Two Types of Morpho-phonology: Lexical and Syntactic Operations in Semitic Languages[1]

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1. Introduction

This paper examines the role of morpho-phonology with respect to the lexicon and the syntax, with reference to the morpho-phonology of thematic arity (valence changing) operations. It is commonly assumed that different thematic realizations of the same concept are derived from the same basic entry via various operations. I examine five such operations in the verbal systems of Modern Standard Arabic[2] (hereafter MSA) and Modern Hebrew (hereafter MH): passivization, decausativization, causativization, reflexivization and reciprocalization. These operations are illustrated in (1) for MH.

(1) <u>Thematic arity operations</u> (Hebrew)

Type of Operation	Examples			
Passivization	siper	→ supar	'told'	→ 'was told'
Decausativization	hirdim	→ nirdam	'put to sleep'	→ 'fell asleep'
Causativization	rac	→ heric	'ran'	→ 'made X run'
Reflexivization	gileax	→ hitgaleax	'shaved'	→ 'shaved oneself'
Reciprocalization	xibek	→ hitxabek	'hugged'	→ 'hugged each other'

Some operations such as decausativization and passivization are cross-linguistically uniform, there are operations such as reflexivization and reciprocalization, which demonstrate cross-linguistic variation. The latter is manifested in sevreal semantic-syntactic characteristics such as productivity, nominalization and idiom formation (Reinhart & Siloni: 2005, Horvath & Siloni, 2005). The cross-linguistic variation in deriving new predicates via arity operations, is accounted for by the Lex(icon)-Syn(tax) Parameter (Reinhart & Siloni, 2005):

(2) The Lex-Syn Parameter
   UG allows arity operations to apply in the lexicon or in the syntax.

I will show that the Lex-Syn parameter has morpho-phonological consequences. I will shed light on four intriguing generalizations observed, involving morpho-phonological differences between passivization and the four other operations:

(3) Generalizations
   a. Passivization is performed only by changing the vocalic pattern of the verb, unlike other operations, which are manifested by different morpho-phonological processes, such as affixation and gemination.

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[2] This analysis is based on the judgements of native speakers of Arabic and Hebrew as well as on data taken from Wehr's Dictionary of Modern Written Arabic (1961) and Wright (1889).

b. Passivization shows unidirectional relations between input and output forms, while the other operations demonstrate bidirectionality, with some forms serving both as a base and as a derived form.

c. The morphological output of passivization can be easily predicted, in contrast to other operations that have more than one possible form.

d. The morphological output of passivization does not serve as input for further operations, while the one of lexical operations is.

I argue for a correlation between arity operations and their morpho-phonological manifestation. Specifically, I will show that the difference in the component of the grammar where operations take place (lexicon vs. syntax) interacts with two different types of morpho-phonology.

2. The different types of morpho-phonology

Following previous studies, I assume that Passivization is syntactic (Horvath & Siloni, 2005), while all other operations, in Hebrew (Reinhart & Siloni, 2005) and in MSA, (Laks, 2004) are lexical.

Having examined the morpho-phonological differences between the operations, I claim that the Lex-Syn parameter has morpho-phonological consequences. Passivization and the other operations seem to be derived by two different types of morpho-phonology, a lexical and a syntactic one. These two types differ in four domains I discuss below: types of morphological processes, predictability of output forms, directionality and the possibility of chain derivations.

2.1. Types of morpho-phonological processes

In this study, I assume the word-based approach (Aronoff ,1976), according to which the lexicon consists of words rather than morphemes or roots or coded concepts lacking a phonological matrix. Aronoff's main thesis states that a new word is formed by applying Word Formation Rules (WFRs) to an already existing word. Both the new word and the existing word are members of a major lexical category. I adopt the theory of Stem Modification (Steriade, 1988, McCarthy & Prince, 1990, Bat-El, 1994), which accounts for generalizations about morpho-phonological alternations by allowing for internal stem adjustments, rather than assuming extraction of a consonantal root (Bat-El, 1986).

MSA and MH consist of prosodic templates called binyanim. The binyan indicates the phonological shape of the verb, i.e. its vowels, its prosodic structure and its affixes (if any).

(4) MSA binyanim[3]

Perfect	Imperfect
faˁal	ya-fˁa/i/ul
faˁˁal	yu-faˁˁil
fa:ˁal	yu-fa: ˁil
ˀafˁal	yu-fˁil
tafaˁˁal	ya-tafaˁˁal
tafa: ˁal	ya-tafa: ˁal
ˀinfaˁal	ya-nfa ˁil
ˀiftaˁal	ya-ftaˁil
ˀistafˁal	ya-stafˁil

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[3] The system of binyanim names verbs according to the traditional practice of associating the consonantal root *p/f*, *ˁ*, *l* with a vocalic template. This does not include inflectional pronoun suffixes, which are concatenated to the stem for agreement purposes.

(5) MH binyanim[4]

Perfect	Imperfect
paʿal	yi-fʿa/ol
nifʿal	yi-paʿel
hifʿil	ya-fʿil
piʿel	ye-fa ʿel
hitpaʿel	yi-tpaʿel

Based on the stem modification theory, the alternation between the binyanim in both MSA and MH is manifested via several processes.
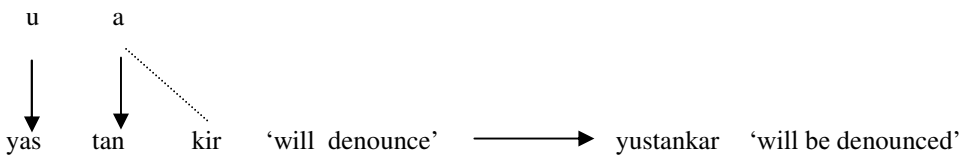
2.1.1. Melodic overwriting

The syntactic operation of passivization has a segmental manifestation of **melodic overwriting**. The vocalic pattern of every transitive verb is overwritten by *u-i* in perfective forms and by *u-a* in imperfective forms. When the verb exceeds the minimal word size, one of the vowels of the passive pattern spreads to the rest of the syllables. Melodic overwriting takes place in a different pattern with respect to perfective and imperfective forms. In the perfective form (6), the last vowel of the stem changes to /i/ and the preceding one to /u/. The /u/ spreads to the preceding syllable.

(6) Arabic Perfective forms: Melodic Overwriting

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            u           i
             ⋰          │          │
              ⋰         ↓          ↓
   ʾis      tan        kar    'denounced'  ⟶   ʾustunkir    'was denounced'
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In the imperfective form (7), the first vowel turns into /u/ and the second one into /a/ which spreads to the rest of the word.

(7) Arabic Imperfective forms: Melodic Overwriting

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       u           a
       │           │    ⋱
       ↓           ↓     ⋱
   yas        tan        kir   'will  denounce'  ⟶   yustankar   'will be denounced'
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The relations between active predicates and their passive counterparts exhibit only melodic overwriting; the prosodic structure in both forms is identical and thus vacuously assigned. Melodic overwriting does not involve reference to the consonantal root (Bat-El, 2002) as it operates directly on the stem.

2.1.2. Prosodic Circumscription

McCarthy and Prince (1990) suggest a process of **prosodic circumscription** in order to account for the formation of Arabic Broken Plural. To derive the plural from the singular, they posit a rule of positive prosodic circumscription that isolates the leftmost moraic foot of the singular base and maps the circumscribed material onto an iambic foot template. McCarthy (1993) extends the circumscription analysis to the verbal system. He suggests a rule of negative circumscription. This rule extracts a prosodic unit, which consists of a moraic syllable and adds a mora prefix to the residue.

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[4] The relevant distinction between the two forms is past and future, rather than perfective and imperfective. However, I use the latter terms in order to keep the terminology consistent with MSA forms.

(8)   Derivation of ħammal from ħamal

Base:	ħamal 'carried'
Negative Circumscription:	\<ħa\> mal
Prefix:	\<ħa\> µ mal
Spread:	\<ħa\> mmal
Output:	ħammal 'carried-CAUS'

2.1.3. Affixation

Some binyanim are derived from others by adjoining a syllable or a mora to the left edge of the base. The addition can invoke a change in the internal prosodic structure of the base, in addition to the external one. For example, MH binyan *hifᶜil* is derived by adding the prefix /hi-/ to *paᶜal*. However, the first vowel of the stem is deleted in order to preserve the prosodic shape of a binary foot, resulting in the *hifᶜil* form. MSA binyan *ʾinfaᶜal* is derived from *faᶜal* by affixation of /n/. An epenthetic vowel is then inserted in order to prevent a consonant cluster in a word initial position and a glottal stop is inserted preventing a vowel initial syllable.

2.1.4. Combination of morphological processes

The derivation of one verbal form from another can sometimes involve more than one morpho-phonological process. The reciprocal verb *tanaat'aħ* 'thrusted each other', for example, is derived from the verb *nat'aħ* 'thrusted'. In this case, the *faᶜal* template, which lacks prefixes and long vowels or consonants, serves as the base for the derivation of the *tafaᶜal* template. This derivation is performed both by affixation of /ta-/ and by prosodic circumscription, resulting in the lengthening of the first vowel of the base form. The derivation of the MH binyan *hitpaᶜel* involves both affixation of the prefix /hit-/ and changing the first vowel of the stem if the base form is *piᶜel* (e.g. *pileg – hitpaleg* 'split') and changing both stem vowels when the base is *paᶜal* (e.g. *sagar - histager* 'closed').

2.1.5. Hierarchy of Intrusiveness

Based on the observed morph-phonological alternations in 2.1.1, I define a hierarchy of intrusiveness for the observed processes (Laks, 2006).

(9)   a.   <u>Hierarchy of Intrusiveness</u>: (i) is more intrusive than (ii)
      i.   **Prosodic modification of the stem**- (1) is more intrusive than (2)
         1) External modification: addition or deletion of syllables - affixation
         2) Internal modification: modification of the internal prosodic structure –
         prosodic circumscription
      ii.   **Segmental modification of the stem:** melodic overwriting

    b.   <u>Intrusiveness evaluation</u>
      i.   The higher the level of word structure manipulated, the greater the degree of intrusiveness
      ii.   The more levels manipulated in one operation, the greater the degree of
      intrusiveness.

The hierarchy of intrusiveness correlates with the structure of the phonological word. The modification of the prosodic structure, including syllables and moras, is more intrusive. I thus consider processes, which add or delete moras or syllables more intrusive than processes which alter the segmental representation only.

(10)   Types of morpho-phonological processes in MSA and Hebrew

Type of Operation	Base	Derived form	
a. Prosodic circumscription:			
MSA causativization	ħamal	ħammal	'carried'
MSA reciprocalization	katab	kaatab	'wrote'
b. Affixation:			
MSA decausativization	ɣalaq	ʔinɣalaq	'closed'
MSA reciprocalization	qaatal	taqaatal	'fought'
c. Affixation and Prosodic Circumscription:			
MSA reflexivization	jahil	tajaahal	'was ignorant'
MSA reciprocalization	madaħ	tamaadaħ	'praised'
d. Affixation and Melodic Overwriting:			
MH reflexivization	sirek/serek	histarek	'combed'
	raxac	hitraxec	'washed'
MH reciprocalization	nišek	hitnašek	'kissed'
MH causativization	xatam	hextim	'signed'
MSA decausativization	yaʔʔas	yaʔis	'became desperate'
e. Melodic Overwriting			
MSA passivization	ʔakkad	ʔukkid	'stressed'
	ʔintaxab	ʔuntuxib	'elected'
	tanaawal	tunuuwil	'handed'
MH passivization	hifkid	hufkad	'deposited'

The correlation that emerges is that syntactic operations involve lower morpho-phonological intrusiveness than lexical operations. Passivization, which is syntactic, involves melodic overwriting (10e). In contrast, the other operations, which are lexical, also involve the addition of moras or syllables via prosodic circumscription or affixation or both. Moreover, passivization involves only one morpho-phonological process, while lexical operations can involve more than one process (10c-d). Each process, which applies in the syntax, can also apply in the lexicon, but there can be a process, the least intrusive one, which applies in the syntax but not in the lexicon. There is no evidence for the latter in MH and MSA, but there is evidence for the former.[5] Melodic overwriting, the least intrusive process (the lowest level in (9b)), applies in both the lexicon (11) as well as the syntax (12).[6]

(11)   <u>Melodic Overwriting in the lexicon</u>[7]
        lamad   'studied'   →   limed   'taught'
        rakad   'study'   →   riked   'danced repeatedly'

(12)   <u>Melodic Overwriting in syntax (passivization)</u>
        siper   'told'   →   supar   'was told'
        hifkid 'deposited' →   hufkad 'was deposited'

Passivization in MH is manifested in the alternation of *hifᶜil* and *piᶜel* to *hufᶜal* and *puᶜal* respectively. The only change which occurs is changing the melodic pattern to *u-a* in both binyanim. The same pattern occurs in MSA, where every transitive verb can turn into a passive by changing its vocalic

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[5] I assume there could be a language with a strict dichotomy between the morpho-phonology of the two types of operations.

[6] There are several verbs in *piᶜel* whose passive form is in binyan *hitpaᶜel*, e.g. *kibel – hitkabel* 'recieved/accepted'. For some reason, these verbs do not have a corresponding form in the *puᶜal* template (*kubal). I view them as an idiosyncrasy and I believe that these passive *hitpaᶜel* forms are lexicalized.

[7] The *rakad → riked* derivation manifests a differebt semantic relation which I do not discuss in this paper. However, I consider it lexical due to its low productivity.

pattern. Note that the same vocalic pattern applies in all MSA passive forms regardless of the prosodic structure of the active base form, i.e. the number of syllables or their weight. When the base consists of a long vowel, e.g. ᶜaalaj 'took care of', it remains long in the derived passive form and only changes to /u/ in ᶜuulij 'was taken care of'. When the base contains more than two syllables, e.g. 'iqtaraħ 'suggested', one of the vowels of the passive melodic pattern spreads to the remaining syllable, forming ᶜuqturiħ 'was suggested'.

Adopting stem modification rather than root extraction correlates with the lex-syn parameter. If we assumed root extraction there would be no reason to assume morpho-phonological differences between lexical and syntactic operations. Root extraction could apply in all operations, mapping the consonantal root to different vocalic templates (which may consist of affixes).

2.2. Predictability and morphological variation

The derived forms of syntactic operations can be easily predicted, as the only change that occurs is the vocalic pattern. Each of the passive templates in both MH and MSA are restricted to a single corresponding binyan in which their transitive counterparts are formed. This is not true for the templates which feed lexical operations, as there is no one-to-one relation between pairs pf binyanim. Templates such as MH puᶜal and hufᶜal do not have an independent existence; they serve only as the passive form of piᶜel and hifᶜil respectively. In contrast, the morphological output of lexical operations is unpredictable, as most operations have more than one possible binyan.

(13)   MSA possible input/output binyanim

Lexical Operation	Input Binyan	Output Binyan	Examples
a. Decausativization	faᶜal	ᵓinfaᶜal ᵓiftaᶜal	kasar → ᵓinkasar 'broke' naθar → ᵓintaθar 'scattered'
	faᶜᶜal	tafaᶜᶜal	farraq → tafarraq 'separated' ħassan → taħassan 'improved'
	ᵓafᶜal	faᶜal	ᵓasqat' → saqat' 'fell'
	faaᶜal	tafaaᶜal	laaša → talaaša 'became extinct'
b. Causativization	faᶜal	faᶜᶜal ᵓafᶜal	šarab → šarrab 'drank' raqas' → ᵓarqas 'danced'
c. Reflexivization	faᶜal	ᵓiftaᶜal	rafaᶜ → ᵓirtafaᶜ 'lifted'
	faᶜᶜal	tafaᶜᶜal	Jammal → tajammal 'made pretty'
	ᵓafᶜal	ᵓistafᶜal	ᵓaᶜadda → ᵓistaᶜadda 'prepared'
d. Reciprocalization	faaᶜal	tafaaᶜal	s'aalaħ → tas'aalaħ 'made peace'
	faᶜal	faaᶜal	qatal → qaatal 'fought'
	faᶜal	tafaaᶜal	madaħ → tamaadaħ 'praised'

(14)   MH possible input/output binyanim

Lexical Operation	Input Binyan	Output Binyan	Examples
a. Decausativization	hifᶜil	paᶜal nifᶜal hitpaᶜel	hixᵓis → kaᵓas 'angered' hirdim → nirdam 'put to sleep' hirgiz → hitragez 'became upset'
	piᶜel	paᶜal hitpaᶜel	simeax → samax 'was happy' rigeš → hitrageš 'excited'
	paᶜal	nifᶜal	haras → neheras 'ruined'
b. Causativization	paᶜal	hifᶜil piᶜel	xatam → hextim 'signed' lamad → limed 'studied - taught' šaxan → šiken 'settled'

		hitpaᶜel	raxac → hitraxec 'washed'
c. Reflexivization	paᶜal		paras → hitpares 'spread'
		nifᶜal	šataf →ništaf 'washed'
	piᶜel	hitpaᶜel	serek → histarek 'combed'
	hifᶜil	nifᶜal	hiškiv → niškav 'lay down'
			hišʾin → nišʾan 'leant'
	hifᶜil	hitpaᶜel	higniv → hitganev 'sneaked'
			herim → hitromem 'lifted'
d. Reciprocalization	paᶜal	hitpaᶜel	laxaš → hitlaxeš 'whispered'
		nifᶜal	pagaš → nifgaš 'met'
	piᶜel	hitpaᶜel	nišek → hitnašek 'kissed'

As demonstrated in (13) and (14), there are several combinations of input and output forms for the same lexical operation. When the base form of MH decausativization is *hifᶜil*, for example, its derived counterpart can be in *paᶜal*, *nifᶜal* or *hitpaᶜel*. There is no phonological or semantic basis explaining why the decausative counterpart of *hirgiz* 'made X upset' is *hitragez* and not *nirgaz*, while the decausative counterpart of *hirdim* 'put to sleep' is *nirdam* and not *hitradem* (14a). The morphological system has access to paradigms of lexical operations. Once a speaker is exposed to a sufficient number of such paradigms, s/he can derive different input forms from different output forms. Such a mechanism involves additional morphological processes to the ones discussed in this section. Deriving binyan *nifᶜal* from binyan *hifᶜil*, for example, involves the changing of the prefix and melodic overwriting.

There are some common paradigms for each lexical operation, but these paradigms are not restricted to a single opeartion. The MH *hifᶜil-hitpaᶜel* paradigm serves for decausativization (14a) and reflexivization (14c). The MSA *faaᶜal-tafaaᶜal* paradigm serves both for reciprocalization (13d) and decausativization (13a). Although the former is much more common, these pardagims of binyanim are not restricted to one meaning and can feed several thematic operations.

There are several verbs in the MH binyan *hifᶜil* which do not undergo any morphological change as a result of decausativization. The verb *hexmir* 'made/became worse', for example, is manifested both as a transitive (15a) and a decausative predicate (15b).

(15) a.   ha-raav   hexmir   et   macavo
           the-starvation made-worse   ACC   condition-his
           'the starvation made his condition worse'
      b.   macavo   hexmir
           condition-his   became-worse
           'his condition   became worse'

Further examples for this pattern are presented in (16).

 (16) <u>Non-alternating morphology of decausativization</u> hivri 'made/became healthy', hišmin 'made/became fat', hitnia 'started a car', hišxir 'made/became black', ʾacar 'stopped'[8]

The lack of morphological alternation provides further evidence for the variey of combinations of input-output relations resulting from lexical arity operations. Unlike passivization, which demonstrates one-to-one relations between bases and derived forms, lexical operations occur in different shapes. This also supports the claim that there is no complete match between form and meaning with regard to binyanim. Binyan *hifᶜil*, for example, is traditionally regarded as a causative form (Gesenius, 1910). While it is indeed the unmarked binyan for causativization (e.g. *hextim* 'made X sign'), it does exibit all kinds of predicates such as PP-taking verbs (*hikšiv* 'listened'), transitive verbs (*hirgiz* 'upset') and decausatives (*hivri* 'became healthy').

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[8] The decausative meaning alternates with *neʾecar.*

Verbs that are derived via lexical operations can share more than one meaning, i.e. the same form is used as the output of more than one operation. This is rather common for *hitpaᶜel* verbs (Siloni, to appear). For example, the transitive verb *ʾirbev* 'mixed' has both reflexive (17a) and (17b) decausative alternates, both sharing the same form *hitʾarbev*.

(17) a. keday   še-titʾarbev ba-kahal
           should   that-mingle   in-the-crowd
           'you should mingle (mix yourself) within the crowd'
    b. ha-tavlinim   hitʾarbevu
           the-spices   became-mixed
           'the spices became mixed'

The MH and MSA templates of passive verbs, however, are mostly restricted to their passive meaning.[9]

Observing the verbal systems of the two languages, it is impossible to predict whether a particular stem will or will not occur in a given binyan. The systems have a large number of accidental gaps (Horvath, 1981). This supports the claim that the alternation of binyanim is lexical as it represents lexical thematic operations. Such operations are subject to gaps and suppletion. It is important to point out that I do not claim the input-output possible forms of lexical operations are totally free. There is a limited set of forms for every operation, e.g. there would be no reflexive or reciprocal predicate in binyan *ʾinfaᶜal* in MSA or in binyan *piᶜel* in Hebrew. I do, however, argue that this set of options is much more varied in comparison with the one of syntactic operations.

Verbs that are basic entries in the lexicon are also subject to morphological variation.

(18) a. MSA: balaᶜ   ~   ʾibtalaᶜ   'swallowed'
    b. MH: nakam   ~   hitnakem   'avenged'

Both *nakam* and *hitnakem*, for example, in (18b) share the same meaning. One form is sometimes older than the other or is used in a different register, but there is no change in the theta grid of the verb or even in its aspect. The difference may be a historical one. Some forms are currently in greater frequency than others but all forms are part of the speakers' knowledge. I regard the possibility of alternating forms of the predicate as a unique feature of predicates that are in the lexicon. There is no such alternation in the morphological shape of passive forms, which are derived in syntax. This also correlates with the notion that as long as a predicate is in the lexicon, it is exposed to different changes. I regard alternation as one of them, in addition to nominalization, semantic drift and idiom formation (Horvath & Siloni, 2005).

2.3. Directionality

The syntactic operation of passivization is manifested mainly by changing the vocalic pattern of the active verb. Passive verbs demonstrate uniformity with regard to the quality of vowels, as they all share the same vocalic pattern. On the assumption that passivization is syntactic, the formation of passive verbs is post-lexical. The outputs of syntactic operations are not listed in the lexicon; hence they are not available as basic entries.[10] Thus, the relationship between the active and passive forms is unidirectional. The morphological shape of the active verb is the base and the passive one is derived, fol-

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[9] There is, however, a group of decausative verbs with a passive morphology, e.g. *huksam*, derived from *hiksim* 'charmed' and *hufta*, derived from *hiftia* 'surprised'. Landau (2002) argues that they have only a decausative interpretation and labels them 'fake-passives', while Meltzer (2005) suggests that they are ambigous and also share a passive meaning. As noted in § 2.1.5, melodic overwriting is not restricted to syntactic operations.

[10] By 'not listed in the lexicon' I refer to the notion that the output forms of syntactic operations are not stored in the same manner as the output forms of lexical operations. Passive verbs can be considered to be formed every time they are used, though it is possible that frequently used passive forms are stored. The issue of frequency-based storage is beyond the scope of this paper.

lowed by a regular change of the vocalic pattern. The picture is different with regard to some lexical operations presented in (19):

(19) MSA Causativization and Decausativization

Lexical Operation	Base	Derived form
a. Causativization	raqas' 'danced'	ˀa-rqas' 'made X dance'
b. Decausativization	ˀa-wqaˤ 'caused X to fall'	waqaˤ 'fell'

Following Reinhart & Siloni (2005), I assume that the unergative-transitive alternation (19a) and the transitive-decausative one (19b) are derived by two distinct lexical operations, as each is limited in a particular way. In (19a), the causative form is derived from *faˤal,* resulting in *ˀafˤal,* while in (19b) the output is *faˤal* and the input is *ˀafˤal*. Both binyanim serve as a base form and as a derived form. The same pattern of bidirectionality can be found in MH (20).

(20) MH Causativization and Decausativization

Lexical Operation	Base	Derived form
a. Causativization	caˀad 'marched'	hicˀid 'made X march'
b. Decausativization	hitbia 'caused X to drown'	tava 'drowned'

In (20a), the *paˤal* form serves as an input, while in (20b) it is the *hifˤil* form. MSA and MH demonstrate bidirectionality in the *faˤal-ˀafˤal* and *paˤal-hifˤil* derivations respectively. How can one account for the two operations, using both forms as inputs and outputs?

I argue that as long as the operation takes place in the lexicon, the morphological system has access to all lexical forms. Consequently, it can derive one form from the other, applying to the basic entry listed in the lexicon, in accordance with the relevant thematic operation. While acquiring a language, the speaker is exposed to the derivation of such paradigms, i.e. simple-to-complex form derivations and vice versa, so that s/he can implement it on new predicates s/he encounters. This approach intertwines with Aronoff's (1976) view of the lexicon as a system of relations that can be active in generation of new words.

2.4. Chain derivations

The output of lexical operations can feed further operations. Since the derived predicate is part of the lexicon, it is still accessible and can undergo thematic operations. The verb *hilbiš* 'dressed', for example, is derived from the transitive verb *lavaš* 'wore' by causativation. The output form *hilbiš* is used as an input form for the derivation of the reflexive form *hitlabeš.*[11] 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. The usual interpretation of such relations of informational presupposition is as the relative ordering of the rules in question. 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, while syntactic operations cannot. This chain derivation is not very common with regard to the operations examined in this paper, but there are no instances of such chains with regard to syntactic operations. This is the same argument regarding nominalization as the latter is considered a lexical operation that can be fed only by the output of lexical operations and not syntactic ones. Once a predicate is formed outside the lexicon, it is no longer accessible to further arity operations.

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[11] *hitlabeš* could not be analyzed as derived from *lavaš*, as its reflexive meaning does not stem from lavaš, but from *hilbiš*. *Hitlabeš* does not mean *lava*š *et acmo* 'wore himself' but *hilbiš et acmo* 'dressed himself'.

(21)   Chain Derivations in MH[12]

Base 1	Derived Form 1 Base 2	Derived Form 2
hikpic 'made X jump'	kafac 'jumped'	kipec 'jumped repeatedly'
lavaš 'wore'	hilbiš 'dressed'	hitlabeš 'dressed oneself'
nam 'slept'	nimnem 'took a nap'	hitnamnem 'took a short nap'

3. Conclusions

The analysis reveals the interaction between thematic operations and morpho-phonological processes, thereby supporting the existence of a lexicon-morphology interface as well as a syntax-morphology interface. The analysis addresses the issue of the role of morpho-phonology and its location and application with respct to other components of the grammar. Assuming that thematic arity operations can apply in a different locus of derivation, every different locus shows relatively different (thought partially overlapping) morpho-phonological manifestations. I suggest that morpho-phonology applies in both components of the grammar. This notion correlates with the analysis of parallel morphology (Borer, 1991). It supports the existence of an autonomous morphological component that interacts with both the lexicon and the syntax, to which it is not reducible.

The differences in the types of morphological processes that thematic operations manifest do not necessarily intertwine with regard to inflectional processes - e.g. tense - that apply in syntax. In the two languages I discuss, the morphonology of passivization is not the same morphology of inflectional processes although both apply in syntax. Inflectional processes, which are relevant for syntax (Anderson 1981) are predictable in their morphological manifestation. There are, however, gaps and idiosyncrasies in syntax as well (e.g. English irregular past verbs) and there does not seem to be a complete dichotomy between the types of processes that apply in inflection and the ones that characterize lexical operations. Affixation, for example applies in both cases, e.g. perfective-imperfective derivations. Prosodic circumscription, on the other hand, applies only in the lexicon. Bat-El (2004) shows that MH reduplication applies only in the lexicon. Processes that involve only melodic overwriting apply mainly in syntactic operations, but only in thematic ones. The motivation for the differences I discuss is to distinguish between the two types of thematic operations. Such a distinction helps setting a parametric choice and facilitates acquisition. The morphology of inflectional processes is irrelvant for this choice. Although the morphological differences I discuss relate to Semitic languages, I contend that they are also relevant for other languages. The differences in types of morpho-phonological processes primarily depend on the morphology of each language and hence may be different among languages, but I expect to find some differences in the morpho-phonology of the lexicon and the syntax cross- linguistically.

The analysis lends support for the Lex-Syn parameter, adding triggers for parameter setting during the acquisition stage. It also supports the word-based approach (Aronoff, 1976). Specifically, it demonstrates the superiority of stem modification over root extraction, which does not discriminate between lexical and syntactic operations, making it virtually impossible to account for the observed generalizations.

The following table summarizes the differences between the morpho-phonology of the two kinds of operations as discussed above.

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[12] Some of the examples include the formation of repetitive and diminutive verbs. Although I do not account for their derivation in this paper, I believe them to be co-related via lexical operations (Laks, 2004).

(22)   Two Types of Morpho-phonology

Property	Syntactic Morpho-phonology	Morpho-phonology
Morphological Processes	Limited to less intrusive processes	All degrees of intrusiveness
Predictability	Predictable	Unpredictable, subject variation of forms
Directionality	Unidirectionality	Bidirectionality, no regular binyan for a specific operation
Chain Derivations	None	Output is subject to further applications

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