radical | A Journal of Phonology
ISSN 2592-656X

volume 4, 2022

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Faust, Noam & Berrebi, Si. 2022. “To the future and back: New aspects of Modern Hebrew imperative truncation”. *Radical: A Journal of Phonology*, 4, 293-328.

Editor: Noam Faust
Reviewers: *Sabine Arndt-Lappe, Iris Berent*

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PAPER

TO THE FUTURE AND BACK: NEW ASPECTS OF MODERN HEBREW IMPERATIVE TRUNCATION

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The new imperative in Modern Hebrew was first described in detail by Bolozky (1979), and then formalized as a synchronic phonologically-governed process of truncation by Bat-El (2002). The present paper begins by proposing language-internal and cross-linguistic motivations for the (re-)emergence of this process. It then breaks Bat El's analysis into its two main components, arguing in favor of synchronic correspondence between future and imperative forms on the one hand, and against the view that surface "partial" and "full" truncation are both the result of the same process. In support of the synchronic status of the truncation process as deriving from the future form, an elicitation experiment reveals the existence of otherwise inexplicable illicit initial clusters. The results are further interpreted as exhibiting the emergence of universal tendencies, as not all clusters are equally bad.

Anti-Faithfulness, Clusters, Modern Hebrew, Sonority, Truncation

INTRODUCTION

Modern Hebrew (MH) is the variety of Hebrew that emerged from the "revernacularization" of the language roughly during the first half of the 20th century. In a historically rare set of circumstances, a target grammar, Standard MH, pre-existed the encounter with the first children to learn it as their only native language. Many of the regularities of that grammar were adopted, as suggested by the their presence in spoken MH. Others were rejected and no longer exist in the spoken register. This paper concerns a third scenario, apparent in the formation of imperatives, in which speakers seem to have rejected the forms inherited from the standard register, but then appear to have ended up generating a new paradigm based on the same rationale that these forms followed.

To illustrate, consider the verb [ʃamaʁ] 'keep, save' in (1). Spoken MH has adopted the future forms of Standard MH. The imperative in Standard MH, in turn, is identical to the future form, only without the 2nd person prefix. This affinity is also apparent in the suffixed form, where the suffixes used are identical to those of the future. The suffixed *stem* of the standard imperative, however, is [ʃimʁ-], unlike the [-ʃmeʁ-] of the future. This alternation in stem forms was not inherited by Spoken MH. Instead, there are two ways to express the imperative in Spoken MH: i. the full future form (1e); and ii. the future form without the 2P prefix, with the *same* stem (1f). No real semantic difference can be identifed. The form in (1f) is the "truncated" imperative which is the topic of this paper.

(1) Imperative formation in Standard and Spoken Modern Hebrew

	a. 2-FUT.2MSG	b. 2-FUT-FMSG/PL	c. IMP.2MSG	d. IMP.2MSG/PL
Standard MH	ti-ʃmoʁ	ti-ʃmeʁ-i/u	ʃmoʁ	ʃimʁ-i/u
Spoken MH	ti-ʃmoʁ	ti-ʃmeʁ-i/u	ti-ʃmoʁ ~ ʃmoʁ	ti-ʃmeʁ-i/u ~ ʃmeʁ-i/u

e. ti-ʃmeʁ-i l-i makom!	f. ʃmeʁ-i l-i makom!
2-save.FUT-FSG DAT-1SG place	save.IMP-FSG DAT-1SG place
'save(FSG) a place for me!'	'save(FSG) a place for me!'

The details of the truncated imperatives in the spoken register were discussed in three previous papers. Bolozky (1979) was the first to distinctly identify what he dubbed "the new imperative".[1] He characterizes this form as "future-related". Bat-El (2002) explicitly formalizes the relationship between the future and the new imperative as a synchronic truncation process. She argues that the amount of subtraction depends on purely phonological considerations. It follows a rationale of "Anti-Faithfulness", i.e., a morphological requirement that the imperative be distinct from the future. But exactly how much of the base future form will be truncated – indeed, whether *any* truncation will take place – is determined solely by the phonology. Returning to this topic, Bolozky (2009) adopts a distinct version of the truncation analysis: in his description, it is always the entire 2nd person morpheme that is truncated. In sum, there are two approaches to the formation of the new imperative: an Anti-Faithfulness approach, in which the prefix is truncated to varying degrees based on phonological considerations; and a morphological approach, in which truncation targets the entire morpheme.

The first goal of the present paper is to bolster the view of truncation as targeting an entire morpheme, as opposed to any segment in the prefix. Section 1 provides more theoretical context. First, we show that imperatives being identical to the future form without the prefix is also the original logic of the standard forms in (1). However, that logic became opaque in MH, and gave way to the two options in Spoken MH. We then provide further details on how the innovative, truncated form was analyzed in the previous studies and why. We argue in favour of the view of entire morpheme truncation on two grounds: cross-linguistic (Section 1.2) and language-internal (Section 1.3).

1 Bar-Adon (1966) mentions one such form in passing.

Once the Anti-Faithfulness account is rejected, and given that an entire morpheme is absent from the Spoken MH imperative, what tells us that there is indeed truncation and not simple absence of the prefix? The second goal of this paper is to adduce evidence in favor of Bat-El's proposal that this is indeed a case of synchronic truncation. First, the main arguments for truncation provided by Bat-El and Bolozky are re-examined. New facts are shown to cast doubt on the decisiveness of these arguments (Section 2). The best evidence for synchronic truncation, it is claimed, would be exceptional phonotactic behavior on the part of imperatives. Precisely such evidence is then brought forth: Section 3 presents an elicitation experiment, illustrating that initial clusters may surface in imperatives that are illicit everywhere else in the language. Such initial clusters can only come about through synchronic reference to the prefixed future form, as suggested by the truncation analysis. In addition, the experiment also emphasizes the importance of the phonological considerations identified by Bat-El: speakers who produce otherwise illicit truncated forms also produce licit ones, but not vice versa (that is, phonological considerations can sometimes block truncation, though the effect is not categorical). An interpretation of the results is provided that again identifies both language-internal and universal factors.

To summarize this introduction, this paper will argue that truncation is not phonological in the sense proposed by Bat-El (2002); but it *is* synchronic, as Bat-El originally argued.

1 IMPERATIVES IN BIBLICAL HEBREW, STANDARD MODERN HEBREW AND SPOKEN MODERN HEBREW

In this section, we provide the necessary context regarding both the facts and the previous analyses of "imperative truncation", and argue for the view that truncation always targets the entire prefix.

1.1 TO THE FUTURE: THE BIRTH OF FUTURE-AS-IMPERATIVE IN MODERN HEBREW

Modern Hebrew was born from Standard Hebrew. Yet Standard Hebrew was not a native language, but rather a lingua franca with many variants, connecting Jewish communities worldwide. Accordingly, its phonology was not uniform; instead, it depended on the reading traditions of different Jewish communities, which in turn were heavily influenced by the vernacular of the community.[2]

For the present purpose, the treatment of the orthographic « schwa » symbol in these pronunciations is most pertinent. Most, if not all scholars agree that Biblical Hebrew (BH) phonotactics did not tolerate any initial clusters. Underlying initial clusters were repaired with an epenthetic vowel, which was marked with an orthographic symbol called « schwa ». The quality of that vowel in BH is subject to a scholary debate (see for instance Morag 2007; Khan 2013); we mark it here as [ə]. In addition, the full vowel of the verb stem under discussion would reduce to [ə] in suffixed forms. Finally, the [ə] vowel appeared only in open syllables followed by a full vowel; in closed ones, or before another [ə], it alternated with [i] (Gesenius 1909: §28).

These facts are summarized in the BH row in table (2). Columns (a,b) illustrate vowel reduction in verb stems; and columns (c,d) illustrate the alternation between [ə] and [i] (in bold). Importantly, the BH facts conform to an analysis in which the imperative corresponds to the future form without the person prefix. Indeed, in the absence of that prefix, the stem is cluster-initial /ʃmor, ʃmər-i/, and so the appearance of [ə] and [i] in (2c,d) follows the language-wide generalizations mentioned above.[3]

2 For a recent summary on the revival of Modern Hebrew, see Doron et al. (2019).
3 For reasons of brevity, the argument here is limited to verbs of the first *Binyan* (verbal type). A similar argument can be constructed for other *binyanim* (though with some interesting complications).

(2) Imperative formation in Biblical and Standard Hebrew

	a. 2-FUT.2MSG	b. 2-FUT-FMSG/PL	c. IMP.2MSG	d. IMP.2MSG/PL
BH	ti-ʃmoːr	ti-ʃmər-i/u	ʃəmoːr	ʃimər-i/u
Standard MH	ti-ʃmoʁ	ti-ʃmeʁ-i/u	ʃ(e)moʁ	ʃimʁ-i/u
Spoken MH	ti-ʃmoʁ	ti-ʃmeʁ-i/u	ti-ʃmoʁ ~ ʃmoʁ	ti-ʃmeʁ-i/u ~ ʃmeʁ-i/u

Standard MH, as shown, does not replicate this treatment of the schwa. First, it is not realized in medial open syllables, e.g. *[ʃiməri]. Second, MH is much more permissive with respect to initial clusters than BH: it disallows only sonorant-initial clusters.[4] This affects the distribution of the BH schwa within MH. When the schwa breaks a *licit* initial cluster, producing it is highly formal and rare: only some older Sepharadi speakers and a few radio announcers may be heard producing forms like [ʃ(e)moʁ]. In contrast, when schwa breaks a sonorant-initial cluster, it is realized as [e] – the syncronic epenthetic vowel of the language (e.g. /nʃama/ 'soul' => [neʃama]). All in all, schwa is treated as the absence of a vowel: syllabically unnecesary schwas are simply not pronounced, and necessary ones are.[5]

As a comparison between BH and Standard MH in (2) shows, these developments fatally opacified the relation between the suffixed and unsuffixed stems of the imperative. Specifically, the [i] of [ʃimʁ-i/u] now alternates with ø instead of [ə]. Together with the fact that [i] is never the epenthetic vowel of MH, this leads to the loss of the epenthetic interpretation of [i]. Instead, this vowel and the stem it is part of have to be learned as lexical facts regarding the suffixed imperative.

Possibly because of these opaque relations between the future and imperative stems, the full imperative paradigm from Standard MH failed to take root in Spoken MH.

4 Though see Asherov and Bat-El (2019) for more fine-grained details, and the discussion below for clusters involving historical gutturals.

5 As argued in Faust (2019), this treatment of schwa is in fact that of the Ashkenazi pronunciation tradition, which in turn is based on Yiddish, a language which crucially allows many initial clusters. This tradition was decisive in this domain in the early years of revernacularization (e.g. Yellin 1904, Jabotinsky 1930, Even-Zohar 1979).

Instead, two alternatives arose. One is the use of the full future form for the imperative mood (the first option in cells 2c-d, e.g. [ti-ʃmoʁ]). Ariel (2019) proposes that this move was an influence of Rabbinic Hebrew, in which future forms used as imperatives abound. Here we would like to suggest two additional reasons to turn to the full future form. Language-internally, the affinity between imperative and future is already established in the unsuffixed form, for which the logic "future without a prefix" does not fail. The similarity between the paradigms was therefore readily available to the first speakers of MH. In addition, as discussed by Aikhenvald (2010: 129ff), the affinity between imperatives and future forms is a cross-linguistic tendency: "the most frequently attested grammatical time reference in imperatives is that of immediate versus delayed or *future* imperative" (ibid., our emphasis). In other words, even if no previous stage of the language had involved the use of future as imperative, it is conceivable that both functional and language-interal forces would have lead to it.

A syncretism was thus created between the future and imperative paradigms for the FSG and MPL, in favor of the future. This syncretism was then extended to the unsuffixed MSG form too. Today, as Kalev (2019) notes, future-as-imperative forms are very widespread, and enjoy a slightly more neutral (that is, less commanding or rude) status than other forms to express this mood.

The second strategy for the derivation of imperatives, "future-without-a-person-prefix", is discussed in the next section.

1.2 …AND BACK FROM THE FUTURE: SHORTENED FUTURE, NEW IMPERATIVE

The paradigm from Standard MH is only opaque because of its suffixed forms, as discussed above. The unsuffixed form presented another logic: the imperative is simply the future stem without the person prefix. Thus, another solution for the opacity of the alternation in stem forms is to extend that logic to the suffixed forms, too. This move

leads to the "truncated" forms in (2) (the second option in cells 2c-d, e.g. [ʃmoʁ, ʃmeʁ-i/u]).

This direction of change is also unsurprising typologically. Indeed, all Semitic languages with a prefix conjugation exhibit the same logic, as illustrated below by Jerusalem Palestinian Arabic (Central Semitic), Tigre (Ethio-Semitic) and Mehri (South Semitic). It is also true for several related languages from the Afro-Asiatic family, such as Bedja (Cushitic) or Tashlhiyt (Berber):

(3) Imperative formation in other Afro-Asiatic languages[6]

	STANDARD MH	ARABIC	TIGRE	MEHRI	BEDJA	TASHLHIYT
2-V	ti-ʃmoʁ	t-uktob	(gɨt)-tɨ-fgər	ta-sba:tˤ	ti-tʔij-a	t-nkkr-t
MSG.IMP	ʃmoʁ	uktob	fɨgər	sba:tˤ	tʔija	nkkr
	'keep'	'write'	'leave'	'hit'	'resemble'	'wake up (habitual)'

Beyond this language family, as reported by Aikhenvald (2010: 44), it is extremely common for an imperative marker to be similar to a declarative one, only shorter by at least one morpheme. Often, that morpheme is the 2nd person marker. This is the case, for instance, in Lango (Nilotic, Noonan 1992: 92), e.g. subjunctive [í-gîk] '2-stop', imperative [gǐk]. It is also the case in Argentinian Spanish (Indo-European; own data), e.g. indicative [mostrá-s] 'show-2', imperative [mostrá] (final stress is not the default case in this langauge, linking the two forms together).[7]

These cross-linguistic trends are probably functionally motivated. As Aikhenvald (*ibid*, 46) proposes, the relative shortness of canonical imperatives may be iconically

6 Hebrew, Arabic (Palestinian) and Tigre data come from the first author's own knowledge of the languages; Mehri (Watson 2012); Bedja (Vanhove 2017); Tashlhiyt Berber (Mohamed Lahrouchi, p.c.). In the latter, both forms carry the habitual morpheme, expressed through gemination.

7 Judeo-Spanish (Bunis 1999), which like Yiddish was spoken by some of the revivers of the language, also exhibits imperative forms without a 2p suffix. Unlike the Argentinian case, the stress pattern of the imperatives is the default pattern of the language, so it is harder to make the case for a derivational relation.

motivated by the immediacy of the order (a consideration mentioned for MH in Bolozky 1979). The omission of a morpheme is one strategy of shortening the form. Omitting specifically the 2nd person morpheme is also functionally motivated: languages tend to display imperative forms only for 2nd person, functionally obviating this marker.[8]

To summarize, speakers of Modern Hebrew ended up reproducing the rationale that underlied the Biblical/Standard Hebrew paradigms, even though they did not adopt the stem alternations it resulted in originally. Both language-internal pressures and cross-linguistically evident functional ones resulted in the birth of an imperative paradigm which consists of the future form without the second person prefix.

1.3 PREVIOUS WORK: ANTI-FAITHFULNESS OR MORPHEME TRUNCATION?

Yet "future-without-a-prefix" is not the characterization of the facts presented by the first two of the three papers previously devoted to the issue. Bolozky (1979) added into his description another form, the "shortened future", which is crucial to the understanding of the facts. (4a,b) show future stems with and without initial clusters respectively. For both types of verb stem, alongside the new imperative, there is a "shortened future" which does include the prefixal consonant, but lacks the vowel of the prefix. Note, in addition, that the new imperative in CV-initial stems is identical to the standard one.

8 Kramer (2019) develops a more formal account of this effect in another Semitic language, Amharic (where the facts are very similar to those in 3). According to Kramer, the imperative mood carries a feature [2] (=second person), which is associated with a null realization. When this feature is linearized directly before the feature [2] of subject agreement – e.g. IMP[2]+[2]VERB – the latter is deleted through feature haplology, and the form therefore surfaces without an overt prefix. Kramer argues that prohibitive forms (e.g. example (5) in the main text below) surface *with* the subject prefix because the feature NEG intervenes between the two features [2], blocking haplology.

(4) Imperative formation in Standard Hebrew according to Bolozky (1979)

STEM	GLOSS	FUTURE	SHORTENED FUTURE	NEW IMPERATIVE	STANDARD MODERN HEBREW
a. CC-initial	'keep'	ti-ʃmoʁ	t-ʃmoʁ	ʃmoʁ	ʃmoʁ
		ti-ʃmeʁ-i/u	t-ʃmeʁ-i/u	ʃmeʁ-i/u	ʃimʁ-i/u
	'write'	ti-χtov	-	χtov	ti-χtov
		ti-χtev-i/u		χtev-i/u	ti-χtev-i/u
b. CV-initial	'lie'	te-ʃakeʁ	t-ʃakeʁ	ʃakeʁ	ʃakeʁ
		te-ʃakʁ-i/u	t-ʃakʁ-i/u	ʃakʁ-i/u	ʃakʁ-i/u

Bolozky (1979) does not evoke a truncation process, but rather designates both the shortened future and the new imperative as stages in an ongoing process of the creation of the "future-related" new imperative: *tiʃmor* => *~~ti~~ʃmor* => *~~ti~~ʃmor*; *teʃaker* => *~~te~~ʃaker* => *~~te~~ʃaker*. Interestingly, he reports that the intermediate stage in cluster-initial verbs is found only if the verb begins with a sibilant, as it is facilitated by the merger of prefixal *t* and the stem sibilant into one affricate. Most importantly for the present purpose, Bolozky (1979) does not designate the entire prefix as the target of the process.

Bat-El's (2002) account within the framework of Optimality Theory takes a similar approach, but ends up regarding the facts slightly differently. Like Bolozky (1979), she claims that it is not the entire prefix that is targeted. Rather, the input to phonology consists of the future form and an Anti-Faithfulness requirement, according to which the imperative must be minimally different from the future base (for Anti-Faithfulness, see Alderete 2001, Horwood 2001). Thus, for an input /tiχtov/, there are three truncation possibilities: (i) [~~ti~~χtov], (ii) [~~ti~~χtov], (iii) [t~~i~~χtov]. Option (ii) is problematic since it leaves an onsetless syllable; option (iii) is impossible due to an illicit three obstruent cluster. Thus, while options (ii) and (iii) are better than (i) because the change in them is more minimal (only one segment), they are ruled out by the phonology.

To support her claim that no reference is made to morphology in the computation of the truncated imperative (besides the general Anti-Faithfulness requirement), Bat-El

shows that in other cases, only the vowel of the prefix is truncated (option (iii)). These are the cases that Bolozky designated as intermediary: [tɨʃmoʁ] and [teʃameʁ]. In [tɨʃmoʁ], the fusion of /t͡ʃ/ makes truncation of the vowel a viable possibility; and in [teʃakeʁ], truncation of the vowel alone yields a licit initial cluster, that is therefore preferred to [ʃakeʁ], because truncation is minimal.

Cases of "over-truncation", which are attested and even common in the language, remain unaccounted for under the proposal that truncation is based on purely phonological considerations. For example, a form like *ʃakeʁ* (future *te-ʃakeʁ*) could yield a licit cluster (as shown above). Bat-El claims that such forms are in fact not truncated imperatives, but borrowings from Standard Hebrew.

Importantly for subsequent parts of the present paper, the Anti-Faithfulness accout predicts that in some cases, truncation should be completely blocked. One such case concerns stems with an initial sonorant, such as [ti-**nv**aχ] 'bark'. According to Bat-El, these forms are not truncated at all, since [nv] is not a licit initial cluster in Modern Hebrew; the only possibly imperative form in this case is the future [tinvaχ]. The issue of initial clusters will be returned to in the experiment below.

Returning to cases where trucation does occur, let us summarize. Both Bolozky (1979) and Bat-El (2002) argue that truncation can be partial or full. Bolozky claims that both are possible for the same verb ([teʃakeʁ, teʃakeʁ]), as they are two stages on a "shortening" path. For Bat-El, there is only one stage: a truncated form like [tɨʃmoʁ], with the entire prefix missing, is the result of the same requirement of Anti-Faithfulness as a form like [teʃakeʁ], with only the vowel missing.[9] This is a crucial point for the

9 There is social meaning associated with the amount of reduction of phonological material, but this relation is not linear. On the one hand, it has been demonstrated that reduction is frequently associated with a more colloquial register. For example, monophthongization is viewed as the reduction of a diphthong, and is accordingly associated in English with more casual speech (as well as with the Southern American English vernacular; Vaughn & Kendall 2018). Perceived reduction contributes to the social meaning of a variant, even when a process cannot easily be categorized as phonological reduction per se, e.g., in the production of the English suffix *-ing*; upon hearing a coronal production instead of the velar, some listeners stated that "g was deleted" (Campbell-Kibler 2007). Partial reduction of the future morpheme *ti-* in MH, e.g. *t͡ʃmoʁ* vs. *ti-ʃmoʁ* 'keep MSG', also seems to be interpreted as this type of

Anti-Faithfulness account: the claim that the phonology is responsible for the amount of truncated material relies on it. Importantly, neither Bolozky (1979) nor Bat-El designate the morpheme as the target of the operation, since they both agree that forms in which only the vowel of the prefix is missing are a possible result.

Bolozky (2009) returned to the discussion and presented a different take. Capitalizing on the fact that /i,e/ vowels often syncopate in MH, he argues that forms like [tɨʃmoʁ] or [teʃakeʁ] are *not* truncations. That is, [tʃakeʁ] and [ʃakeʁ] are not points on the same reduction continuum; rather, they are morphologically distinct.

We agree with this view, and add another argument in its favor, relying on otherwise unexpected differences in the syntactic behavior of fully truncated and shortened forms. Shortened forms such as [tɨʃmoʁ] or [teʃakeʁ] are attested in environments where they cannot be understood as expressing the imperative mood. In these environments, a fully truncated form is ungrammatical. One example is conditionals such as [kʃe-teʃakeʁ] 'when you (shall) lie', impossible with full truncation *[kʃe-~~te~~ʃaker]. Similarly, the "wish" construction joining the complementizer [ʃe] and the future form, e.g. [ʃe-tekabel maka] 'may you receive a blow!' can definitely be pronounced [ʃe-tkabel maka], but not *[ʃe-kabel maka].[10,11]

Perhaps the most relevant case is that of prohibitives. As in many other languages, in Standard MH the prohibitive (or "negative imperative") does not involve the same form as the imperative. Instead, a negative particle [al] is followed by the future form, *including* the prefix. Full truncation is again ungrammatical in this case in both

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colloquial reduction. On the other hand, full truncation bears two possible social meanings, depending on its parsing as truncated future or normative (SMH); the masculine singular forms are identical in both cases, as illustrated in Table (3). Fully truncated feminine and plural forms are distinguishable due to the position and quality of the vowel, e.g. *ʃmeʁi* (truncated form, Spoken MH) vs. *ʃimʁi* (normative), and are thus more colloquial as well. In sum, the social status of phonological reduction varies based on the corresponding normative form, which adds another parameter – register – to the choice of imperative.

10 For the "wish" construction in Modern Hebrew, see Bar-Adon (1966).

11 Bolozky does provide examples of "shortened future" in non-imperative environment, but only as instances of /i,e/ deletion. He does not make the explicit argument presented here.

Standard and Spoken MH (5i); but prefixed forms with the missing vowel are perfectly compatible with this construction in Spoken MH (5ii).

(5) Prohibitive

	i. NEG 2-open.FUT.MSG	ii. NEG 2-receive.FUT.MSG
a. Standard MH	al ti-ftaχ, *ftaχ	al te-kabel, *kabel
b. Spoken MH	al ti-ftaχ, ~ t-ftaχ *ftaχ	al te-kabel ~ t-kabel, *kabel

Finally, Bolozky reports that the missing data point in table (3) above – a form like [tχtov] – is in fact attested. In sum, under the morphological truncation analysis outlined in Bolozky (2009), the only real truncated forms are those from which the entire prefix is missing. Forms previously characterized as "partial truncation", i.e. deletion of the vowel alone, are due to a prosodic process that occurs elsewhere in Spoken MH as well, and cannot be characterized as true truncation. This view pulls the rug from under the Anti-Faithfulness-based account, which relied crucially on the variable degrees of truncation.

However, if one accepts that the entire morpheme is absent in the imperative forms, doubt is cast on the entire *truncation* analysis. What indicates that the new imperative is really a truncated form, rather than the same stem as the future, but without a prefix? In other words, why think that the new imperative is based in any way on the future form?

In the rest of this paper, we will provide more reason to support the idea that MH imperatives are synchronically derived from the future through truncation.

2 SYNCHRONIC TRUNCATION

In the previous section, we provided reasons to reject the Anti-Faithfulness component of Bat-El's (2002) analysis. Next, we provide evidence in favor of another component

of this analysis, namely the claim that in Spoken MH, there is an imperative form that is *synchronically* derived through subtraction (i.e. derivation by segmental deletion).[12]

Two arguments featured in both Bolozky (1979) and Bat-El (2002) as supporting a synchronic process of truncation in Modern Hebrew. One was already mentioned: the stem vocalization of the suffixed truncated imperative is identical to that of the suffixed future (underlined in 6).

(6) Imperative formation in Spoken Modern Hebrew: reminder

a. 2-FUT	b. IMP.2MSG	c. 2-FUT-FSG/PL	d. IMP-2FSG/PL
ti-ʃmoʁ	ʃmoʁ	ti-ʃme̲ʁ-i/u	ʃme̲ʁ-i/u

Considering that the input from Standard MH was [ʃimr-i/u], the only source for the [e] vocalization (as well as its position – after the second and not first consonant of the stem) is the future form. However, this does not necessarily point to a *synchronic* FUT => IMP derivation. It might well be that speakers learn two forms for the verbal stem – an unsuffixed one and a suffixed one. The suffixed allomorph will appear in the suffixed imperative for the same reason that it does in the suffixed future, but not *because* it appears in the suffixed future.

The second argument comes from spirantization. In Biblical Hebrew, the stops [b,g,d,k,p,t] spirantized to [β,ɣ,ð,x,ɸ,θ] respectively in a post-vocalic position. This is definitely not the case in Modern Hebrew; still, there are many verbs whose past and future stems exhibit the stops [p,b,k] alternating with post-vocalic [f,v,χ] fricatives (in bold in 7). Crucially, the truncated imperatives in (7i.c) may have an initial spirant. This initial spirant, the argument goes, can only come from the future form.

12 To be clear, we are not suggesting that this is necessarily the case in the languages in (3); the imperative could simply be a stem to which a prefix is never attached.

(7) Imperative formation in Spoken Modern Hebrew: spirantization

	a. PST	b. 2-FUT	c. IMP.2MSG	d. IMP-2FSG/PL	GLOSS
i.	**p**ataχ	ti-**f**taχ, *ti-ptaχ	ftaχ ~ ptaχ	ft<u>e</u>χ-i/u ~ pt<u>e</u>χ –i/u	'open'
	badak	ti-**v**dok, *ti-bdok	vdok ~bdok	vd<u>e</u>k-i/u ~ bd<u>e</u>k-i/u	'check'
	katav	ti-**χ**tov, ??ti-ktov	χtov ~ ktov	χt<u>e</u>v-i/u ~ kt<u>e</u>v-i/u	'write'
ii.	**ʃ**a**f**at	ti-**ʃp**ot ~ tiʃfot	ʃpot ~ ʃfot	ʃp<u>e</u>t-i/u ~ ʃf<u>e</u>t-i/u	'judge'
	ʃa**v**aʁ	ti-**ʃb**oʁ ~ ??tiʃvoʁ	ʃboʁ ~ ʃvoʁ	ʃb<u>e</u>ʁ-i/u ~ ʃv<u>e</u>ʁ-i/u	'break'
	za**χ**aʁ	ti-z**k**oʁ ~ *tizχoʁ	zkoʁ ~ zχoʁ	zk<u>e</u>ʁ-i/u ~ zχ<u>e</u>ʁ-i/u	'remember'

However, as can also be observed in (7), the truncated imperative – unsuffixed (7c) *or* suffixed (7d) – can surface with the non-spirantized version of the future base. The same indeterminacy is true for future forms with a stop (7ii) – in the truncated form, these, too, can appear with a spirant. Given the data in (7), spirantization cannot be used as a decisive argument for a subtractive FUT=>IMP derivation.[13]

While the argument from spirantization is not decisive, its rationale is solid: if some consistent aspect of the imperative can only be understood syncronically with reference to the future, the dependency of the former on the latter will become evident. The experiment presented below points to such a consistent aspect: truncated imperatives allow for initial clusters that are otherwise illicit in the language.

3 POSSIBLE INITIAL CLUSTERS IN IMPERATIVES: AN ELICITATION EXPERIMENT

3.1 RATIONALE

So far, we have established that partial reduction of the 2P future prefix (i.e. [i]-deletion) and complete reduction of the prefix result in syntactically distinct forms, and thus cannot be regarded as the outcomes of the same word-formation strategy. In the

13 The judgments in (7) are our own. Note that some future forms also alternate with respect to spirantization, whereas others do not. For a more detailed presentation of spirantization facts in MH, see Albert (2019).

current section, we provide experimental evidence in favor of the claim that the prefixless imperative is derived through truncation, based on the future form of the stem. The logic is the same as that of Bolozky's (1979) and Bat El's (2002) spirantization argument: the new imperative strongly relies on the corresponding future form, in that it includes clusters that are otherwise illicit in the language, as demonstrated in the remainder of this subsection.

The range of clusters allowed word-initially in MH is illustrated by the action noun template QTiLa, which is the default template associated with the verb type QaTaL. As shown in (8), the language is quite permissive in this domain. Initial clusters can in principle involve almost any two obstruents (TT, 8a) or any obstruent followed by a sonorant (TR, 8b).

(8) Possible initial clusters illustrated by QTiLa (action noun of QaTaL verbs)

		PST.3MG QaTaL	Action noun QTiLa
a. TT	'attack'	takaf	tkifa
	'betray'	bagad	bgida
	'carry'	saχav	sχiva
b. TR	'build'	bana	bnija
	'wean'	gamal	gmila
	'retire'	paʁaʃ	pʁiʃa

We focus on two types of initial clusters that are impossible. The first are expected RC clusters, where R is a sonorant and C is any consonant (glides are grouped with sonorants for this purpose). These are resolved through [e] epenthesis (bold in 9a). The second type originates in verbs with a second absent consonant, which may be realized as a glottal stop (9b). The QTiLa template is expected to yield [#C.V]~[#CʔV]; instead, one again finds [e]-epenthesis.

(9) Impossible initial clusters illustrate by QTiLa (action noun of QaTaL verbs)

		pst.3mg QaTaL	Action noun QTiLa
a. *RC	'sip'	lagam	l**e**gima
	'bark'	navaχ	n**e**viχa
	'rebel'	maʁad	m**e**ʁida
	'create'	jaʦaʁ	j**e**ʦiʁa
b. *Cʔ	'kick'	ba(ʔ)at	b**e**.ita ~ b**e**ʔita; *bita, *bʔita
	'aspire'	ʃa(ʔ)af	ʃ**e**.ifa ~ ʃ**e**ʔifa; *ʃifa *ʃʔifa
	'taste'	ta(ʔ)am	t**e**.ima ~ t**e**ʔima; *tima *tʔima

Importantly, RC and Cʔ sequences are not problematic word-internally, as illustrated by the future forms in (10) below.

Truncation of the prefix in the imperative form may give rise to precisely the type shown to be illicit in (9) above. There is only one possible repair that is compatible with MH phonology, namely epenthesis, as shown for QTiLa in (9). However, epenthesis in this case sounds like a highly formal pronunciation of Standard MH, probably due to its formal identity to the Biblical Hebrew imperative (see discussion in Section 1.1). In Table (10), the epenthesis-repaired form is marked with *. Although this form is not necessarily illicit, it is clearly stylistically marked, hence not part of the Spoken register.

(10) Otherwise illicit initial clusters surface in truncated imperative[14]

		PST.MSG	2-FUT.MSG	IMP
a. RC	'sip'	lagam	ti-lgom	?lgom, *legom
	'bark'	navaχ	ti-nvaχ	?nvaχ, *nevaχ
b. Cʔ	'aspire'	ʃa(ʔ)af	ti-ʃ(ʔ)af	?ʃ(ʔ)af, *ʃe(ʔ)af
	'taste'	ta(ʔ)am	ti-t(ʔ)am	?t(ʔ)am, *te(ʔ)am

14 One case of an RC in a truncated imperative was also mentioned in passing in Bolozky (2009). Another frequent instance of a #Cʔ cluster in the imperative results from a basic *suffixed* future base. The future form [ti-s(ʔ)-i/u] '2-drive.FUT-FSG/PL' corresponds to the imperative [s(ʔ)-i/u] 'drive.IMP-FSG/PL'. Similar forms we find completely fine are [ʦ(ʔ)-i/u] 'go.out.IMP-FSG/PL' and [g(ʔ)-i/u] '2-touch.IMP-FSG/PL'.

The more interesting possibility is that of no repair, resulting in an initial RC/Cʔ cluster, a structure that is not found elsewhere in the language, as discussed above.[15] Cluster-initial RC stems, e.g., [nvax] *'bark!'*, marked with ? in Table (10) were described as illicit by Bat El (2002), as mentioned in section 2. However, as native speakers of the language, we intuit that they are possible. We intuit the same for initial Cʔ clusters, which have not been discussed in previous works on the topic.

If these forms would emerge in an elicitation task, this would provide evidence for the Subtraction Hypothesis in the following way. If the imperative is based on the future, then aspects of the form of the future may exert power on the imperative. Here, the impossibility of the epenthetic repair (in the Spoken register) is one such effect. Because the two consonants are adjacent in the future base, they are not separable in the imperative. We can see no other logic that would lead to the acceptability of these clusters in imperatives, and only in them. In other words, in the spirit of the spirantization argument of the previous section, the attestation of otherwise illicit initial clusters in imperatives, and only in imperatives, can only be accounted for with reference to a future base.

The goal of the elicitation experiment described below is therefore twofold:

1. To provide a first sample of naturally occurring imperatives produced by various native speakers across a variety of phonological environments. This is crucial for the analysis of imperatives, because the array of allowed clusters is contested: first, cluster-initial CC stems allow for partial reduction in the truncated future form ([t-χtov] 'write') according to Bolozky (2009) but are illicit according to Bat El (2002); second and more crucially, cluster-initial RC stems ([nvax]

15 According to our intuitions, there is another marginal exception to this rule, with a well-defined and rare syntactic structure: the non-final N(oun) or A(djective) of a compound N/A(+N)+N, e.g. [**pʔ**il ʃalom] 'peace activist', [**lv**uʃ ʃxorim] 'clad in black (lit. clad+black.PL)'.

'bark!') were described as illicit by Bat El (2002), but are possible according to our intuitions.

2. To test the Subtraction Hypothesis, namely, the idea that the new imperative is synchronically derived by the subtraction of the 2p prefix of the future form.

In the rest of this section, we describe the composition of the experimental list, emphasizing the stems with phonological structures that may provide evidence in favor of an account in terms of morphological subtraction.

3.2 DESIGN AND PROCEDURE

We used an elicitation task, in which participants received written past tense sentences with a 3MSG subject, and were requested to produce each sentence as an order. A list of 21 sentences was devised, each including a target verb with different structural configurations, illustrated in Table (11). The table lays out the input (past) form, and all the possible outputs that can fulfill the order function, and may therefore be used by participants.

The composition of the materials was as follows. In four stems, truncation would result in an RC cluster (11a), and in an additional four, it would result in a Cʔ cluster (11b). Of the latter, one target was Rʔ ([nʔal] 'put on (shoes)!'). In seven stems, truncation of the prefix would result in a CC cluster, of which four included a strident in the first consonantal position, which was previously claimed to be allowed in a Shortened Future form (11c); and three did not include a strident (11d). Four additional stems appeared in the QiTeL template (11e). In the imperative of QiTeL, there is no initial cluster (e.g. [sipeʁ] => [sapeʁ]). Finally, two stems were irregular truncated forms that are very common in both colloquial and standard Hebrew, but do not involve initial clusters (11f).

(11) Structural configurations in the materials and sample items

		Input (Past)	FUTURE	SHORTENED FUTURE	TRUNCATED	STANDARD
a. RC	'bite'	naʃaχ	ti- nʃaχ	-	nʃaχ	neʃoχ
(4 items)	'write'	ʁaʃam	ti-ʁʃom	-	?ʁʃom	ʁeʃom
b. CʔC	'act'	pa(ʔ)al	ti- f(ʔ)al	-	f(ʔ)al	pe(ʔ)al
(4 items)	'taste'	ta(ʔ)am	ti-t(ʔ)am	-	t(ʔ)am	te(ʔ)am
c. SC	'send'	ʃalaχ	ti- ʃlaχ	tʃlaχ	ʃlaχ	ʃelaχ
(4 items)	'count'	safaʁ	ti-spoʁ	tsfoʁ	sfoʁ	sefoʁ
d. CC	'catch'	badak	ti-vdok	tvdok	bdok	bedok
(3 items)	'jump'	kafats	ti-kfots	tkfots	kfots	kefots
e. QiTeL	'tell'	sipeʁ	te-sapeʁ	tsapeʁ	sapeʁ	sapeʁ
(4 items)	'try'	nisa	te-nase	tnase	nase	nase
f. CVC target	'go'	halaχ	te-leχ	-	leχ	leχ
(2 items)	'rise'	kam	ta-kum	-	kum	kum

All sentences had a 3MSG subject, and all were of the structure "he+V.past+(in)direct object" – an example is given in (12a). Participants were asked to transform the sentence into an order, with the addition of the word [kvaʁ] 'already' at the end (12b). They were given two examples involving CVC targets (like the items in (11f) above): [jaʃav] => [ʃev] 'sit' and [jatsa] => [tse] 'go out'. All participants received the same list (with the same order of verbs).

(12) Illustration of the experiment: input sentence and predicted target sentence

a. hu maχak t-a-tsijuʁ
3MSG ersae.PST.3MSG ACC-DEF-drawing
'he erased the drawing'

b. (ti-)mχak t-a-tsijuʁ kvaʁ
(2MSG-)erase.FUT/IMP.3MSG ACC-DEF-drawing already
'Erase the drawing already!'

Three measures were taken to avoid influence from the standard language. First, the sentences were short and colloquial. Second, when possible, a spoken register was signaled orthographically, with the use of the orthographically abbreviated accusative

particle <t'>, read as [t], as opposed to the full <ʔt>, which is read as [et] (12 above is an example). Finally, participants were told the experiment was "about how we sound when we're angry" and were asked to sound as if overcome by anger. See Appendix A for the list of sentences.

Participants were asked to record themselves on their smartphones and send back the recording. The recording was then examined using PRAAT (Boersma & Weenik 2021).

3.3 PARTICIPANTS

The experimental list was sent in writing to 27 native speaker, friends and acquaintances of the first author: 10 women and 17 men, mean age = 39,2; SD = 8,9. Participants come from different backgrounds and different geographic locations in Israel.[16]

3.4 RESULTS

Table (13) is a summary of the results, with an example of each production.

16 In recent years, there is a growing body of work suggesting that central areas differ somewhat in their syntax, lexicon and socio-phonetic characteristics from more peripheral areas, especially in the south of Israel (Henshke, 2013a-b; Berrebi 2021). There is, to date, no published work on social variation in the production of the imperative, and the current pilot study did not control for this factor in a way that would allow us to attribute variation to participants' linguistic background.

(13) Results of the elicitation experiment, %forms across items

	FUTURE	SHORTENED FUTURE	TRUNCATED	STANDARD
a. RC (4 items)	tilχats 50.93%	tlχats 0	lχats 18.5%	leχats 19.44%
b. Cʔ (4 items)	tifʔal 50%	tfʔal 0	pʔal 48.15%	peʔal 1.85%
c. SC (3 items)	tiʃlaχ 13.89%	tʃlaχ 12.96%	ʃlaχ 68.52%	ʃelaχ 0
d. CC (3 items)	tivdok 21%	tvdok 0	bdok 79%	bedok 0
e. QiTeL (4 items)	teχapes 20%	tχapes 7.17%	χapes 72.8%	
f. CVC target (2 items)	takum 22.66%	tkum 0	kum 77.33%	

Note that in QiTeL forms, truncated and standard forms are identical. Besides the results presented in the table, there were 12 CVC productions of RC items, such that the sonorant at the onset of the stem was not produced, e.g., [χats] for [lχats]. There were five missing recordings, all in the SC condition (two in one word, and the rest divided between the remaining 3); that is why in these two rows, the percentage does not add up to 100. The full results by verb are found in Appendix B.

All but four of the participants produced at least one prefixed form, and all but one produced at least one truncated form. These results confirm, at least to some extent, the validity of the experimental design: both prefixed and truncated forms can be provided given the task and the examples.

Shortened future forms occurred only in QiTeL (7.17%) and in strident-initial SC items (12.96%) in QaTaL, indicating that triconsonantal initial clusters were an option only when the second obstruent is a strident. This result is compatible with our assumption that deletion of the vowel of the future prefix is a purely phonological

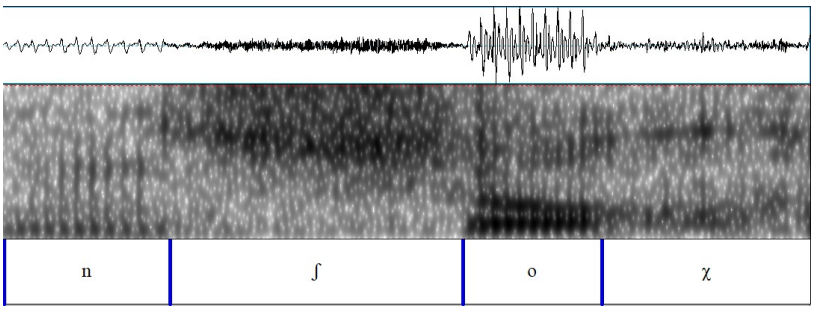
process; the vowel can more easily be deleted when the resulting cluster is available elsewhere in the language as an affricate (e.g., *tsrima* 'dissonance', *tsnim-im* 'toast.Pl'; *tʃlenov, tʃriker* 'family names'). Having said that, we are not ruling out the possibility that other triconsonantal clusters do occasionally occur in rapid speech (indeed it is our intuition that we have previously heard and produced such clusters), but they are crucially not limited to the imperative.

In contrast with the limited distribution of shortened future forms, truncated forms were found in all the tested configurations. They were used at comparable rates in SC, CC, QiTeL and CVC targets (68.5-79%) and were less common, but attested, in Cʔ and RC clusters, for which future forms were more common.[17] In the majority of cases, a Cʔ cluster was produced with a glottal or pharyngeal stop; in some cases, the cluster was simplified, leaving only the first consonant. The breakdown of reduced/full Cʔ clusters produced for each verb is available in Appendix B.

Standard forms were used in two occasions: when they are identical to the truncated form (in QiTeL and CVC targets), and when they involved vowel insertion in RC clusters (and marginally in Cʔ clusters). We interpret this finding as an indication that speakers were not inclined to use the Standard form, and produced it only as a last resort in RC clusters.

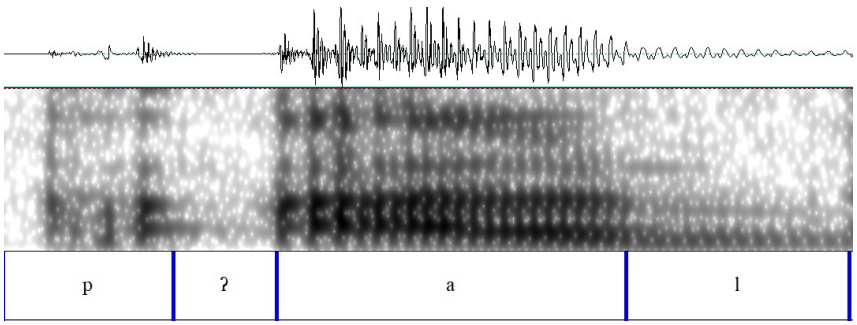
We now move on to examine participants' individual behavior. Out of 27 people, 12 provided at least one truncated imperative with an #RC cluster. This finding confirms that RC clusters are available in Spoken MH Truncated forms. Here is the PRAAT capture of the performance of [nʃoχ] by one of the participants:

17 We take the 12 cases of R deletion in RC items, e.g., [χats] for [lχats] as cases of truncation that resulted in voicelessness of the sonorant, yielding practically no sound.



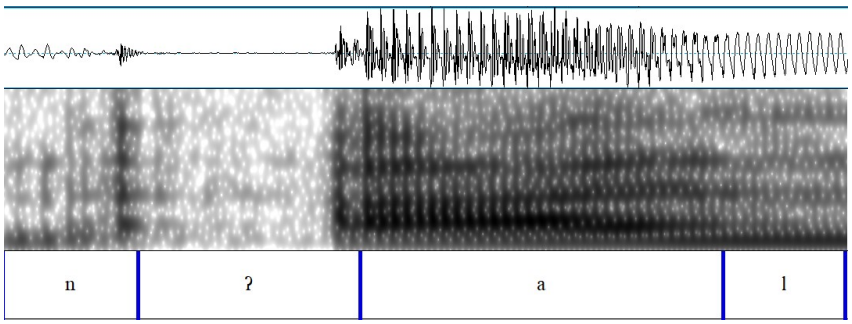
Picture 1. [nʃoχ]

Nineteen out of 27 participants provided at least one truncated imperative with a #Cʔ cluster. Here is the PRAAT capture of a performance of [pʔal] by one:



Picture 2. [pʔal]

Eight participants produced the combination of the two illicit clusters, [nʔal]. Here is the PRAAT capture of the clearest performance:



Picture 3. [nʔal]

Alongside these results, the exceptionality of #RC and #Cʔ clusters was also confirmed. First, there were additional reductions of both #RC and and #Cʔ clusters. For the latter, many participants produced simple CV syllables, i.e. [pal] for [pʔal] 'act!'. This result is less surprising because, as already mentioned, the glottal stop is optional in the prefixed form, too. For #RC clusters, as mentioned above, 12 productions did not include the initial sonorant. For instance, 6 participants provided [χatʦ] 'press!' for the base [tilχatʦ], instead of [lχatʦ]. It is possible that the articulatory gesture of the first consonant was executed, but with no acoustic manifestation. Interestingly, further reduction of R from #RC was not found for [nʔal] (*=> [ʔal]) or for the only [ʁ]-initial target, [ʁʃom] 'write' (*=> [ʃom]). No such additional truncation was found for licit initial clusters: forms like [ti-tfos] 'catch' were commonly truncated to [tfos], but never *[fos]. Finally, as mentioned, the standard form with initial epenthesis was produced only in the #RC cases. All of these findings suggest that there was some difficulty for the participants to perform #RC clusters.

So far, we have analyzed the distribution of the different forms by cluster type. But possibly the most interesting finding of this experiment is the implicational relation between the production of illicit and licit clusters within the speech of individual participants. All of the speakers who produced truncated forms with #RC clusters also produced truncations with #Cʔ and licit clusters. The implication was clearly uni-

directional: several speakers provided truncated forms with licit initial clusters, but did not provide such forms with initial #RC. Others produced both licit #CC and #Cʔ clusters, but not #RC clusters. In other words, if a speaker was "willing" to produce the illicit #RC cluster, they also produced #Cʔ and licit clusters. But the production of licit clusters through truncation, and even the production of illicit #Cʔ, does not entail the production of #RC. It seems that speakers' productions – that is, their choice to truncate or not – *was* sensitive to the phonotactics of the language.

To summarize the results of the experiment, it was found that forms with otherwise phonotactically illicit initial clusters do emerge in truncated imperatives. This finding confirms the synchronic nature of truncation. The experiment also validates Bat-El's claim that phonological considerations can block truncation: speakers tend to avoid truncation if its result would be phonotactically illicit.

3.5 DISCUSSION

The main result of the experiment is unambiguous: phonotactically illicit initial clusters occur in the new imperative. This result cannot be explained away as a confound of the experimental design, since many participants still avoided such clusters. At worst, the design encouraged participants to truncate. Still, no unnatural truncation was attested in the forms of the experiment, indicating that the experiment prodded the linguistic knowledge of participants, and not their compliance with some language game.

Another finding that strengthened the ecological validity of the design is that production of illicit clusters was graded, such that a new implicational markedness scale for consonant clusters in Spoken MH was revealed: if a speaker produces illicit #RC, they will also produce illicit #Cʔ and licit initial cluster; if they produce illicit #Cʔ, they will produce licit initial clusters, but may avoid #RC; and finally, they may avoid illicit clusters altogether. The finding suggests the markedness hierarchy in (14), whereby the

production of the more marked cluster implies the possibility of the production of the less marked one:

(14) illicit #RC > illicit #Cʔ > licit TT,TR

The ranking is interesting for at least two reasons. First, since the pressure to truncate is presumably equally strong in all cases, the markedness of #RC clusters can be attributed to a universal tendency to avoid sonority violations, as argued, for instance, by Berent et al. (2007). However, such an argument from universality can be countered because #RC clusters are illicit elsewhere *within* MH. Their marked status can be attributed to the phonotactics of the language, rather than to some universal tendency.

In contrast, the hierarchy between the two illicit types of initial clusters cannot be attributed to language-internal phonotactics. Based on language-specific facts only, since both #RC and #Cʔ are otherwise illicit in MH, they are expected to be equally problematic for speakers, against the attested facts. The significant difference between them can be understood if universal considerations are taken into account: #Cʔ clusters do not violate the sonority slope more than licit TT clusters. It just so happens that the phonotactics of MH rules them out. Because of this, #Cʔ will be easier to accept than #RC ones through reference to the non-truncated base. This logic is shown graphically in the table in (15):

(15) Universal and Local motivation for the hierarchy in (14)

	Existence in future Base	Universal Sonority Principles	Language-internal Phonotactics
#RC	✓	×	×
#Cʔ	✓	✓	×
#TT	✓	✓	✓

The results of the study therefore argue for a cumulative effect of language-specific and universal factors.[18]

Given the variation in the production of RC items, as well as the variation in judgments among the linguists who have previously described the new imperative, it would now be interesting to see whether speakers who did not truncate nevertheless *accept* the truncated forms provided by their peers. This question is especially interesting given the relative homogeneity of the participants in the experiment. Two participants, friends who grew up together, provided radically different forms: one produced mainly future forms, the other mainly truncated ones, including #RC and #Cʔ. It is therefore possible that the non-truncator would not find fault with the truncator's production (the other way around is obviously the case). In other words, even though only 12 out of 30 people produced #RC forms (and 19 out of 30 #Cʔ ones), the acceptability rate of such productions is probably higher.

Still, it is worth noting that the reported experiment introduced several confounds: (i) All participants saw the same order of sentences; (ii) The population was not representative, as all participants were friends and family of the first author; (iii) The verbs used were not controlled for in terms of frequency. In terms of its design, a major flaw of the experiment was the testing of unsuffixed MSG targets only. As these forms are identical in Standard and Spoken MH, the influence of Standard forms on the results presents an additional confound.

In sum, illicit initial clusters do emerge in truncated imperatives. At the same time, in support of the same description, language-internal phonotactic constraints play a role in the production of individual speakers, and these interact with universal tendencies. As argued for above, the emergence of such otherwise illicit clusters is expected if the subtractive process of truncation is a synchronic process.

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18 See for instance Kawahara & Sano (2014) for a similar accumulative effect in ill-formed Japanese "rendako".

4 CONCLUSION

During the emergence of Modern Hebrew, the grammar that had to be acquired by the first children was often mediated by pronunciation traditions that opacified certain alternations. Several alternations ended up being denied entry into spoken Modern Hebrew, while still being part of the more "correct" standard register.

Such was the case of the imperative paradigm. The logic of the Biblical Hebrew facts ("future-without-prefix") was opacified by the Ashkenazi pronunciation of clusters. As a result, the future form is today widely used for the imperative mood. At the same time, *Spoken* MH started employing the truncation of the prefix from that future form. Thus, MH imperatives turned to the future – and then came "back" from it, reproducing the original logic.

Alongside language-internal factors, universal ones were at play in both of these moves: the future is the closest tense to the imperative mood, and the person prefix is often obviated by the non-existence of other persons in the paradigm. Both moves are widely attested cross-linguistically, within and outside of Afro-Asiatic.

Bat-El (2002) proposed that the new imperative is an example of synchronic truncation, which results from an Anti-Faithfulness instruction to the phonology. The present paper argued, with Bolozky (2009), against the Bat-El's claim that the driving force behind truncation was Anti-Faithfulness. This view relies on there being varying degrees of truncation – which, we claimed based on syntactic evidence, is not the case. At the same time, the existence of illicit initial clusters exclusively in imperatives supports the proposal that the imperative is derived via a synchronic process of truncation of the entire second person morpheme.

The possibly controversial existence of such clusters was corroborated by a pilot experiment. The experiment showed that as suggested by Bat-El, phonological factors play a role in the choice of the speaker to produce a truncated or full future form. Moreover, here, too, both universal and language-internal factors are at play. These

combine in a cumulative fashion to explain why sonorant-initial clusters were treated as more marked than glottal-second ones, even though both are illicit elsewhere in MH.

Two future avenues present themselves. First and foremost, the experiment must be replicated and expanded upon. Second, a formal account of imperative truncation should be developed which is able to cover the sensitivity to phonological well-formedness.

ACKNOWLEDGEMENTS

The authors would like to thank Outi Bat-El, Jean Lowenstamm, Andrew Nevins and Tobias Scheer for useful discussions, as well as the reviewers Iris Berent and Sabine Arndt-Lappe for helpful comments.

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APPENDIX A. EXPERIMENTAL MATERIALS

Examples	1	hu jaʃav po	'he sat here'
		=> ʃev po kvaʁ!	=> sit here already!
	2	hu jatsa me-ha-báit	'he went out of the house'
		=> tse ma-ha-bát kvaʁ!	=> get out of the house already!
Sentences	1	hu ʃalaχ t-a-tmuna => ?	'he sent the picture'
	2	hu halaχ mi-po => ?	'he went away from here'
	3	hu dibeʁ im vajnʃtejn => ?	'he spoke to Weinstein'
	4	hu ʃamaʁ t-a-mismaχ => ?	'he saved the dcument'
	5	hu laχats al ha-kaftor => ?	'he pressed the button'
	6	hu tafas t-atsmo b-a-jadá-im => ?	'he grabbed hold of himself'
	7	hu taʔam t-a-glida => ?	'he tasted the ice-cream'
	8	hu sipeʁ t-a-sipuʁ => ?	'he told the story'
	9	hu ʁaʃam kol mila => ?	'he wrote every word'
	10	hu kafats aχoʁa => ?	'he jumped backwards'
	11	hu maχak t-a-tsijuʁ => ?	'he erased the drawing'
	12	hu nisa li-kfots => ?	'he tried to jump'
	13	hu paʔal bli laχsov => ?	'he acted without thinking'
	14	hu badak t-atsmo => ?	'he chekced himself'
	15	hu naʔal t-a-naʔalá-im => ?	'he put on the shoes'
	16	hu safaʁ ad éseʁ => ?	'he counted until ten'
	17	hu χipes t-a-afikoman => ?	'he looked for the *Afikoman*'
	18	hu naʃaχ la t-a-ʁegel => ?	'he bit her leg'
	19	hu ʃafaχ t-a-biʁa => ?	'he spilled the beer'
	20	hu tsaʔak al-av => ?	'he shouted at him'
	21	hu kam le-ʃʔat efes => ?	'he got up for H-hour'

APPENDIX B. RESULTS BY VERB

The table on the next page illustrates the full distribution of imperative forms used in the task. We ignored the spirantization alternation in the second consonant of the stem (e.g. *sfoʁ* vs. *spoʁ* 'count'), since it did not bear on our hypothesis. The distribution of stop vs. fricative did not differ between the verbs in our sample. However, this is likely due to the limited sample of verbs. Albert (2014) suggests that spirantization of the second consonant of the stem is dependent on the identity of the 1st consonant of the stem. In an elicitation study aiming for the Future form, he showed that the fricative alternant tends to be selected when the first consonat is a stop (*jitfoʁ*, cf. *jitpoʁ* 'sew.Fut'), and the stop alternant is selected more often when the first consonant is a strident (*jispoʁ,* cf. *jisfoʁ* 'count.Fut').

Standard forms use the vowel insertion repair in all forms except in the QiTeL template; in this case, they are identical to truncated forms.

	FUTURE	SHORTENED FUTURE	TRUNCATED		STANDARD	MONO-SYLLABIC
RC	ti- nʃaχ 59.3%	- 0	nʃaχ 22.2%		neʃaχ 3.7%	ʃaχ 14.8%
	ti-ʁʃom 66.7%	- 14.8%	ʁʃom 14.8%		ʁeʃom 18.5%	ʃom 0
	ti-mχak 40.7%	-	mχak 18.5%		meχak 29.6%	χak 11.1%
	ti-lχats 37%	-	lχats 18.5%		leχats 25.9%	χats 18.5%
CʔC	ti- f(ʔ)al 44.4%	-	pʔal 55.56%	pal 0	pe(ʔ)al 0	-
	ti-ts(ʔ)ak 48.1%	-	tsʔak 48.39%	tsak 13.83%	tse(ʔ)ak 0	-
	ti-n(ʔ)al 48.1%		nʔal 35.56%	nal 11.85%	ne(ʔ)al 7.41%	-
	ti-t(ʔ)am 59.3%	-	tʔam 29.88%	tam 10.86%	te(ʔ)am 0	-
SC	ti- ʃlaχ 11.1%	tʃlaχ 14.8%	ʃlaχ 66.7%		ʃelaχ 0	-
	ti-ʃmoʁ 7.41	tʃmoʁ 25.9%	ʃmoʁ 63%		ʃemoʁ 0	-
	ti-ʃpoχ 22.2%	tʃpoχ 11.1%	ʃfoχ 63%		ʃefoχ 0	-
	ti-spoʁ 14.8%	tsfoʁ 0	sfoʁ 81.5%		sefoʁ 0	-
CC	ti-vdok 37%	tvdok 0	bdok 63%		bedok 0	-
	ti-tfos 11.8%	-	kfots 88.9%		kefots 0	-
	ti-kfots 14.8%	tkfots 0	kfots 85.2%		kefots 0	-
QiTeL	te-dabeʁ 11.1%	tdabeʁ 0	dabeʁ 88.9%			
	te-χapes 21.4%	tχapes 10.7%	χapes 67.9%			
	te-sapeʁ 17.9%	tsapeʁ 14.3%	sapeʁ 67.9%			-
	te-nase 29.6%	tnase 3.7%	nase 66.7%			-
CVC target	te-leχ 10.7%	tleχ 0	leχ 89.3%			
	ta-kum 34.6%	tkum 0	kum 65.4%			