	*pɔrən*	*herən*
	'travel'	'pair up'	'hear'
1SG	*fɔr*	*pɔr*	*her*
2SG	*ferst*	*pɔrst*	*herst*
3SG	*fert*	*pɔrt*	*hert*
1PL	*fɔrən*	*pɔrən*	*herən*
2PL	*fɔrt*	*pɔrt*	*hert*
3PL	*fɔrən*	*pɔrən*	*herən*

The same thing is true for other vowel alternations, such as the singular-plural alternations of preterite presents (§2.3.1) and *Wechselflexion* verbs (§2.3.2). For these alternations, the set of vowels involved was more varied, but the configuration would always have been the same: neutralization in one direction for the singular, and in another direction for the plural/infinitive.

---

[35]It appears that an earlier stage of Yiddish did have word-final devoicing, but this was lost early on in most dialects; see Sapir (1915), Kiparsky (1968), Sadock (1973), and King (1980) for evidence and discussion.

(31) Verbs with singular ∼ plural alternations, prior to leveling

Infin.	visən	vishən	heysən
	'know'	'wipe'	'call'
1SG	*veys*	*vish*	*heys*
2SG	*veyst*	*vishst*	*heyst*
3SG	*veys(t)*	*visht*	*heyst*
1PL	*visən*	*vishən*	*heysən*
2PL	*vist*	*visht*	*heyst*
3PL	*visən*	*vishən*	*heysən*

Since these processes affect all parts of the paradigm equally and do not favor any particular form for its informativeness, it is perhaps unnecessary to quantify the exact number of lexical items involved. Crucially however, when compared with the neutralizations discussed above, these processes would have affected only a small number of words. In MHG, umlaut occurred consistently in strong class VI, which contained approximately a dozen verbs (Paul, Wiehl, and Grosse 1989, p. 250, §251), and variably in strong class VII, containing approximately sixteen more verbs (Paul, Wiehl, and Grosse 1989, p. 252, §253). Singular ∼ plural *Wechselflexion* was slightly more prevalent, occurring in about three dozen verbs in strong classes IV and V (Paul, Wiehl, and Grosse 1989, pp. 248-249), but these were still a small minority compared to non-alternating /e/ and /i/ verbs. Finally, there were just ten preterite present verbs (Paul, Wiehl, and Grosse 1989, pp. 262-264). In sum, these alternations have had no impact on the choice of base, and were all too small to achieve the productivity needed to attract new members.

3.5   Other miscellaneous processes

In contrast to processes like voicing assimilation and degemination, the remaining processes in section 2 would have had little or no practical impact on the selection of an optimal base form. For example, the epenthesis of [ə] in /rm/ clusters (§2.4) does not result in any neutralizations, since there happen to be no Yiddish verbs that ended in underlying (non-alternating) /Vrəm/. Therefore, a 1SG in -*rəm* could be mapped with absolute certainty onto a 1PL with -*rmən*, and vice versa. Similarly, the parallel processes of closed syllable shortening and open syllable lengthening make vowel length alternations mostly predictable in both directions. Word-level sandhi effects like umlaut in *meg*, *ken* and voicing in *muz*, *loz* would have created ambiguities with underlying /e/ and /z/ verbs, but these ambiguities involved only four verbs total. Under the hypothesis that learners seek the most accurate possible grammar given the limitations of the formalism, these processes are irrelevant, since they involve few or no neutralizations and hence could never cause errors.

3.6   The resulting grammar, and the mechanism of leveling

The neutralizations discussed in this section are summarized in Figure 2, which shows that prior to leveling, the 1SG would clearly have been the least neutralizing—and hence most informative—form in the inflectional paradigm. Therefore, under the proposed model, learners would have chosen it as the base form, and constructed rules to derive the remainder of the paradigm.
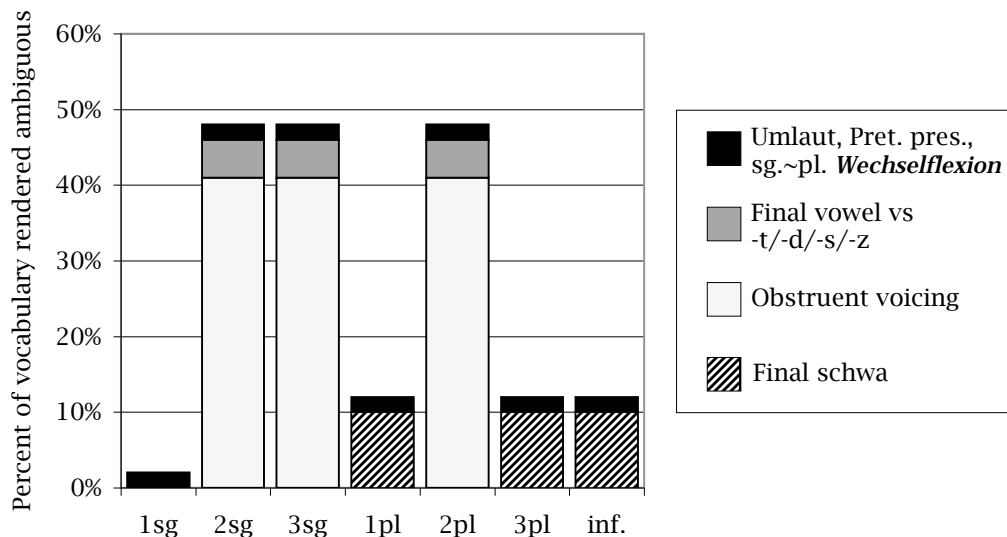
Figure 2: Neutralizations affecting Yiddish present tense paradigms, prior to leveling

The rules needed to transform the 1SG into another form are generally quite straightforward. For the most part, the remaining forms simply involve adding the appropriate suffix (*-st*, *-t*, or *-ən*), and applying the phonological rules of obstruent voicing assimilation, /t/-deletion, and degemination. (See Albright and Hayes 2002 for an algorithmic approach to learning morphological and phonological rules, once the direction of mapping has been established.) For a small number of forms, however, this simple grammar yields incorrect results. In particular, it fails to apply umlaut and singular $\sim$ plural alternations, and it does not undo word-level sandhi effects. There is no way to predict these alternations based on the surrounding segmental context or the verb's meaning, so words that undergo these processes must be treated as irregular. For these verbs, there is a conflict between the grammatically expected (regular, non-alternating) forms and the memorized (irregular, alternating) ones. Using the logic laid out at the beginning of this section, such verbs are susceptible to overregularization if the memorized irregular form is not known or is not retrieved fast enough to block the regular outcome.

It should be emphasized that under this model, leveling is not the result of a universal preference for non-alternating paradigms, but is rather the extension of a pre-existing dominant pattern of non-alternation. Under this account, if verbs with umlaut or singular $\sim$ plural alternations had by chance outnumbered non-alternating verbs, then the optimal grammar of Yiddish would have treated alternations as regular and non-alternation and exceptional, and regularization would have involved extending the alternations.

4 Discussion

In the preceding sections, we have seen a close relationship between the directionality of leveling and the patterns of neutralization that affected various parts of the paradigm. In particular, leveling in Yiddish has

consistently favored the 1SG, which was (and is) the form that maintains phonological contrasts for the greatest number of lexical items. I have argued that this relation is not coincidental, but is rather an inevitable consequence of the way that grammar is organized, with all members of the paradigm are derived with reference to a single, maximally informative base form. This is not the first proposal to draw a connection between contrast and the directionality of leveling. Vennemann (1972, p. 189) suggests, echoing a longstanding intuition within historical accounts, that leveling frequently reestablishes underlying contrasts that have become obscured somewhere within the paradigm due to regular sound change; he dubs this the PREDICTABILITY PRINCIPLE. More generally, any analysis of paradigms that relies on principle parts or basic alternants constitutes a claim of language-specific paradigm structure, in which the choice of principle parts is guided (implicitly or explicitly) by considerations of predictability (e.g., Harris 1951, p. 308, fn. 14; Paunonen 1976; Blevins 2006; Ackerman and Blevins 2006). The current model formalizes the intuition behind such approaches, providing an algorithmic implementation that allows us to test the predictions of a very strong version of such a theory. What we see for Yiddish is the model correctly predicts all and only the attested analogical changes.

In this section, I address a few residual questions. First, I compare Yiddish to modern German, showing that unlike Yiddish, leveling to the 1SG is virtually unattested in German. This difference turns out to follow from a small but important phonological difference in the two languages, which makes the relative informativeness of various paradigm members quite different in German. I then consider the question of whether the attested levelings must be seen as a single historical event, or could they have happened gradually over time.

4.1   Comparison with NHG

In the model defended here, the directionality of leveling follows from the organization of the grammar, which in turn depends on the set of phonological and morphological neutralizations that affect various parts of the paradigm. This leads us to expect that if two languages have the same morphemes and the same set of phonological and morphophonological processes, they should exhibit the same directionality of leveling.

It is interesting in this light to compare data from dialects of modern German, which have inherited largely the same set of suffixes and morphophonemic alternations. In fact, some dialects show levelings that mirror the Yiddish changes discussed above. Upper German dialects, for example, have lost umlaut alternations in favor of invariant [a]:

(32)   Loss of umlaut alternations in Upper German

	MHG	Standard NHG	Swiss German (Marti 1985, p. 141)	Bavarian (Zehetner 1985, p. 95)
1SG	*slafe*	*schlafe*	*schlaafe*	*schlaf*
2SG	*slefist*	*schläfst*	*schlaffsch*	*schlaffsd*
3SG	*slefit*	*schläft*	*schlafft*	*schlaffd*

The examples in (32) show that while Upper German dialects have lost umlaut, they have generally retained vowel length alternations in open vs. closed syllables (seen in the *a* ∼ *aa* alternation in Swiss German, and the single vs. doubled *f* in Bavarian, indicating short vs. long preceding vowels). Many other

dialects have leveled vowel length alternations in favor of invariant long vowels, however, and this feature is reflected in Standard NHG.

(33)   Leveling of vowel length alternations

   a.   Leveling in all closed syllables

	MHG	Standard NHG
1SG	*l*[eː]*be*	*l*[eː]*be*
2SG	*l*[e]*bst*	**l[eː]bst**
3SG	*l*[e]*bt*	**l[eː]bt**
1PL	*l*[eː]*ben*	*l*[eː]*ben*
2PL	*l*[e]*bt*	**l[eː]bt**
3PL	*l*[eː]*ben*	*l*[eː]*ben*

   b.   Leveling in the 2PL

	MHG	Standard NHG
1SG	*n*[iː]*me*	*n*[eː]*me*
2SG	*n*[i]*mst*	*n*[i]*mst*
3SG	*n*[i]*mt*	*n*[i]*mt*
1PL	*n*[eː]*men*	*n*[eː]*men*
2PL	*n*[e]*mt*	**n[eː]mt**
3PL	*n*[eː]*men*	*n*[eː]*men*

Note that both for umlaut and for length alternations, leveling has favored the vowel found not only in the (modern) 1SG, but also in the infinitive, 1PL, and 3PL. When we look to patterns for which the 1SG was distinct from the infinitive, such as preterite present and singular ∼ plural *Wechselflexion* alternations, it appears that very few German show any sort of leveling at all. Schirmunski (1962) reports (pp. 497–498) that *e∼i* alternations have been preserved everywhere except in a small group of dialects on along the Rhine, including southern Hessian, Lothringian, Palatine, and south Franconian Alsatian, which level to [e]; e.g., Lothringian *èst* 'eat-3SG' (Follmann 1909). At least in some cases, however, leveling in these dialects may have been precipitated by a sound change lowering *i* to *e* (e.g., *štirpt > štērpt* 'die-3SG', with lowering before *r* seen also in words such as *Irrtum > Errtum* 'error'). For patterns that do not involve *e ∼ i* alternations, such as preterite present verbs or umlaut, these dialects retain alternations (e.g., Lothringian *šlę̄ft* 'sleep-3SG' with umlaut, and *wēs ∼ wìsə* 'know-1SG/1PL'). Thus, it seems fair to say that there is virtually no NHG parallel to the Yiddish levelings requiring a 1SG pivot.

In contrast, many analogical changes in NHG are compatible with a plural or infinitive pivot. In addition to the leveling of umlaut and length alternations shown in (32)–(33), many dialects have actually extended umlaut alternations to verbs that used to have either invariant vowels or singular ∼ plural alternations. As discussed above in section 2.3.2, this is particularly prevalent in Central German dialects such as Thuringian (Schirmunski 1962, p. 499). Representative data from Thuringian is shown in (34). Using the same logic that was applied in section 2, we would be forced to conclude that the pivot for the German changes has not been the 1SG or the 2/3SG, since all of these forms show analogical restructuring.

(34) Extension of umlaut alternations in Central German

a. Extension to formerly invariant verbs

	Standard NHG	Thuringian
1SG	*komme*	*kom*
2SG	*kommst*	*kömst*
3SG	*kommt*	*kömt*
1PL	*kommen*	*kommen*

b. Extension to former singular ∼ plural *Wechselflexion* verbs

	Standard NHG	Central German
1SG	*gibe*	*geb*
2SG	*gibst*	*gibst*
3SG	*gibt*	*gibt*
1PL	*geben*	*geben*

What all of the NHG changes have in common is that they regularize the relation between the infinitive/plural and the singular forms: the vowel in the 1SG is identical to that in the infinitive/plural in both quality and length, while the vowel in the 2/3SG is either identical or raised with respect to the infinitive/plural. Interestingly, a parallel regularization is seen in verb stem errors made by children acquiring NHG as a first language: infinitive/plural allomorphs are often erroneously substituted for an irregular singular form, but never the reverse (Clahsen, Prüfert, Eisenbeiß, and Cholin 2002). The analysis advanced here attempts to unify the patterns seen in child errors and in language change, by attributing them to a single mechanism: overregularization with grammatically expected forms in cases where exceptional forms are not known or not accessed fast enough to block the grammatically preferred form.

In sum, it appears that the direction of analogy in NHG is consistently different from that of Yiddish, favoring an infinitive or plural form over the 1SG. This naturally raises the question of why Yiddish would differ so radically from German, even though the morphemes involved are largely the same? Looking back at Figure 2, it is possible to identify several differences between the two languages. For one thing, most NHG dialects do not neutralize of /d/ and /t/ before -*t*, and instead have epenthesis:

(35) Epenthesis averts neutralization before -*t*

UR	Yiddish	Standard NHG	Gloss
/red+t/	[ret]	[redət]	'speak-2PL'
/bet+t/	[bet]	[betət]	'pray-2PL'
/ze+t/	[zet]	[zet]	'see-2PL'

A more significant difference concerns final schwas. As discussed in section 3.3, Yiddish verb stems may end in underlying ("thematic") schwa, which has the potential to be neutralized before the 1PL/3PL/infinitive -*ən* suffix. In German, there is no stem-final *C* vs. *Cə* contrast, so this neutralization is never a consideration in predicting the remainder of the paradigm. As a result, the 1PL/3PL/infinitive form is just as informative as the 1SG in German. The relative severity of neutralizations affecting each member of the paradigm in German is summarized in Figure 3.
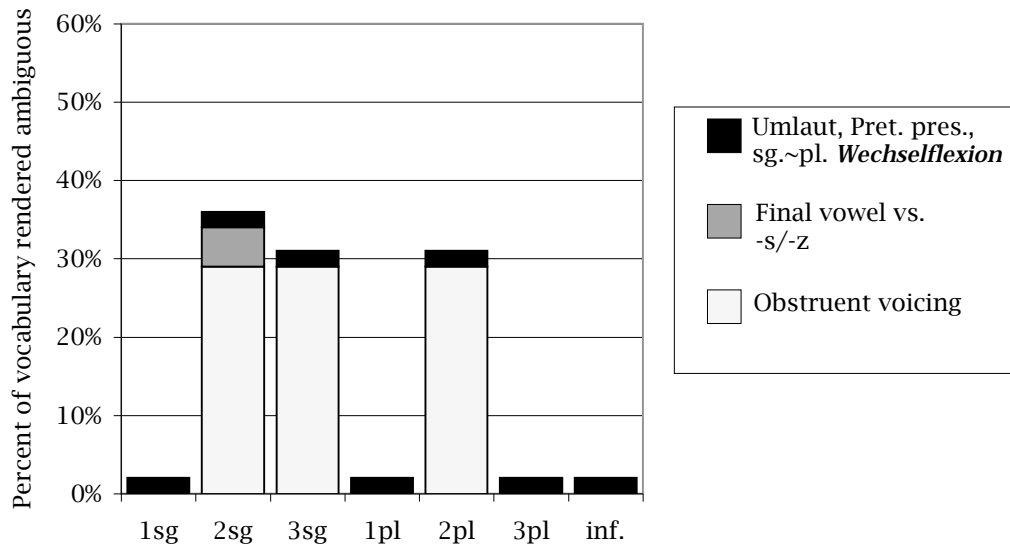
40

Figure 3: Neutralizations affecting NHG present tense paradigms

If the 1SG and the infinitive/1PL/3PL are equally informative, what is the predicted grammatical organization for German verb paradigms? Albright (2002a) suggests that in such cases, token frequency may play a decisive role, with the most frequent form gaining a slight advantage because of the details of how predictability is calculated. In German (as in many languages), infinitive forms occur far more frequently than 1SG forms, which could tip the balance in favor of using the infinitive as a base. This correctly predicts the attested directionality of analogical restructuring in German.

The comparison of Yiddish and NHG dialects provides a striking minimal pair: two virtually identical languages which differ primarily in the addition of a single phonological contrast. According to the proposed model, this one extra contrast has the effect of qualitatively changing the organization of verb paradigms, causing analogical change to proceed in the opposite direction. If this is correct, it means that just one simple historical change—namely, the introduction of schwa-final verbs—was sufficient to radically alter the structure of the Yiddish morphological grammar.

4.2 One change, or many?

The claim of this paper is that there is a single force—namely, the organization of the grammar—that has led to a consistent direction of leveling in Yiddish verb paradigms. As noted above, we cannot rule out the possibility this was, in fact, accomplished by a series of independent and unrelated changes (leveling to the infinitive for vowel length, to the 1PL for umlaut, to the 1SG for singular ∼ plural alternations, etc.), which have conspired to create the appearance of a single source for the modern stem forms. The fact that a consistent pattern is seen across so many different alternations, however, makes this very unlikely. If we assume, for example, that leveling could be to any form in the paradigm with equal prior probability, then the probability of getting the precise pattern of leveling shown in Table 2.7 would be on the order of .001%. Even with a more nuanced theory of what types of leveling are more and less likely, the probability of creating a

set of so many changes that happen to converge and are compatible with a single pivot is vanishingly low. This supports the hypothesis that these changes are connected by a single unifying principle that predicts that they should all have the same directionality.

The unified account does not necessarily imply, however, that all of the observed changes must have taken place simultaneously. In fact, it seems likely that the choice of base for a given language would often remain stable over long periods of time, since the neutralizations that favor a particular form can remain in effect for generations. Looking back at the chart in Figure 2, for example, we see that in an older stage of Yiddish, the 1SG was optimal because it permitted simple phonological analyses of degemination and voicing agreement. These processes have not been altered or undone by any subsequent changes, however, so the picture for the modern language is essentially the same. All that has changed is the loss of vowel alternations (the small black portion on top of each bar), which has had the effect of decreasing the amount of unpredictability in the system, but has not altered the fact that the 1SG most clearly reveals stem-final consonants and schwas. The only thing that would change the relative informativeness of different parts of the paradigm would be the loss of phonological processes affecting suffixed forms—for example, if obstruent voicing assimilation or degemination were to become unproductive somehow—or the addition of a neutralizing process in the 1SG, such as final devoicing. Neither type of change has occurred in Yiddish,[36], leaving the situation in Figure 2 basically intact.

As a result of this stability, it is entirely possible that the completely regular paradigms of the modern language were accomplished slowly, with leveling proceeding pattern by pattern or verb by verb over the course of several centuries. At the same time, the model does make some predictions about the time course of leveling: in general, regularization should proceed fastest for verbs with low token frequency (since they offer the least evidence that they are irregular), and for patterns with low type frequency (since they are grammatically the least productive). Both of these predictions distinguish the model from an account that derives leveling by promoting output-output constraints, since such an account leads one to expect that all verbs that undergo a particular alternation should level at the same time. Detailed philological work could provide valuable evidence, by helping to establish the relative chronology of the various levelings discussed here and determining to what extent it is compatible with the proposed model.

5   Conclusion

In this paper, I have shown how in modern Yiddish present tense verb paradigms, a diverse set of etymologically expected patterns of alternation have been eliminated through analogical change. When all of the changes are viewed together, a striking generalization emerges: in every case, the 1sg form has been extended to the remainder of the paradigm. This generalization is unexpected under a model of analogy in which any member of the paradigm may act as a pivot, with a tendency to favor more frequent or less marked forms. I have argued that although the 1sg is neither unmarked nor is it especially frequent, it enjoys a different sort of advantage: it is the form that most clearly reveals phonological properties of verbs, because it incurs the fewest phonological neutralizations. The fact that leveling favors the most informative form is precisely what is predicted by the model of paradigm acquisition developed by Albright (2002a), in which learners seek a single surface form from which all other forms can be derived. The Yiddish data provides strong support for such a model, since it narrowly predicts exactly the set of attested analogical changes.

---

[36]Yiddish historically did have final devoicing, but it was lost prior to the levelings discussed here. Furthermore, some dialects of Central Yiddish spoken in Poland have reintroduced a version of final devoicing, but apparently only in phrase-final position—see King (1980, pp. 404–405).

References

Ackerman, F. and J. P. Blevins (2006). Paradigms and predictability. Paper presented at the 2006 meeting of the Linguistic Society of America, Albuquerque, NM, Jan 5–8.

Albright, A. (2002a). *The Identification of Bases in Morphological Paradigms*. Ph. D. thesis, UCLA. http://www.mit.edu/~albright/papers/AlbrightDiss.html.

Albright, A. (2002b). Islands of reliability for regular morphology: Evidence from Italian. *Language 78*(4), 684–709.

Albright, A. and B. Hayes (2002). Modeling English past tense intuitions with minimal generalization. *SIGPHON 6: Proceedings of the Sixth Meeting of the ACL Special Interest Group in Computational Phonology*, 58–69.

Aronoff, M. (1976). *Word formation in generative grammar*. Cambridge, MA: MIT Press.

Baayen, R. H., R. Piepenbrock, and H. van Rijn (1993). *The CELEX lexical data base on CD-ROM*. Philadelphia, PA: Linguistic Data Consortium.

Baković, E. (1999). Assimilation to the unmarked. In J. Alexander, N.-R. Han, and M. M. Fox (Eds.), *University of Pennsylvania Working Papers in Linguistics 6.1*, pp. 1–16.

Baroni, M. (1998). The phonetic nature of the Northern Italian allophones [s] and [z] in words with variable realization: electroglottographic and acoustic evidence. *UCLA Working Papers in Phonetics 96*, 166–174.

Behaghel, O. (1928). *Geschichte der deutschen Sprache* (5th ed.). Number 3 in Grundriss der germanischen Philologie. Berlin: de Gruyter.

Benua, L. (1997). *Transderivational Identity: Phonological Relations Between Words*. Ph. D. thesis, University of Massachusetts, Amherst.

Besch, W. (1967). *Sprachlandschaften und Sprachausgleich im 15. Jahrhundert: Studien zur Erforschung der spätmittelhochdeutschen Schreibdialekte und zur Entstehung der neuhochdeutschen Schriftsprache*, Volume 11 of *Bibliotheca Germanica; Handbücher, Texte und Monographien aus dem Gebiete der germanischen Philologie*. München: Francke.

Blevins, J. P. (2006). Word-based morphology. *Journal of Linguistics 42*, 531–573.

Brenner, O. (1895). Zum deutschen Vokalismus. *Beiträge zur Geschichte der deutschen Sprache und Literatur 20*, 80–87.

Bybee, J. (1985). *Morphology: A study of the relation between meaning and form*. Amsterdam: John Benjamins Publishing Company.

Chen, M. (1970). Vowel length variation as a function of the voicing of the consonant environment. *Phonetica 22*, 129–159.

Clahsen, H., P. Prüfert, S. Eisenbeiß, and J. Cholin (2002). Strong stems in the German mental lexicon: Evidence from child language acquisition and adult processing. In I. Kaufmann and B. Stiebels (Eds.), *More than Words. Festschrift for Dieter Wunderlich*, pp. 91–112. Berlin: Akadamie Verlag.

Dammers, U., W. Hoffmann, and H.-J. Solms (1988). *Grammatik des Frühneuhochdeutschen, Vol. 4: Flexion der starken und schwachen Verben*. Heidelberg: Carl Winter Universitätsverlag.

Dinnsen, D. A. and J. Charles-Luce (1984). Phonological neutralization, phonetic implementation and individual differences. *Journal of Phonetics 12*(1), 49–60.

Ebert, R. P., O. Reichmann, H.-J. Solms, and K.-P. Wegera (1993). *Frühneuhochdeutsche Grammatik*. Tübingen: Max Niemeyer Verlag.

Ernestus, M. and R. H. Baayen (2003). Predicting the unpredictable: Interpreting neutralized segments in Dutch. *Language 79*, 5–38.

Faber, A. and R. King (1984). Yiddish and the settlement history of Ashkenazic Jewry. *Mankind Quarterly 24*, 393–425.

Fertig, D. (2000). *Morphological Change Up Close: Two and a Half Centuries of Verbal Inflection in Nuremberg*, Volume 422 of *Linguistische Arbeiten*. Tübingen: Niemeyer.

Follmann, M. F. (Ed.) (1909). *Wörterbuch der deutsch-lothringischen Mundarten*, Volume 12 of *Quellen zur lothringischen Geschichte*. Quelle und Meyer.

Gaeta, L. (2002). Umlaut extension in German modals as natural change. *Diachronica 19*, 1–41.

Geyer, A. (1912). *Die starke Konjugation bei Johann Fischart*. Hofbuchdruckerei C. A. Kaemmerer & Co.

Harris, Z. S. (1951). *Methods in Structural Linguistics*. The University of Chicago Press.

Herzog, M. I. (1965). *The Yiddish Language in Northern Poland: Its Geography and History*. Bloomington, IN: Indiana University.

Hock, H. H. (1991). *Principles of Historical Linguistics* (2nd ed.). Mouton de Gruyter.

Hoenigswald, H. (1960). *Language Change and Linguistic Reconstruction*. University of Chicago Press.

Itô, J. and A. Mester (1995). The core-periphery structure of the lexicon and constraints on reranking. In J. Beckman, S. Urbanczyk, and L. Walsh (Eds.), *University of Massachusetts Occasional Papers in Linguistics [UMOP] 18: Papers in Optimality Theory*, pp. 181–209. Amherst: GLSA.

Itô, J. and A. Mester (2002). The phonological lexicon. In N. Tsujimura (Ed.), *A Handbook of Japanese Linguistics*. Oxford: Blackwell.

Jacobs, N. G. (1989). Hebrew-aramaic origin verbs in Yiddish: The interplay of inherited form and synchronic phonology. *Mediterranean Language Review 4–5*, 97–108.

Jacobs, N. G. (1990). *Economy in Yiddish vocalism: A study in the interplay of Hebrew and non-Hebrew components*. Mediterranean Language and Culture Monograph Series. Otto Harrassowitz.

Jacobs, N. G. (2005). *Yiddish: A Linguistic Introduction*. Cambridge University Press.

Joesten, M. (1931). *Untersuchungen zu ahd. (as.) ë, i, vor u der Folgesilbe und zur 1. Pers. Sg. Präs. Ind. der starken e-Verben (Kl. IIIb, IV, V)*. Number 28 in Gießener Beiträge zur deutschen Philologie. Gießen: Wilhem Schmitz Verlag. 1968 reprint, Swets & Zeitlinger N.V., Amsterdam.

Joos, M. (1952). The medieval sibilants. *Language 28*, 222–231.

Kager, R. (1999). Surface opacity of metrical structure in Optimality Theory. In B. Hermans and M. van Oostendorp (Eds.), *The Derivational Residue in Phonological Optimality Theory*. Amsterdam: Benjamins.

Kager, R. (in press). Lexical irregularity and the typology of contrast. In K. Hanson and S. Inkelas (Eds.), *The Structure of Words*. MIT Press.

Katz, D. (1987). *Grammar of the Yiddish Language*. London: Duckworth.

Kenstowicz, M. (1997a). Base identity and uniform exponence: alternatives to cyclicity. In J. Durand and B. Laks (Eds.), *Current Trends in Phonology: Models and Methods*, pp. 363–394. Salford: University of Salford.

Kenstowicz, M. (1997b). Uniform exponence: Extension and exemplification. In V. Miglio and B. Morén (Eds.), *University of Maryland Working papers in Linguistics 5: Selected papers from the Hopkins Optimality Workshop 1997*, pp. 139–54. Available for download on the Rutgers Optimality Archive: http://roa.rutgers.edu.

Kenstowicz, M. and C. Kisseberth (1977). *Topics in Phonological Theory*. New York: Academic Press.

Kern, P. O. (1903). *Das starke Verb bei Grimmelshausen: Ein Beitrag zur Grammatik des Frühneuhochdeutschen*. Chicago: University of Chicago.

King, R. D. (1980). The history of final devoicing in Yiddish. In M. I. Herzog, B. Kirshenblatt-Gimblett, D. Miron, and R. Wisse (Eds.), *The Field of Yiddish: Studies in Language, Folklore, and Literature, Fourth Collection*, pp. 371–430. Philadelphia: Institute for the Study of Human Issues.

Kiparsky, P. (1968). Linguistic universals and linguistic change. In E. Bach and R. T. Harms (Eds.), *Universals in Linguistic Theory*. New York: Holt, Rinehart, and Winston. Reprinted in Kiparsky (1982).

Kiparsky, P. (1974). Remarks on analogical change. In J. Anderson and C. Jones (Eds.), *Historical Linguistics II*. Amsterdam: North-Holland Publishing Co. Reprinted in Kiparsky (1982), pp. 199–216.

Kiparsky, P. (1978). Analogical change as a problem for linguistic theory. In *Linguistics in the Seventies: Directions and Prospects*, Number 8:2 in Studies in the Linguistic Sciences. Dept. of Linguistics, University of Illinois, Urbana, Illinois. Reprinted in Kiparsky (1982), pp. 217-236.

Kiparsky, P. (1982). *Explanation in Phonology*. Dordrecht: Foris Publications.

Kopkalli, H. (1993). *A phonetic and phonological analysis of final devoicing in Turkish*. Ph. D. thesis, University of Michigan.

Kuryłowicz, J. (1947). The nature of the so-called analogical processes. *Diachronica 12*(1), 113–145. (trans. Margaret Winters, 1995, Diachronica 12:1.113-145).

Landau, A. (1895). Das Deminutivum der galizisch-jüdischen Mundart. *Deutsche Mundarten 1*, 46–58.

Lass, R. (1980). Paradigm coherence and the conditioning of sound change. In J. Fisiak (Ed.), *Historical morphology*, pp. 251–272. The Hague: Mouton.

Manaster Ramer, A. and M. Wolf (1997). Yiddish origins and the Austro-Bavarian problem. *Folia Linguistica Historica 17*, 193–209.

Mańczak, W. (1958). Tendences générales des changements analogiques. *Lingua 7*, 298–325 and 387–420.

Mańczak, W. (1980). Laws of analogy. In J. Fisiak (Ed.), *Historical morphology*, pp. 283–288. The Hague: Mouton.

Marti, W. (1985). *Berndeutsch-Grammatik für die heutige Mundart zwischen Thun und Jura*. Bern: Francke Verlag.

McCarthy, J. (2005). Optimal paradigms. In L. J. Downing, T. A. Hall, and R. Raffelsiefen (Eds.), *Paradigms in Phonological Theory*, pp. 170–210. Oxford: Oxford University Press. Available from the Rutgers Optimality Archive, ROA-485.

Mieses, M. (1924). *Die jiddische Sprache: Eine historische Grammatik des Idioms der integralen Juden Ost- und Mitteleuropas*. Berlin/Vienna: Benjamin Harz.

Nordström, T. Studien über die ausbildung der neuhochdeutschen starken präsensinflexion. Uppsala dissertation.

Paul, H. (1920). *Prinzipien der Sprachgeschichte* (5th ed.). Halle: Niemeyer.

Paul, H., P. Wiehl, and S. Grosse (1989). *Mittelhochdeutsche Grammatik* (23rd ed.). Max Niemeyer Verlag Tübingen.

Paunonen, H. (1976). Allomorfien dynamiikkaa. *Virittäjä 79*, 82–107.

Penzl, H. (1968). Die mittelhochdeutschen Sibilanten und ihre Weiterentwicklung. *Word 24*, 340–349.

Philipp, G. (1980). *Einführung ins Frühneuhochdeutsche: Sprachgeschichte, Grammatik, Texte*. Heidelberg: Quelle und Meyer.

Port, R. and M. O'Dell (1986). Neutralization of syllable-final voicing in German. *Journal of Phonetics 13*, 455–471.

Prilutski, N. (1917). *Der yidisher konsonantizm*. Number 1 in Yidishe dialektologishe forshungen. Warsaw: Nayer Farlag.

Prince, A. and P. Smolensky (2004). *Optimality Theory: Constraint Interaction in Generative Grammar*. Blackwell Publishing.

Prokosch, E. (1939). *A Comparative Germanic Grammar*. Philadelphia, PA: Linguistic Society of America.

Russ, C. V. J. (1982). *Studies in Historical German Phonology: A Phonological comparison of MHG and NHG with reference to modern dialects*, Volume 616 of *European University Studies, Series I: German Language and Literature*. Bern: Peter Lang.

Sadock, J. M. (1973). Word-final devoicing in the development of Yiddish. In B. B. Kachru, R. B. Lees, Y. Malkiel, A. Pietrangeli, and S. Saporta (Eds.), *Issues in Linguistics: Papers in Honor of Henry and Renée Kahane*, pp. 790–797. Urbana, IL: University of Illinois Press.

Sapir, E. (1915). Notes on Judeo-German Phonology. *The Jewish Quarterly Review 6*, 231–266.

Schirmunski, V. (1962). *Deutsche Mundartkunde*. Berlin: Akademie-Verlag.

Sonderegger, S. (1987). *Althochdeutsche Sprache und Literatur: eine Einführung in das älteste Deutsch; Darstellung und Grammatik (2nd ed.)*. Berlin: Walter de Gruyter.

Tiersma, P. (1982). Local and general markedness. *Language 58*(4), 832–849.

Vennemann, T. (1972). Phonetic analogy and conceptual analogy. In T. Vennemann and T. H. Wilbur (Eds.), *Schuchhardt, the Neogrammarians, and the transformational theory of phonological change: Four essays by Hugo Schuchhardt*, Number 26 in Linguistische Forschungen, pp. 183–204. Frankfurt am Main: Athenäum.

Weinhold, K. (1883). *Mittelhochdeutsche Grammatik* (2nd ed.). Schöningh. Reprinted 1967.

Weinreich, M. (1973). *Geshikhte fun der yidisher shprakh: Bagrifn, faktn, metodn [History of the Yiddish language: concepts, facts, methods]*, Volume 2. New York: Yidisher Visnshaftlikher Institut (YIVO).

Weinreich, U. (1990). *Modern English-Yiddish, Yiddish-English Dictionary*. New York: YIVO Institute for Jewish Research.

Zaretski, A. (1926). *Praktishe yidishe gramatik far lerers un studentn*. Farlag aktsionern gezelshaft "shul un bukh".

Zehetner, L. (1985). *Das bairische Dialektbuch*. München: Verlag C. H. Beck.