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3. LINEAR FIRST-TIME DERIVATION OF VERBS AND CONSONANT CLUSTER PRESERVATION IN ISRAELI HEBREW

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Following a rather complex and somewhat controversial reconstruction process, Wexler (1990) claims that “genetically speaking,” Modern Hebrew is in fact not a Semitic language, but rather a Slavic one. One of the pieces of evidence he brings forth for the “latent non-Semitic traits” of the language is the derivation of *xaver* ‘friend’ > *hitxaver* ‘befriended, became friend,’ rather than the expected *hitxaber* (an independent item meaning ‘joined, intr.’). Since by definition, all verb forms are discontinuously derived in a Semitic language, this type of linear derivation, Wexler argues, betrays the underlying non-Semitic nature of Modern Hebrew.

(1) *xaver* ‘friend’ > *hitxaver* ‘befriended, became friend’ (cf. *hitxaber* ‘joined, intr.’)

Nobody would claim, of course, that the actual paradigm is linear. The only question is whether at the point of initial derivation, from a given word to a derived verb (mostly denominative), the innovator actually uses a discontinuous or linear derivation device to generate the verb for the first time.

Schwarzwald (2000) discusses a number of additional verbs, which she claims also result from first-time linear derivation; some of them are quoted in Bolozky (1978, 1999), as evidence for the innovator’s inclination to preserve the source as transparently as possible by maintaining its consonantal clusters (see also Bat-El, 1994):

(2) *flik* ‘blow (N)’ > *hiflik* ‘gave a blow’
špric ‘squirt (N)’ > *hišpric* ‘squirted’

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švic 'sweat; bragging' > *hišvic* 'sweated; bragged'
xrop 'a nap' > *laxrop* 'to nap' (> *xarap* 'napped')
bármén 'barman' > *lebarmén* 'to work as barman'
tránsfer 'transfer (N)' > *letransfer* 'to transfer'

Needless to say, with the increased influence of English and the large number of borrowings from it, the number of allowable consonant cluster configurations in Hebrew increases. Schwarzwald also cites a number of other cases where a base without clusters is fully transparent in the derived verb:

- (3) *níjes* 'a nag' > *nijes* (or *nijez*) 'nagged'
díjey 'DJ' > *ledaje* 'to work as DJ' (instead of the expected **ledajot*)

as well as what appears to be linear derivation in the speech of bilingual Hebrew-English kids:

- (4) put > *laput* 'to put'
 drop > *lidrop* 'to drop'
 flush > *laflaš* 'to flush'

She also shows that there are some instances in earlier stages of the language which appear to constitute linear derivation of verbs from non-verb stems, most of them from the Days of Awe Musaf prayer:

- (5) *šāqēṭ* 'peaceful' > *yīššāqēṭ* 'become peaceful' (**nišqāṭ*)
šālēw 'tranquil' > *yīššālēw* 'become tranquil' (**nišlāw*)
`ānī* 'poor' > *yē`ānī 'become poor' (**yē`ānē*, \**nē`ēnā*)
šāfēl 'low' > *yīššāfēl* 'become low' (**nišpal*)

and points out that at least from the base *`ani*, both *hif`il* and *nif`al* forms are attested in Mishnaic Hebrew:

- (6) *`ānī* 'poor' > *he`ēnī* ~ *yē`ānī* 'became/become poor' (\**he`ēnā*, **yē`ānē*, \**nē`ēnā*)

In some cases, maintaining full transparency of the base while still sticking to the intended *binyan* is achieved by reduplicating the final consonant, as in:

- (7) *faks* 'facsimile' > *lefaksēs* 'to fax' > *fiksēs* 'faxed'
flirt 'a flirt' > *flirtet* 'flirted'
kod 'a code' > *koded* 'encoded'
yon 'ion' > *yonen* 'ionized'
šnor 'schnor (N)' > *šnorer* 'schnorred'

Although certain inconsistency is involved, in that some of these verbs are derived via the past stem, whereas others require entry through the infinitive, they can still be seen as first-time linear derivations, which fully preserve the transparency of the base.

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To determine the place of linear derivation in the initial verb formation process, one should look at its interaction with other factors involved. Bolozky (1999) claims that the primary motivation for any formation of any neologism is semantic. When the target meaning centers on the patient/theme, the primary choice is still *hitpa`el*, with some inchoatives realized in *nif`al*. When agentive verbs are involved, the primary choice is *pi`el*, with *hif`il* being selected for some *bona fide* causatives. Other factors are transparency of the base, maintained mostly through preservation of its consonant clusters intact in the derived form, and of course constraints on pronounceability. The innovator tries to select the best suited *binyan*, with preference given to the form that reflects the base best, if there is more than one option. In some cases, the similarity between the base and some *binyan* stem is so striking, that it would take preference over the semantic default choice.

The question is, whether one has to **necessarily** assume initial linear derivation to account for such cases, or the other mechanisms involved, which are independently needed, would do the same without requiring that we invoke linear derivation.

We will start with the Wexler illustration. It is impossible to tell from a case like *xaver* 'friend' > *hitxaver* 'befriended' whether discontinuous or linear derivation is at work. The pattern is *hitCaCeC*, so it could arise either way. That *v* is used instead of the expected *b* is a function of the innovator's intention to maintain the transparency of the source (see Bolozky 1978, 1999), as well as the independence of *v* from *b* as a separate phoneme, not to mention the need to distinguish the form from homonymous *hitxaber* 'connected.' Furthermore, since this is a reciprocal verb, one would expect it to be realized in *hitpa`el* anyway. But it can also be viewed as linear derivation, which maximally maintains the transparency of the source. Similarly, in the case of *flirtet* 'flirted,' *lefakses* 'to fax,' *koded* 'encoded,' etc., the transparency of the source is fully maintained, but the forms would have been realized in *pi`el* anyway, as general agentive verbs. *Flirtet*, for instance, could potentially be realized as *\*hiflirt* while maintaining the original clusters, but as a non-causative agentive it should be realized in *pi`el* anyway.

Furthermore, straightforward linear derivation cannot actually **replace** the consonant cluster preservation principle. Clearly, for the vast majority of new verbs, assignment to either *pi`el* or to *hif`il* – while preserving the consonant clusters of the base – usually applies to words (with clusters) in which there is no complete identity with the base. The original vowels are ignored; consonant are extracted from the base, then reapplied onto the discontinuous canonical pattern with their original clustering maintained (reduplication may be involved, and "more inflection-like" suffixes may be ignored):

- (8) *tarbut* 'culture' > *tirbet* 'acculturated'
melcar 'waiter' > *milcer* 'served as waiter'
torpédo 'torpedo (N)' > *tirped* 'torpedoed'
sifra 'digit' > *sifrer* 'digitized'
toxnit 'plan (N)' > *tixnen* 'planned'
tízmóret 'orchestra' > *tízmer* 'arranged for orchestra'

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maxaze ‘play’ > *himxiz* ‘turned into a play script’
kveč ‘solid matter that has become soft (sl.)’ > *hikvič* ‘made (smoothing) soft (sl.)’
floc ‘fart (N) (sl.)’ > *hiflic* ‘farted (sl.)’
knas ‘a fine’ > *hiknis* ‘fined (sl.)’
tróm(i) ‘pre(fabricated)’ > *hitrim* ‘was ahead (of his time, etc.)’

This is true of hundreds, perhaps thousands, of derived verbs – even recent ones, like the *tróm(i)* > *hitrim* case above, as well as of some **very** recent formations like those used in the hi-tech community (cf. Rosenthal 2002):

- (9) deliver > *ledalver* ‘to deliver’ forward > *lefarverd* ‘to forward’
 test > *letastes* ‘to test’ (also *tost* ‘toast’ > *letastes* ‘to toast’?)
 configure > *lekanfeg* ‘to configure’ (~ *lekanfreg*?)
 compile > *lekampel* ‘to compile’
 filter > *lefalter* ‘to filter’ refresh > *lerafreš* ‘to refresh’

Only a handful (probably only the ones mentioned above) can be claimed to be truly linear.

So the cluster preservation principle is still indispensable. So is the constraint on cluster pronounceability, which would force many long stems into *pi`el* because of its bisyllabic stem, which can accommodate more consonants; the monosyllabic *hif`il* base cannot incorporate as many:

- (10) *tarbut* ‘culture’ > *tirbet* ‘acculturated’ (**hitrbt*)
melcar ‘waiter’ > *milcer* ‘served as waiter’ (**himlcir*)
torpédo ‘torpedo (N)’ > *tirped* ‘torpedoed’ (**hitripid*)
katalog ‘catalogue (N)’ > *kitleg* ‘catalogued’ (**hiktlig*)

Thus, since a cluster preservation principle will be required anyway, and the pronounceability constraint applies universally, can one demonstrate **independent** need for linear derivation?

It appears that the answer is yes, insofar as the interaction of semantic and transparency considerations are concerned. As non-causative agentive verbs, one would have expected forms like *hišpric* ‘squirted,’ *hiflik* ‘gave a blow’ and *hišvic* ‘bragged’ to be realized in *pi`el* (\**šiprec*, \**filek* and \**šivec*, respectively). The fact that the correspondence with *hif`il* is so striking (see Bolozky, 1978, 1999) suggests that the choice of *hif`il* is indeed motivated by transparency considerations, and that linear derivation is a plausible assumption. A similar argument may be made regarding *laxrop* ‘to nap,’ *lamuv* ‘to move,’ *laput* ‘to put,’ *lidrop* ‘to drop,’ since they use *pa`al*, which is hardly productive today. The principle of cluster preservation (to maintain transparency) can account for these derivations, but one also needs to explain why for these forms, semantic selection considerations may be outweighed by the cluster preservation principle functioning as a transparency maintenance device. The “transgression” is limited; one would not

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expect, for instance, a causative verb to be realized in *hitpa`el* just because of base-pattern similarity. But attraction of a base to a pattern owing to very close phonological similarity does occur.

Bolozky (1999) accounts for these forms by suggesting that when the similarity between the base and a *binyan* stem is “striking,” the “attraction” of that *binyan* may take precedence over optimal semantically-based pattern assignment. Regarding such cases as linear derivations would simplify the account. One may introduce an additional *binyan* selection principle, which supersedes the semantic one: if a base stem is of a form that is **identical** in structure to an existing canonical *binyan* form, its derived verb will be realized in that *binyan*, e.g., *CC(C)iC* is realized in *hif`il*, *C(C)iC(C)eC* or *C(C)aC(C)eC* in *pi`el*, *CCoC* or *CuC* in *pa`al* (through the infinitive), *CoC* in *pi`el* (final consonant reduplication is required, to yield *CoCeC*).

(11)	Base Pattern	Illustration	Binyan	Verb
	<i>CC(C)iC</i>	<i>flik</i> ‘blow (N)’	<i>hif`il</i>	<i>hiflik</i> ‘gave a blow’
		<i>špric</i> ‘squirt (N)’	<i>hif`il</i>	<i>hišpric</i> ‘squirted’
	<i>C(C)iC(C)eC/</i>	<i>flirt</i> ‘flirt (N)’	<i>pi`el</i>	<i>flirtet</i> ‘flirted’
	<i>C(C)aC(C)eC</i>	<i>bármén</i> ‘barman’	<i>pi`el</i>	<i>lebarmén</i> ‘work as barman’
	<i>CoC</i>	<i>kod</i> ‘code (N)’	<i>pi`el</i>	<i>koded</i> ‘encoded’
		<i>šnor</i> ‘schnor (N)’	<i>pi`el</i>	<i>šnorer</i> ‘schnorred’
	<i>CCoC</i>	<i>xrop</i> ‘a nap’	<i>pa`al</i>	<i>laxrop</i> ‘to nap’
		<i>drop</i> ‘to drop’	<i>pa`al</i>	<i>lidrop</i> ‘to drop’
	<i>CuC</i>	<i>put</i> ‘to put’	<i>pa`al</i>	<i>laput</i> ‘to put’

Regarding this small sub-group of verbs as manifestation of linear derivation will also enable us to incorporate the pre-modern cases (*yē`āl* ‘become poor,’ *yīššālēw* ‘become tranquil,’ etc.) as well as cases where transparency maintenance does not involve any consonant clusters (*nijes* ‘nag,’ *ledaje* work as DJ’), pointed out by Schwarzwald.

So although the cluster preservation principle may account for most new verbs that look like linear derivations, it could nevertheless serve some purpose to incorporate a linear derivation option that interacts with semantically-based choice of a derivation pattern.

Looking more closely at the consonant cluster preservation principle, one should note that its validity may be questioned by derivations such as *blof* ‘bluff (N)’ > *bilef* ‘bluffed,’ as well as (the very early) *truma* ‘contribution’ > *taram* ‘contributed’ – where the (stem-initial) base cluster is **not** preserved:

- (12) *blof* ‘bluff (N)’ > *bilef* ‘bluffed’ *truma* ‘contribution’ > *taram* ‘contributed’

Bolozky (1999) also shows that in productivity tests, consonant clusters tend to be preserved, but not always. There are some exceptions involving trilateral roots, e.g.:

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- (13) *naxs* ‘bad luck’ > *nixes* ‘caused (one) to be unlucky’ (preferred to *nixses*)
talk ‘talcum powder’ > *tilek* ‘sprayed with talcum powder’ (preferred to *tilkek*)

Actually, by now, *nixes* and *tilek* may have become real words. The former is now apparently an established slang item, and *tilek* is commonly used in the Israeli Army’s medic lexicon (Ben Gelbart, personal communication). Bolozky (2003) suggests that there is probably no escape from assuming that triliteral bases are still going strong, and that the option of reinterpreting a triliteral base as consisting of a traditional triliteral root is always available – though it is not necessarily predictable whether it will be invoked or not. One possibility is that, in spite of *fikses* ‘faxed’ etc., reduplication is not always readily available as a cluster preservation device, particularly not when the option of straightforward triliteral interpretation presents itself. There appear to exist no violations of cluster preservation when the base contains more than three consonants.

It should be noted that whether initial derivation can be linear or not, it will have no direct bearing on determining whether the actual derivation process relies on ‘roots’ as the base for derivation, or on words. First-time derivation of neologisms cannot be attributed to abstract roots – new words can only be generated from existing words (cf. Bolozky, 1999), and the question is whether a process of consonant extraction is involved or not, which will determine whether initial derivation is discontinuous or linear. Even when extraction takes place – with as much cluster preservation as possible – it does not mean that the root necessarily plays a role in the actual derivation. Rather, the root is an “after-the-fact” construct, derived from the speaker’s awareness that related words sharing the same core. It is a perceptual, not a derivational, concept. Even as a conceptual notion, however, the traditional root concept is too abstract and often contradicted by consonant distribution on the surface. What is required is a new definition, according to which the root may be regarded as being composed of “*shorshanim*” (cf. Bolozky 1999, 2003) – consonants or consonant sequences that are never split within the paradigm (only within the verb?). The *shorshan* concept roughly corresponds to the verb pattern slot described in Goldenberg (1994). It is also functionally identical to the principle of consonant cluster preservation of Bat-El (1994) and Bolozky (1978), and may be argued to constitute its automatic corollary, except that it refers to the consonantal slot *per se* rather than to the cluster preservation principle (see comment on *xr-p* > *x-r-p* below). The *shorshan* makes it easier to distinguish the basic structure underlying seemingly complex forms, e.g. *stingref* ‘do stenography’ or *’ibtrtekt* ‘made abstract,’ as extended *pi`el* realizations. Regular *pi`el* forms, for instance, will all have three *shorshanim*, of varying sizes, which dispenses with the need for describing roots that are *meruba`im* ‘quadriliteral,’ *mexumašim* ‘quintiliteral,’ etc., and with the arbitrariness of regarding each segment in a fixed consonantal slot as constituting an independent root radical – which for all practical purposes it is not. *Hif`il* will only have two *shorshanim* if there are no related verb forms with three. Also note that another reason for the reduced productivity of *pa`al* and *nif`al* is that new verbs formed in them will

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not have stable, or optimal, *shorshan* structure when any base cluster is involved: *laxrop* ‘to nap’ captures the *xr-p* *shorshan* structure of the stem, but *xarap* ‘napped’ immediately splits it.

Clearly, a *shorshan* may change, e.g. when *laxrop* ‘to nap’ becomes *xarap* ‘napped,’ the number of *shorshanim* is expanded from two to three. In terms of cluster preservation, a violation has occurred; the *shorshan* slot-concept, however, allows us to refer to the split as *shorhan* restructuring, *xr-p* > *x-r-p*. The same is true of *hiflik* ‘gave a blow,’ once a *filek* variant emerges, turning a *fl-k* two-*shorshan* sequence into *f-l-k*, with three. Apparently, *faks* ‘facsimile’ > *fikses* ‘faxed’ starts with two *shorshanim*, *f-ks*, and the third is formed through autosegmental spreading to the right (cf., for instance, McCarthy, 1986), which yields *f-ks-s*. Spreading is independently needed to capture relationships such as between *dimem* ‘bled’ and *dam* ‘blood,’ where the second element in *d-m* at the consonantal tier spreads to the right, yielding *d-m-m*, which is mapped onto the *CiCeC* pattern – *dimem*. Similarly, the rightmost component of the *ks* *shorshan* in *f-ks* spreads to the right to yield *f-ks-s*, mapped onto the *CiCeC* pattern – *fikses* ‘faxed.’ The primary *shorshan* *fl-rt* in *flirt* ‘flirt (N)’ spreads to *fl-rt-t* in *flirtet* ‘flirted.’ In *bilef* ‘bluffed, lied,’ the first *shorshan* of *blof* splits, yielding *b-l-f*, but a derived *bilfef* ‘bluffed, diminutive’ suggests restructuring into *b-lf*, which spreads into *b-lf-f*. If we derive both *galal* ‘roll, tr. (e.g. scroll)’ and *gilgel* ‘roll, tr. (e.g. wheel)’ from a two-*shorshan* *g-l*, then the former will be derived by right-spreading, whereas for the latter we will clearly need to reduplicate both *shorshanim* (cf. also Bat-El, 1989), and apply the result to the *pi`el* pattern. The restructuring yields a *g-lg-l* *shorshan* pattern, since the middle cluster always stays the same. The hi-tech test > *letastes* ‘to test’ mentioned above suggests that the reduplicating mechanism of the *gilgel* type is still available to speakers of Hebrew as a synchronic productive device. The consonant *t*, the least sonorant of all consonants, is very unstable and hardly audible at the end of the word after a fricative, and is thus ignored. A basic *t-st* *shorshan* sequence is restructured into *t-s*, and is finally realized as *t-st-s* in *letastes*. Also note that just as the number of *shorshanim* may be expanded in new verb formation, they may also be contracted, as can be seen from *katalog* ‘catalogue (N)’ > *kitleg* ‘catalogued,’ *maxaze* ‘play’ > *himxiz* ‘converted to a play’ and *xantariš* ‘nonsense’ > *xintreš* ‘spoke nonsense’ (see below). Some support for these derived *shorshanim* formation patterns may be found in child language. Berman (1990) shows that in general, children rely on triconsonantal roots as the least marked and most accessible when they form denominative verbs. Some of their *shorshan*-expansion strategies are not standard adult ones: they may reduplicate consonants in unexpected positions (e.g. *argaz* ‘box’ > *megargez*), or add consonants at the end, with a universal preference for coronals as the least marked consonants, as in *ambatya* ‘bath’ > *meamben*, *sapa* ‘sofa’ > *mesapen*, *pax* ‘trash can’ > *mepaxen*, *kir* ‘wall’ > *mekaret*. But they also use normal grown up formation devices: spreading to the right, as well as reduplication (similarly to *g-l* > *g-l-l* in *galal*, *g-l* > *g-lg-l* in *gilgel*), as in *kise* ‘chair’ > *mekases* or *mekaskes*, *sal* ‘basket’ > *mesalel*, *mesalsel*, *maslil*, *kaf* ‘spoon’ > *mekafef*.

Below are some of the data discussed above, put together in table form:

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(14) Shorshanim and Derived shorshanim					Derived
Base	Shorshanim	Form	Derived Form	Shorsh.	
<i>tarbut</i> 'culture'	<i>t-rb-t</i>	<i>tirbet</i> 'acculturated'	none		
forward	<i>f-rv-rd</i>	<i>lefarverd</i> 'to forward'	none		
<i>švic</i> 'bragging'	<i>šv-c</i>	<i>hišvic</i> 'bragged'	none		
<i>špric</i> 'squirt (N)'	<i>špr-c</i>	<i>hišpric</i> 'squirted'	none		
<i>xrop</i> 'a nap'	<i>xr-p</i>	<i>laxrop</i> 'to nap'	<i>xarap</i> 'napped'	<i>x-r-p</i>	
<i>flik</i> 'a blow'	<i>fl-k</i>	<i>hiflik</i> 'gave a blow'	<i>filek</i>	<i>f-l-k</i>	
<i>dam</i> 'blood'	<i>d-m</i>		<i>dimem</i> 'bled'	<i>d-m-m</i>	
<i>faks</i> 'facsimile'	<i>f-ks</i>		<i>fikes</i> 'faxed'	<i>f-ks-s</i>	
<i>flirt</i> 'flirt (N)'	<i>fl-rt</i>		<i>flirtet</i> 'flirted'	<i>fl-rt-t</i>	
<i>blof</i> 'bluff (N)'	<i>bl-f</i>		<i>bilef</i> 'bluffed'	<i>b-l-f</i>	
			<i>bilfef</i> 'bluffed' (diminutive)'	<i>b-lf > b-lf-f</i>	
	<i>g-l</i>		<i>galal</i> 'rolled, tr. (e.g. scroll)'	<i>g-l-l</i>	
			<i>gilgel</i> 'rolled (tr.)' (e.g. wheel)'	<i>g-lg-l</i>	
<i>test</i> 'test (N)'	<i>t-st > t-s</i>	<i>tistes</i> 'tested'		<i>t-st-s</i>	
<i>maxaze</i> 'play'	<i>m-x-z</i>	<i>himxiz</i> 'converted to a play'		<i>mx-z</i>	
<i>katalog</i> 'catalog'	<i>k-t-l-g</i>	<i>kitleg</i> 'catalogued'		<i>k-tl-g</i>	
<i>xantariš</i> 'nonsense'	<i>x-nt-r-š xintreš</i>	'spoke nonsense'		<i>x-ntr-š</i>	

In this kind of framework, then, one may distinguish between:

- (i) an **historical root**, one which the word may have originally been more directly related to, e.g., *r-b-y* in the case of *tarbut* 'culture,' *x.z.y* in the case of *maxaze* 'play' – but which is no longer relevant synchronically;
- (ii) a **synchronic root** that reflects the base from which recent verbs have been derived, e.g., *t-rb-t* as today's root reflecting *tirbet* 'acculturated (V),' *meturbat* 'cultured, acculturated (participle),' etc.;
- (iii) and a **derived synchronic root**, reflecting subsequent *shorshan* changes in synchronic root structure, as in *fl-k > f-l-k* to reflect *filek* emerging as an alternant to *hiflik* 'gave a blow,' or *x-nt-r-š > x-ntr-š* to reflect modification of the structure of the base in creating the verb form – *xantariš* 'nonsense' > *xintreš* 'spoke nonsense.' In a form like *gilgel* 'rolled (tr.),' the root *g.l* may be either historical (since no obvious base for derivation like *dam* 'blood' for *dimem* 'bled' is involved) or synchronic. It spreads to *g.l.l* for *galal* 'rolled (paper etc.),' or – alternatively – is reduplicated, yielding *g.lg.l* for *gilgel* 'rolled (wheel etc.)' – both of them synchronic (derived?) roots.

Needless to say, the three types of roots may all be identical in the case of regular, stable roots, but the distinctions suggested are useful for those instances in which we have a clear base for derivation that in itself may have been related to other, earlier

forms, but where the relationship has no synchronic evidence; and for cases in which the consonantal clustering of the base may have undergone recent changes.

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