

**Valence changing operations:**  
Where does morpho-phonology interfere?

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This study addresses the correlation between valence changing operations and morpho-phonology in Modern Hebrew. I examine the formations of reflexive, reciprocal and decausative verbs and the selection of their morphological output. I show that morpho-phonological constraints affect the application of valence changing operations that apply in the lexicon in contrast to the ones that apply in the syntax. The paper reveals the unique morpho-phonology of the lexicon the position of morphology as an independent component of the grammar.

*1. Introduction*

This paper examines the interaction between valence changing operations and morpho-phonological constraints in Hebrew. It is commonly assumed the different thematic realizations of the same concept are derived from the same basic entry via thematic (valence changing) operations, as demonstrated in (1) and (2).

- (1) a. The sun melted the ice.  
b. The ice melted.
- (2) a. John washed himself.  
b. John washed.

The intransitive verb in (1b) is derived from the transitive one in (1a), while the reflexive verb in (2b) is derived from the transitive verb in (2a). In both cases, the syntactic valence of the verb is reduced. Thematic operations usually result in at least two predicates that denote the same concept. In Semitic languages such as Modern Hebrew (hereafter MH), thematic operations usually has a morphological manifestation (3).

- (3) a. Dan nigev et acmo.  
Dan wiped ACC himself  
'Dan wiped himself.'

- b. Dan hitnagev.  
 Dan wiped-REFL  
 ‘Dan wiped.’

The two thematic realizations *nigev* (3a) and *hitnagev* (3b) are also morphologically distinct. That is, valence changing operations are, to a great extent, manifested in morphological processes. Thematically related verbs in MH share the same consonants and are represented in different prosodic templates called *binyanim* (Berman 1978). The *binyan* determines the phonological shape of the verb, i.e. its vowels, prosodic structure and affixes (if any). The phonological shape of a verb, unlike that of a noun, is essential for determining the shape of the other forms in the inflectional paradigm (Berman 1978; Bolozky 1978; Bat-El 1989; Aronoff 1994).

(4) MH *binyanim*<sup>1</sup>

Past	Present	Future
pa'al	po'el/ pa'el/ pa'ol	yi-f'a/ol
nif'al	nif'al	yi-pa'el
hif'il	ma-f'il	ya-f'il
pi'el	me-fa 'el	ye-fa 'el
hitpa'el	mi-tpa'el	yi-tpa'el

In this paper, I examine the morpho-phonology of three types of predicates derived via valence changing operations: reflexives, reciprocals and decausatives (5).

(5) MH valence changing operations

Type of derived verb	Examples	
Decausatives	kimet → hitkamet	‘wrinkle’ → ‘become wrinkled’
Reflexives	serek → histarek	‘comb’ → ‘comb oneself’
Reciprocals	xibek → hitxabek	‘hug’ → ‘hug each other’

While valence changing operations apply cross-linguistically, languages demonstrate various differences with regard to operations such as reflexivization (Reinhart & Siloni 2005; Horvath & Siloni 2005). Reinhart & Siloni (2005) suggest that thematic operations can apply in the lexicon or in the syntax, according to a parametric choice. In this framework, the grammar includes an active lexicon (Levin and Rappaport Hovav 1994, 1995, Reinhart 2002, Siloni 2002), which is more than a mere list of items, and allows the application of derivational operations. The lexicon is regarded as an interface between the conceptual system and the computational system. From the thematic point of view, it contains coded concepts, along with their thematic grids, and it functions as a computational component, which can perform valence changing operations pre-syntactically.

Nonlexicalist approaches reduce the operative role of the lexicon entirely, transferring all derivational procedures to syntax (Marantz 1997, 2000a, 2000b, 2001; Borer 1998, 2001, 2004; Doron 2003; Arad 2003; Manzini and Savoya 2004 among others). Such theories view the lexicon as a mere list of roots, whose argument can be manipulated only in the syntax, by

<sup>1</sup>The system of *binyanim* names verbs according to the traditional practice of associating the consonantal root *pf*, *'*, *l* with a vocalic template.

merging with functional heads. Theories that are couched within this framework eliminate the lexicon as an active component altogether, and instead suggest architecture of the grammar as a single generative engine, that replaces the active lexicon with non-computational lists of items. I will advocate the view of the lexicon as a computational component with regard to valence changing operations as well.

Following Reinhart and Siloni (2005), I assume these operations in MH apply in the lexicon, in contrast to passivization that applies in the syntax (Horvath & Siloni 2005). The distinction between lexical and syntactic valence changing operations is manifested in a cluster of semantic-syntactic properties such as ECM formation, nominalization, idiom formation and semantic drift (Horvath & Siloni 2005). For examples, MH passive verbs do not have derived nominalizations, while reflexives, reciprocals and decausatives do. In Laks (2006, 2007b), I show that lexical and syntactic operations have different morpho-phonological behavior. While passivization shows a relatively steady and predictable morphology, lexical operations are unpredictable with regard to the shape of their output forms. MH passivization is performed mainly via melodic overwriting in which the vocalic pattern of the verb changes (e.g. *siper* ‘tell’ → *supar* ‘be told’).<sup>2</sup> Lexical operations are manifested in various morphological processes including melodic overwriting, affixation, gemination and a combination of several processes.<sup>3</sup> In contrast to passivization, it is impossible to provide an exact prediction of the output of lexical operations. However, it is possible to identify patterns regarding the derivational relations between the binyanim. Another unique feature of lexical operations is what I label ‘chain derivations’. The output of lexical operations can feed further lexical operations, as the derived predicate is part of the lexicon and, therefore, accessible. The verb *hilbiš* ‘dress’, for example, is derived from the transitive verb *lavaš* ‘wear’ by causativization. The output form *hilbiš* is used as an input for the derivation of the reflexive form *hitlabeš* ‘dress oneself’. Anderson (1992) claims that a lexical rule might presuppose the application of another lexical operation, but it is not expected to presuppose the application of a syntactic rule, since such rules do not apply within the lexicon. Lexical rules apply to one another’s output, but not to the output of syntactic rules. Applying this observation to the two kinds of thematic operations, lexical operations can apply in a chain, but cannot follow syntactic operations. The two types of morpho-phonology I propose demonstrate which types of morpho-phonological processes apply in the lexicon and which types apply post-lexically with regard to thematic operations. These morphological differences between passivization and other operations support the claim that such operations do not apply in the same module of the grammar. Assuming that thematic operations can apply in a different components, every different locus shows relatively different (thought partially overlapping) morpho-phonological manifestations. Such a distinction helps set a parametric choice and facilitates acquisition.

This paper addresses the correlation between MH valence changing operations and their morphological manifestation. I will show that morpho-phonological criteria play a central role in a choosing a binyan for verbs that are derived by thematic operations. I argue that these criteria are unique to morpho-phonological processes that apply in the lexicon in contrast to those that apply in the syntax, thereby supporting the existence of two types of operations and two types of morpho-phonology (Aronoff 1976; Anderson 1977; Scalise 1984, 1988; Perlmutter 1988; Booij 1990; Borer 1991 among others).

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<sup>2</sup> See Laks (2006) for the case of *nif'al* passive forms.

<sup>3</sup> This distinction does not relate to inflectional morphology. See Laks (2006) for a separate discussion.

## 2. Binyan selection

The selection of a certain binyan for a verb can be predicted on the one hand but is subject to a great deal of variation and idiosyncrasy on the other hand. Previous studies have addressed different aspects of the relations between form and meaning with regard to the verbal systems of Modern Hebrew (Berman 1978; Bolozky 1978; 1999, Schwarzwald 1981; Nir 1993; Bat-El 1994; Ussishkin 1999; Ravid 1990; Doron 1999; 2003; Siloni to appear). The criteria I suggest in the following sections focus on the choice of binyan for MH verbs. These criteria are divided into two main types: thematic-semantic criteria and morpho-phonological criteria.

### 2.1. Thematic-semantic criteria

Thematic-Semantic considerations mainly relate to the theta grids of verbs and to operations they undergo. In addition, other semantic properties also intervene in their formation.

#### 2.1.1. Base vs. derived form

MH binyanim are divided into two main groups. *Pi'el* and *hif'il* are used for verbs that are basic entries in the lexicon, i.e. not derived by thematic operations (e.g. *xipes* 'look for', *himtin* 'wait'). *Hitpa'el* and *nifa'l* are chosen for predicates that have undergone some kind of reduction in their theta grids (Reinhart and Siloni 2005) as a result of a thematic operation. In both cases, the verb loses one argument thus becomes syntactically reduced.<sup>4</sup> These are forms that are not listed as basic entries in the lexicon but as entries derived from another basic entry. These are mostly derived counterparts of transitive verbs in *pi'el* and *hif'il* (e.g. *hitraxec* 'wash oneself') but also some decausative, reflexive or reciprocal verbs without a transitive alternate. For example, the reciprocal verb *histoded* 'talk discreetly to each other' is derived from the noun *sod* 'a secret,' but has no transitive counterpart (*\*soded*). I assume an active morphological component in the lexicon that determines in which binyanim verbs are realized. These criteria strengthen the claim that some verbs are listed in the lexicon as basic entries while others are listed as sub-entries, derived by thematic operations, as it also has morphological evidence. It offers a unified analysis for the division of labor between binyanim.

It should be pointed out that the above characteristics are tendencies rather than a complete dichotomy of the division of labor between binyanim. There is a group of derived verbs in *hif'il* and *pi'el*, some of which are derived from homophonous transitive verbs (e.g. *hexmir* 'make/get worse'). There are also instances of basic entries in *nif'al* and *hitpa'el* (e.g. *nitpal* 'pick on X', *hit'alel* 'abuse'). I do not account for these forms in this paper.

#### 2.1.2. Semantic blocking and resemblance

Semantic factors that do not relate to the theta grid of verbs also affect the choice of binyan. Semantic blocking is a case where formation of a word is blocked in order to avoid a semantic clash with another word that already exists in a language. For example, the verb *šataf* 'wash' does not have a reflexive counterpart in *hitpa'el*. The form *hištatef* is already occupied for a totally different verb 'take part'. This could affect the lack of this form as a reflexive one. The degree to which semantic blocking can apply differs with regard to different operations

<sup>4</sup> Binyan *pa'al* is used for both forms, as it is neutral with respect to transitivity (see Berman 1980).

and relations between binyanim. There are hardly any cases of blocking with regard to the *pi'el-hitpa'el* paradigms, as this is an unmarked paradigm that is hardly subject to any irregularities (see 2.2.1). *Hitpa'el* verbs derived from *pi'el* can share more than one meaning (e.g. *hitnaka*, derived from *nika* ‘clean’, is both reflexive and decausative). There is a greater degree of blocking with regard to the *hif'il/pa'al* – *nif'al/hitpa'el* paradigms. For example, the transitive verbs *rašam* ‘register’ *hiršim* ‘impress’ share the same stem consonants. Their derived counterparts are formed in different binyanim in order to prevent the unification of the two verbs. The reflexive counterpart of *rašam* is derived in *nif'al* (*niršam*, and not *\*hitrašem*), while the decausative counterpart of *hiršim* is formed in *hitpa'el* (*hitrašem*, and not *\*niršam*). Blocking also correlates with paradigm contrast, discussed in Kenstowicz (2005). Kenstowicz discusses several cases in which the phonology conspires to ensure that two members of a paradigm remain phonologically distinct. He presents data where phonologically motivated processes fail to apply in order to maintain a paradigmatic contrast. Blocking the formation of verbs in a specific binyan could be motivated by paradigmatic contrast with another existing form.

Semantic resemblance also plays a role in choosing a binyan. Verbs that belong to a specific semantic class tend to occur in the same binyan. There are, for example, two relatively new verbs that denote sleeping, *xarap* ‘sleep deeply’ and *šanac* ‘take a noon nap’. The former is based on the noun *xrop* ‘a nap’ and the latter is derived from the acronym word *šnac* (= *šnat cohorayim*) ‘a noon nap’. The choice of *pa'al* in innovation is very exceptional. In this case, I believe it stems from semantic resemblance to other verbs denoting sleeping, e.g. *yašan*, *nam* ‘sleep’ and *nax* ‘rest’.

Semantic resemblance and blocking seem to play a relatively minor role in the selection of binyan, in comparison to the other criteria I propose, yet it should still be taken into consideration as well.

## 2.2. Morpho-phonological constraints

I adopt the notion of Optimality Theory (Prince and Smolensky 1993) that explains cross-linguistic variation in terms of different ranking of conflicting constraints. There are several competing morpho-phonological constraints that favor one binyan over the other. The notion of two competing forces is in the spirit of Optimality Theory. I contend that both markedness and faithfulness constraints play a role in choosing a binyan between the two thematically distinct verbs: base and derived form.

### 2.2.1. Markedness constraints

Markedness constraints reflect universal markedness, based on phonetics and comparative empirical facts about languages. Such constraints require that marked structures will not surface. The *pi'el-hitpa'el* paradigm is the most common one. Both binyanim, as well as *hif'il*, share the same prosodic structure in their past, present, future and infinitive forms; hence their inflectional paradigm is unified (6). In contrast, the binyanim *pa'al* and *nif'al* do not have the same prosodic structure in their inflectional paradigms (7). In *pa'al*, the future and infinitive forms contain a consonant cluster, while the past and present forms do not. *Nif'al* past and present forms consists of a consonants cluster, while the future and infinitive forms do not. There is no such alternation in the prosodic structure of the binyanim in (6).

## (6) Uniform inflectional paradigms

	pi'el	hitpa'el	hif'il
Past	kines	hitkanes	hixmis
Present	mekans	mitkanes	maxnis
Future	yekanes	yitkanes	yaxnis
Infinitive	lekanes	lehitkanes	lehaxnix
	'gather'	'gather around'	'let in'

## (7) Non-uniform inflectional paradigms

	pa'al	nif'al
Past	lamad	nilmad
Present	lomed	nilmad
Future	yilmad	yilamed
Infinitive	lilmod	lehilamed
	'study'	'teach'

There are morpho-phonological constraints on the output that block the use of other binyanim, making them more marked than *pi'el* and *hitpa'el*. Specifically, tri-consonants clusters are mostly forbidden in the verbal system of MH. *Hif'il*, *pa'al* and *nif'al* cannot host verbs with more than three consonants, as this would yield tri-consonantal clusters.<sup>5</sup> *Pi'el-hitpa'el* is therefore regarded as the unmarked derivational paradigm. *Pi'el* is preferred for the formation of basic entries. New verbs that are not basic entries are formed in *hitpa'el* as it is a part of the unmarked paradigm *pi'el-hitpa'el*. The morphological system shows a strong tendency to choose *hitpa'el* and maintain paradigm uniformity across the various inflections of the binyan.

## 2.2.2. Faithfulness constraints

Faithfulness constraints require identity across various forms of the paradigm and therefore penalize every change, such as deletion, epenthesis and stress shift. Some basic entries are derived in binyan *hif'il*. There is a tendency to form verbs in *hif'il* when the base is a monosyllabic word that begins with a consonant cluster (e.g. *kraš* 'crash' → *hikriš* 'crash an application') (Bolzky 1978, 1999, Bat-El 2002). Why is it so? Bat-El (1994) suggests that speakers aim at faithfulness to the base form with regard to the adjacency of the consonants. *Hif'il* is the only binyan where the cluster remains intact throughout the whole inflectional paradigm.

Most derived forms of *pi'el* verbs are in *hitpa'el* due to the markedness constraint discussed in 2.2.1. The *pi'el-hitpa'el* paradigm is very stable and is hardly subject to irregularities.<sup>6</sup> However, the derived forms of *hif'il* and *pa'al* demonstrate an intriguing variation with regard to their binyan. The derived counterparts of *hif'il* and *pa'al* verbs exhibit an intriguing variation. Some are formed in *nif'al* while others are formed in *hitpa'el* (8).

<sup>5</sup> There are a few cases where *hif'il* host verbs with tri-consonantal clusters.

<sup>6</sup> There are rare exceptions, e.g. *'ilec* 'force' – *ne'elac* 'be forced' (\**hit'alec*).

(8) Derived counterparts of *hif'il/pa'al* verbs

Base		Derived form	
a. <i>hirgil</i>	'make X get used to'	<i>hitragel</i> / * <i>nirgal</i>	'get used to'
b. <i>hirdim</i>	'put to sleep'	<i>nirdam</i> / * <i>hitradem</i>	'fall asleep'
c. <i>katav</i>	'write'	<i>hitkatev</i> / * <i>nixtav</i>	'correspond'
b. <i>pagaš</i>	'meet'	<i>nifgaš</i> / * <i>hitpageš</i>	'meet each other'

The derived counterpart of *hirgil* (8a) is formed in *hitpa'el*, while that of *hirdim* is formed in *nif'al* (8b). There seems to be no apparent reason for preferring any of the binyanim in both cases. I argue that the variation of some derived forms stems from a non-crucial ranking of two constraints. On the one hand, *hitpa'el* is favored because of markedness. *Hitpa'el* is the preferred unmarked output binyan, as opposed to *nif'al*. *Nif'al*, as well as *pa'al*, is less productive due to the complex morphology of its inflectional paradigm (Schwarzwald 1996). It does not preserve its syllabic structure throughout its inflectional paradigm (e.g. *nimšax-yimašex* 'last'). This results in a phonological load expressed by prosodic shifting (Bat-El 2002). *Hitpa'el* is prosodically consistent throughout the paradigm. On the other hand, binyan *nif'al* is preferred because of a faithfulness constraint. In this case, the constraint preserves the adjacency of the consonants of the form. *Hif'il* and *nif'al* share the same prosodic structure of the past and present forms, as both forms contain a consonant cluster. Markedness involving uniformity across the inflectional paradigm competes with faithfulness requiring (partial) uniformity of the derivational paradigm. Owing to the competing constraints, we find both forms of verbs as derived counterparts of *hif'il*.

These two competing constraints also cause a notable degree of variation that is also manifested in the occurrence of the same derived verb in two binyanim. For example, the verb *hirtiv* 'make X wet' has two decausative counterparts, *nirtav* and *hitratev* 'become wet'. There is no difference in the thematic grids of the two verbs and in their truth conditions. They may differ with regard to register and sometime one form is newer than the other. There are also case where each of the form has a unique meaning but there is at least one meaning that both form share. Compare for example *niftar* and *hitpater*. *Niftar* has a unique meaning of 'pass away' (9a) while *hitpater* has a unique meaning of 'resign' (9b). However, both verbs share the meaning of 'get rid of' (9c).

- (9) a. Dan *niftar* / \**hitpater* me-hetkef lev.  
 Dan passed-away resigned from- attack heart  
 'Dan passed away because of a heart attack.'
- b. Dan *hitpater* / \**niftar* mi-mekom avodato.  
 Dan resigned passed-away from-place work-HIS  
 'Dan resigned from his job.'
- c. Dan *sof sof niftar* / *hitpater* me-ha-orxim.  
 Dan finally passed-away resigned from-the-guests  
 'Dan finally got rid of the guests.'

In addition to the markedness and faithfulness constraints discussed above, there are several morpho-phonological constraints that motivate the choice of *nif'al* over *hitpa'el* (Laks 2007a). These are faithfulness constraints within the derivational paradigm that block the application of a phonological process. There are four groups of verbs divided according to their first stem consonant. These verbs show a clear tendency to prefer *nif'al* over *hitpa'el*, as a result of the following constraints. Note that these constraints relate to verbs in binyan *hif'il* and *pa'al*, as

in these cases morphology is in a crossroad; it has to choose between two compatible binyanim.

### 2.2.2.1. Block deletion/epenthesis - *t* and *d* initial stems

Hebrew has a constraint that prohibits homorganic clusters. Verbs whose initial stem consonant is *t* or *d* are usually not derived in *hitpa'el* since such derivation creates the homorganic /tt/ or /dt/ clusters. Such a sequence in Hebrew is dealt with either via vowel epenthesis or deletion of a consonant (e.g. *katavti* 'I wrote' vs. *yaradeti* 'I went down'). In both cases a phonological process has to apply. Forming a verb in *nif'al* prevents the application of deletion or epenthesis and therefore allows the output to be faithful to the base form.

(10) *hif'il/pa'al* → *nif'al* with /t/ or /d/ initial consonants

Base		Derived form	
hidlik	'turn on'	nidlak / *hidalek, *hitdalek	'get turned on'
hitrif	'drive mad'	nitraf / *hitaref, *hittared	'get mad'
hidhim	'amaze'	nidham / *hidahem, *hitdahem	'become amazed'
hitmi'a	'assimilate'	nitma / *hitama, *hittama	'become assimilated'
tala	'hang'	nitla / *hitala, *hittala	'hang oneself'
daxaf	'push'	nidxaf / *hidaxef, *hitdaxef	'push oneself'

Further support for this constraint can be found in *pi'el* verbs that do not have a derived counterpart in *hitpa'el*. The verb *diber* 'talk' has a reciprocal counterpart in *nif'al*, *nidbar* 'talk to each other'. The *pi'el-nif'al* paradigm is rather rare. The reciprocal verb is formed in *nif'al* in order to prevent a /t/ deletion in *hitpa'el* (*hitdaber* → \**hidaber*).

In addition, there are *pi'el* verbs that do not have derived counterparts at all. To some extent, this is arbitrary and can be related to the relatively low productivity of lexical operations (Aronoff 1976 among others). Nonetheless, many of these *pi'el* verbs begin with *t* or *d*. I contend that they do not have derived counterparts in *hitpa'el* as such derivations would lead to the application of deletion (11).

(11) *pi'el* transitive verbs with no derived counterparts

Base		Derived form
tiyev	'improve'	*hitayev
tipel	'take care of'	*hitapel
tipeax	'hang'	*hitapeax
tinef	'make X dirty'	*hitanef
te'er	'describe'	*hita'er
tiken	'fix'	*hitaken
tiyeax	'cover up'	*hitayev
tigen	'fry'	*hitagen
te'em	'coordinate'	*hita'em
dika	'turn on'	*hidaka
dimyen	'imagine'	*hidamyen
dilver	'deliver (technology)'	*hidalver

## 2.2.2.2. Block metathesis

Some verbs with a strident as their initial stem consonants do not have a derived form in *hitpa'el*, as this would result in metathesis (e.g. \**hitsarek* → *histarek* ‘comb oneself’, derived from *serek* ‘comb’). Again, the selection of *nif'al* allows avoiding the application of this process.

(12) *hif'il/pa'al* → *nif'al* derivations with initial stridents

Base		Derived form	
hicmid	‘stick’	nicmad / *hictamed	‘become stuck’
zarak	‘throw’	nizrak / *hizdarek	‘throw oneself’
hiš'ir	‘leave’	niš'ar / *hišta'er	‘remain’
hizkir	‘remind’	nizkar / *hizdaker	‘remember’

## 2.2.2.3. Block prosodic and vocalic alternation

Verbs whose initial stem consonant is a glottal stop have an identical prosodic structure in *hif'il* and *nif'al*.<sup>7</sup> The initial vowel /i/ of *hif'il* (past form) is lowered to /e/, which is also inserted after the first stem consonant (e.g. *he'evir* ‘transfer’). The prefix in other tenses is a low vowel /a/ that is also inserted after the first stem consonant (e.g. *ya'avir* ‘transfer-Fut.’). A similar pattern occurs in the past and present forms of *nif'al* that consist of a consonant cluster. Compare, for example, *ne'elam* ‘disappear’ to *nirdam* ‘fall asleep’ (Bolzky 1994-5, Schwarzwald 2001). *Hif'il* and *nif'al* verbs share an identical prosodic structure of CVCVCV in all their inflectional paradigms (Schwarzwald to appear). *Nif'al* is more faithful to *hif'il* than *hitpa'el*, hence it is preferred. Furthermore, such verbs share the same prosodic structure in all tenses of *nif'al*, similarly to *hif'il*, *pi'el* and *hitpa'el*. They do not demonstrate the morphological complexity of *nif'al* and this provides *nif'al* with another advantage over *hitpa'el*.

(13) *hif'il* → *nif'al* derivations with glottal stops

Base		Derived form	
he'eliv	‘insult’	ne'elav / *hit'alev	‘become insulted’
he'eniš	‘punish’	ne'enaš / *hit'aneš	‘become punished’
he'ešim	‘blame’	ne'ešam / *hit'ašem	‘blame’
he'exir	‘befoul’	ne'exar / *hit'axer	‘become befouled’

## 2.2.2.4. Block stop-fricative alternation

Verbs whose first consonant stem is /f/, /v/ or /x/ usually have a derived counterpart in *nif'al* in order to maintain the fricative consonant. As these fricatives tend to surface as stops in post-consonantal position, derivation in *hitpa'el* may result in an alternation.

<sup>7</sup> The glottal stop is deleted by most speakers.

(14) *hif'il* → *nif'al* with /v/, /f/ or /x/ initial consonants

Base		Derived form	
hivhil	'frighten'	nivhal / * hitbahel	'become frightened'
hifsik	'stop X'	nifsak / *hitpasek <sup>8</sup>	'stop'
hixšil	'fail X'	nixšal / *hitkašel	'fail'

Note, however, that this constraint yields only partial uniformity within the relations between *hif'il* and *nif'al*, as the future and imperative forms of the latter consist of a stop rather than a fricative consonant (e.g. *yibahel* 'become frightened-Future'). Nonetheless, choosing *nif'al* yields partial uniformity, while choosing *hitpa'el* yields no uniformity.

Further evidence for this constraint can be found in denominative verbs. There are nouns with initial clusters whose denominative verbs are formed in *pi'el* and not *hif'il*, such as *bilef* 'trick' derived from *blof* 'a bluff'. The reason for this could be paradigm uniformity. If the verb were derived in *hif'il*, it would undergo spirantization yielding *\*hivlif*. This would result in an undesirable /b~/v/ alternation throughout the derivational paradigm. Although the stop~fricative alternation has long been subject to free variation and lack of stability (Ornan 1973, Schwarzwald 1976, Adam 2002), there are no cases where a *hif'il* or *nif'al* verb with a /b/ or /p/ initial stem consonant is preceded by a vowel.<sup>9</sup>

It should be pointed out that the above constraints manifest a strong tendency, but there is a certain amount of irregularities (e.g. *hicdik* 'justify' → *hictadek* / \* *nicdak* 'justify oneself'). This is also typical to the morphology that applies in the lexicon, in contrast to the one that applies in the syntax. The latter is rather predictable and seems to be less restricted by morpho-phonological constraints.

### 3. Blocking thematic operations

Morpho-phonology can also restrict the application of thematic operations. Some transitive verbs, whose external theta role is a cause, have no decausative counterpart (e.g. *hecik* 'hassle'). I argue that this results from their irregular morpho-phonology. Most of them have stems with only two consonants. Such verbs have different morpho-phonology in the possible output binyanim when decausativization applies (e.g. *he'ir* 'wake X up' → *hit'orer* 'wake up'). The formation of such verbs is considered exceptional and unproductive in terms of innovation. I assume that such forms are lexicalized and their formation is not a part of the morphological component in the lexicon. I argue that their irregular morpho-phonology blocks the derivation of their decausative counterparts. Examining their thematic grids does not explain why they do not undergo this operation, as there is no observed difference compared to other verbs that undergo this operation. This case gives further rise to a surface-based account, in which forms are derived from actually occurring words, rather than a system in which forms are derived by relating to an entity that never occurs in isolation on the surface (Ussishkin 1999, 2005). If we assumed that such decausative verbs are derived on the base of roots, there would be no reason for their relatively low productivity. Note that there are also some transitive verbs that do not undergo passivization (e.g. *tiyev* 'improve'). This restriction does not result from morpho-phonological reasons, but from thematic ones (Doron 1999, 2003; Landau 2002).

<sup>8</sup> This form also alternates with the *pa'al* verb *pasak*.

<sup>9</sup> For historical reasons, there are cases of /k/ initial stem in these binyanim, e.g. *hiksim* 'charm'.

#### 4. Conclusions

The analysis reveals the effect of morpho-phonological criteria on thematic operations. This interaction seems to be unique to the lexicon, as it is not attested in syntax. The four constraints I discussed demonstrate a clear case where the output of thematic operations is dependent on morpho-phonological considerations.

Further support for these blocking constraints should be attested in experiments of verb formations. I expect speakers not to form some derived counterparts of *pa'al* and *hif'il* in *nif'al* based on the constraints I presented. In addition, binyan switching in child language can also indicate that the above constraints restrict some case of verb formation in *hitpa'el*. Berman (1980, 1982, 1993) shows case studies of binyan switching in the development of derivational relations between verbs, where MH speaking children used a verb in wrong binyanim. In one of the stages of language acquisitions, Berman discussed switching between intransitive binyanim *nif'al* and *hitpa'el* (e.g. *nirdam* → *hitradem* 'fall asleep'). I assume that the constraints I discuss would also prevent changing some *nif'al* form into *hitpa'el* (e.g. *nidham* 'become amazed' would not turn into *\*hitdaham* or *\*hidahem*).

The analysis lends support for the unique type of morpho-phonology that applies in the lexicon. It supports the position of morphology as an independent component that interacts with the lexicon while taking into account both morpho-phonological and thematic considerations.

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