

Base-driven leveling in Yiddish verb paradigms

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1 Introduction

A noteworthy feature of Yiddish¹ non-past tense verbal inflection is that, unlike many other Germanic languages, Yiddish has virtually no irregular stem vowel changes.

¹The data discussed in this paper come from modern Eastern Yiddish, and except where noted, hold of all three major dialect areas (Northeastern, Central, and Southeastern). For thorough descriptions of Yiddish verb inflection, see Katz (1987:121–155) and Jacobs (2005:212–218). Fully inflected verb paradigms for many of the verbs discussed below can also be found in Rockowitz (1979), and words are cited in the form in which they are listed in Weinreich (1990). In order to keep the discussion as dialect-neutral as possible, Yiddish forms are cited using the standardized YIVO system of transliteration (http://www.yivo.institute.org/yiddish/alefbeyts_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 (*kriɡst*). In the YIVO orthography, the orthographic diphthongs <ey>, <ay>, and <oy> are standardly used to represent [eɪ], [aɪ], and [ɔɪ], respectively, but the pronunciation and distribution of these diphthongs is subject to considerable dialect variation. 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. Forms which are inferred to be innovative are marked with ‘*’.

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Whereas Middle High German (the source language for Yiddish verbal inflection²) had numerous subclasses of verbs with different patterns of tense vowel alternations, Yiddish verbs have the same vowel for all non-past person and number forms.

(1) Vowel alternations in Middle High German (MHG) ($\text{ë} = [\text{ɛ}]$)

INF	sa:gen 'say'	tra:gen 'carry'	gëben 'give'	dürfen 'need'	wi:zen 'know'
1SG	sa:ge	tra:ge	gibe	darf	wei:z
2SG	sa:g(e)st	tre:g(e)st	gi(b(e))st	darft	weist
3SG	sa:g(e)t	tre:g(e)t	gi(b(e))t	darf	wei:z
1PL	sa:gen	tra:gen	gëben	dürfen	wi:zen
2PL	sa:g(e)t	tra:g(e)t	gëb(e)t	dürf(e)t	wi:z(e)t
3PL	sa:gen(t)	tra:gen(t)	gëben(t)	dürfen	wi:zen
SG IMP	sag(e)	trag	gib	–	wei:z
PL IMP	sa:g(e)t	tra:g(e)t	gëb(e)t	–	wi:z(e)t
PST PTCP	gesagt	getra:gen	gegeben	bedorft	gewust

(2) Invariant present tense stem vowels in Yiddish (* = innovative forms; a: > ɔ by regular sound change)

INF	zɔgən ³ 'say'	trɔgən 'carry'	gebən 'give'	*darfən 'need'	visən 'know'
1SG	zɔg	trɔg	gib	darf	veys
2SG	zɔkst	*trɔkst	gist	darfst	veyst
3SG	zɔkt	*trɔkt	git	darf	veys(t)
1PL	zɔgən	trɔgən	*gibən	*darfən	*veysən
2PL	zɔkt	trɔkt	*git	*darft	*veyst
3PL	zɔgən	trɔgən	*gibən	*darfən	*veysən
SG IMP	zɔg	trɔg	gib	–	veys
PL IMP	zɔkt	trɔkt	*git	–	*veyst
PST PTCP	gezɔkt	getrɔgən	gegebən	*gedarft	gevust

The paradigms in (1) show that for certain classes of verbs, MHG present tense paradigms had a distinct vowel in the 2/3SG (*tra:gen* 'carry': *tra:ge*, *tre:gest*, *tre:get*) or in the entire singular (*gëben* 'give': *gibe*, *gibest*, *gibet*).⁴ Comparing the paradigms

²There 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 Chap. 2 of Jacobs (2005), 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.

³The infinitive suffix /-ən/ is realized in many contexts as a syllabic nasal: [trɔg̃n], [lɛbm̃]. For discussion, see Jacobs (1990: 92–97), and Sect. 4.3 below.

⁴As discussed below, these patterns had distinct, but related historical sources: [a] ~ [ɛ] alternations in verbs like *tra:gen* arose from fronting of *a* to *æ* or *e* before suffixal *i* during the transition from OHG to

of *sa:gen* ‘say’ and *tra:gen* ‘carry’, we see that these alternations were lexically restricted; in fact, most verbs had invariant vowels like ‘say’, and only a small minority of verbs had alternations among present tense forms. In the development from MHG to Yiddish all of these alternations have been eliminated, leaving a uniform vowel in all present tense finite forms, as shown in (2). The forms in (2) exhibit a number of innovations that cannot be attributed to regular sound changes,⁵ but which have the effect of producing uniform vowels throughout the paradigm (PARADIGM LEVELING). 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 other alternations relatively intact.

As is often the case with paradigm leveling, each individual change in (2) is amenable to a wide variety of possible interpretations. The choice of [a:]/[ɔ] over [e] in the verb ‘to carry’, for example, might be attributed to the fact that it was the majority allomorph, occurring in four out of six MHG finite present tense forms. The choice of the vowel [i] 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 commonly 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 against the high front rounded vowel [y], which does not occur in Yiddish.⁶ Indeed, all of these factors are plausible, and have been argued to play a role in cases of paradigm leveling in other languages (see, e.g., Hock 1991: Chaps. 10–11 for discussion, and Sect. 4 below). Often, 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 involves 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 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

MHG, while [e] ~ [i] alternations in verbs like *gēben* came about through raising of *e* to *i* before suffixal high vowels, seen already in OHG.

⁵The relevant regular sound correspondences include: ü, ö > i, e; a: > ɔ; o: > ɔɪ; iə (MHG *ie*) > i; for a more complete treatment, see Jacobs (2005: 22–40). In addition, I assume that the MHG vowel written *iu*, sometimes assumed to have been pronounced [y:], corresponds to Yiddish *ay* [aɪ], as seen in words like MHG *niun* ‘nine’, *iuch* ‘you.PL.OBJ’, *biutel* ‘bag’ vs. Yiddish *nayn*, *aykh*, *baytel*.

⁶For suggestive evidence that at least some early varieties of Yiddish may have had front rounded vowels, see Haines (1975).

Yiddish change runs counter to the more usual dominance of the more frequent and less marked 3SG form (Kuryłowicz 1947; Mańczak 1958, 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 Sect. 5.1, NHG dialects have also undergone analogical change, but they have generally either extended alternations or leveled to forms other than the 1SG. Thus, the broader question 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 accidental, but follows from a deeper fact about how verbal paradigms are organized in Yiddish. To preview the major claims, I argue below that the direction of leveling is determined by the grammatical structure of the language rather than by frequency or by a non-deterministic combination of multiple factors. In particular, I argue that a model of paradigm structure is required 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 (Kenstowicz 1997; Benua 1997; Albright 2002a; Hall and Scott 2007). 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 show that the Yiddish data is compatible with a model that selects base forms that display as many unpredictable contrastive properties as possible for each lexical item. 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 long/tense vowel, while in Yiddish, they may also end in a schwa (e.g., *shayn*- ‘shine’ vs. *taynə*- ‘argue’). This difference may seem trivial, but it has the consequence that Yiddish learners face an additional challenge of determining which verbs have stem-final schwa. This property is not trivial to infer from inflected forms, 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. Section 2 provides background concerning theoretical models of paradigm leveling, and briefly summarizes the informativeness-based model of Albright (2002a), which predicts that analogical change should uniformly be based on the form that best maintains lexical contrasts. Section 3 describes the development of a number of different verb types, comparing their MHG sources to their modern Yiddish outcomes, and concludes that as predicted, regularization has indeed been strikingly asymmetrical. 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 describe the various changes in some detail to establish the correctness of the generalization. I then

show that the 1SG also reveals more lexically idiosyncratic contrasts than any other form, making it the maximally informative member of the Yiddish inflectional paradigm. Finally, the Yiddish change is briefly compared with facts from representative 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.

2 An asymmetrical model of paradigm structure

Although analogical change is frequently depicted as intrinsically sporadic or irregular (e.g., Sturtevant 1917: 83–84), it has often been noted that certain types of analogical change such as paradigm leveling can actually be extremely thorough and systematic within a language (King 1969: 132; Hock 1991: Sect. 9.1; and others). Yiddish provides an excellent illustration of the thoroughness and systematicity with which paradigm leveling may occur. In spite of the prevalence of segmental alternations in older stages of German, very few traces of these alternations remain in modern Yiddish verb paradigms. Furthermore, as we will see in greater detail below, the elimination of alternations in verbal paradigms in the development from MHG to modern Yiddish shows a systematic directionality: In virtually all cases, the expected 1SG form has been extended to the remainder of the paradigm.

Systematic directionality in analogical change is not unusual; in fact, analogical innovations in child language and in diachronic change are often remarkably asymmetrical, with stem alternations consistently eliminated in favor of the allomorph found in one particular part of the paradigm. A typical example can be seen in data from Spanish. Spanish present tense paradigms display a number of lexically restricted (irregular) alternations, including vowel changes (*vuelo/volamos* ‘I/we fly’; *cierra ~ cerramos* ‘I/we close’; *pido ~ pedimos* ‘I/we ask for’), consonant alternations (*pongo ~ ponemos* ‘I/we put’), and other irregularities (*sé ~ sabemos* ‘I/we know’). In a survey of 5,691 verb forms produced by 15 Spanish-learning children (ages 1;7 to 4;7), Clahsen et al. (2002a) showed that as one might expect, children occasionally make errors on irregular verbs by incorrectly using the wrong stem allomorph (227 tokens). These errors are strikingly asymmetrical: children incorrectly use the form of the stem that occurs in the 1PL and infinitive to produce innovative 1SG forms (e.g., **volo* ‘I fly’ (INF *volar*), **pono* ‘I put’ (INF *poner*), **sabo* ‘I know’ (INF *saber*)). The converse error, incorrectly extending the allomorph found in the 1SG to the 1PL or infinitive, is unattested in their data.⁷ This asymmetry is mirrored by historical change: A number of verbs that used to alternate in Old Spanish no longer do so in modern Castilian Spanish, and just as in child Spanish, alternations have been systematically eliminated in favor of the allomorph found in the 1PL and infinitive (Penny 2002; Morris 2005).

⁷Leveling in the opposite direction is found in some dialects, including New Mexico Spanish (Harris 1974). It is beyond the scope of this paper to explain this difference among varieties of Spanish, but the comparison between Yiddish and German below may help point to some relevant considerations in how closely related languages can diverge in this way.

Why are analogical innovations characteristically asymmetrical? Over the past century, a sizable literature has emerged exploring the factors that may influence the directionality of leveling (Kuryłowicz 1947; Mańczak 1958; Hoenigswald 1960; Schindler 1974; Vincent 1974; Kiparsky 1978; Hooper 1980; Lahiri and Dresner 1984; Wetzels 1984; Bybee 1985; Garrett 2008; and many others). Numerous tendencies have been observed: Leveling tends to favor the morphosyntactically least marked form (Kuryłowicz's 'second law'), the form with highest token frequency (Mańczak's 'fourth tendency'), the form marked with the phonologically shortest affix (Mańczak's 'third tendency'), or the allomorph found in the greatest number of inflected forms ('majority rules': McCarthy 2005). In many languages, these trends converge to favor a single base of reanalysis. For example, as documented by Bybee (1985: Chap. 3), the morphosyntactically least marked member of the paradigm (for verbs, the 3SG indicative) also tends to have the highest token frequency and the least affixal marking, making it the most likely base of analogy by most of the criteria listed above. In many languages, however, these criteria do not converge, and unfortunately it appears that different factors prevail in different cases (see Hock 1991: Chaps. 10–11 for extensive discussion). Furthermore, even when all relevant factors would seem to favor a single base of analogy, speakers may nonetheless extend a different form. The Spanish example discussed in the previous paragraph is a case in point: The 3SG and 1SG present tense forms are the morphosyntactically least marked and shortest forms, and also exhibit the highest token frequency and employ the most widely occurring stem allomorph. Yet child errors and historical change show the 1SG and 3SG being rebuilt on the basis of the 1PL or infinitive rather than vice versa. This appears to be a language-particular fact about Spanish; as will be documented in greater detail below, in Yiddish the 3SG, 1PL, and sometimes also the infinitive have been rebuilt based on the 1SG. Of course, such exceptions do not necessarily falsify the claim that there are statistical tendencies that may influence the direction of analogy. However, to the extent that learners and speakers of a given language are consistent in the types of errors and innovations that they produce, we must explain what leads them to converge on the same base of reanalysis.

One promising line of attack has been to view analogical change as a consequence of the language-particular grammatical structure imposed by learners. Three different grammatical explanations for paradigm leveling can be discerned in the literature. The first is that leveling represents a change to the phonological grammar over time: Processes are lost or the interaction between processes changes such that they no longer produce alternations within the paradigm (Kiparsky 1965, 1968, 1974, 1978; King 1969: 127–134). Under such an account, the direction of leveling is determined by whether the process is lost (in which case it increasingly underapplies) or becomes opaque (in which case it overapplies). If we can explain why learners of a given language would consistently either fail to learn a given process or mislearn its interaction with other processes, we would have a ready explanation why analogical change is characteristically unidirectional. This line of reasoning has proven insightful in explaining analogical change; see Chap. 5 of King (1969), and Chap. 11 of Hock (1991) for discussions of many relevant cases. As we will see below, however, such an approach cannot satisfactorily explain the full range of Yiddish data, since the changes to be accounted for represent an unexplainable mix of rule loss (underapplication)

and rule reordering (overapplication), as well as elimination of alternations that were almost certainly morphological rather than phonological in nature.

An alternative, though not unrelated, proposal is that leveling itself is a grammatical force. Within Optimality Theory (Prince and Smolensky 2004), this has been formalized using Uniform Exponence or Paradigm Uniformity constraints (Burzio 1994; Kenstowicz 1997; Steriade 2000), which learners may rank highly due to an innate initial preference for non-alternating paradigms (McCarthy 1998). The fact that certain forms in the paradigm are favored over others is often taken to diagnose an asymmetrical correspondence relation demanding faithfulness to a privileged BASE form within the paradigm (Kenstowicz 1997; Benua 1997: 236–244; Kager 1999; Hall and Scott 2007).⁸ Although there is no universally accepted set of independent criteria by which a given form may be designated as a base of correspondence, it is generally assumed that it must be a form that is unmarked in terms of morphosyntactic features, and is ideally also a phonological substring of the remaining forms (Hayes 1999; Kager 1999: 261). Unfortunately, these criteria appear to be at once too strong and too weak. For Spanish present tense inflection, they are too strong in that they uniquely favor the 3SG as the privileged base form, yet as we have seen, the 3SG is actually rebuilt on the basis of other forms. The criteria are also too weak, in that languages may have several unsuffixed forms, so the choice of base is underdetermined. This is the case for Yiddish. As we will see below, the 1SG is just one of several unsuffixed forms, but an account of the observed levelings requires reference specifically to the 1SG. At the very least, a more sophisticated notion of base is needed in which learners are able to choose from among the various unsuffixed forms (as in the case of Yiddish) or even among the suffixed forms (as in Spanish). Ideally, we would also like a theory that predicts why different forms may act as the base in different languages.

In response to such challenges, Albright (2002a) proposes a grammatical account of analogical change in which the direction of reanalysis is the result of a learned morphological structure that defines certain forms in relation to other forms. Specifically, it is proposed that morphological grammar has the asymmetrical structure in Fig. 1, in which one form is designated as the base form and the remaining forms are derived from it by rules. This is referred to as the SINGLE SURFACE BASE hypothesis. Assuming for expository purposes that the infinitive is the base form for MHG present tense inflection, the grammar would need to include rules mapping the *-en* suffix to *-e* in the 1SG, to *-(e)st* in the 2SG, to *-(e)t* 3SG, and so on: *sa:gen* ‘to say’ → *sa:ge* (1SG), *sa:g(e)st* (2SG), *sa:g(e)t* (3SG) (cf. the forms in (1)). For many verbs, the mapping from the infinitive to the present tense forms is completely straightforward: Replace the infinitive suffix with the appropriate person/number suffix. For some verbs, this is not sufficient, however. For example, as seen in (1) above, forming the 3SG of the verb *tra:gen* ‘carry’ requires not only the addition of the *-t* affix,

⁸McCarthy (2005) raises the interesting possibility is that the direction of leveling is determined in purely phonological terms through the interaction of paradigm uniformity constraints with regular markedness constraints, and does not require reference to a privileged base form. However, it appears that not all cases of leveling can be described in this way; see Sturgeon (2003); Hall and Scott (2007); and Albright (2008b) for examples. For this reason, I focus here on models with the added structure of correspondence to a privileged base form.

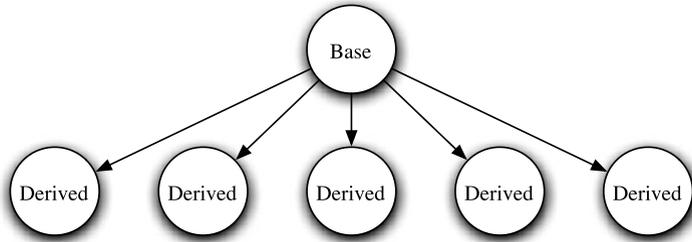


Fig. 1 Morphological structure defining all paradigm members with respect to a designated base

but also a change of the stem vowel from *a* to *e*: *tra:gen* → *tre:g(i)t*. Comparing the 3SG forms *sa:g(et)* ‘say-3SG’ vs. *treg(et)* ‘carry-3SG’, we find that such vowel adjustments are not completely predictable from the infinitive—that is, there is no reliable way to guess based on the phonological forms or meanings of *sa:gen* and *tra:gen* that one alternates while the other does not. In such cases, there are two possibilities: Either the vowel alternation is a productive process and *sa:gen* is exceptional, or the alternation is lexically restricted and *tra:gen* must be listed as exceptional. As it turns out, non-alternating verbs greatly outnumber alternating verbs, making it logical to suppose that verbs with vowel changes should be treated as exceptions. The mechanism of leveling is overregularization (Paul 1920; Marcus et al. 1992; Pinker 1999): If speakers happen to forget (or have never had the opportunity to learn) that a particular verb has vowel alternations in the 3SG, they will use their grammar to construct innovative/regularized forms lacking vowel alternations. Such grammatical regularizations are especially likely to target low frequency lexical items, while leveling exceptional high frequency forms intact.

Under this account, the fact that leveling follows a consistent directionality follows from the asymmetrical nature of morphological grammar, while the fact that a given pattern is consistently over- or underapplied is a consequence of whether the process was productive or not at the time of leveling. The fact that languages may differ in the direction of influence, and the choice of leveling vs. extension of alternations, follows from the hypothesis that languages may differ in which form serves as the base, and whether the alternations in question are productive or not. In order to provide an explanatory model of the direction of change, then, we need two things: (1) a model of how learners determine the correct asymmetrical morphological structure for their language, and (2) a way to decide which patterns are productive and which are exceptional.

In order to predict cross-linguistic differences in the form that serves as the base, Albright (2002a) proposes a learning algorithm in which learners attempt to minimize exceptions by selecting a base form that is maximally informative with respect to the remaining inflected forms. In the ideal case, learners can identify a single form that contains all of the information needed to predict the remaining inflected forms correctly for all lexical items. If such a form is available, it can serve as the input to a grammar that reliably projects all of the remaining forms, and no exceptions are needed at all. Unfortunately, as the MHG example shows, such a form is not always available. On the one hand, the infinitive does not contain the information needed

to distinguish non-alternating [a] verbs like *sa:gen* ‘say’ from alternating [a] ~ [e] verbs like *tra:gen* ‘carry’, which look alike in the infinitive but differ in the 2/3SG. On the other hand, the 2/3SG are no more informative, since in those forms alternating verbs like *tre:g(i)t* ‘carry-3SG’ are indistinguishable from non-alternating [e] verbs like *leb(i)t* ‘live-3SG’. Thus, a certain number of exceptions is inevitable, and the task of the learner is to minimize them by selecting as predictive a base form as possible. Since different languages exhibit different patterns of phonological neutralizations and different inflection class systems, the optimal (=maximally informative) base form may differ from language to language. This means that languages may have different grammatical organizations, depending on what parts of the paradigm are affected by neutralizations. The claim of this approach is that these predictability differences are responsible for the observed cross-linguistic differences in the directionality of analogical change.

In order to see how the learning algorithm identifies the most predictive base form, consider the made-up language in (3).

(3) 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
h.	kroma	kromi

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 forms in (3g–h) show that the language also has a process of vowel deletion in hiatus (/zupa+i/ → [zupi]), and 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.⁹ In such cases, it is hypothesized that the 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 (3), this criterion would favor the plural as a base, since the

⁹Within generative phonology, such examples are often taken as evidence that the stored form of a word must be an abstract representation that combines unpredictable information from multiple sources; see Chap. 1 of Kenstowicz and Kisseberth (1977) 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.

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 grammar is forced to contend with a certain degree of competition between unpredictable patterns. This competition is captured by means of stochastic rules that attempt to find the most reliable phonological contexts for each pattern. For the examples in (3), it happens that the words which are consonant-final in the singular all have stops before the plural *-i* suffix, while the words which are *a*-final in the singular all have labials in that position. Within their respective contexts, consonant-final singulars can be predicted quite reliably (accounting for 6 out of 7, or 86% of plurals ending in stop+*i*), while vowel-final singulars are less predictable (representing only 2 out of 4, or 50% of plurals ending in labial+*i*). Since these reliability estimates are based on a very small number of observed forms, they are adjusted downwards using lower confidence limit statistics ($\alpha = .25$), which has the effect of decreasing the speaker's confidence in rules based on just a few words. The competition between these two rules, as reflected in their confidence values, is illustrated in (4).

(4) Competing rules

Rule	Examples	Exceptions	Reliability	Confidence (adjusted, $\alpha = .25$)
$i \rightarrow \emptyset / \left[\begin{array}{l} -\text{son} \\ -\text{cont} \end{array} \right] _$	drubi, sapi, radi, . . .	zupi	$6/7 \approx .86$.71
$i \rightarrow a / [+lab] _$	zupi, kromi	drubi, sapi	$2/4 = .50$.21

The final morphological grammar that is learned for the language in (3), then, is one in which singulars are derived from plurals, and the productive singular formation process is to simply remove the final *i* of the plural and apply final devoicing. Under this analysis, the *a*-final singular forms *zupa* and *kroma* are irregular, employing an unproductive minority pattern, and must be listed as such. Thus, these two forms are predicted to be susceptible to regularization, and may acquire innovative singular forms *zup*, *krom*. The predictive power of this model comes from the asymmetrical structure of the grammar (Fig. 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). Since in this language singulars are projected from plurals and not vice versa, there are no grammatical rules that would yield innovative plural forms. Therefore, levelings in the opposite direction, such as innovative *drupi* or *rati*, are not predicted.

In this schematic example, only two inflected forms are considered and one form clearly displays more phonological contrasts than the other. In many languages, however, there are multiple inflected forms that provide similar or even exactly the same

information about the word (its phonological form, its inflectional class, etc.). In such cases, the learner may be forced to choose among various inflected forms that are all more or less equal in their informativeness. Note, however, that although different inflected forms may in principle provide equivalent information, in practice, inflected forms with higher token frequency tend to provide information about a greater number of words. Put differently, learners are more likely to have encountered words in a frequent inflected form such as the 3SG or nominative singular, than in an infrequent form such as the 1PL exclusive or the ablative dual. Here, the statistical confidence limit adjustment illustrated in the last column in (4) may become decisive since it rewards rules based on more data. This has the effect of assigning slightly greater confidence to rules based on more frequent parts of the paradigm. Albright (2008a) explores the impact of this adjustment and finds that when two inflected forms are very close in their informativeness, it may tip the balance in favor of choosing the more frequent form as base. Therefore, although the model does not consider or encode token frequency directly, it is influenced by token frequency to a limited extent. This turns out to make no difference for Yiddish, where the most informative form is also a relatively frequent form, but it will figure in the comparison with German in Sect. 5.1.

To summarize, the model presented here predicts that overregularization errors should be unidirectional, and based on the form that best exhibits lexical contrasts. This prediction has been shown to be correct in various cases, including the Spanish verb example discussed above (Albright 2002a), Latin noun paradigms (Albright 2005), and Yiddish nouns (Albright 2008b). The changes in the development of Yiddish verbs introduced briefly at the outset provide another important test case, since levelings have been so pervasive and have eliminated numerous unrelated alternations. The purpose of the next two sections is to demonstrate that the changes in Yiddish verb forms have indeed been asymmetrical in the way predicted by the single surface base hypothesis (Sect. 3), and that the base of reanalysis was indeed the most predictive form prior to leveling (Sect. 4).

3 The shape of Yiddish verb stems

The inflectional morphology of verbs in Yiddish can be traced back straightforwardly to some form of Middle High German (MHG).¹⁰ In standard literary MHG, present indicative verbs were inflected with the person and number suffixes in (5) (Paul et al. 1989: Sect. 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 et al. 1989: Chap. 3).

¹⁰The source language for German components in Yiddish was almost certainly not identical to the literary language of classical MHG (Landau 1895; Weinreich 1973, vol. 4: 117–118), but as far as verbal affixes are concerned, there are no significant differences that would require us to assume a different starting point. We will see a case in which more careful dialect comparison is needed in Sect. 3.3.2 below.

(5) MHG present tense inflection: *singen* ‘to sing’

1SG	<i>singe</i>	/zɪŋg+ə/	[zɪŋgə]
2SG	<i>singest</i>	/zɪŋg+(ə)st/	[zɪŋg(ə)st]
3SG	<i>singet</i>	/zɪŋg+(ə)t/	[zɪŋg(ə)t]
1PL	<i>singen</i>	/zɪŋg+ən/	[zɪŋgən]
2PL	<i>singet</i>	/zɪŋg+(ə)t/	[zɪŋg(ə)t]
3PL	<i>singen(t)</i>	/zɪŋg+ən(t)/	[zɪŋgən(t)]
Imperative: <i>sing(e)!</i> [zɪŋg(ə)] (SG), <i>sing(e)t!</i> [zɪŋg(ə)t] (PL)			
Past participle: <i>gesungen</i> [gəzʊŋgən]			

In Yiddish, the verbal suffixes have been preserved almost unchanged. In fact, other than the loss of finite past and conditional/subjunctive finite forms (not shown here), there are only two major differences, both of which were well underway already in late MHG and are shared with most NHG dialects: the reduction of 3PL *-ent* to *-en*, and a widespread loss of [ə] in final syllables. In the 1SG, apocope of the final [ə] removed all overt affixation and left the stem-final consonant in word-final position, where it could conceivably have undergone final devoicing. There is abundant evidence that apocope opaquely counterfed devoicing, which quickly led to the loss of final devoicing; see King (1980) for evidence and discussion. I will therefore assume that stem-final consonants remained voiced in the 1SG. By contrast, 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. The forms in (6) represent the totality of inflected verbal forms in Yiddish; since there is no morphological distinction between present and future, I use the terms ‘present’ and ‘non-past’ interchangeably.¹¹

(6) Yiddish verb inflection: *zingən* ‘to sing’

1SG	<i>zing</i>	/zɪŋg+∅/	[zɪŋg]
2SG	<i>zingst</i>	/zɪŋg+st/	[zɪŋkst]
3SG	<i>zingt</i>	/zɪŋg+t/	[zɪŋkt]
1PL	<i>zingən</i>	/zɪŋg+ən/	[zɪŋgən]
2PL	<i>zingt</i>	/zɪŋg+t/	[zɪŋkt]
3PL	<i>zingən</i>	/zɪŋg+ən/	[zɪŋgən]
Imperative: <i>zing!</i> [zɪŋg] (SG), <i>zingt!</i> [zɪŋkt] (PL)			
Past participle: <i>gəzungən</i> [gəzʊŋgən]			

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 of certain strong verb classes, Yiddish

¹¹Yiddish does have a compound future tense, formed with the auxiliary ‘velən’ and the infinitive: *ikh vel zing-ən* ‘I will.1SG sing-INF’.

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 Proto-Yiddish or Yiddish, or within some dialect or sociolect of German prior to the development (or formation) of Yiddish as a distinct language. This seems like a simple assumption, in conformity with the Neogrammarian hypothesis (Osthoff and Brugmann 1878:xiii). However, in this case it is potentially controversial, because it sometimes leads us to infer based on comparative evidence that Yiddish could have inherited alternations that have left no traces in the attested modern language. This goes against current scholarly practice that avoids defining Yiddish in relation to German (e.g., Jacobs 2005: 4), so it merits some 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. In fact, many authors implicitly or explicitly assume that the simplifications of the MHG system that are found in Yiddish are due to imperfect acquisition of the German system by non-native speakers. For example, Mieses (1924: 165) claims that ‘[t]he simplifying tendency that is evident in the Yiddish language is a typical development which holds sway whenever a foreign race adopts and modifies a foreign language’ (trans. mine). Some of these simplifications must certainly be due to the system that speakers impose on the data (analogical forces), but some could also be due 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 should not be attributed to impoverished data about the patterns of alternation in the source language. First, it is worth noting that early Yiddish texts show many of the same alternations seen in MHG, meaning that at least in the Western dialect region, Jews may have spoken a language that had inherited them. For example, Eliah Levita’s *Bovo-bukh* (1541) has [e]~[i] alternations (stanza 81.1 *shprekh-ən* ‘speak’ (infinitive) ~ 23.3 *shprikh* (imperative); 18.1 *nem-ən* (infinitive) ~ 9.6 *nim* ‘take’ (imperative)), umlaut in subjunctive forms (1.6 *hot* ‘have’ (3SG.IND.) ~ 33.6 *het* (3SG.SUBJ.)), and a wide range of irregular preterite forms that are completely absent in modern Yiddish; further examples will be cited below as relevant. We must treat such evidence with caution, since written sources may show features of German that were imported as a learned standard, and were never part of the spoken language (Weinreich 1928); however, the occurrence of such forms in texts that are clearly Yiddish suggests that incomplete transmission was not intrinsic to the sociolinguistic setting of the development of the language.

A more direct 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, as seen in (7).

(7) Preservation of alternations in the past participle

MHG infinitive, past participle	Yiddish infinitive, past participle	Gloss
b[i:]ʒen ~ geb[i]ʒen	b[ai]sən ~ geb[ɪ]sən	‘bite’
sch[iə]ʒen ~ gesch[o]ʒen	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[ɔ]lfən	‘help’

Of even more immediate relevance, Yiddish also preserves traces of many of the expected stem allomorphs when they occur in forms outside the non-past 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 (8); 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.

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

		INF	1SG	3SG	1PL	PST PTCP	Related
MHG	‘give’	g[ɛ]ben	g[i]be	g[i]b(e)t	g[ɛ]ben	geg[ɛ]ben	g[a:]be ‘gift’
Yiddish		g[e]bən	g[i]b	g[i]t	g[i]bən	gəg[e]bən	g[ɔ]b
MHG	‘know’	w[ɪ]ʒen	w[ei]ʒ	w[ei]ʒ	w[ɪ]ʒen	gew[ʊ]st	w[ɪ]ʒec ‘conscious’
Yiddish		v[ɪ]sən	v[ei]s	v[ei]s(t)	v[ei]sən	gəv[ʊ]st	v[ɪ]sik
MHG	‘carry’	tr[a:]ʒen	tr[a:]ʒe	tr[e:]ʒet	tr[a:]ʒen	getr[a:]ʒen	tr[e:]ʒer ‘carrier’
Yiddish		tr[ɔ]ʒən	tr[ɔ]ʒ	tr[ɔ]kt	tr[ɔ]ʒən	gətr[ɔ]ʒən	tr[e]ʒər

Taken together, the forms in (7) and (8) show that Yiddish displays approximately the same range of stem allomorphy found in MHG. This 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, and that reduced allomorphy in the finite verbal system is not a result of insufficient exposure to the complexities of the MHG system. The major difference between the two languages specifically concerns whether alternations are permitted within the non-past tense paradigm. The task of the next few sections will be to determine which vowel has been favored when alternations have been eliminated.

3.1 Leveling of vowel length

MHG is generally believed to have had vowel length alternations conditioned by syllable structure: roughly, long vowels in open syllables (open syllable lengthening; OSL) and short vowels in closed syllables (closed syllable shortening; CSS) (Paul et al. 1989: Sect. 45; Russ 1982: Sects. 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 *leben* ‘to live’, *sagen* ‘to say’, *haben* ‘to have’, and *stößen* ‘to push’ in (9):

(9) Vowel length alternations in late MHG

INF	l[e:]ben	s[a:]gen	h[a:]ben	st[o:]zen
1SG	l[e:]be	s[a:]ge	h[a:]be	st[o:]ze
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[e:]ben	s[a:]gen	h[a:]ben	st[o:]zen
2PL	l[e]bt	s[a]gt	h[a](b)t	st[o]st
3PL	l[e:]ben(t)	s[a:]gen(t)	h[a:]ben(t)	st[o:]zen(t)
SG IMP	l[e:]b(e)	s[a:]g(e)	h[a:]b(e)	st[o]ʒ
PL IMP	l[e]bt	s[a]gt	h[a](b)t	st[o]st
PST PTCP	gel[e]bt	ges[a]gt	geh[a](b)t	gest[o:]zen

This pattern of alternation is still found in many Bavarian dialects (Zehetner 1985: 95). It has generally been eliminated in Yiddish (or in a pre-Yiddish sociolect of German; Jacobs 1993), but small traces of it remain to show that it was once present. For example, the infinitive of the verb ‘to have’ is *həbən* by regular sound change from *ha:bən* ([a:] > [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 *shlōgen* (< *sla:gen*), but the related noun is *shlak* (MHG *slac* with short [a]). Even more telling, some dialects of Northeastern Yiddish retain the reflex of length alternations within the inflectional paradigm of a single high-frequency verb: *r[er]dən* ‘to speak’: *r[er]d*, *r[ɛ]tst*, *r[ɛ]t*, *r[er]dən*, *r[ɛ]t*, *r[er]dən* (David Braun, p.c.; Weinreich 1990: 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: Sect. 132). The expected pattern of alternations is shown in (10), 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, unexpected (analogically rebuilt) forms are marked with ‘*’.

(10) Loss of length alternations

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

	Late MHG	Expected Yid.	Actual Yid.
INF	s[a:]gen	zɔgən	zɔgən
1SG	s[a:]ge	zɔg ¹²	zɔg
2SG	s[a]gst	zakst	*zɔkst
3SG	s[a]gt	zakt	*zɔkt
1PL	s[a:]gen	zɔgən	zɔgən
2PL	s[a]gt	zakt	*zɔkt
3PL	s[a:]gen	zɔgən	zɔgən

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

	Late MHG	Expected Yid.	Actual Yid.
INF	st[o:]gen	sht[ɔɪ]sən	sht[ɔɪ]sən
1SG	st[o:]ge	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[o:]gen	sht[ɔɪ]sən	sht[ɔɪ]sən
2PL	st[o]st	sht[ɔ]st	*sht[ɔɪ]st
3PL	st[o:]gen	sht[ɔɪ]sən	sht[ɔɪ]sən

A question that arises is why the forms with short vowels were lengthened (*zakt* ⇒ *zɑ:kt* > *zɔkt*), rather than shortening the forms with long vowels (*zɑ:g* ⇒ *zag*). One possible line of explanation, inspired by the Optimal Paradigms approach (McCarthy 2005), would be to look for a phonotactic reason why lengthening was preferred—that is, to find some high-ranking markedness constraint that hypothetical short 1SG *zag*, 1PL *zagən* would have violated, making the lengthened forms *zɔkst*, *zɔkt* a more harmonic choice. Under such an analysis, the change would be viewed as overapplication of lengthening, motivated by this high-ranking markedness constraint, in concert with high-ranking output-output faithfulness. For example, given the fact that MHG showed open syllable lengthening, we may assume that constraints against short vowels in open syllables ($*\check{V}]_{\sigma}$) and against long vowels in closed syllables ($*V:C(C)]_{\sigma}$) were both active in the language,

¹²Although 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 ([za:ɡə]), which was subsequently deleted by apocope (> *zɑ:g*). The fact that lengthening remained even after apocope can be seen from the development of (formerly) schwa-final nouns: *ga:bə* > *gɔb* ‘gift’. A parallel opaque interaction of lengthening and apocope is also found in NHG dialects that have lost 1SG -ə (Zehetner 1985: 95). As noted above, final apocope interacted opaquely with other processes as well, such as final devoicing; see King (1980) for discussion.

outranking IO-IDENT([±long]). It is therefore conceivable that a high-ranking Output-Output IDENT constraint, together with $*\check{V}]_{\sigma}$, could have favored uniformly long paradigms as in (11). (Recall that long [a:] subsequently became [ɔ] in Yiddish.)

(11) Overapplication of open syllable lengthening motivated by $*\check{V}]_{\sigma}$

/zag-st/, /zag-t/, /zag-ən/	OO-IDENT ([±long])	$*\check{V}]_{\sigma}$	$*V:C(C)]_{\sigma}$	IO-IDENT ([±long])
a. zagst, zakt, za:gən	*!*			*
 b. za:gst, za:gt, za:gən			**	***
c. zagst, zagt, zagən		*!		

The result in (11) depends crucially on an assumption that the markedness constraint motivating open syllable lengthening ($*\check{V}]_{\sigma}$) outranked the markedness constraint driving closed syllable shortening ($*V:C(C)]_{\sigma}$). This assumption appears to be otherwise unmotivated, since the vowel alternations seen in (9) show that the two constraints are equally important in producing the observed allophonic distribution of length. Unfortunately, if we look beyond verbs, there is little 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, meaning that neither constraint was absolutely inviolable. 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 (10) show, the loss of the 1SG -ə suffix created closed syllables with long vowels (CV:C). This opaque interaction created surface exceptions to closed syllable shortening, but these were limited to singly-closed syllables ($*CV:CC$). Conversely, MHG lengthening in open syllables was rather more complex and irregular, and failed to apply in many contexts (MHG *wazzər* > Yid. *vasər*/ $*vɔsər$ ‘water’; MHG *tasche* > Yid. *tash*/ $*tɔsh$ ‘pouch’; MHG *hamer* > Yid. *hamər*/ $*hɔmər$ ‘hammer’; etc.). Moreover, words from other source languages introduced additional short vowels in open syllables in Yiddish, further weakening the tendency for open syllable lengthening. As a result, there would already have been a fair number of words with short vowels in 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 $za:gt$, $za:gst$).

In the absence of a clear-cut phonotactic preference for long vowels, various other possible explanations suggest themselves. Perhaps the [za:g] allomorph won out because it occurred in the infinitive, which is the citation form for Yiddish verbs. Perhaps it won out because 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 (4 inflected forms + infinitive, as opposed to 3 inflected forms + past participle), or because the forms with [za:g] 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.

3.2 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 NHG, but are completely lacking in Yiddish (Faber and King 1984: 398; Manaster Ramer and Wolf 1997: 19; Jacobs 2005: 216). In many MHG verbs, a process known as UMLAUT changed the stem vowel /a/ to [e] in the 2/3SG: *trage*, *treigest*, *treiget* ‘carry-1/2/3SG’. The development of this alternation is illustrated in (12). 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’, *vorn* ‘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 et al. 1989: Sects. 251–253). In Yiddish, these alternations are lacking in the present tense paradigm, with verbs showing consistent [ɔ] or [a] depending on whether the root vowel was in a lengthening or shortening context.

(12) Loss of umlaut in Yiddish

a. Leveling to [ɔ]

	OHG	Late MHG	Expected Yid.	Actual Yid.
INF	tr[a]gan	tr[a:]gen	tr[ɔ]gən	tr[ɔ]gən
1SG	tr[a]gu	tr[a:]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[a:]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[a:]gen(t)	tr[ɔ]gən	tr[ɔ]gən

b. Leveling to [a]

	OHG	Late MHG	Expected Yid.	Actual Yid.
INF	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]ltēn	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

Unlike vowel length alternations, which still have isolated reflexes in the Yiddish verbal system, no traces of umlaut remain in inflected Yiddish verb forms. Thus, the expectation that (Proto-)Yiddish may have inherited such alternations is necessarily based on indirect evidence. First, it may be noted that in the language in general, umlaut is a relatively robust process. Inflectionally, it is often used to form noun plurals and diminutives, including some cases not inherited from MHG umlaut: e.g., *tæg* ~ *teg* ‘day-SG/PL’ (cf. MHG PL *ta:gə, pənəm* ~ *pənəmər* ‘face-SG/PL’ (of Semitic origin, umlaut added in Yiddish)). It is also found, irregularly, in adjective comparison (*alt* ‘old’ ~ *elter* ‘older’), and may have even applied as a productive phonological process to some Semitic words (Heb. *rabi* > Yid. *rebi*; Bin-Nun 1973: 23). Verb stems also undergo umlaut in various derived contexts: *trəgən* ‘carry’ ~ *tregər* ‘carrier’, *shlɔfən* ‘sleep’ ~ *shlefik* ‘soporific’, *vashən* ‘wash’ ~ *vesh* ‘laundry’, *vaksən* ‘grow’ ~ *geveks* ‘growth’. Moreover, the set of roots that display umlaut in deverbal formations appears to correspond fairly closely to the set that showed inflectional umlaut alternations in MHG. In sum, when we look beyond inflected verbal forms, we find that Yiddish shows evidence of umlaut as a morphophonological process. The chief difference between Yiddish and MHG in terms of umlaut is the fact that Yiddish lacks umlaut in the 2/3SG forms of verbs.

The existence of umlaut outside the verbal system, together with more general facts about German-to-Yiddish sound correspondences and the chronology of umlaut,¹³ support at least the modest conclusion that the German component of Yiddish must also have originally participated in the umlaut process that also changed *a* > *e* in the 2/3SG of MHG class VI/VII strong verbs. This does, of course, leave open the possibility that umlaut alternations within verbal paradigms were lost in some earlier stage of the German source—and indeed, some scholars have suggested a connection between the lack of umlaut in Yiddish and in Upper German dialects, particularly Bavarian (Faber and King 1984). However, although there are numerous affinities between these dialects and modern Yiddish, in terms of verbal stem allomorphy, the lack of umlaut is the only parallel. Thus, it seems just as plausible that the loss of

¹³In particular, the raising/fronting of *a* > *e* in forms such as *tregit* ‘carry-3SG’ appears to have been quite early (Penzl 1949), predating other changes which are clearly reflected in the German component of Yiddish, such as umlaut of /u/ (*turi* > *türə*, Yid. *tir* ‘door’), as well as the reduction and eventual deletion of the high vowels that originally triggered umlaut.

umlaut was an independent change in Bavarian and in Yiddish (or some immediate precursor to Yiddish). I consider it here among the set of Yiddish changes to show that it is fully consistent with the broader set of undeniably Yiddish-specific developments. However, if evidence emerged that umlaut-less verbal forms were inherited from an umlaut-less German precursor, the remainder of the account would not be affected.

Interestingly, there is one MHG umlaut verb which shows [e] instead of [a] in Yiddish: *gefələn* ‘be pleasing’ is related etymologically to *fələn* ‘fall’, but shows the expected umlaut [e] of the 2/3SG. The apparently backwards direction of leveling in this particular case can be straightforwardly attributed 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’). This phenomenon of reversed directionality 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 so rare as to be practically non-existent. If this account is correct, the 3SG form of this verb must have had umlaut at the time of leveling. It should be noted that this is not conclusive evidence for the existence of umlaut within Yiddish verb paradigms, since it is also conceivable that the verb *gefeln* is based on a back-formation from a modern borrowing from NHG *es gefällt* ‘it is pleasing’ (N. Jacobs, p.c.). However, since there is no evidence that *gefelt* was, in fact, borrowed, the occurrence of an [e] in this verb does at least suggest the possibility that Yiddish may have had vowel alternations in the 2/3SG (third column of (12)) and that these alternations were eliminated as part of the same set of changes that eliminated other alternations in Yiddish.

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’¹⁴: *freg*, *frest*, *frekt*), so there is certainly no absolute ban on forms like hypothetical *treg*, *trekst*, *trekt*. 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 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 NHG (Baayen et al. 1993) to provide a rough approximation. Specifically, I took the set of all verb roots with final stressed syllables,¹⁵ and counted the number of roots containing each vowel. Overall, the

¹⁴Readers 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 *gefələn*. In fact, it is not (or at least not directly): MHG had a variant *vrēgen*, which is almost certainly the source of the modern Yiddish verb *fregən*.

¹⁵The 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 *-ieren* (learned, and often modern formations), and verbs with a frequency count of zero. This

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 in the paradigm 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.

3.3 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 verbs, the alternation can be traced 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.

3.3.1 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: Sect. 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 et al. 1989: Sects. 269–275). For example, the MHG verb *wizzen* ‘to know’ had singular present forms with the vowel [eɪ] (*wei3*, *weist*, *wei3*), but plural forms with [ɪ] as in the infinitive (*wizzen*, *wiz3(e)t*, *wizzen*)—a pattern that is still preserved in NHG. Interestingly, distinct plural vowels are also found in early Yiddish texts, showing that at least some variety of Yiddish (literary Western Yiddish) may have had synchronic alternations: Eliah Levita’s *Bovo-bukh* (Isny, 1541) 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 Eastern Yiddish, however, the singular and plural always have the same vowel:

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.

veys ~ *veysən* ‘know-1SG/1PL’, *darf* ~ *darfən* ‘need-1SG/1PL’. This development is illustrated in (13a). Note that the infinitive retains [ɪ] (*visən* ‘to know’), and from this and related forms (*visən* ‘knowledge’, *visik* ‘conscious’, *gəvisən* ‘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 trace of the previous plural/infinitive vocalism remains (13b).

(13) 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[ɪ]ʒʒen	w[ɛɪ]ʒ w[ɛɪ]st w[ɛɪ]ʒ	w[ɪ]ʒʒen w[ɪ]st w[ɪ]ʒʒen	v[ɪ]ʒən	v[ɛɪ]ʒ v[ɛɪ]st v[ɛɪ]ʒ	v[ɪ]ʒən v[ɪ]st v[ɪ]ʒən	v[ɪ]ʒən	v[ɛɪ]ʒ v[ɛɪ]st v[ɛɪ]ʒs(t)	*v[ɛɪ]ʒən *v[ɛɪ]st *v[ɛɪ]ʒən

b. Leveling of all forms, including infinitive

MHG			Expected Yiddish			Actual Yiddish		
INF	SG	PL	INF	SG	PL	INF	SG	PL
d[u]rfən ¹⁶	d[a]rf d[a]rf(s)t d[a]rf	d[u]rfən d[u]rft d[u]rfən	d[u]rfən	d[a]rf d[a]rfst d[a]rf	d[u]rfən d[u]rft d[u]rfən	*d[a]rfən ¹⁷	d[a]rf d[a]rfst d[a]rf	*d[a]rfən *d[a]rft *d[a]rfən
t[u]rren	t[a:]r t[a]r(s)t t[a:]r	t[u]rren t[u]rt t[u]rren	t[u]rən	t[ɔ:]r t[a]rst t[ɔ:]r	t[u]rən t[u]rt t[u]rən	*t[ɔ:]rən	t[ɔ:]r *t[ɔ:]rst t[ɔ:]r	*t[ɔ:]rən *t[ɔ:]rt *t[ɔ:]rən
t[u]gen	t[ou]c t[ou]c(s)t t[ou]c	t[u]gen t[u]ct t[u]gen	t[u]gən	t[ɔ:]g t[ɔ:]gst t[ɔ:]g	t[u]gən t[u]gt t[u]gən	*t[ɔ:]gən	t[ɔ:]g t[ɔ:]kst t[ɔ:]g	*t[ɔ:]gən *t[ɔ:]kt *t[ɔ:]gən
s[u]ln	s[ɔ]l s[ɔ]lst s[ɔ]l	s[u]ln s[u]lt s[u]ln	z[u]ln	z[ɔ]l z[ɔ]lst z[ɔ]l	z[u]ln z[u]lt z[u]ln	*z[ɔ]ln	z[ɔ]l z[ɔ]lst z[ɔ]l	*z[ɔ]ln *z[ɔ]lt *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. Additionally, since most of these verbs are modals, they lack imperative forms, so the singular imperative is ruled out as the base of leveling. If we consider further the expected effect of vowel shortening, we see from the paradigm of *tərən* ‘be allowed to’ that it is specifically a long vowel that is extended, rather than the shortened vowel that would have resulted from the addition of suffixes. Note that unlike the paradigms discussed in Sect. 3.1, in preterite present verbs the 3SG had no overt suffix so the 1/3SG had only a singleton coda:

¹⁶The MHG verbs in (13b) 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, unlauded or not.

¹⁷Herzog (1965: 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 systematic analogical changes seen in other preterite present verbs, and need not be attributed to an exceptional sound change.

t[a:]r. Monosyllables with singleton coda *r* appear to have undergone lengthening in MHG and Yiddish,¹⁸ which should have led to length alternations: *ta:r*, *tarst*, *ta:r*. 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 these verbs, Yiddish has invariant [e], which does not seem to correspond to either the singular or the plural.

(14) 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]cst m[a]c	m[a/u]gen m[a/u]g(e)t m[a]c	m[ɔ/u]gən	m[a]g m[a]gst m[a]g	m[ɔ/u]gən m[ɔ/u]gt m[ɔ/u]gən	*megan	*meg *megst *meg	*megan *megt *megan
k[u]nen	k[a]n k[a]nst k[a]n	k[u]nen k[u]n(e)t k[u]nen	k[u]nən	k[a]n k[a]nst k[a]n	k[u]nən k[u]nt k[u]nən	*kenən	*ken *kenst *ken	*kenən *kent *kenən

What could be the source of Yiddish [e] in these two verbs? As noted by Brenner (1895) and Behaghel (1928: 438), umlaut of /a/ to [e] was triggered not only by suffixal [i] (e.g., 2/3SG in Sect. 3.2), 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 *sielsi* ‘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.¹⁹ 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

¹⁸Other examples include MHG *gar* > *gar* > Yid. *gor* ‘complete’, and MHG *tor* > *to:r* > Yid. *toyər* ‘gate’. An equivalent lengthening did not take place in syllables with multiple coda consonants: MHG *hart* > Yid. *hart* ‘hard’. See Paul et al. (1989: 76, Sect. 45 note 2, and Sect. 46β) for discussion of parallel facts in NHG.

¹⁹It 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 (cf. *wahsit* ‘grows’, *hagsizza* ‘witch’ (NHG *Hexe*); Sonderegger 2003: 250), making *mag siu* > *meg siu* a somewhat uncertain change. Raising of *a* > *e* did extend to these contexts under a later secondary umlaut process, which has also been argued to apply across word + clitic boundaries (Gaeta 2002: 8), but the evidence for this is thinner and may be restricted to certain German dialects.

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: 548–550). Under this account, the semantic similarity of *megen* and *kenen* is also 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.²⁰

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: 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: perhaps Yiddish underwent a similar change, adopting [ɛ] 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 a red herring. 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. 16), 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’, *künic* ‘king’ > NHG *Sonne*, *Sommer*, *gewonnen*, *König* (Paul et al. 1989: Sect. 50). Crucially, Yiddish did not participate in this change: *zun*, *zumər*, *gevunən*, *kinig*. Thus, late MHG *künnen* should correspond to Yiddish **kinən*, with unrounding but no lowering, rather than attested *kenən*. Therefore, 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 show leveling to the singular in Yiddish. Consideration of expected vowel length alternations suggests that leveling favored the 1/3SG form in particular ((13) 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.

²⁰The 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: 554), and Gaeta (2002). Neither of these changes is relevant for Yiddish.

3.3.2 Loss of singular ~ plural *Wechselflexion*

A second type of MHG singular ~ plural alternations are the result of a sound change in Old High German raising *e* → *i* before a high vowel in the following syllable: *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 (*-em*, *-et*, *-ant*), this raising created *i* ~ *e* singular/plural alternations. These alternations are sometimes known as singular ~ plural *Wechselflexion* (‘alternating inflection’) (Paul et al. 1989: Sects. 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 (15) that Yiddish once again shows leveling within the present tense paradigm.

(15) Leveling to singular [ɪ]: *gebən* ‘to give’

	OHG	Late MHG	Expected Yid.	Actual Yid.
INF	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]st	g[ɪ]st
3SG	g[i]bit	g[i](p)t	g[ɪ]t	g[ɪ]t
1PL	g[ɛ]bên	g[e]ben	g[e]bən	*g[ɪ]bən
2PL	g[ɛ]bet	g[e]pt	g[e](p)t	*g[ɪ]t
3PL	g[ɛ]bent	g[e]ben(t)	g[e]bən	*g[ɪ]bən
SG IMP	g[i]b	g[i]p	g[ɪ]b	g[ɪ]b
PL IMP	g[ɛ]bet	g[e]pt	g[e](p)t	*g[ɪ]t
PST PTCP	gig[ɛ]ban	geg[e]ben	gəg[e]bən	gəg[e]bən

The pattern for *gebən* is essentially the same as for *visən* 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 Sect. 3.2, 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. 15). 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 (16). In addition, all class II verbs with *ie* ~ *iu* alternations show leveling to plural *ie*, as shown in (17). 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’.

(16) Leveling to plural [e]: *nemən* ‘to take’

	OHG	Late MHG	Expected Yid.	Actual Yid.
INF	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]mễn	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
SG IMP	n[i]m	n[i]m	n[ɪ]m	*n[e]m
PL IMP	n[ɛ]met	n[e]mt	n[e]mt	n[e]mt
PST PTCP	g̃in[o]man	g̃en[o]men	g̃ən[u]mən	g̃ən[u]mən

(17) Leveling to plural [i]: *krixən* ‘to crawl’

	OHG	Late MHG	Expected Yid.	Actual Yid.
INF	kr[io]chan	kr[iə]chen	kr[ɪ]xən	kr[ɪ]xən
1SG	kr[iu]chu	kr[y:]che	kr[ar]x	*kr[ɪ]x
2SG	kr[iu]chis(t)	kr[y:]chst	kr[ar]xst	*kr[ɪ]xst
3SG	kr[iu]chit	kr[y:]cht	kr[ar]xt	*kr[ɪ]xt
1PL	kr[io]chễn	kr[iə]chen	kr[ɪ]xən	kr[ɪ]xən
2PL	kr[io]chet	kr[iə]cht	kr[ɪ]xt	kr[ɪ]xt
3PL	kr[io]chent	kr[iə]chen(t)	kr[ɪ]xən	kr[ɪ]xən
SG IMP	kr[iu]ch	kr[y:]ch	kr[ar]x	*kr[ɪ]x
PL IMP	kr[io]chet	kr[iə]chet	kr[ɪ]xt	kr[ɪ]xt
PST PTCP	g̃ikr[o]chan	g̃ekr[o]chen	g̃əkr[ɔ]xən	g̃əkr[ɔ]xən

For verbs like *nemən* and *krixən*, leveling to the vowel of the MHG 1SG should have yielded 1PL *n[i]mən*, *kr[ar]xən* (see fn. 5). Thus, 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 ~ 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, since 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: 142–149; Faber and King 1984; Jacobs 2005: 15–17).²¹ As it turns out, verbs such as *nemen* and *kriechen* exhibited several different patterns of alternation in these dialect areas. The canonical singular ~ plural pattern seen in the second columns of (15–17) 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 pattern, which is typically attributed to the influence of the 2/3SG umlaut pattern (Sect. 3.2), is shown as Pattern B in (18). Furthermore, in late MHG, both of these patterns began to face competition from a completely leveled distribution (Pattern C).

(18) Three different distributions of alternation

	Pattern A		Pattern B		Pattern C	
INF	nemen	kriechen	nemen	kriechen	nemen	kriechen
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
SG IMP	nim	kriuch	nim	kriuch/*krieuch	nim/*nem	kriuch/*krieuch
PL IMP	nemt	kriecht	nemt	kriecht	nemt	kriecht

The change from Pattern A to Patterns B and C involved substantial dialectal, idiolectal, and verb-by-verb variability (Dammers et al. 1988; Fertig 2000). In brief, Pattern A is found in OHG texts (Sonderegger 2003:251), 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: Sects. 347, 355; Paul et al. 1989: Sect. 242, note 1; Besch 1967: 305; Philipp 1980: 66). The change seems to have proceeded gradually and on a verb-by-verb basis (Kern 1903: 47–60, Geyer 1912: Sects. 31–32), taking hold earlier in the east than in the west (Dammers et al. 1988: Sect. 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

²¹Weinreich (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).

1911: 5; Dammers et al. 1988: Sect. 148.4).²² 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 et al. 1993: 256). This change was earlier, more widespread, and more aggressive in class II (*ie* ~ *iu*) than in classes IIIb, IV, V (*e* ~ *i*),²³ 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 et al. 1988: Sect. 148.5). Many Bavarian dialects show non-alternating Pattern C for class II ([i] or [iə] throughout) but retain the original MHG pattern A for *e* ~ *i* in classes IIIb–IV (Kranzmayer 1956: 13). Similarly, 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 does share several grammatical affinities with modern Bavarian, including the loss of umlaut (Sect. 3.2 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. [a:vət], Yid. [arbət] vs. Standard NHG [arbartət] ‘work-3SG’), along with (dialectally restricted) use of the 1PL suffix *-mər* (Herzog 1965: 147) and 2PL *-ts*. Yiddish also has affinities with Central German that set it apart from Bavarian, however, including loss of vowel length alternations (Sect. 3.1 above), loss of root-final [h]/[x] alternations through leveling,²⁴ 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: 289; Herzog 1965: 272). It is entirely possible that the input to modern Yiddish was some combination of patterns, including not only pattern

²²The introduction of [iə], [e] in the 1SG is usually thought to be due analogical influence of the umlaut pattern (Sect. 3.2), 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.

²³For 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 et al. 1988: Sect. 144.2, and references therein).

²⁴MHG $s[i:]e \sim s[ix]-st \sim s[ix]-t$ ‘see-1/2/3SG’ \Rightarrow Bavarian $s[i\text{œ}] \sim s[i\text{æk}]-st \sim s[i\text{æk}]-t$ (Zehetner 1985), but Central German and Standard NHG $s[e:]e \sim s[i:]st \sim s[i:]t$, Yid. $z[e] \sim z[e]-st \sim z[e]-t$.

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 etymologically 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.

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] ((15) vs. (16)). Interestingly, Dammers *et al.* do not list *geben* among the verbs with frequent pattern C variants in early NHG; that is, 1SG *gibe* appears to have been retained fairly consistently. This may plausibly be linked to its exceptionally high token frequency, which could 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,²⁵ 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 Sect. 4, there is more to be gained than simply an elegant historical story; in fact, this direction

²⁵Token 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 than *geben* is *werden* ‘become’, which curiously is one of the first verbs to show leveling (Fertig 2000). Interestingly, for this verb, Fertig documents a variant of Pattern B in which the 1SG and 3SG have [e], while the 2SG retains [i]; Elia Levita’s ‘Hamavdil Song’ (Frakes 2004: 149–164) shows a similar pattern (stanza C5.4 and C22 *vert* ‘become’ (3SG) vs. O47/C69 *verst*, O48 *virstu* (2SG)). The preference for lowering in this verb could possibly be an independent sporadic phonological lowering effect caused by the following [r]; cf. MHG *stirne*/Yid. *shtern* ‘forehead’.

of reanalysis can be seen to follow from the grammatical structure of the language, making it a more predictive analysis.

As a final note, it may be observed that these verb classes provide additional demonstration that leveling was not to the singular imperative, which, unlike the 1SG, firmly retained the raised vowel [i] in verbs like *nehmen* (cf. NHG *nimm*) in German, and even retained [y:]/[ɔɪ] to a certain extent (as a literary form) in verbs like *kriegen* and *fliegen*.²⁶

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

A minor but regular sound change in the history of Yiddish involved epenthesis of [ə] into *rm* clusters in the coda of stressed syllables: MHG *warm* > Yid. *sturm* > *shturəm* ‘storm, assault’, *schirm* > *shirəm* ‘umbrella’, *form* > *fərəm* ‘form’, *turm* > *turəm* ‘tower’, *varəm* ‘warm’. This change did not affect intervocalic *rm* clusters: *shturmish* ‘stormy, violent’, *shirme* ‘screen’, *fərmən* ‘form-pl’, *turmə* ‘prison’, *varməs* ‘dinner’ (lit. ‘warm stuff’; a form *varəməs* also occurs). In verbs, this sound change should have created [ə] ~ Ø 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’. We may note that the same is also seen with the *rn* cluster in *vərənən* ‘warn’, but there are fewer cases available to assess the regularity of the sound change in this context, so I leave it aside.

(19) Leveling of [ə] ~ Ø alternations: *shturəmən* ‘storm, assault’

	Late MHG	Expected Yid.	Actual Yid.
INF	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
SG IMP	sturm(e)	shturəm	shturəm
PL IMP	sturmt	shturəmt	shturəmt
PST PTCP	gesturmt	geshturəmt	geshturəmt

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

²⁶Lessing (1759) *Der Sperling und die Feldmaus* (‘The sparrow and the fieldmouse’): ‘ich **flieg** ihm gleich.’ ‘**flieg**, praler’, rief die maus. (‘I’ll fly-1SG right to him.’ ‘Fly-IMP, braggart’ called the mouse.)

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’, *refərəm* → *reformirən* ‘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 /r/ 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 derived from a base 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.²⁷ 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* (*fərəm/fərən* ‘form-SG/PL’), epenthesis is not extended to the plural (**fərəmən*). Strikingly, in these cases singulars without epenthesis are possible as alternate variants: *fərm* alongside *fərəm*. This variability is not allowed for nouns that do not have intervocalic *-rm-* in the plural: *vərəm/vərəms* ‘worm-SG/PL’, *shvərəm/shvərəms* ‘swarm-SG/PL’ do not have singular variants **vərm*, **shvərm*. 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; see (Albright 2008b) for discussion of the direction of leveling in nouns. 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.

3.5 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.

²⁷Recent 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’.

3.5.1 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* ‘let’ (cf. Standard NHG *mü[s]en*, *la[s]en*). In MHG, these verbs had a coronal strident written <ʒ> (or <ʒ̥> after short vowels), often thought to have been a voiceless laminal strident (Joos 1952: 226).²⁸ At some point during the MHG period, the place distinction between ʒ and *s* was lost, though the two phonemes remained distinct intervocalically because *s* voiced to [z] (MHG *blâsen* > NHG [bla:zən], Yid. *blözən* ‘blow’), while ʒ did not (MHG *vüeʒe* > Yid. *fis* ‘feet’, MHG *mâʒen* > Yid. *məsən* ‘measures, measured amounts’, MHG *haʒzen* > Yid. *hasən* ‘hate’). Parallel to ‘feet’ and ‘measured amount’, MHG *müezen* ‘must’ and *lâʒen* ‘let’ should have yielded Yiddish *mi[s]ən*, *lo[s]ən* with voiceless [s]. In sum, the voicing in *muzən*, *lozən* cannot be explained as a 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, including *biz* ‘until’ (cf. MHG *biʒ*, NHG *bis*), *bloyz* ‘only’ (MHG *blôʒ*), and *iz* ‘is’ (MHG *ist* > *is*). 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: 30–31; Jacobs 2005: 120–121). There is no tendency to reanalyze other final obstruents as voiced in proclitics, however (e.g., *mit* ‘with’ ≠ **mid*), leading King (1980: 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.²⁹ 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 ((20)). 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]) ((21)), while the singular imperative was exceptionally contracted and had no strident at all. 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 (Sect. 3.3.1), while *lozən* has a long, un-umlauted vowel (Sects. 3.1–3.2). These developments are summarized in (20–21). Since the inflection of ‘let’ was idiosyncratic and variable in MHG, a number of possible outcomes are give in (21); * marks those forms for which Yiddish shows none of the possible expected outcomes.

²⁸Penzl (1968) argues for a more generic ‘lenis/fortis’ characterization of the *s/ʒ* contrast; see Paul et al. (1989: 164) for additional references.

²⁹Sapir (1915: 256) suggests that voicing occurs specifically when the final /s/ of a proclitic element 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.

(20) Leveling of [z] from 1SG/3SG: *muzən* ‘must’

	Late MHG	Expected Yid.	Actual Yid.
INF	müezen	mizən	* muzən
1SG	muoꝝ	mus/muz	muz
2SG	muost	must	must
3SG	muoꝝ	mus/muz	muz
1PL	müezen	mizən	* muzən
2PL	müest	mist	* must
3PL	müezen	mizən	* muzən

(21) Leveling of [z] from 1SG: *lʷzən* ‘let’

	Late MHG	Expected Yid.	Actual Yid.
INF	la:n/la:ʒen	lən/ləsen	* lʷzən
1SG	la:n/la:ʒe	lən/ləs/lʷz	lʷz
2SG	la:st/læst	lʷst/lest	lʷst
3SG	la:t/la:st/læt/læst	lʷt/lʷst/lest	lʷst
1PL	la:n/la:ʒen	lən/ləsen	* lʷzən
2PL	la:t/la:st	lʷt/lʷst	lʷst
3PL	la:n/la:ʒen	lən/ləsen	* lʷzən
SG IMP	la:	lʷ	* lʷz
PL IMP	la:t/la:st	lʷt/lʷst	lʷst
PST PTCP	gela:n	gələn	* gəlʷzən

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 Sect. 3.3.1 above, and lends further support to the idea that the modern form of Yiddish verbs can always be derived from the expected 1SG form. Note further that the source of the modern Yiddish forms of these verbs could not be the imperative, since the verb *muzən* is a modal and lacks imperative forms, and the verb *lʷzən* had a contracted imperative which can still be found in frozen forms (*lʷmækʰ* ‘lemme’, *lʷmər* ‘let’s’) but has generally leveled to *lʷz*.

3.5.2 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: 258–260; Sadock 1973: 792–795; and King 1980: 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* > *gevərən* ‘became’. CELEX counts reveal that *werden* and *finden* are both among the twenty most frequent verbs in modern German,³⁰ and would therefore be quite likely to undergo /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.

(22) Loss of stem-final /d/: *finən* ‘find’, *verən* ‘become’

	Late MHG	Expected	Actual		Late MHG	Expected	Actual
INF	findən	(gə)fin(d)ən	gəfinən	INF	werdən	ver(d)ən	verən
1SG	finde	(gə)fin	gəfin	1SG	werd(e) ³¹	ver	ver
2SG	find(ə)st	(gə)fin(t)st	gəfinst	2SG	wir(d)st	vir(t)st	*verst
3SG	find(ə)t	(gə)fint	gəfint	3SG	wirt	virt	* vert
1PL	findən	(gə)fin(d)ən	gəfinən	1PL	werdən	ver(d)ən	verən
2PL	find(ə)t	(gə)fint	gəfint	2PL	wer(də)t	vert	vert
3PL	findən	(gə)fin(d)ən	gəfinən	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 (22) 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.

3.5.3 *The verb tən*

Another verb in Yiddish that shows an effect of paradigm uniformity is *tən* ‘do’, which has the stem *tu-* in all present tense inflected forms (*tu, tust, tut, tuən, tut, tuən*), but the vowel [ə] in the infinitive (at least in some dialects): *tən*. 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

³⁰These 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’.

³¹See fn. 25 regarding the early change from *wird* to *werd*.

suon/sun > Yid. *zun* ‘son’). It is not clear to me whether there was an irregular [u] > [ɔ] change affecting just this one high frequency word, or whether there was a leveling from the past participle (MHG *getân* > Yid. *getən*). 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 among the finite non-past forms than elsewhere.

3.5.4 *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 that it should be identical to the 1SG plus the addition of the *-st* suffix.³² 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.

3.6 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 possible 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 (6), 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].

(23) Non-occurring levelings of voicing alternations

	Underlying	Expected/Actual	Unattested A	Unattested B
Infinitive	/zɔg+ən/	zɔgən	zɔgən	*zɔkən
1SG	/zɔg+Ø/	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

³²Zaretski (1926: 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”.

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’). On the one hand, the preservation of voicing alternations may not seem surprising, given the fact that voicing assimilation in coda clusters is extremely productive and automatic (POSTLEXICAL, in the traditional terminology of Lexical Phonology); see Hoenigswald (1960: 107–109) for discussion. However, this only pushes back the problem: Why did voicing assimilation remain productive in Yiddish, while other processes such as final devoicing became unproductive and open to leveling? Furthermore, there is reason to think that it could, in principle, have been extended analogically. First, we may note that automatic voicing adjustments such as final devoicing are often extended to occur outside their phonetically expected context—i.e., from expected phrase-final or pre-consonantal position to phrase-medial pre-vocalic position (Steriade 2000). In fact, the developments described in Sect. 3 include several examples in which external sandhi phenomena (arguably among the most productive of phonological processes) appear to have been extended to forms where they should not have applied; these included proclitic *s*-voicing in forms like *lɔz ikh* ‘let-1SG’ (3.5.1) and unstressed vowel coarticulation in forms like *m[a]g ikh/m[e]g ikh* (3.3.1). Regarding voicing assimilation in particular, analogical leveling of regressive assimilation is seen elsewhere in Yiddish. A popular example concerns the names of certain letters, which show regressive voicing depending on the name of the following letter: older *beys veys giməl* ⇒ newer (dial.) *beyz veyz giməl* with voicing of the final /s/ in the first two letter names, as opposed to *khes tes yud* with no voicing (Sadock 1973). While ordered recitations of the alphabet no doubt play a very prominent role in learning the names of letters, it is implausible to think that such utterances were the only evidence that learners would have about the letter names. In this and similar cases of analogical contamination, it is usually assumed that speakers had access to both isolated and sandhi realizations, but that the frequent sandhi realization with voicing assimilation influenced the realization in isolation. Logically, then, one might expect frequently occurring 3SG forms such as [zɔkt] ‘say-3SG’ to influence the realization of other forms, particularly for impersonal verbs that appear overwhelmingly in the 3SG. The claim that leveling to a devoiced variant is, in principle, possible is confirmed by the fact that this is precisely what is found in some nouns in Yiddish (*hant* ~ *hend* ‘hand-SG./PL.’ ⇒ **hent*; King 1980), and also sporadically in German (Schindler 1974:3).³³ The fact that such levelings do not occur therefore requires an explanation.

If we look just at potential levelings based on the 1SG, an answer immediately presents itself: the 1SG preserves voicing ([zɔg]), so there is no pressure to level to

³³Leveling of laryngeally neutralized segments is also attested for features other than voicing. For example, in Korean, stem-final aspiration and fortis/tense distinctions are currently being leveled in favor of lax values. Ko (2006) analyzes this as leveling to the laryngeally neutralized word-final realization found in unaffixed forms.

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/ and /t/ (details in Sect. 4.2 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 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 *gefin*), but as was shown above in Sect. 3.5.2, 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 Sect. 4.3 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.

In sum, the claim that leveling targets unproductive phonological processes does not make any strong predictions about which processes will lose productivity and be leveled. On the one hand, even apparently phonetic or post-lexical processes such as voicing assimilation may be extended analogically in some cases, such as Yiddish and Korean nouns. On the other hand, even morphophonemic processes such as umlaut may remain quite productive (Yiddish nouns and diminutives). I argue here that the most important distinction in predicting which processes leveled in Yiddish verbs is that the processes that leveled caused neutralizations in the 1SG, while the processes that remained active caused neutralizations elsewhere in the paradigm (if at all).

3.7 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 Wechsselflexion. For other verbs, alternations were due to regular phonological processes, either within words (e.g., open syllable lengthening, epenthesis in *rm*]_σ clusters) or as sandhi phenomena (umlaut before the 1SG pronoun *ich*, voicing of *s* in proclitics). This is summarized in Table 1, in which it is clear that all of the attested changes (top

Table 1 Summary of possible sources of leveling of alternations

		1SG	2SG	3SG	1PL	2PL	3PL	INF
Leveled	Open syllable lengthening (Sect. 3.1)	✓			✓		✓	✓
	Umlaut (Sect. 3.2)	✓			✓	✓	✓	✓
	Preterite presents (Sect. 3.3.1)	✓	✓	✓				
	megən, kenən (Sect. 3.3.1)	✓						
	SG ~ PL Wechselflexion (Sect. 3.3.2)	(✓)			✓	✓	✓	✓
	gebən, kumən (Sect. 3.3.2)	✓	✓	✓				
	Epenthetic ə / r__m (Sect. 3.4)	✓	✓	✓		✓		
	Voicing in muzən, ləzən (Sect. 3.5.1)	✓						
	Loss of /d/ in verən, gefinən	✓			(✓)	✓	(✓)	(✓)
[n] in 2SG binst (Sect. 3.5.4)	✓							
Not leveled	Devoicing by assimilation (Sect. 3.6, Sect. 4.1)		✓	✓		✓		
	Deletion of stem-final /s/ (Sect. 3.6, Sect. 4.2)		✓					
	Deletion of stem-final /t/ (Sect. 3.6, Sect. 4.2)		(✓)	✓		✓		
	Deletion of stem-final /ə/ (Sect. 3.6, Sect. 4.3)				✓		✓	✓

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 characterization, 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, 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 1 would be just one of many possible outcomes for Yiddish. For example, it would have been conceivable for 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 is 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.

4 Predicting the directionality of leveling in Yiddish

The directionality of analogical change has been a topic of intense investigation in historical linguistics, and various principles have been proposed. As mentioned in Sect. 2, a prevailing approach in the historical linguistics literature has been to treat the direction of analogy as the result of a number of statistical tendencies. A tendency-based approach cannot explain why the Yiddish developments all obey a consistent directionality, both across lexical items and across patterns. Furthermore, as we will see below, the Yiddish changes differ systematically from what is found in NHG dialects—a difference that is also left unexplained under a tendency-based approach.

The systematicity of the Yiddish developments suggest that they may have something to do with the grammatical organization of the language. One approach that has proven very fruitful is to analyze analogical leveling as the result of rule loss or rule reordering. In the current case, however, the differences between MHG and Yiddish cannot be unified in terms of rule loss or reordering. The leveling of vowel length alternations reflects a general loss of productive allophony between short and long vowels (open syllable lengthening, closed syllable shortening), but this alone does not explain why shortening stopped applying in forms like *hot* ‘have-3SG’ but continued to apply in the past participle *gəhat*, or why other verbs were consistently reanalyzed as containing long, rather than short vowels. In the case of 2/3SG umlaut, we might analyze the MHG process as a phonological readjustment rule which applies in certain morphological contexts: plurals, diminutives 2/3SG present of verbs, and with some derivational affixes. The loss of umlaut alternations in verbs but not in other contexts can be characterized only as a reduction in the set of triggering contexts, without any explanation for why it was specifically the verbs that stopped participating. Singular/plural *e ~ i* alternations in MHG could be described as a raising process in the singular, which was indeed lost in most cases in Yiddish, but which unexpectedly continues to apply in a broadened set of contexts (all non-past forms) in the verb *gebən* ‘give’. Likewise, alternations in preterite presents like *visən* ‘know’ were once the result of verb-specific allomorphy/readjustment in the singular forms, but now apply in all non-past forms (and sometimes beyond). Finally, processes like epenthesis in *rm* clusters, which once had straightforward phonological motivation,

now have morphological conditioning (either applying at the stem level, or failing to apply within verbs). In short, we observe a conspiracy (Kisseberth 1970): the grammar of Yiddish has undergone many different changes, all cooperating to achieve the effect of extending the form of the verb that occurred in the 1SG.

Another approach would be to grant special status to the 1SG as the grammatically unmarked form, which may then serve as the base of output-output correspondence (Kenstowicz 1997; Benua 1997) or the source of underlying forms (Lahiri and Dresner 1984; Dresner 2000). Under this approach, unlike a tendency-based approach, the status of a form as the ‘unmarked base’ is assumed to follow from universal principles. Yiddish provides a clear illustration of the challenge of characterizing all attested changes with a single principle, however. For example, a definition of markedness based on universal principles of featural markedness would probably favor the 3SG rather than the 1SG as the unmarked base form. This would correctly predict the extension of singular forms in preterite presents (Sect. 3.3.1) and the overapplication of schwa-epenthesis in *rm* clusters (Sect. 3.4), but it would incorrectly predict the extension of short vowels due to closed syllable shortening (cf. Sect. 3.1) and of fronted allomorphs for umlaut verbs (cf. Sect. 3.2). In many cases the allomorph that prevails is also the most widely occurring (majority) allomorph, so perhaps an underspecification or ‘elsewhere’-based definition of markedness would work better. However, in verbs such as *gib* (Sect. 3.3.2), *meg* (Sect. 3.3.1), *ken* (Sect. 3.3.1), *muz* (Sect. 3.5.1), and *lɔz* (Sect. 3.5.1), a minority/specific allomorph was favored.

A more promising principle for Yiddish might be to define markedness in terms of phonologically overt marking: since the 1SG lacks an overt suffix and is therefore (modulo any alternations) a substring of other inflected forms, we might declare the 1SG to be the unmarked base form in Yiddish. Unfortunately for such an approach, the 1SG is not the only unsuffixed verb form in Yiddish; there is also a singular imperative (*zing* ‘sing!’) and a ROOT form which is always identical to the infinitive minus the *-ən* suffix (*gib/tu a zing*, lit. ‘I give/do a sing(ing)’),³⁴ both of which lack overt suffixes. Among these, it is not obvious which (if any) should be treated as unmarked with respect to the finite present tense forms. The 1SG represents an unmarked tense and number, but the markedness relation between first and third person is controversial: some authors argue that first person is unmarked (Mayerthaler 1981), but it is more commonly assumed that third person is unmarked with respect to first and second person (Jakobson 1932; Benveniste 1966; Bybee 1985; Blevins 2000; Harley and Ritter 2002; McGinnis 2005). For this reason, faced with a similar choice between the 1SG and imperative for Schwabian German, Hall and Scott (2007) assume that the base of correspondence must actually be the imperative rather than the 1SG. As we have seen, however, the Yiddish developments require reference to the

³⁴It is not clear whether to treat the root form as a verbal form or as a derived noun. As Jacobs (2005: 222) observes, it can be modified like a noun (*a hoykhn zing* ‘a loud sing(ing)’, *a zingele* ‘a little sing (dimin.)’), but unlike any other type of derived noun, separable prefixes come after the verb root: *er hot gətən a zing-oyf* ‘he struck up a song’ (lit. ‘did a sing(ing)-up’). Furthermore, existing cognate nouns can never be used in place of the root form, nor do they morphologically block the creation of root form: *shpringən* ‘leap’ has a related noun *shprung* ‘a leap’, but *ikh gib a shpring/*shprung* ‘I leap’. For completeness I treat the root form as part of the verbal system. However, since the root form was apparently not the base of analogical leveling anyway, nothing hinges on this decision.

Table 2 Applicability of proposed principles to the direction of Yiddish changes

	V length (Sect. 3.1)	Umlaut (Sect. 3.2)	SG ~ PL diffs (Sect. 3.3)	<i>muzən</i> , <i>lozən</i> (Sect. 3.5.1)	2SG <i>binst</i> (Sect. 3.5.4)
1. Majority rule	(Tie)	Yes	No	No	No
2. Most frequent (=3SG)	No	No	Yes (exc. <i>meg</i> , <i>ken</i>)	No	No
3. Default person/number	No	No	Yes (exc. <i>meg</i> , <i>ken</i>)	No	No
4. Unaffixed form	(Tie)	(Tie)	(Tie)	(Tie)	(Tie)
5. Phonotactic markedness	No	No	No	No	No
6. Predicability	Yes	Yes	Yes	Yes	Yes

1SG rather than the imperative. In short, a more flexible notion of markedness that can select phonologically unaffixed or shortest forms also fails to uniquely select the 1SG as the base in Yiddish. The difficulty of finding a single markedness principle that captures all of the Yiddish changes is illustrated in the first five rows of Table 2. We are forced to conclude that the direction of analogy in Yiddish does not follow straightforwardly from any known universal principle of markedness.

We are left in the following position: A tendency-based approach is too permissive to explain why a given language should follow a consistent directionality at the expense of obeying different tendencies for different verb types, while an approach based on some universal definition of markedness is not flexible enough to explain why Yiddish shows the cross-linguistically unusual pattern of leveling to the 1SG. The informativeness-based approach of Albright (2002b) offers a middle ground. Like base-derivative correspondence, it attributes the consistent directionality of change to the structure of grammatical relations. However, it allows morphological structure to differ from language to language by allowing learners to select the base form that is most advantageous in preserving lexical contrasts. This has the potential to predict on independent grounds which form was the base in Yiddish (or perhaps Proto-Yiddish) prior to the levelings that shaped the modern language. In order to test the validity of this approach, we must determine which verb form would have been maximally informative in earlier stages of the language. In this section I will argue that the most informative form would in fact have been the 1SG, because it suffered from fewer phonological neutralizations than any other part of the paradigm and therefore maintained distinctions between the greatest number of lexical items. It is important to reiterate that our interest here is not in determining the structure of 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 correspondences and no further analogical modification. We will consider the phonological and morphological neutralizations that were present in this stage of the language, and what parts of the paradigm they would have affected.

4.1 Voicing agreement

As discussed above, Yiddish, like English, German, and many other languages, disallows sequences of tautosyllabic obstruents that disagree in voicing: **bs*]_σ, **pd*]_σ,

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 MHG and standard NHG, this assimilation is regressive, yielding a voiceless cluster: /klɔg+t/ → [klɔkt] ‘complain-3SG’.³⁵ This means that in the 2SG, 3SG, and 2PL, voicing assimilation neutralizes the contrast between root-final voiced and voiceless obstruents,³⁶ as shown in (24) for *libən* ‘love’ vs. *zipən* ‘sift’, and *klɔgən* ‘complain’ vs. *brəkən* ‘crumble’.

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

INF	libən	zipən	klɔgən	brəkən
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*, *ɪ/ʔdʒ*). 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. 15), a preliminary estimate of the set of Yiddish verb roots can be gotten by comparing equivalent counts in German.³⁷ I searched the German portion of CELEX for all verb lemmas that had a token frequency of 1 or greater (i.e.,

³⁵In 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) and Albright (2008b) for an analysis and discussion.

³⁶A 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 Jan 1984), but not in others (Turkish: Kopkallı 1993; Russian: Chen 1970: 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.

³⁷This 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 /dʒ/, 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.

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], was excluded from the counts.³⁸ Out of the 4877 non-compound verb lemmas, 1988, or 41% end in potentially voiced obstruents—that is, obstruents that are either voiced or have a voiced counterpart. This 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 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.

4.2 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: 216). This process was also found quite regularly in MHG (Paul et al. 1989: Sect. 53d), and is also preserved in some German dialects. In the last form of (25b), we see that at least in present day Yiddish, this process affects not only /s+st/, but also /st+st/.

(25) 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’

³⁸Gutman (1928) observes that at least in Lithuanian Yiddish, regressive voicing assimilation may also neutralize /rt/ and /xt/ to [xt]; I do not consider the consequences of this neutralization here, since it appears to be recent and dialectally restricted.

b. Anterior stridents

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

Jacobs (2005: 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 consonants³⁹: /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 (/hust+st/ → husst) and degemination (husst → [hust]).

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 (26–27).

(26) Neutralization in the 2SG

INF	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

(27) Neutralization in the 3SG/2PL

INF	dreyən	tretən	sheydən (zikh)
	‘turn’	‘step’	‘part (with)’
1SG	drey	tret	sheyd
2SG	dreyt	tretst	sheytst
3SG	drey[t]	tre[t]	shey[t]
1PL	dreyən	tretən	sheydən
2PL	drey[t]	tre[t]	shey[t]
3PL	dreyən	tretən	sheydən

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

³⁹Specifically, 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: 224).

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’ is unlikely to come from a verb **meən*, though it could correspond either to (hypothetical) *mesən* or to (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 (28–29). 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.

(28) Indirect inference from the 2SG

2SG Context	Likely infinitive(s)	Non-occurring alternatives
... short/lax \check{V} st	... \check{V} sən, ... \check{V} zən	... \check{V} ən (rare), ... \check{V} stən (rare)
... labial C st	... Cən	... Csen, ... Cten (rare), ... Csten (non-occurring)
... fricative st	... Cən, ... Ctən	... Czən, ... Csən

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

3SG Context	Likely infinitive(s)	Non-occurring alternatives
... short/lax \check{V} t	... \check{V} tən	... \check{V} dən (rare), ... \check{V} ən (rare)
... labial C t	... Cən	... Cten, ... Cden (rare), ... Csten (non-occurring)
... \check{t} t	... \check{t} ən	... \check{d} ən, ... \check{t} 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.

4.3 Neutralization of stem-final [ə]

So far we 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’)

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

INF	blankən ‘gleam’	blɔnkən ‘stray’
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: 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 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 actually be pronounced as [ən], as a syllabic nasal ([ṁ], [ṅ] or [ŋ]), or simply as [n]. The syllabic allomorph assimilates in place to a preceding stop: *həb*[ṁ] ‘have’, *red*[ṅ] ‘speak’, *zəg*[ŋ] ‘say’, but is otherwise coronal *həf*[n] ‘hope’, *lax*[n]. The distribution is as follows:

(31) Surface realizations of infinitive/1PL/3PL *-ən*

a. /ən/ → [n] after

- Schwa: *hulyə*-[n] ‘rejoice’
- [əɪ]: *hunger*-[n] ‘be hungry’, *farmatər*-[n] ‘tire out’
- A few irregular vowel-final verbs: *gey*-[n] ‘go’, *shtey*-[n] ‘stand’, *ze*-[n] ‘see’, *tə*-[n] ‘do’

b. /ən/ → syllabic nasal after

- Single consonants other than *m*, *n*: *red*-[ŋ] ‘speak’, *həb*-[ŋ] ‘have’, *pas*-[ŋ] ‘fit’
- Clusters other than *ŋk*, *ŋg*, and *Cl*: *folg*-[ŋ] ‘obey’, *merk*-[ŋ] ‘notice’, *tants*-[ŋ] ‘dance’, *felsh*-[ŋ] ‘forge’

c. /ən/ → [ən] after

- Vowels other than schwa: *drey*-[ən]⁴⁰ ‘turn’, *fli*-[ən] ‘fly’
- *m*, *n*: *shvim*-[ən] ‘swim’, *meyn*-[ən] ‘mean’
- *ŋk*, *ŋg* and *Cl* clusters: *zing*-[ən] ‘sing’, *zink*-[ən] ‘sink’, *vinkl*-[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[ŋ]*, but *Cə-ən* always remains *C[ən]*. This contrast is not always easy to perceive, however, since it requires distinguishing between [ŋ] and [ən]. In cases where [ŋ] assimilates in place to a preceding stop, the contrast is supported by not only a syllabicity difference, but also a place difference: *mek*[ŋ] ‘erase’ vs. *mek*[ən] ‘bleat’, *shlep*[ŋ] ‘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: *löd*[ŋ] ‘load’ vs. *yad*[ən] ‘irk’, *vish*[ŋ] ‘wipe’ vs. *lish*[ən] ‘make a racket’, *ayl*[ŋ] ‘rush’ vs. *yayl*[ən] ‘wail’, *pər*[ŋ] ‘pair up’ vs. *pər*[ən] ‘fuss with’, *shmər*[ŋ] ‘stew’ vs. *shmər*[ən] ‘snort’.⁴¹ 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*).

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 [ŋ] with assimilation to [ŋ], [ŋ] 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

⁴⁰One argument for treating the suffix as underlyingly /ən/ with reduction to [ŋ] 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 *drey-n* 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; see Jacobs (1990) for discussion. What is important for present purposes is that this suffix does not actually have a surface [ə] in all contexts.

⁴¹The degree of ambiguity between *-ən* and *-n* is perhaps greater for speakers who pronounce the /r/ as a trill than for those who pronounce it as [r̥].

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 [ɪ] and [əɪ]) is in comparison to a much more robust one (such as \emptyset 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: 330–331; Jacobs 1989: 100)—e.g., *lyubə-n* ‘caress’ from Slavic, and *taynə-n* ‘argue’ from Hebrew.⁴² 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’, *pyeshthən* ‘pamper’, *mloyən* ‘nauseate’, *tlīən* ‘smolder’, *strashən* ‘threaten’, *prazhən* ‘fry’.⁴³ Weinreich (1958: 393) provides evidence that speakers may, in fact, associate stem-final schwa with stem-final properties elsewhere in the word: from the German root *lax-* ‘laugh’, a pseudo-Slavic variant *lyaxə-* ‘guffaw crudely’ was formed, with both palatalization and a final schwa. In addition to segmental clues, there are two derivational suffixes that always contain 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 *pər-ən* ‘match’ or *pə-rə-n* ‘fiddle with’, but it is still far from predictable. Indeed, in addition to *pər-ən* vs. *pə-rə-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. *blənkə-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

⁴²Weinreich (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*. Mieses (1924: 163) identifies also *zeyə-n* ‘sow’ and *kreyə-n* ‘caw’, though Weinreich lists both as having free variation (*zeyə-n* ~ *zey-ən*).

⁴³The problem of how speakers identify members of separate lexical strata is a general one in phonology; see Itō 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. Indeed, 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. However, it is not implausible to 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.

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.

4.4 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. 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’). Assuming, for reasons discussed above, that such alternations did once occur in Yiddish (or some immediate precursor to Yiddish), they could not have been predicted 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 would have been fundamentally different from, say, voicing assimilation, in that they led to ambiguity in every single part of the paradigm. Kager (2008) 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 (32), which shows that prior to leveling, in every row, the umlaut verb *fɔrɛn* would have been ambiguous with one type of non-alternating verb or the other.

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

INF	fɔrɛn ‘travel’	pɔrɛn ‘pair up’	herɛn ‘hear’
1SG	fɔr	pɔr	her
2SG	ferst	pɔrst	herst
3SG	fert	pɔrt	hert
1PL	fɔrɛn	pɔrɛn	herɛn
2PL	fɔrt	pɔrt	hert
3PL	fɔrɛn	pɔrɛn	herɛn

The same thing is true for other vowel alternations, such as the singular-plural alternations of preterite presents (Sect. 3.3.1) and *Wechselflexion* verbs (Sect. 3.3.2). 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.

(33) Verbs with singular ~ plural alternations, prior to leveling

INF	visən 'know'	vishən 'wipe'	heysən '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 et al. 1989: Sect. 251), and variably in strong class VII, containing approximately sixteen more verbs (Paul et al. 1989: Sect. 253). Singular ~ plural *Wechselflexion* was slightly more prevalent, occurring in about three dozen verbs in strong classes IV and V (Paul et al. 1989: 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 et al. 1989: 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.

4.5 Other miscellaneous processes

In contrast to processes like voicing assimilation and degemination, the remaining processes in Sect. 3 would have had little or no practical impact on the selection of an optimal base form. For example, the epenthesis of [ə] in /rɪm/ clusters (Sect. 3.4) does not result in any neutralizations, since there appear to have been no Yiddish verbs ending in underlying (non-alternating) /Vrɪm/. Therefore, a 1SG in *-rəm* could be mapped with absolute certainty onto a 1PL with *-rən*, 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 ikh*, *ken ikh* and voicing in *muz ikh*, *loz ikh* would have created ambiguities with underlying /e/ and /z/ verbs, but these ambiguities involved only four verbs in all. Under the hypothesis that learners seek the most accurate possible grammar given the limitations of the formalism, these processes are essentially irrelevant, since they involve few or no neutralizations and hence could never cause errors.

4.6 The resulting grammar, and the mechanism of leveling

The neutralizations discussed in this section are summarized in Fig. 2, which shows that prior to leveling, the 1SG would clearly have been the least neutralizing—and

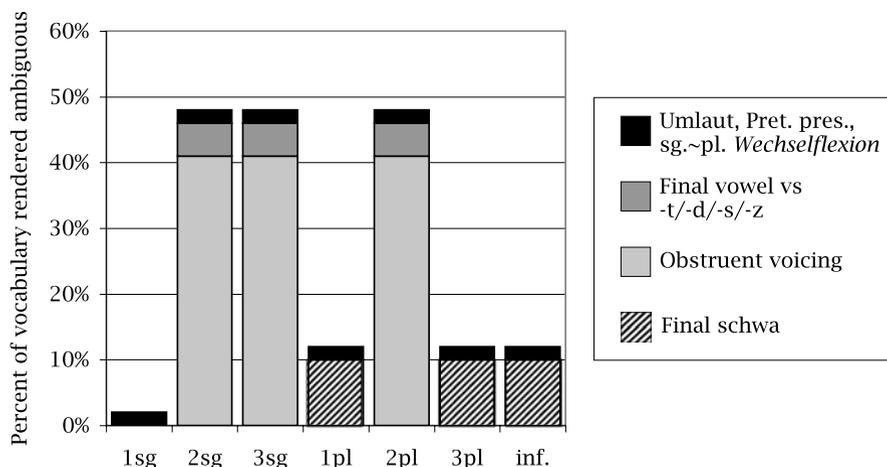


Fig. 2 Neutralizations affecting Yiddish present tense paradigms, prior to leveling

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.

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 ~ 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 ~ 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; for further discussion, see Albright (2005, 2008a).

5 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 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: 189) suggests, echoing a longstanding intuition within historical descriptions 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: 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 that 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 two small but important phonological differences between the two languages, which make 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 whether they could have happened gradually over time.

5.1 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 [a] (see also Kranzmayer 1956: 85).

(34) Loss of umlaut alternations in Upper German

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

The examples in (34) 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). The argument that umlaut was once present but has been lost is similar to the argument put forward for Yiddish in Sect. 3.2: The traces of umlaut are widespread outside the verbal system, leading us to infer that these dialects must have participated in the sound change that gave rise to umlaut. Under the hypothesis that sound change is regular, this leads us to infer that umlaut should also have affected the 2/3SG non-past forms of verbs. This expectation is supported by the fact that isolated dialect islands do in fact show umlaut alternations in verbs (see Kranzmayer 1956: ix,13,85 for Bavarian, and Nübling 2000: 21 for Swiss). Furthermore, many Swiss dialects that generally lack umlaut in the 2/3SG retain it just in a single high frequency verb, ‘to have’ (Basel German: 1SG *ha:*, 2SG *hɛf*, 3SG *hɛt*; Nübling 2000: 19),⁴⁴ reminiscent of the exceptionality of the single high-frequency verb *gebən* ‘to give’ in Yiddish (Sect. 3.3.2). Thus, we conclude that umlaut alternations have been leveled in these dialects. It must once again be emphasized that we cannot exclude the possibility that the lack of umlaut in Upper German and in Yiddish is a shared innovation prior to the formation of Yiddish, as Faber and King (1984) and others have suggested. The point here is simply that many German dialects show a similar lack of 2/3SG umlaut, without showing the full range of other levelings seen in Yiddish.

Many other German dialects have, like Yiddish, leveled vowel length alternations in favor of invariant long vowels, however. In fact, this feature is reflected in Standard NHG.

⁴⁴This verb does not have umlaut in Standard NHG, but is attested with umlaut variants in OHG (Jasanoff 1973: 867; Sonderegger 2003: 327).

(35) Leveling of vowel length alternations

a. Leveling in all closed syllables

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

b. Leveling in the 2PL

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

Note that as for umlaut alternations, it is possible to suppose that the leveling of length reflects a shared innovation in the pre-history of the German component of Yiddish, though the fact that umlaut and length frequently level independently in German dialects complicates the picture. It is equally possible to suppose that the Yiddish and German developments are independent (as indeed is often assumed, at least of length changes; Jacobs 1990), and that the German changes reflect leveling to the vowel of some other form, such as the 1PL, 3PL, or infinitive (which virtually always show the same stem allomorph).

When we consider other changes attested in German dialects, we see that they are unambiguously based on the plural (or a form like it). Changes to the singular ~ plural alternations of preterite present verbs appear to be rare in German, but at least in early NHG, there was a sporadic tendency to level the vowel of *wissen* ‘to know’ to the [i] of the plural—e.g., 2SG *weisst* ⇒ *wisst* (Wegeza 1985:1317). Recall that this is exactly the opposite change that is seen in Yiddish, where the plural now shows the expected singular vowel. The loss of singular *iu* in class II (e.g., *fliuge* ⇒ *fliege* ‘fly-1SG’) described in Sect. 3.3.2 represents a similar extension of the plural vowel rather than the 1SG. Interestingly, while *e* ~ *i* alternations in MHG classes IIIb–V are completely lost in Yiddish, Schirmunski (1962: 497–498) reports that they have been preserved in almost all German dialects except for in a small group region along the Rhine, including southern Hessian, Lothringian, Palatine, and south Franconian

Alsatian, which level to [e]; e.g., Lothringian *èst* ‘eat-3SG’ (Follmann 1909). In at least 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’), rather than extension of the *e* from the plural. For patterns that do not involve *e* ~ *i* alternations, such as preterite present verbs or umlaut, these dialects retain alternations (e.g., Lothringian *šlēft* ‘sleep-3SG’ with umlaut, and *wēs* ~ *wisə* ‘know-1SG/1PL’). The more common change to *e* ~ *i* alternations in NHG dialects is the more limited change in the 1SG (pattern B in (18)): 1SG *gebe*, 2SG *gibst*, 3SG *gibt*. This is frequently analyzed as an extension of the alternation between the 2/3SG and all other forms that is also seen in umlaut, and is sometimes accompanied by other extensions of umlaut as well. Tellingly, such changes are characteristically found in dialects where 2/3SG umlaut is retained in classes IIIb–V, including Central German dialects such as Thuringian (Schirmunski 1962: 499). Representative data from Thuringian is shown in (36).

(36) 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

	Southern NHG	Central, Standard NHG
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 et al. 2002b). 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 replacing exceptional forms in cases where the exceptions are either not known or not accessed fast enough to block the grammatically preferred form.

In sum, it appears that although there is some overlap in the development of Yiddish and NHG dialects from MHG, they also exhibit some unique (and contradictory)

developments. For the changes that are unique to NHG, we see that a plural or infinitive form must have acted as the pivot, since 1SG, 2SG, and 3SG forms have all been replaced with innovative forms. Furthermore, even the changes that are in common with Yiddish are compatible with a plural/infinitive pivot, allowing for a consistent generalization about NHG: Reanalysis is always based on the plural/infinitive. Although we cannot be sure that all of the Yiddish changes occurred independently of the German changes, we are forced to contend with the fact that some (if not all) of the German changes diagnose a different morphological structure than we found for Yiddish. This naturally raises the question of why the two languages would differ so radically, even though the morphemes involved are largely the same.

Looking back at Fig. 2, it is possible to identify several differences between the Yiddish and German. For one thing, most NHG dialects do not neutralize of /d/ and /t/ before *-t*, and instead have epenthesis:

(37) Epenthesis averts neutralization before *-t* in NHG

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 Sect. 4.3, 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.⁴⁵ The relative severity of neutralizations affecting each member of the paradigm in German is summarized in Fig. 3.

If the 1SG and the infinitive/1PL/3PL are equally informative, what is the predicted grammatical organization for German verb paradigms? As described in Sect. 2, Albright (2002a) suggests that in such cases, token frequency may play a decisive role, with the most frequent form gaining a slight advantage because it affords data about a larger number of words. 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.

By comparison, recall that in Yiddish, the 1SG is more informative than the infinitive, and is therefore a significantly more reliable predictor of the remaining forms. Albright (2008a) shows that even when confidence values are adjusted for token frequency, phonological/morphological informativeness is still the major determinant of the choice of base; that is, a more frequent but less informative form will be chosen as base only if the frequency difference is huge and the informativeness difference is

⁴⁵In some dialects, the schwa suffix of the 1SG is lost and (unlike Yiddish) the stem-final consonant undergoes final devoicing: *habə* > *hap* ‘have-1SG’. In such dialects, the 1SG will be clearly less informative than the 1PL/3PL/INF, leading to the straightforward selection of one of those forms as the base.

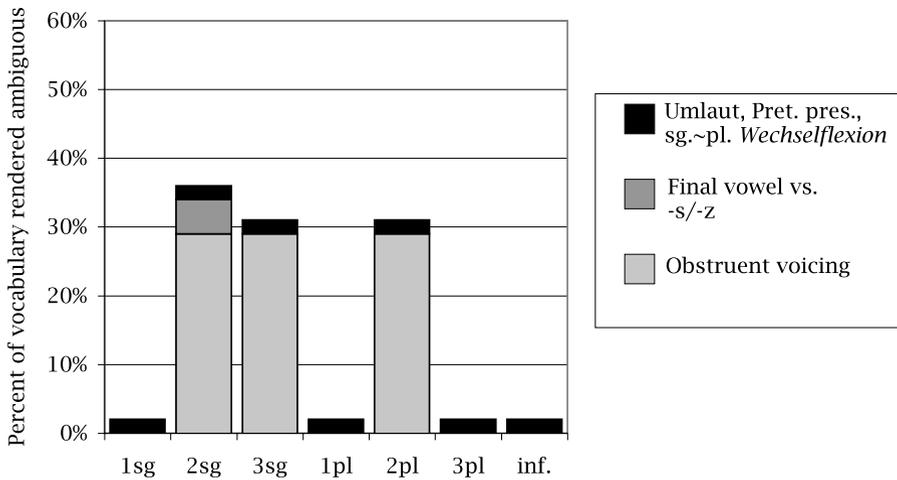


Fig. 3 Neutralizations affecting NHG present tense paradigms

small. In the competition between the 1SG and infinitive in Yiddish, the frequency difference is a modest one, while the difference in informativeness is quite large (10%). Thus, the model correctly predicts the difference between Yiddish and German: in Yiddish, the 1SG is clearly most informative and serves as the base, while in NHG, a number of forms are equally informative, and the difference in token frequency tips the balance towards the infinitive.

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.

5.2 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 that 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 probability, then the chances of getting the precise pattern of leveling shown in Table 1 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 extremely 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 Fig. 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. Phonological processes such as degemination and schwa coalescence remain, however, with the result that the 1SG still 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,⁴⁶ leaving the situation in Fig. 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.

6 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

⁴⁶Yiddish 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: 404–405).

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 provide strong support for such a model, since it narrowly predicts exactly the set of attested analogical changes.

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