Agency and Voice: The Semantics of the Semitic Templates[1]

Edit Doron, The Hebrew University of Jerusalem
edit@vms.huji.ac.il
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Abstract

Semitic templates systematically encode two dimensions of verb meaning: (a) *Agency*, the thematic role of the verb's external argument, and (b) Voice. The assumption that this form-meaning correspondence is mediated by syntax allows the parallel compositional construction of the form and the meaning of a verb from the forms and the meanings of its root and template. The root and its arguments are optionally embedded under a light verb *v* which introduces the Agent (Hale and Keyser 1993, Kratzer 1994). But this is only the unmarked case, which, in Semitic, is encoded by the *simple* templates. Two dimensions of markedness are introduced by two additional types of syntactic heads: (a) *Agency-heads*, which modify agency, and are morphologically realized as the *intensive* and *causative* templates, and (b) *Voice-heads*, which modify voice, and are morphologically realized as the *passive* and *middle* templates. Causative and middle morphemes are thus accounted for within a unified system, which, first, explains their affinity in language in general (both are found cross linguistically as markers of transitivity alternation), and which, moreover, sheds new light on problems in the interface of semantics and morphology. One problem is the impossibility, mostly ignored in linguistic theory, of deriving the semantics of middle verbs from that of the corresponding transitive verbs. The second is explaining the identity found cross linguistically between middle and reflexive morphology. The third is determining the grammatical function of the causee in causative constructions.

1. Causative and Middle Morphology as Marking Transitivity Alternation

It is known from the typological literature (Nedyalkov and Silnitsky 1973, Haspelmath 1993) that languages which overtly mark transitivity alternation vary in their choice of the marked alternant. The transitive verb may be marked as causative, or the intransitive verb may be marked as middle,[2] a marking often identical to the marking of lexical reflexivity. The verb *finish*, for example, has a middle intransitive alternant in Hebrew, but a causative transitive one in Turkish. The verb *freeze*, on the other hand, has a causative transitive alternant in Hebrew, but a middle intransitive one in Spanish:

1.

	finish			***freeze***	
	intrans	*trans*		*intrans*	*trans*
Hebrew:	ni-gmar *middle*	gamar	*Hebrew*:	qafa	hi-qpi *causative*

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[2] The term *middle* is used in this paper in its general sense of marking transitivity alternation rather than in its narrower dispositional sense found in "This bread cuts easily".

Turkish:	bit	bit-ir *causative*	*Spanish*:	congelar-se *middle*	congelar

The cross-linguistic study of Haspelmath 1993 reveals an important typological generalization which cannot be captured if causative and middle verbs are analyzed independently of each other. It follows from this generalization that it is impossible to find a *single* language which reverses the Hebrew pattern of marking in (1), which is why the combination of Turkish and Spanish was needed to exemplify the reverse pattern. Haspelmath shows that there is a universal ranking of predicates: ... P_i .... P_j ... (according to "spontaneity of the event") such that in every natural language, if P_i is expressed as an unmarked monadic verb, then so is P_j, and if P_j is expressed as an unmarked dyadic verb, then so is P_i. A section of this ranking, extending (1), is shown in (2):

2.	**. . .**	***open*** **. . .**	***finish*** **. . .**	***freeze*** **. . .**	***boil*** **. . .**
		intrans/ trans	*intrans/ trans*	*intrans/ trans*	*intrans/ trans*
Spanish:		abrir-se/ abrir	terminar-se/ terminar	congelar-se/ congelar	hervir/ hacer hervir
Hebrew:		ni-ftax/ patax	ni-gmar/ gamar	qafa/ hi-qpi	ratax/ hi-rtiax
Turkish:		aç-il/ aç	bit/ bit-ir	don/ don-dur	pis/ pis-ir

Yet the theoretical literature does not treat causative and middle verbs as values of a single alternation. Rather, in lexicalist and non-lexicalist theories alike, causatives and middles are given separate analyses. While middles involve a single predicate, causatives are usually constructed from two predicates. Middles (including reflexives) have been given non-lexicalist analyses based on syntactic relations (Kayne 1975, Moore 1991) or lexicalist analyses based on argument structure (Marantz 1984), including in languages such as Romance, where they are marked by a clitic (Grimshaw 1982, 1990, Alsina 1996, Miller and Sag 1997). What is common to both the lexicalist and non-lexicalist analyses is that they involve a single predicate. Causativization, on the other hand, is often taken to involve two separate predicates, not just in the case of the periphrastic Romance and Korean causative constructions, but for morphologically marked causatives as well, as in Turkish. Non-lexicalist analyses of causative constructions have further assumed that they are biclausal at some syntactic level, as in the generalized transformational account of Kuroda 1965, the Predicate Raising analysis of Kayne 1975 and Aissen 1979, the Clause Union analysis of Relational Grammar (references in Gibson and Raposo 1986), and the Verb Incorporation analyses of Marantz 1985, Baker 1988, and Li 1990. Lexicalist analyses, on the other hand, assume that the causative sentence is syntactically monoclausal, as in Rosen 1990, Alsina 1996, Miller 1992 and Aranovich 2002.

In view of the typological observation that causatives and middles often mark a single alternation, it is compelling to look for a unified analysis. Clearly, such an analysis would assume a single predicate, as it seems unnatural to analyse middles as involving two predicates. The only analyses of causativization in the literature that assume a single predicate have so far been lexicalist (Aissen and Hankamer 1980, Williams 1981, DiSciullo and Williams 1987, Alsina 1992 and Katada 1997).

But a lexicalist treatment is not the only possibe basis for a unified analysis. The present paper develops a non-lexicalist unified analysis, based on Semitic template morphology. In the Semitic languages, causative and middle verbs alike are derived by particular templates. As will be established in the paper, the Semitic templates denote *voice* (of which *middle* is one possible value) and a thematic dimension which I call *agency* (of which *causative* is one possible value).

The present analysis of causative verbs in terms of a causative template is not equivalent to an analysis in terms of an additional causative predicate. A causative template is restricted to denote a particular thematic role, which is not the same as introducing a predicate in general. For example, if a causative verb involves a single predicate, we do not expect two of its arguments to have the same thematic role, but if two predicates are involved, then it should be possible to find two arguments with the same thematic role. Moreover, if a causative verb involves a single predicate, we expect it to denote a single event, rather than two separate events.

The present analysis differs from Parsons 1990 and Pustejovsky 1995, where causative verbs are interpreted as denoting two separate events. In the present account, a causative verb describes a single event which has a causer participant. The evidence that Parsons adduces in favour of the two event analysis is based on the ambiguity of the adverbial *behind the museum* in the following example:

3. Mary flew her kite behind the museum

Parsons attributes this ambiguity to the fact that the adverbial may modify either of the two events participating in the causal relation described by (3). In other words, either of the following two different events may have taken place behind the museum: (a) Mary did whatever one does to fly a kite or (b) the kite flew. But this is very inconclusive evidence, since the spatial location of an event is less well defined than its temporal location. In general, the spatial location of an event is the spatial location of one of its participants, and I think this is the source of the ambiguity of (3). As a matter of fact, the same ambiguity is attested for verbs that are not causative:

4.a Mary wrote the poem on the floor.

b Mary saw Bill on the bus.

Another argument for the complexity of causal events is based on Dowty's 1979 argument concerning the ambiguity of such verbs as in (5):

5. John closed the door again

(5) can mean, according to Dowty, either that the whole accomplishment of closing the door is repeated, or that only the result state is repeated (i.e. John's closing of the door is the first time ever that the door is being closed, yet the door has already been in a closed state, and has only been opened once before). This argument indeed holds for particular aspectural classes, but it does not hold for causative verbs in general. (6a) below cannot mean that the dog has previously walked on its own, and neither can (6b) mean that I have performed one act of getting the horse to gallop twice:

6.a I walked the dog again
b I galloped the horse twice

In sum, I do not think there is evidence for event decomposition as part of the analysis of causative verbs. After all, the causal source of an event is part of its characterization. There is no reason to introduce a new "causing event" when language characterizes some event causally. Moreover, in the Semitic system, causative morphology, realized as the causative template, is not the only way to systematically characterize an event. Intensive morphology is another systematic way. The intensive template characterizes an event as an action. Clearly, event decomposition would not be appropriate for this type of characterization. Rather, the different templates characterize the same event by different thematic relations: the causer relation in the case of the causative template, and the actor relation in the case of the intensive template.

The existence of the template as an independent morphological unit lends support to the view of argument structure advocated by non-lexicalist theories such as Hale and Keyser 1993 and Kratzer 1994. According to this view, the external argument is an argument of a functional head, here the template. The fact that the thematic role of the external argument is determined by a special morpheme (the template), in causative and intensive verbs alike, is unexpected under lexicalist views of argument structure, where the external argument is an argument of the basic predicate (e.g. Bresnan and Kanerva 1988, Pollard and Sag 1994).

Another reason to adopt a non-lexicalist approach is that in lexicalist theories, the identity found cross-linguistically between the middle and the reflexive morphemes remains a mystery, unless one adopts Chierchia's 1989 idea that middle and reflexive verbs have identical semantics. But this view is not tenable, as will be shown in section 2 below. Lexicalist views based on Marantz 1984 attribute the identity of middle and reflexive morphemes to the fact that both "perform the same function: that of dethematizing

the [NP,IP] position and suspending the assignment of structural accusative Case" (Cinque 1988:566, attributed to R. Kayne, and see Grimshaw 1990 as well). Yet the different semantics of middles and reflexives does not follow from this fact. The present non-lexicalist approach will include a solution to this mystery.

2. The Semantics of Causatives and Middles

The lexical decomposition approach to causative verbs (Dowty's 1976, 1979, Van Valin and LaPolla 1997, based on the work of the generative semanticists, eg. Lakoff 1970, McCawley 1968) has several drawbacks as an account for transitivity alternations. First, under this view, the transitive verb is derived from the basic verb by means of the operator CAUSE. Since the transitive verb is derived, we expect a more highly marked morphology for it, yet sometimes it is the other verb which is morphologically marked by the middle morpheme, as exemplified in (1) and (2) above. Second, under this approach, the identity of the middle morpheme with the reflexive morpheme is completely unexpected. The reflexive morpheme presumably denotes a different operator REFL (where REFL = $\lambda P\, \lambda x\, [P(x,x)]$), which is unrelated to CAUSE.

The approach of Chierchia 1989 goes in the opposite direction from that of lexical decomposition. It takes the transitive verb as basic, and derives the middle verb from it. This approach overcomes the shortcomings of the decomposition approach, but it runs into the converse of the first problem: even in languages with middle morphology, it is not necessarily the case that the transitive verb is unmarked; often, it is the transitive verb which is marked (as causative), see (1) and (2) above again.

The direction of derivation which takes the transitive verb as basic and derives the middle verb faces a serious semantic problem. The problem is that there is no way to "eliminate" the semantic contribution of the transitive verb's external argument. Unlike passive, the meaning of a middle verb does not involve existentially binding the external argument of the transitive verb. The sentence *The vase broke* does not entail that somebody/ something broke the vase. It is therefore a total mystery how to derive the meaning of unaccusative *break* from that of transitive *break*: in circumstances where *x broke the vase* would be considered false for any *x* to which we would normally apply the predicate, we might still consider it true that the vase broke. So what are the truth conditions for *The vase broke*? This problem has simply been ignored in the literature, other than in Chierchia's discussion. Chierchia, on the other hand, is well aware of the problem. Yet, he wants to derive the meaning of the middle verb from that of the transitive verb. His solution is to assign to *The vase broke* the truth conditions of *The vase broke itself*. Chierchia reaches this conclusion by arguing in the following way: there is a limited set of semantic operations which correspond to the morphological reduction of any argument of a dyadic verb; actually there are exactly three: existential binding of the external argument in passive, existential binding of the internal argument in unspecified object deletion, and binding of the internal to the external argument in reflexivization. One of these must be the right one for the derivation of middle verbs, if indeed it involves argument reduction. Of the three possible reduction operations, the reduction of an argument in middle verbs most closely matches reflexivization.[3] In other words, middle morphology attributes the instigation of the denoted event to the patient itself. This view also accounts for the observation that unaccusatives and reflexives often share the middle morphology, as exemplified here from Romance:[4]

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[3] The view that the argument structure of unaccusative verbs can be traced back to reflexivity (whether or not they exhibit middle morphology) is also found in Grimshaw 1982, Wehrli 1986, DiSciullo and Williams 1987, Brousseau and Ritter 1990. The converse reduction, of lexical reflexivity to unaccusativity, is argued for in Zribi-Hertz 1987, Marantz 1984 and Grimshaw 1990, and see criticism of this view in Reinhart and Siloni 2003.

[4] Shared unaccusative/reflexive morphology is attested in Semitic, Romance, German, Russian, Greek, Armenian, Hungarian, Georgian, Old Icelandic, Khmer, Gilyak, Swahili, Uzbek (Nedyalkov and Silnitsky 1973), Salish (Davis 2000) and Kannada.

7.	***transitive***	***middle***	
a	casser rompere *break*	se casser rompersi *break*	***unaccusative***
b	laver lavare *wash*	se laver lavarsi *wash oneself*	***reflexive***

In Hebrew as well, middle morphology (realized as either of the two middle templates *simple middle* and *intensive middle*) marks both unaccusative and reflexive verbs:[5]

7.	*root*	***transitive***	***middle***		
c	[š][b][r]	[š]a[v]a[r] *break*	ni[š][b]a[r] *break*	***unaccusative***	*simple*
	[p][r][q]	[p]e[r]e[q] *take apart*	hit[p]a[r]e[q] *fall apart*		*intensive*
d	[d][x][p]	[d]a[x]a[f] *push*	ni[d][x]a[f] *push oneself*	***reflexive***	*simple*
	[r][x][c]	[r]a[x]a[c] *wash*	hit[r]a[x]e[c] *wash oneself*		*intensive*

The remainder of this section argues against the reduction of unaccusativity to reflexivity. First, empirically, it is not satisfactory to represent the semantics of the Hebrew unaccusative *be born* as *give birth to oneself*, nor the unaccusative *become vacant* as *vacate oneself*. In these particular examples, unaccusativity is compatible with the event always being brought about by another participant.

8.a nolad tinoq
bear-SIMPL-MID *baby*
'A baby was born' ≠ 'A baby gave birth to itself'

b hitpana kise
vacate-INTNS-MID *seat*
'A seat became vacant' ≠ 'A seat vacated itself'.

Second, this approach does not explain why middles vary with respect to the unergative/ unaccusative classification. In Romance for example, middles are difficult to classify as either unaccusative or unergative. In Italian, auxiliary selection and participation in participial adverbial clauses point in the direction of unaccusativity, yet reflexives fail the *ne*-cliticization test of unaccusativity (see the discussion in Alsina 1996). In Hebrew, middle verbs which are interpreted as reflexive are unergative, e.g. *nidxaf* 'push oneself' and *hitraxec* 'wash oneself' in (7d), but middle verbs which are non-reflexive may be either unaccusative or unergative. The middle verbs *nišbar* 'break' and *hitpareq* 'fall apart' in (7c) are unaccusative, but many others are unergative. A split among non-reflexive middle verbs into unaccusative and unergative is found in Spanish as well (Aranovich 2002).

[5] The simple middle template and the intensive middle template can be recognized by the prefix *ni-* (sometimes realized as *no-* or *ne-*), and the prefix *hit-* respectively.

Two tests for unaccusativity in Hebrew have been proposed in Borer and Grodzinsky 1986. Unaccusative verbs, but not unergative verbs, allow verb-first clauses (as in (9a-b) below), and the addition of a Possessive Dative argument (as in (10a-b)):

9.a	hitpareq	ha-kise	kše-	dani	nixnas	la-	ambatya
	fell-apart-MID	*the chair*	*when*	*Dani*	*entered*	*to-the*	*bathroom*
	'The chair fell apart when Dani entered the bathroom.'						
b *	hitraxec	ha-yeled	kše-	dani	nixnas	la-	ambatya
	washed-MID	*the child*	*when*	*Dani*	*entered*	*to-the*	*bathroom*
	'The child washed when Dani entered the bathroom.'						

10.a	ha-kise	hitpareq	le-ruti
	the chair	*fell-apart-MID*	*to-Ruti*
	'Ruti's chair fell apart.'		
b *	ha-yeled	hitraxec	le-ruti
	the child	*washed-MID*	*to-Ruti*
	'Ruti's child washed.'		

In addition, resultative phrases may be predicated of the argument of unaccusative but not unergative verbs:

11.a	ha-kise	nišbar	le-xatixot
	the chair	*broke-MID*	*to-pieces*
	'The chair broke to pieces.'		
b *	ha-cva'ot	nilxamu	le-xatixot
	the armies	*fought-MID*	*to pieces*

The question of the unaccusative/ unergative split among middle verbs has been addressed by Reinhart 1996 and Simmons 1996 (though they only discuss intensive-template verbs). Both maintain that it is possible to predict on the basis of the agentivity of the transitive verb whether its middle counterpart is reflexive or unaccusative: agentive verbs give rise to reflexive middles, whereas non-agentive verbs give rise to unaccusative middles. But a closer inspection of this correspondence reveals that it does not actually hold.

Considering first the issue of whether agentivity of the transitive verb is sufficient for the reflexivity of its middle-form counterpart, in many cases it is indeed so, in conformity with the cross-linguistic study of Haspelmath 1993. Haspelmath has argued that agentivity of the transitive verb prevents the derivation of an unaccusative verb, since the latter implies the absence of an agent. Yet reflexivity does not follow. Two readings are possible in addition to the reflexive reading. One is a reading where the subject has others perform the action on him/her, or otherwise does whatever it takes to achieve the same result. This is in general an available reading for reflexive morphology, e.g. in Russian, Armenian Georgian, Gilyak (cf. Nedyalkov and Silnitsky 1973), alongside the reflexive interpretation:

12.a	cilem	hictalem
	take a photo	*have one's photo taken* (not: take a picture of oneself)
b	siper	histaper
	cut (hair)	*have a haircut* (not: cut one's own hair)

c	piter *fire (from job)*	hitpater *resign* (not: fire oneself)
d	sileq *kick out*	histaleq *depart* (not: kick oneself out)
e	nigen *play (tune)*	hitnagen *sound* (not: play itself)

Another reading of middle forms derived from agentive verbs is an iterative reading. This reading too is found crosslinguistically (in Russian, Hugarian, Georgian according to Nedyalkov and Silnitsky 1973):

13.a	rac *run*	hitrocec *run to and fro*
b	halax *walk*	hithalex *walk to and fro*
c	‘af *fly*	hit’ofef *fly away/to and fro*
d	našam *breathe*	hitnašem *breathe heavily*
e	caxaq *laugh*	hictaxeq *act laughingly*
f	xiyex *smile*	hitxayex *act smilingly*
g	na’ *move*	hitno’ea’ *move about*

The other direction of Reinhart’s and Simmons’ correspondence does not hold either. Lack of agentivity of the transitive verb does not guarantee unaccusativity of the middle verb. Some unergative middles correspond to experiencer rather than agentive verbs, as in (14a-b) noted already by Reinhart. Other unergative middles do not correspond to verbs at all, but to nouns, as in (14c-d), or adjectives (14e-f):

14.a	hifli *to puzzle*	hitpale *be puzzled*
b	ixzev *to disappoint*	hit’axzev *be disappointed*
c	yeled *child*	hityaled *behave childishly*
d	šafan *rabbit*	hištafen *behave like a rabbit (behave cowardly)*
e	acel *lazy*	hit’acel *act lazily*

f	xole/xala	hitxala
	ill/ fall ill	*act ill*

Moreover, some verbs give rise to middle verbs that are reflexive or unaccusative depending on the nature of their argument, as shown in (15), an observation already found in Borer and Grodzinsky 1986:

15.a	niqa	ha-yeled/ha-avir hitnaqa
	to clean	*the child /the air cleaned-MID*
		'The child cleaned himself.'/'The air became clean.'
b	matax	ha-yeled/ha-beged hitmateax
	to stretch	*the child /the garment stretched-MID*
		'The child stretched.'/'The garment stretched.'
c	bitel	ha-yeled/ha ši'ur hitbatel
	to cancel	*the child/the class cancelled-MID*
		'The child was idle/effaced himself.'/ 'The class was cancelled'
d	gila	hitgala lo mal'ax/ hitagala (*lo) ocar
	to discover	*discovered-MID to-him an angel/discovered-MID a treasure*
		'An angel showed itself to him.'/'A treasure was discovered (*to him).'
e	pina	ha-qahal / ha-maqom hitpana
	to *evacuate*	*the crowd / the place evacuated-MID*
		'The crowd evacuated.' / 'The place vacated.'

In sum, there is no way to predict the unaccusative/reflexive classification of middle verbs if one derives them from their transitive counterparts.

Levin and Rappaport Hovav 1995 propose to maintain Chierchia's transitive-to-middle direction of derivation only for a subset of verbs, those which denote what they call "externally caused" events, but they reverse the direction of derivation for verbs which denote what they call "internally caused" events. This view entails that the events in (16a) are "internally caused", since it is the transitive verb which is morphologically marked (with the causative template, recognizable by the prefix *hi-*), whereas those in (16b) are "externally caused", since there it is the intransitive verb which is morphologically marked (with a middle template recognized by the prefix *ni-*):

16.a	*root*	*intransitive verb (simple)*		*transitive verb (causative)*	
	[q][p][ʻ]	[q]a[f]a[ʻ]	*freeze*	hi[q][p]i[]	*freeze*
	[n][m][s]	[n]a[m]a[s]	*melt*	hi[][m]i[s]	*melt*
	[r][t][x]	[r]a[t]a[x]	*boil*	hi[r][t]ia[x]	*boil*
	[y][r][d]	[y]a[r]a[d]	*lower*	ho[][r]i[d]	*lower*
	[ʻ][l][y]	[ʻ]a[l]a[]	*rise*	he[ʻ]e[l]a[]	*raise*
	[n][p][l]	[n]a[f]a[l]	*fall*	hi[][p]i[l]	*make fall*
	[z][z]	[z]a[z]	*move*	he[z]i[z]	*move*
	[n][š][b]	[n]a[š]a[v]	*blow*	hi[][š]i[v]	*blow*
	[m][t]	[m]e[t]	*die*	he[m]i[t]	*kill*

b	*root*	*intransitive verb (middle)*		*transitive verb (simple)*	
	[g][m][r]	ni[g][m]a[r]	*finish*	[g]a[m]a[r]	*finish*

[š][b][r]	ni[š][b]a[r]	*break*	[š]a[v]a[r]	*break*
[p][t][x]	ni[f][t]a[x]	*open*	[p]a[t]a[x]	*open*
[q][r][‘]	ni[q][r]a[‘]	*tear*	[q]a[r]a[‘]	*tear*
[š][p][k]	ni[š][p]a[x]	*pour*	[š]a[f]a[x]	*pour*
[m][t][x]	ni[m][t]a[x]	*stretch*	[m]a[t]a[x]	*stretch*
[m][r][x]	ni[m][r]a[x]	*spread*	[m]a[r]a[x]	*spread*
[h][r][s]	ne[h]e[r]a[s]	*get destroyed*	[h]a[r]a[s]	*destroy*
[h][r][g]	ne[h]e[r]a[g]	*get killed*	[h]a[r]a[g]	*kill*

Yet the distinction between internal and external causation does not seem to correlate the different morphological markings in (16) with any other linguistically significant properties. First, the intransitive verbs in both (16a) and (16b) are unaccusative. Second, Rappaport Hovav and Levin 1998, 2000 show that in English, the state denoted by resultative phrases has a different temporal relation to an event of internal vs. external causation. Yet resultative phrases do not distinguish the verbs in (16a) from those in (16b). For both types of verbs, the unfolding of the result state is cotemporal with the event denoted by the verb:

17.a	ha-nozel	qafa	le-guš exad
	the liquid	*froze-SIMPL*	*to one piece*
b	ha-re’i	nišbar	le-xatixot
	the mirror	*broke-MID*	*to pieces*

Third, in many cases both unaccusative *and* causative verbs are marked, which is a problem for any attempt to derive the intransitive and transitive verbs from each other:

18.a ***locative verbs***

root	*intransitive verb (middle)*		*transitive verb (causative)*	
[š][‘][n]	ni[š][‘]a[n]	*lean*	hi[š][‘]i[n]	*lean*
[d][b][q]	ni[d][b]a[q]	*stick*	hi[d][b]i[q]	*stick*
[x][b][‘]	ne[x][b]a[]	*hide*	he[x][b]i[]	*hide*
[s][t][r]	ni[s][t]a[r]	*hide*	hi[s][t]i[r]	*hide*
[p][r][d]	ni[f][r]a[d]	*separate*	hi[f][r]i[d]	*separate*
[š][‘][r]	ni[š][‘]a[r]	*remain*	hi[š][‘]i[r]	*leave*
[n][g][š]	ni[][g]a[š]	*approach*	hi[][g]i[š]	*present*
[k][n][s]	ni[x][n]a[s]	*enter*	hi[x][n]i[s]	*insert*
[‘][l][m]	ne[‘]e[l]a[m]	*disappear*	he[‘]e[l]i[m]	*conceal*
[š][q][p]	ni[š][q]a[f]	*be in view*	hi[š][q]i[f]	*have a view*
[m][š][k]	ni[m][š]a[x]	*continue*	hi[m][š]i[x]	*continue*

b ***experiencer verbs***

root	*intransitive verb (middle)*		*transitive verb (causative)*	
[d][h][m]	ni[d][h]a[m]	*be amazed*	hi[d][h]i[m]	*amaze*
[b][h][l]	ni[v][h]a[l]	*get frightened*	hi[v][h]i[l]	*frighten*
[r][t][‘]	ni[r][t]a[‘]	*be repelled*	hi[r][t]ia[']	*repel*
[‘][l][b]	ne[‘]e[l]a[v]	*be insulted*	he[‘]e[l]i[v]	*insult*
[z][h][r]	ni[z][h]a[r]	*beware*	hi[z][h]i[r]	*warn*
[y][k][x]	no[][x]a[x]	*be aware*	ho[][x]ia[x]	*make aware*
[l][x][c]	ni[l][x]a[c]	*be stressed*	hi[l][x]i[c]	*stress*
[n][c][l]	ni[][c]a[l]	*be saved*	hi[][c]i[l]	*save*

[k][n][‘]	ni[x][n]a[‘]	*surrender*	hi[x][n]ia[‘]	*make surrender*
[š][b][‘]	ni[š][b]a[‘]	*take oath*	hi[š][b]ia[‘]	*put under oath*

The middle verbs in (18) are not derived from the causative verbs: their middle morphology does not correspond to a missing causer, but to a missing locative argument in (18a), and to what Pesetsky 1995 calls the subject-matter argument in (18b). The middle verb, then, is not derived from the causative verb, but rather from some basic predicate, the *root*. In (18), the root is dyadic, and middle morphology marks the derivation of an intransitive verb. Causative morphology marks the assignment of the cause thematic role, either to one of the root's arguments or to an additional argument. Accordingly, both intransitive and transitive verbs are marked.

In (16) too causative morphology marks the assignment of the cause thematic role, and the fact that in (16a) the intransitive verbs are unmarked is an indication to the monadic nature of the root. Monadic roots are common cross-linguistically in verbs which, according to Croft 1990 and Haspelmath 1993, describe events such as freezing, melting, going out, sinking, which are "spontaneous" events that "occur commonly in nature around us and do not need an agentive instigator" (Haspelmath 1993:103). In (16b), on the other hand, the roots are dyadic, and correspond to events which normally have instigators. Accordingly, the intransitive forms of these verbs are marked by middle morphology.

In sum, I have shown that neither direction of derivation is tenable which operates on the verbs themselves. Considering transitives verbs and their corresponding middles, the latter are not derived from the former, and neither are the former derived from the latter.[6] Neither is derived from the other, but at the same time, neither is underived, which explains why both may be morphologically complex. Both are derived from basic predicates (roots). The transitive verb is derived by combining the root with a morpheme which contributes an external argument. A morpheme which specifically contributes a cause marks the derived verb with causative morphology. A morpheme which contributes an actor external argument marks the derived verb with intensive morphology. These morphemes, which contribute the external argument and mark it with various thematic roles are realized in Semitic as various templates. This view of the templates is developed in sections 3 -- 5.

A middle verb is derived by combining the root with a middle morpheme. This morpheme prevents the insertion of a new argument (the external argument) into the derivation. In section 7 of the paper, I argue that the reflexive reading of a middle verb results from the middle morpheme assigning an agent thematic role to the root's argument. Section 6 is an analysis of another voice morpheme, the passive.

3. Semitic Morphology

Verb, noun and adjective stems in Semitic languages are derived from (tri-)consonantal roots by different intercalations, called *templates*, of CV skeleta, vowel sequences and affixes (cf. e.g. McCarthy 1981, Batel 1989, Aronoff 1994 for modern accounts for this type of morphology). The root is usually the only common element shared by derivationally related forms. For example, all the Hebrew words in (19) below share the root [y][l][d], 'birth', but they do not share an underlying stem. Similarly, the words in (20) share the root [b][t][x], but no underlying stem. If there existed such an underlying stem, there would also be phonological rules or constraints accounting for the modification of its vowels and syllable structure to derive all the other stems in (19) or (20). But no such phonologically motivated rules or constraints are known (though Batel 1994 and Ussishkin 2000 are attempts in this direction), and therefore it is generally assumed that each stem is derived directly from the root, by the intercalation of different templates:

19. **root** [y][l][d] 'birth'

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[6] Analyses based on the second direction of derivation have been proposed for Japanese by Jacobsen 1985, for Italian by Centineo 1995, for English by Pesetsky 1995, for Hebrew by Arad 1998 and for Salish by Davis 2000.

a	[y]a[l]a[d]	*to give birth*	b	[y]i[l]e[d]	*to deliver (of) child*
c	ho[][l]i[d]	*to beget*	d	[y]i[l]o[d]	*newborn*
e	[y]e[l]e[d]	*child*	f	[y]a[l][d]on	*small child*
g	[y]a[l][d]a	*girl*	h	[y]a[l]i[d]	*native*
i	[][l]e[d]a	*birth*	j	mo[][l]a[d]	*nativity*
k	[y]a[l][d]ut	*childhood*	l	[y]e[l]u[d]a	*birth ratio*
m	mu[][l]a[d]	*innate*	n	me[y]a[l]e[d]	*obstetrician*

20. **root** [b][t][x] 'sure, secure'

a	[b]a[t]a[x]	*to trust*	b	[b]i[t]ea[x]	*to insure*
c	hi[v][t]ia[x]	*to assure/secure*	d	'i[v][t]ea[x]	*to safeguard*
e	[b]a[t]ua[x]	*sure/safe*	f	[b]i[t]ua[x]	*insurance*
g	[b]i[t]a[x]on	*security*	h	[b]e[t]a[x]	*surely*
i	[b]i[t][x]oni	*pertaining to security*	j	[b][t]i[x]ut	*safety*
k	ha[v][t]a[x]a	*assurance*	l	'a[v][t]a[x]a	*security force*
m	mi[v][t]a[x]im	*confidence*	n	me[v]u[t]a[x]	*insured*
o	me[v]a[t]ea[x]	*assurer*	p	me'a[v][t]ea[x]	*security person*

In English, on the other hand, it would be impossible to analyze all stems containing a particular string of consonants as derived from that string, e.g. the consonantal string [b][r][n], which is common to all the English words in (21):

21.a	[b][r]ai[n]	b	[b]a[r][n]
c	[b]u[r][n]	d	[b][r]a[n]
e	[b]a[r]o[n]	f	[b]ou[r][n]
g	[b]ou[r][b]o[n]	h	[b][r]ow[n]
i	[b][r]u[n]ette	j	[b][r]ui[n]

Even where there is such an underlying root, e.g. in 21(h-j), it is clearly not strictly consonantal. What is underlying in (21h-j) is not just a consonantal root, as it is in (19) and (20), but includes a particular syllabification and a particular vowel as well, i.e. the root is *bru:n*, which is much more than just a string of consonants. The same is the case for all purported examples of "consonantal roots" in Germanic, such as Ullendorff's 1971 examples *sing/ sang/ sung, give/ gave, goose/ geese* or *Vater/ Väter*.

What counts as morphological similarity for the purpose of indicating semantic similarity may be different in different languages. A common consonantal skeleton obviously does not count as morphological similarity in the Indo-European languages. Rather, the root of an Indo-European word includes not only consonants but also syllabification and some aspects of vocalism. Yet variation in vocalism may indicate variation in meaning even in the Indo-European languages, e.g. the plural meaning associated with umlaut in Germanic: *goose/ geese*, *Vater/ Väter*, or the temporal meaning associated with ablaut, e.g. *sing/sang/sung*. Vennemann 1998 considers ablaut to be a borrowing into Germanic from a Semitic substratum in prehistoric Europe.

What is striking about the Semitic system is that while there are scores of templates which derive nouns from roots, the verbal system is extremely limited. Setting aside voice variation (which is discussed in sections 6 and 7), each verb in Hebrew is derived by one of exactly *three* templates. These templates, also found in Akkadian, Syriac, Arabic, are traditionally known as (a) the **simple** template, (b) the **intensive** template, and (c) the **causative** template. Though the template system is on principle the same in all the Semitic languages, the actual forms vary from language to language. The present study is based on the forms found in Hebrew, shown in (22):

22. **the active voice**

a	the **simple** template	[C]a[C]a[C]
b	the **intensive** template	[C]i[C]([C])e[C]
c	the **causative** template	hi[C][C]i[C]

Since each and every active-voice verb in Hebrew is derived by one of exactly three templates, it is natural to suspect that the choice of template is not arbitrary, but that it indicates some factor of the meaning of the derived verb. This indeed is the traditional view concerning the templates, as is suggested, for example, by the term **causative**. Yet modern linguists (e.g. Berman 1978, Batel 1989, Wexler 1990, Arad 1998) have noted numerous examples where the semantic contribution of the template is unpredictable (e.g. (35) below), and have concluded that these examples doom to failure any attempt at a systematic analysis.

Though I agree that the semantic contribution of the templates is not transparent, I disagree that it is not systematic. For example, the alternations in (23) and (24) below are completely systematic. (23) exemplifies the causative alternation, and (24) -- the intensive alternation. In (23), within each pair of equi-rooted verbs, the first derived by the simple template and the second by the causative template, it is the first which is intransitive and the second which expresses its transitive (viz. causative) counterpart, and this is never reversed for any such pair in the language:[7]

23. **the causative alternation**

a	*root*	*simple verb (unergative)*		*causative verb (transitive)*	
	[y][l][k]	[h]a[l]a[x]	*walk*	ho[][l]i[x]	*make walk*
	[r][q][d]	[r]a[q]a[d]	*dance*	hi[r][q]i[d]	*make dance*
	[‘][p]	[‘]a[f]	*fly*	he[‘][]i[f]	*fly*
	[c][‘][d]	[c]a[‘]a[d]	*march*	hi[c][‘]i[d]	*march*
	[z][x][l]	[z]a[x]a[l]	*crawl*	hi[z][x]i[l]	*make crawl*
	[d][h][r]	[d]a[h]a[r]	*gallop*	hi[d][h]i[r]	*gallop*
	[n][s][‘]	[n]a[s]a[‘]	*ride*	hi[][s]ia[‘]	*give a ride*
	[‘][b][d]	[‘]a[v]a[d]	*work*	he[‘]e[v]i[d]	*make work*
	[m][r][d]	[m]a[r]a[d]	*rebel*	hi[m][r]i[d]	*make rebel*
	[c][h][l]	[c]a[h]a[l]	*be joyous*	hi[c][h]i[l]	*make joyous*
	[l][n]	[l]a[n]	*spend the night*	he[l]i[n]	*host for the night*

b	*root*	*simple verb (unaccusative)*		*causative verb (transitive)*	
	[q][p][‘]	[q]a[f]a[‘]	*freeze*	hi[q][p]i[]	*freeze*
	[n][m][s]	[n]a[m]a[s]	*melt*	hi[][m]i[s]	*melt*
	[r][t][x]	[r]a[t]a[x]	*boil*	hi[r][t]ia[x]	*boil*
	[y][r][d]	[y]a[r]a[d]	*lower*	ho[][r]i[d]	*lower*
	[‘][l][y]	[‘]a[l]a[]	*rise*	he[‘]e[l]a[]	*raise*
	[y][c][‘]	[y]a[c]a[]	*go out*	ho[][c]i[‘]	*take out*
	[n][p][l]	[n]a[f]a[l]	*fall*	hi[][p]i[l]	*drop/ make fall*
	[p][n][y]	[p]a[n]a[]	*turn*	hi[f][n]a[]	*turn*
	[z][z]	[z]a[z]	*move*	he[z]i[z]	*move*

[7] The vocalic melodies are *a-a* for the **simple** template and *i-i* for the **causative** template. The **causative** template also involves the prefix *hi-*. Several phonological processes apply in stems, e.g. (a) postvocalic *b*, *p*, *k* typically spirantize to *v, f, x* respectively, (b) postvocalic glides usually delete, and sometimes *n* as well, (c) glides, pharyngeals and the glottal stop cause a lowering of the preceding vowel, or epenthesis of a following *e*, or, if word final, the epenthesis of a preceding *a* following any vowel but *a*.

[n][š][b]	[n]a[š]a[v]	*blow*	hi[][š]i[v]	*blow*
[m][t]	[m]e[t]	*die*	he[m]i[t]	*kill*

In (24), for each pair of equi-rooted verbs, the first derived by the simple template and the second by the intensive template, it is the second rather than the first which classifies the event as an *action*. Again, crucially, this is never reversed for any such pair in the language:[8, 9]

24. **the intensive alternation**

root	*simple verb (transitive)*		*intensive verb (transitive)*	
[š][b][r]	[š]a[v]a[r]	*break*	[š]i[b]e[r]	*actively break*
[y][c][r]	[y]a[c][a[r]	*produce*	[y]i[c]e[r]	*manufacture*
[p][t][r]	[p]a[t]a[r]	*excuse*	[p]i[t]e[r]	*dismiss/ fire*
[s][r][q]	[s]a[r]a[q]	*comb (area)*	[s]e[r]e[q]	*comb (hair)*
[q][š][r]	[q]a[š]a[r]	*tie*	[q]i[š]e[r]	*connect*
[q][c]	[q]a[c]a[c]	*cut off*	[q]i[c]e[c]	*actively cut off*
[š][l][x]	[š]a[l]a[x]	*send*	[š]i[l]ea[x]	*send away*
[s][p][x]	[s]a[f]a[x]	*add*	[s]i[p]ea[x]	*annex*
[x][z][y]	[x]a[z]a[]	*witness*	[x]i[z]a[]	*predict*
[c][p][y]	[c]a[f]a[]	*witness*	[c]i[p]a[]	*expect*
[x][b][l]	[x]a[v]a[l]	*hit*	[x]i[b]e[l]	*damage*
[p][g][‘]	[p]a[g]a[‘]	*hurt*	[p]i[g]ea[']	*commit terrorist act*
[n][g][x]	[n]a[g]a[x]	*hit with head*	[n]i[g]ea[x]	*ram*
[y][‘][c]	[y]a[‘]a[c]	*give advice*	[y]e[‘]e[c]	*advise*

The causative alternation being familiar from many languages, the meaning differences in (23) should be fairly clear. The intensive alternation in (24), on the other hand, is less familiar, and requires some discussion. In general, the causative alternation is a valence-increasing alternation, whereas the intensive alternation is not (though we will later have to return to this question and correct this generalization). Intensive verbs do not add an argument to the simple verb, but they add entailments to the effect that the event denoted is an action. Accordingly, they are only predicated of entities which are capable of action. Yet the relevant notion of action is very weak. It does not imply sentience or volition, and therefore the actor (the agent of action) is not necessarily an animate being. This notion of “actor” seems to be the one also identified by Van Valin and Wilkins 1996 in distinction from “effector”. Actors are not necessarily animate. There are inanimate entities in the universe which exert all kinds of forces: the planets and other bodies exerting gravitation, magnets, narcotic substances, and other natural forces such as wind, fire, water, which have their own force without possessing mental capabilities. Instruments as well may be classified as actors in this sense.

It is this weak concept of action, I believe, which is at the basis for the alternation in (24), independently of whether it is the volitional or purposive action that philosophers concentrate on. The latter presupposes animacy, at the very least, but animacy is not part of action in the sense relevant in the present context. Yet I canot at this point formulate the lexical entailments which characterize a predicate of action. Some idea is given by Ross’ 1972 and Dowty’s 1979 explication of the meaning of DO. Causation, which is often an intensional relation, is explicated by Lewis 1973. Notice that, as explained by Davidson 1971, action cannot be reduced to causation any more than causation can be reduced to action.

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[8] The vocalic melody for the **intensive** template is *i-e* . See preceding footnote for the phonological processes which apply to the stem.

[9] I agree with an anonymous reviewer that several intensive verbs are literary forms which are felt to be archaic: *šiber ‘actively break’*, *šileax ‘send-away’, hilex ‘actively walk’ , šiqe’a ‘sink’*. These four verbs belong to a formal register, yet they are clearly part of the lexicon of Hebrew speakers.

All this said, it is nevertheless true that many verbs which involve action do presuppose animacy by virtue of their meaning. They do so for actors (and other arguments as well) but crucially not for causes. Accordingly, if a particular verb *requires* its subject to be animate, we know that this subject is not a cause. Animacy requirements on subjects can therefore be used to easily identify action. A simple verb, on the other hand, may describe the same event as an intensive verb, but without ascribing action. Accordingly, a simple verb but not necessarily an intensive verb, is equally good with an animate and an inanimate subject:

25.a ha-yeladim/ ha-tiltulim ba-argaz šavru et-ha-kosot
the children/ the shaking within the box broke-SIMPL ACC the glasses

b ha-yeladim/ * ha-tiltulim ba-argaz šibru et-ha-kosot
the children/ the shaking within the box broke-INTNS ACC the glasses*

26.a ha-menahel/ macavo ha-bri'uti patar et dani me-ha-'avoda
the director/ the state of his health excused-SIMPL ACC Dani from the job

b ha-menahel/ * macavo ha-bri'uti piter et dani me-ha-'avoda
*the director/ * the state of his health excused-INTNS ACC Dani from the job (fired)*

Despite the contrast in (25)-(26), the decisive factor of the alternation in (24) is not the contrast between animate and inanimate actors, but rather between actors and non-actors. Regardless of animacy, the intensive member of the pair is necessarily predicated of an acting force, whereas the simple verbs is not thus restricted. In (27) below, in both the (a) and (b) sentences the subject is animate. Yet if the verb is simple, the subject may be affected rather than an actor, whereas if the verb is intensive, the subject can only be interpreted as an actor. The simple verb *break* in (27a), but not the intensive one in (27b), has a reading where its subject is the victim of the arm breaking:

27.a rina šavra et ha-yad
Rina broke-SIMPL ACC the arm
'Rina broke her arm (or some other arm).'

b rina šibra et ha-yad
Rina broke-INTNS ACC the arm
'Rina actively broke some arm (maybe her own).'

The same contrast can be shown in English between auxiliary *do* and the main verb *do*. Unlike the auxiliary *do,* the main verb *do* only has an action meaning, as noted by Ross 1972:

28.a Rina broke her arm, and Dina did too.
b Rina broke her arm, and Dina did it too.

Conversely, in both the (a) and (b) sentences in (29) below, the subject is inanimate. Yet if the verb is intensive, the subject can only be interpreted as an actor. The simple verb *produce* in (29a) has a reading where the protein is the trigger for antibodies being produced. The intensive-template verb in (29b) can only be interpreted such that the protein actually participates in the production process itself:

29.a ha-xelbon yacar ba-guf nogdanim
the protein produced-SIMPL in the body antibodies
'The protein produced antibodies in the body.'

b ha-xelbon yicer ba-guf nogdanim

the protein *produced-INTNS* *in the body* *antibodies*
'The protein manufactured antibodies in the body.'

The simple verb, then, does not necessarily entail for any of its arguments that it is an actor or a cause (though of course they could well be), whereas the causative and intensive verbs do have such entailments. The causative and intensive alternations therefore demonstrate that the template system does make a systematic semantic contribution.

Another semantic factor that distinguishes causation from action is intensionality. Causal effects are not necessarily manifested in the actual world, whereas the effects of action always are. For example, it is possible to find out (maybe after lengthy psychoanalysis) that a particular actual person was the cause for something that took place in my dream, e.g. a ship sinking. Yet that person cannot be the *actor* of the sinking of the ship whithout also being part of the dream. Accordingly, it would be true in such circumstances to say (30a), with a causative verb, but not (30b) with an intensive verb:

30.a ze ata še- hitba'ta li et ha-oniya ba-xalom
it (is) *you* *that* *sink-CAUS* *to-me* *ACC the ship* *in-the dream*
'It was you who caused the ship to sink in my dream.'

b ze ata še- tiba'ta li et ha-oniya ba-xalom
it (is) *you* *that* *sink-INTNS* *to-me* *ACC the ship* *in-the dream*
'It was you who sunk the ship in my dream.'

Indeed, many causative verbs involve hypothetical situations, for example:

31. he'ešim hicdiq
guilty-CAUS *justified-CAUS*
'blame' 'justifiy'

The verbs in (31) literally mean: cause to be guilty, cause to be justified, yet this is only caused in some hypothetical world that the hearer is invited to consider. Another type of examples involves visual appearances, as in (32a), whereas intensive verbs are interpreted in the real world, as in (32b):

32.a ha-me'il maxvir / marze / mazqin otax
the coat *pale-CAUS /slim-CAUS/ old-CAUS* *ACC-you*
'The coat makes you look pale/slim/old.'

b ha-qrem mešazef / menaqe otax
the cream *tans-INTNS / cleans-INTNS* *ACC-you*
'The cream tans/cleans you.' (*not*: The cream makes you look tanned/clean.)

A minimal pair is afforded by the intransitive forms of the causative vs. intensive verbs derived from the root *'dm* 'red'. (33a) is the natural way to express the fact that if I look at you through glasses with red lenses, you look red. (33b), on the other hand, makes the different claim, which is far less natural in view of our knowledge of the world, that whenever I look at you through glasses with red lenses, you actually change colors:

33. kol pa'am še- ani mistakelet aleyxa derex ha-mišqafayim ha-ele,
each time *that* *I* *look* *at-you* *through* *these glasses,*

a ata ma'adim
you *redden-CAUS*

b ata mit'adem
you redden-INTNS-MID

The contrast in (33) is indicative, since it is very subtle, nevertheless very robust. Native speakers that I have consulted all agree that (33a) is the way to express the intended meaning, though they do not know why. Speakers, including myself, think of the two verbs as synonymous until confronted with (33). This type of contrast was discovered by Zribi-Hertz 1987 for French. In French, the causative/intensive distinction of Hebrew shows up as a distinction between a lexical and a periphrastic causative. Hence, (34a) and (34b) below differ in the same way as the Hebrew (33a) and (33b) above:

34.a Ces lunettes rougissent les gens qu'on regarde
These glasses redden the people that one looks at "causative"
≠
b Ces lunettes font rougir les gens qu'on regarde
These glasses make the people that one looks at redden "intensive"

Going back to the issue of how systematic the semantic contribution of the templates is, it is crucial that all the meaning contrasts discussed above are achieved by the pairing of equi-rooted verbs. On the other hand, when a single verb is derived from a root, i.e. when the verb is not paired with another equi-rooted verb, then the contribution of the template is more erratic. Even then, a lot of systematicity can be shown to exist if one also takes into account equi-rooted nouns and adjectives. But when no contrast whatsoever is expressed by the choice of morphology, then, as often as not, the template is arbitrary. For example, verbs such as *listen*, *climb*, or *urge* are not semantically causative, despite their derivation by the causative template, neither do *perfume, end, disperse* necessarily denote actions, despite their derivation by the intensive template. Since the template is not contrastive for these verbs, their idiosyncratic meaning follows in the system of default features developed in section 5:

35.a *Causative-template verbs with non-causative meaning:*

hiqšiv	he'epil	hifcir
listen-CAUS	*climb-CAUS*	*urge-CAUS*
'listen'	'climb'	'urge'

b *Intensive-template verbs with non-action meaning:*

bisem	siyem	pizer
perfume-INTNS	*end- INTNS*	*disperse- INTNS*
'perfume'	'end'	'disperse'

Idiosyncrasy in the form of single verbs is often due to overriding pholonogical considerations dictating its template. For example, quadriliteral or reduplicated binary roots can only be derived by the intensive template, it being the only template which provides a slot for an extra consonant beyond the three customary ones. Accordingly, no alternation for the verb *drip* (which has the reduplicated binary root *tp*) is morphologically overt. Both transitive and intransitive *drip* share a single stem in the intensive template: *tiftef*. Of course, it does not follow in this case that the verb *drip* is an action verb, which it is not in (36a-b) below. The same holds of *dg* 'tickle', shown in (37). Similarly, the stative verb *like* with the binary root *xb*, which participates in the causative alternation, is derived under both variants by the intensive template, but surely it is not a verb of action:

36.a qafe tiftef me-ha- berez
coffee dripped-INTNS from the faucet

b ha- berez tiftef qafe

the faucet *dripped-INTNS* *coffee*

37.a medagdeg li
tickles-INTNS *to-me* 'I feel tickling.'

b ha-sveder medagdeg oti
the sweater *tickles-INTNS* *me* 'The sweater tickles me.'

38. a ha-talmid xibev et-ha-miqco'a
the student *liked-INTNS* *ACC the subject*

b ha-sefer xibev al-ha-talmid et-ha-miqco'a
the book *liked-INTNS* *on the student* *ACC the subject*
'The book made the student like the subject.'

Yet when two or three verbs are derived from the same root, a systematic contrast does emerge, as was illustrated in (23) and (24) above: the subject of the intensive template verb denotes an actor, whereas the subject of the causative template verb denotes a cause. The semantics of the templates only reveals itself in verbs where the choice of template is paradigmatic rather than idiosyncratic. It is not the role of semantics, but of morphology, to account for why no meaning is expressed when no contrast is created by the choice of template, in other words, why it is that a single verb derived from a root is often idiosyncratic. A morphological solution of this problem is presented in section 5. In the meantime, assuming the systematicity of the semantic alternations found in (23) and (24), we uncover in section 4 the syntactic correlates of these semantic alternations.

4. Action and Causality as affecting Valence

In the previous section, a preliminary distinction was drawn between the intensive and causative templates to the effect that the former, unlike the latter, does not involve a valence change relative to the simple verb, only entailments of action. Intensive and causative verbs related to the same monadic simple verbs are shown in (39). In each case, the causative verb is transitive, i.e. induces an increase in valence, whereas the intensive verb is intransitive, i.e. does not involve an increase of valence, but only reclassifies the simple verb's argument as an actor:

39. *root*	*simple verb (intransitive)*		*intensive verb (intransitive)*		*causative verb (transitive)*	
[r][q][d]	[r]a[q]a[d]	*dance*	[r]i[q]e[d]	*actively dance*	hi[r][q]i[d]	*make dance*
[q][p][c]	[q]a[f]a[c]	*jump*	[q]i[p]e[c]	*jump up and down*	hi[q][p]i[c]	*make jump*
[']][p]	['']a[f]	*fly*	['']o[f]e[f]	*actively fly*	he['][]i[f]	*fly*
[y][l][k]	[h]a[l]a[x]	*walk*	[h]i[l]e[x]	*actively walk*	ho[][l]i[x]	*make walk*
[x][z][r]	[x]a[z]a[r]	*return*	[x]i[z]e[r]	*court*	he[x][z]i[r]	*return*
[p][q][d]	[p]a[q]a[d]	*command*	[p]i[q]e[d]	*be in command*	hi[f][q]i[d]	*put in charge*

We can show that the simple and causative verbs, but not the intensive verbs, are equally good with an animate and an inanimate subject. (40c) also shows that causative verbs are not derived from intensive verbs:

40.a ha-yeladim/ ha-mexirim qafcu
the children/ *the prices* *jumped -SIMPL*
'The children jumped.' 'The prices raised.'

b ha-yeladim/ * ha-mexirim qipcu

the children/ the prices *jumped -INTNS*
'The children/*the prices jumped up and down.'

c mašehu hiqpic et-ha-yeladim/ et-ha-mexirim
something *jumped-CAUS* *ACC the children / ACC the prices*
'Something made the children jump/ the prices raise.'

The distinction in (40b) is expressible in English by using the main verb *do*, which, as already mentioned in the context of example (28) above, only has an action meaning:

41.a The girls jumped up and down after the boys did it.
b * The prices jumped up and down after the taxes did it.

We now have to fine-tune the generalization regarding the effect on adicity of intensive vs. causative templates. We first show cases where the intensive template involves a valence increase. This happens when the simple verb is unaccusative. Unlike unergative and transitive simple verbs, where the intensive template assigns the actor thematic role to one of the arguments of the simple verb, if the simple verb is unaccusative, then the actor role is assigned to an additional argument. The intensive verbs in (42), which correspond to simple unaccusative verbs, are therefore just as transitive as the equi-rooted causative verbs:

42.*root*	*simple verb (unaccusative)*		*intensive verb (transitive)*		*causative verb (transitive)*	
[p][n][y]	[p]a[n]a[]	*turn*	[p]i[n]a[]	*turn out*	hi[f][n]a[]	*turn*
[y][c][‘]	[y]a[c]a[]	*come out*	[y]i[c]e[]	*export*	ho[][c]i[]	*take out*
[g][d][l]	[g]a[d]a[l]	*grow*	[g]i[d]e[l]	*grow*	hi[g][d]i[l]	*increase*
[p][x][t]	[p]a[x]a[t]	*reduce*	[p]i[x]e[t]	*devaluate*	hi[f][x]i[t]	*reduce*
[t][b][‘]	[t]a[v]a[‘]	*drown*	[t]i[b]ea[']	*drown*	hi[t][b]ia[']	*drown*
[š][q][‘]	[š]a[q]a[‘]	*sink*	[š]i[q]ea[']	*sink*	hi[š][q]ia[']	*sink/invest*
[k][p]	[k]a[f]a[f]	*bend*	[k]o[f]e[f]	*bend*	hi[x][p]i[f]	*subordinate*
[b][‘][r]	[b]a[‘]a[r]	*be on fire*	[b]e[‘]e[r]	*destroy by fire*	hi[v][‘]i[r]	*put on fire*
[y][b][š]	[y]a[v]a[š]	*dry*	[y]i[b]e[š]	*dry*	ho[][v]i[š]	*dry*
[‘][b][d]	[‘]a[v]a[d]	*get lost*	[‘]i[b]e[d]	*lose*	he[‘]e[v]i[d]	*make get lost*
[b][q][‘]	[b]a[q]a[‘]	*split*	[b]i[q]ea[']	*split open*	hi[v][q]ia[']	*split*
[t][‘][m]	[t]a[‘]a[m]	*match*	[t]e[‘]e[m]	*coordinate*	hi[t][‘]i[m]	*match*
[n][g][d]	[n]a[g]a[d]	*contradict*	[n]i[g]e[d]	*contrast*	hi[n][g]i[d]	*contrast*
[b][š][l]	[b]a[š]a[l]	*ripen*	[b]i[š]e[l]	*cook*	hi[v][š]i[l]	*ripen*
[p][s][q]	[p]a[s]a[q]	*stop*	[p]i[s]e[q]	*punctuate*	hi[f][s]i[q]	*stop*
[x][s][r]	[x]a[s]a[r]	*miss*	[x]i[s]e[r]	*subtract*	he[x][s]i[r]	*miss*
[n][p][x]	[n]a[f]a[x]	*blow*	[n]i[p]ea[x]	*blow up*	hi[][p]ia[x]	*blow into*
[c][m][x]	[c]a[m]a[x]	*grow*	[c]i[m]ea[x]	*grow*	hi[c][m]ia[x]	*grow*

We can verify that the additional argument of the intensive verb is an actor, whereas the additional argument of the causative verb is not. In the following examples, the intensive verb can only be predicated of an animate actor.[10] The causative verb, on the other hand, may be predicated of any kind of cause (including abstract causes), as shown in (43)-(45):

[10] An anonymous reviewer notes that there are even simple verbs which, because of their meaning, require an animate subect, e.g. the simple verbs *give birth* and *trust* of (19a) and (20a) respectively. But notice that even in such cases, the animate subjects are not actors in the respective events. It is the subjects of the parallel intensive verbs (19b) and (20b) which are assigned the role of actors in the events where the subjects of the simple verbs are affected participants.

43. a	ba'alat-ha-bayit/ ha-avtala	hifneta	et-ha-dayarim	le-liškat-ha-avoda	
	the landlady /unemployment	*turned-CAUS*	*ACC the tenants*	*to the employment agency*	
b	ba'alat-ha-bayit	pinta	et-ha-dayarim		
	the landlady	*turned-out-INTNS*	*ACC the tenants*		
c *	ha-avtala	pinta	et-ha-dayarim		
	unemployment	*turned-out-INTNS*	*ACC the tenants*		
44.a	medinot aniyot / maskorot nemuxot	hoci'u	po'alim	le-hafganot	
	poor countries / low wages	*brought-out-CAUS*	*workers*	*to demonstrations*	
b	medinot aniyot	meyac'ot	po'alim		
	poor countries	*export-INTNS*	*workers*		
c *	maskorot nemuxot	meyac'ot	po'alim		
	low wages	*export-INTNS*	*workers*		
45.a	ha-agronomit / eyxut-ha-qarqa	higdila	et-ha-yevul		
	the agronomist /the quality of the soil	*increased-CAUS*	*ACC the crop*		
b	ha-agronomit	gidla	yeraqot		
	the agronomist	*grew-INTNS*	*vegetables*		
c *	eyxut-ha-qarqa	gidla	yeraqot		
	the quality of the soil	*grew-INTNS*	*vegetables*		

The intensive template, then, adds an argument to unaccusative simple verbs, but not to unergative and transitive simple verbs. This claim appears at first sight to be contradicted by the intensive verbs in (46) below, which correspond to simple verbs that are unergative, or even transitive, yet have an actor which is not an argument of the simple verb:

46.	*root*	*simple verb (unergative/transitive)*		*intensive verb (transitive)*	
	[y][š][b]	[y]a[š]a[v]	*sit/ sit down*	[y]i[š]e[v]	*settle (trans.)*
	[š][k][n]	[š]a[x]a[n]	*dwell*	[š]i[k]e[n]	*relocate*
	[y][š][n]	[y]a[š]a[n]	*sleep*	[y]i[š]e[n]	*lull to sleep*
	[š][t][q]	[š]a[t]a[q]	*be/ become silent*	[š]i[t]e[q]	*paralize*
	[y][d][‘]	[y]a[d]a[‘]	*know*	[y]i[d]ea[']	*inform*
	[l][m][d]	[l]a[m]a[d]	*study/ learn*	[l]i[m]e[d]	*teach*
	[y][g][‘]	[y]a[g]a[‘]	*spend energy*	[y]i[g]ea[']	*exhaust*

But the simple verbs in (46) are stative verbs which, in general, are ambiguous between a state reading, for which they are unergative, and an inchoative reading, for which they are unaccusative. Crucially, the corresponding intensive verbs do not include the state reading as part of their meaning, but rather the inchoative reading. But this is the reading which corresponds to the unaccusative verbs. In other words, the intensive verbs are derived from predicates which are unaccusative, and this is why the intensive verbs have an *additional* actor. For this reason, and another one we discuss below, we will not assume, when we present the formal account in the next section, that intensive (and causative) verbs are derived from the corresponding simple verbs, but rather from the root. It is the roots in (46) which are unaccusative, not the simple verbs. The simple verbs in (46) are special in that they allow an argument of the root to be the external arguments of the verb. That this is indeed the case is further evidenced by the fact that their corresponding adjectival passives may be predicated of their *subjects*: *yašuv* ‘someone who has sat down’, *lemud-nisayon* (literally experience-learned) ‘someone who has learned from experience’.

We now turn to a second correction of the generalization regarding the effect of the templates on adicity. The following are examples where the causative template does not involve valence increase. The simple verbs in these examples have an argument that is thematically a "source". In the corresponding causative verbs, this very same argument may be expressed as causer, but actually it has the exact same role as with the simple template. In such a case, no new participant is added by the causative template. The causative verbs in (47) are the converses of the simple verbs, and have the same adicity:

47. **causative converses**

root	*simple verb (dyadic intransitive)*		*causative verb (dyadic transitive)*	
[c][m][x]	[c]a[m]a[x]	*grow in*	hi[c][m]ia[x]	*be the location of growth*
[n][š][r]	[n]a[š]a[r]	*fall off*	hi[][š]i[r]	*shed*
[ʿ][l][y]	[ʿ]a[l]a[]	*rise from*	he[ʿ]e[l]a[]	*raise (dust, smoke)*
[n][d][f]	[n]a[d]a[f]	*emanate from*	hi[][d]i[f]	*emanate*
[n][z][l]	[n]a[z]a[l]	*drip from*	hi[][z]i[l]	*drip*
[p][☒][d]	[p]a[x]a[d]	*fear*	hi[f][x]i[d]	*scare*
[d][ʿ][g]	[d]a[ʿ]a[g]	*worry*	hi[d][ʿ]i[g]	*worry*
[k][ʿ][s]	[k]a[ʿ]a[s]	*be annoyed*	hi[x][ʿ]i[s]	*annoy*

root	*simple verb (triadic transitive)*		*causative verb (triadic transitive)*	
[y][r][š]	[y]a[r]a[š]	*inherit*	ho[][r]i[š]	*bequeath*
[q][n][y]	[q]a[n]a[]	*receive*	hi[q][n]a[]	*provide*
[s][k][r]	[s]a[x]a[r]	*rent from*	hi[s][k]i[r]	*rent to*
[x][k][r]	[x]a[x]a[r]	*lease from*	he[x][k]i[r]	*lease to*
[š][ʿ][l]	[š]a[ʿ]a[l]	*borrow*	hi[š][ʿ]i[l]	*lend*
[l][v][y]	[l]a[v]a[]	*borrow*	hi[l][v]a[]	*lend*
[n][x][l]	[n]a[x]a[l]	*acquire*	hi[n][x]i[l]	*provide*

It should be noted in this context that the preposition *me-*'from' is used to express both locative and causative relations (as is common crosslinguistically). An argument marked with this prepostion is thematically a source (or, in other words, a cause). In Hebrew, it can undergo the causative conversion and surface as the subject:

48.a. re'ax ra' nadaf me-ha-kelev
smell bad emanated-SIMPL from-the-dog
'Bad smell emanated from the dog.'

b. ha-kelev hidif re'ax ra'
the dog emanated-CAUS smell bad
'The dog emanated bad smell.'

Crucially, the relevant thematic role is expressed once but not twice (similarly to Pesetky's 1995 T/SM restriction):

49. * ha-haznaxa hidifa re'ax ra' me-ha-kelev
the-neglect emanated-CAUS smell bad from-the-dog
'Neglect caused bad smell to emanate from the dog.'

The same is apparently true of lexical causatives (LEX-CAUS) in Japanese, unlike syntactic causatives (SYN-CAUS)). A lexical causative verb does not license the addition of a causer to a sentence already containing a "source" argument, though a syntactic causative does:

50. kodomo-no kega-ga titioya-ni zibun-no otido-o
child-GEN *injury-NOM* *father-DAT* *self-GEN* *fault-ACC* [11]

kurusim-(s)ase-ta / * kurusim-e-ta
be-distressed-SYN-CAUS-PAST / *be-distressed-LEX-CAUS-PAST*

'The child's injury caused the father to be distressed at his fault.' (Katada 1997, fn.4)
'* The child's injury distressed the father at his fault.' (Katada 1997 (18))

We are now in a position to reformulate our initial generalization that the causative template adds a cause, whereas the intensive template just reclassifies one of the existing arguments as an actor. Rather, it would be more correct to say that the causative verb has a cause argument which is *not* the same as the external argument of the simple verb, whereas the intensive verb has an actor argument which *is* the same as the external argument of the simple verb (if there is one). This generalization, which at present is only stated informally, leads us to see intuitively what the difference is between the causative template and the intensive template. Each of the causative and intensive verbs denote the same event denoted by the simple verb. The intensive template classifies it as having an actor, and the causative template classifies it as having a cause. The actor relation must select what is anyway the most prominent participant of the event, which is the argument that the simple verb takes as an external argument (agent, or more exactly proto-agent in the sense of Dowty 1991). The cause relation, on the other hand, *changes* the prominence of the participants. It can in principle even designate a participant of the event itself as the cause, and make it the most prominent participant. What is interesting is that the external argument of the simple verb *never* gets selected as the cause. This is so since external arguments are by default understood to be causers. The causative morphology is the marking of a change in this default attribution of causation. The causer in a causative verb is therefore necessarily different from the external argument of the simple verb.

A similar effect is described in Chinese by Li 1995. In Chinese, according to Li, it is possible to find an agent realized as an object, while the patient is realized as the subject. This happens when the patient, similarly to the source role in Hebrew, is interpreted as cause, while the agent is interpreted as afectee. In Hebrew, this marked relation is licensed by causative morphology on the verb, whereas in Chinese it is licensed by compounding the verb with a resultative verb predicated of the agent. In both languages, if the thematic prominent role coincides with the grammatical prominent function, then no marking occurs.

Actually, Li shows that even when prominence coincides, compounding may be used, but it does not indicate causativity. The same is true in Hebrew. Hagit Borer has noticed (p.c.) that many verbs in modern Hebrew have "spurious" causative morphology, in that the causative template simply replaces the simple template in colloquial registers, and does not denote causativity:

51.	*root*	*SIMPL*	*CAUS*	common meaning
	[s][k][r]	[s]a[x]a[r]	hi[s][k]i[r]	*rent from*
	[l][v][y]	[l]a[v]a[]	hi[l][v]a[]	*borrow*
	[y][l][d]	[y]a[l]a[d]	ho[][l]i[d]	*give birth*
	[q][c][b]	[q]a[c]a[v]	hi[q][c]i[v]	*allocate*
	[ʻ][l][b]	[ʻ]a[l]a[v]	he[ʻ]e[l]i[v]	*insult*
	[s][p][d]	[s]a[f]a[d]	hi[s][p]i[d]	*eulogize*
	[n][q][š]	[n]a[q]a[š]	hi[][q]i[š]	*knock*
	[l][b][š]	[l]a[v]a[š]	hi[l][b]i[š]	*wear*

[11] The acceptability of the sentence with the synactic causative would be enhanced by using the dative Case marker *-ni* instead of the accusative Case marker-*o*, i.e. *otido-ni* rather than *otido-o* (R. Harada p.c.).

We have already hinted to the fact that it is not the simple verb which is the input to the intensive and causative templates. When the system is formally presented in the next section, it is the root rather than the simple verb which is taken to be the basic predicate. One reason for this has been provided by examples (46) above. Another reason is that in many cases, the intensive and causative templates derive verbs from a root which does not derive any simple verb, but only adjectives or nouns:

52.	*root*	*SIMPL*	*INTNS* *(transitive)*		*CAUS* *(transitive)*	
	[z][m][n]	*	[z]i[m]e[n]	*summon*	hi[z][m]i[n]	*invite*
	[t][q][n]	*	[t]i[q]e[n]	*repair*	hi[t][q]i[n]	*install*
	[l][b][n]	*	[l]i[b]e[n]	*white-heat metal*	hi[l][b]i[n]	*whiten*
	[p][c]	*	[p]o[c]e[c]	*blow up*	hi[f][c]i[c]	*bomb*
	[‘][r]	*	[‘]o[r]e[r]	*excite*	he[][‘]i[r]	*wake up*
	[g][n]	*	[g]o[n]e[n]	*physically protect*	he[][g]e[n]	*protect*
	[r][x]	*	[r]i[x][r]ea[x]	*sniff*	he[][r]ia[x]	*smell*
	[g][d][r]	*	[g]i[d]e[r]	*fence*	hi[g][d]i[r]	*define*
	[k][n][s]	*	[k]i[n]e[s]	*gather*	hi[x][n]i[s]	*bring in*
	[s][d][r]	*	[s]i[d]e[r]	*arrange*	hi[s][d]i[r]	*regulate*
	[n][c][x]	*	[n]i[c]ea[x]	*win*	hi[n][c]ia[x]	*immortalize*
	[š][m][n]	*	[š]i[m]e[n]	*oil*	hi[š][m]i[n]	*fatten*
	[r][m]	*	[r]o[m]e[m]	*lift*	he[][r]i[m]	*raise*
	[š][l][m]	*	[š]i[l]e[m]	*pay*	hi[š][l]i[m]	*complete*

For these roots as well, the contribution of the templates is systematic, and is thematically the same as for roots which derive simple verbs. Consider the denominal verbs in (53) and (54) below. The subject of the causative denominal emission verbs in (53) has the source/ cause role found with other causative verbs:

53.	*root*	*noun*		*causative verb* *(intransitive unergative)*	
	[y][z][‘]	[][z]e[‘]a	*sweat*	hi[][z]ia[‘]	*sweat*
	[y][q][‘]	[][q]i[]	*vomit*	hi[][q]i[]	*vomit*
	[š][p][r][c]	[š][p][r]i[c]	*squirt*	hi[š][p][r]i[c]	*squirt*
	[š][t][n]	[š]e[t]e[n]	*urine*	hi[š][t]i[n]	*urinate*
	[r][‘][m]	[r]a[‘]a[m]	*thunder*	hi[r][‘]i[m]	*thunder*
	[r][‘][š]	[r]a[‘]a[š]	*noise*	hi[r][‘]i[š]	*emit noise*
	[r][q][b]	[r]a[q]a[v]	*rot*	hi[r][q]i[v]	*rot*
	[b][r][q]	[b]a[r]a[q]	*glitter/lightning*	hi[v][r]i[q]	*glitter*
	[‘][r]	[‘]o[r]	*light*	he[][‘]i[r]	*emit light*

The subject of the intensive denominal verbs in (54) has an actor role, i.e. the role of *putter*, *remover* and *maker* in (54a-c) respectively:

54.a	*root*	*noun*		*intensive verb: put* *(transitive)*	
	[g][d][r]	[g]a[d]e[r]	*fence*	[g]i[d]e[r]	*fence*
	[y][‘][r]	[y]a[‘]a[r]	*forest*	[y]e[‘]e[r]	*forest*
	[s][b][n]	[s]a[b]o[n]	*soap*	[s]i[b]e[n]	*soap*
	[b][s][m]	[b]o[s]e[m]	*perfume*	[b]i[s]e[m]	*perfume*
	[x][t][l]	[x]i[t]u[l]	*diaper*	[x]i[t]e[l]	*diaper*
	[š][m][n]	[š]e[m]e[n]	*oil*	[š]i[m]e[n]	*oil*

	[s][y][d]	[s]i[][d]	*paint*	[s]i[y]e[d]	*paint*
	[z][p][t]	[z]e[f]e[t]	*tar*	[z]i[p]e[t]	*tar*
	[q][v]	[q]a[v]	*line*	[q]i[v][q]e[v]	*line*
	[ʻ][m][l][n]	[ʻ]a[m]i[l]a[n]	*starch*	[ʻ]i[m][l]e[n]	*starch*
	[r][m][z][r]	[r]a[m][z]o[r]	*stoplight*	[r]i[m][z]e[r]	*put stoplight*
	[n][m][q]	[n]i[m]u[q]	*argument*	[n]i[m]e[q]	*provide argument*
	[s][n][d][l]	[s]a[n][d]a[l]	*sandal*	[s]i[n][d]e[l]	*put sandals on*
	[ʻ][y][š]	[ʻ]i[][š]	*man*	[ʻ]i[y]e[š]	*man*
b	*root*	*noun*		*intensive verb: remove (transitive)*	
	[ʻ][b][q]	[ʻ]a[v]a[q]	*dust*	[ʻ]i[b]e[q]	*dust*
	[ʻ][s][b]	[ʻ]e[s]e[v]	*weed*	[ʻ]i[s]e[v]	*weed*
	[q][r][p]	[q]a[r][q]e[f]et	*scalp*	[q]i[r][q]e[f]	*scalp*
	[y][l][d]	[y]e[l]e[d]	*child*	[y]i[l]e[d]	*deliver child*
c	*root*	*noun*		*intensive verb: make (transitive)*	
	[g][š][r]	[g]e[š]e[r]	*bridge*	[g]i[š]e[r]	*bridge*
	[r][š][t]	[r]e[š]e[t]	*net*	[r]i[š]e[t]	*net*
	[š][r]	[š]a[r][š]e[r]et	*chain*	[š]i[r][š]e[r]	*chain*

As we see in the next section, roots are in general of types <s,t> or <s,<e,t>>, where s is the type of expressions denoting events, and e is the type of expressions denoting other individuals. To account for denominal derivations, we have to assume that roots can also be of type <e,t>, i.e. some roots are inherently nominal. In denominal derivations of verbs, it is the template itself which introduces the event. This maybe indicates that there is a notion of canonincal action which involves objects, i.e. *put/remove*, and a notion of canonical causation involving objects which is *emit*.

The denominal derivation of intensive verbs explains away an additonal apparent counterexample to the generalization that the intensive verb has the same subject as a corresponding transitive simple verb. In (55), the intensive verb has an actor subject (typically the obstetrician) which is not identical to the subject of the simple verb (the mother):

55.	*root*	*simple verb (transitive)*		*intensive verb (transitive)*	
	[y][l][d]	[y]a[l]a[d]	*give birth*	[y]i[l]e[d]	*deliver*

If we assume that the intensive verb [y]i[l]e[d] 'deliver' is derived from the *noun* child, i.e. it means 'deliver of child', then it is similar to the other denominal intensive verbs of removal shown in (54b). The middle form *hityaled* of the intensive verb further demonstrates its denominal origin, for it means 'behave like a child' and not 'deliver oneself' or 'be delivered'.

The present appoach will also account for the two Case patterns of Hebrew causative verbs described by Cole 1976 but left unexplained since. Cole noted that the "causee" (originally the subject of the simple verb) is accusative for some causative verbs but oblique for others. In the examples below, the causee is accusative in (56), but oblique in (57):

56.	*root*	*simple verb (transitive)*		*causative verb (transitive)*	<u>*ACC CAUSEE*</u>
	[s][p][g]	[s]a[f]a[g]	*absorb*	hi[s][p]i[g]	*soak*
	[ʻ][k][l]	[ʻ]a[x]a[l]	*eat*	he[ʻ]e[x]i[l]	*feed*

[t][‘][m]	[t]a[‘]a[m]	*eat*	hi[t][‘]i[m]	*feed*
[š][t][y]	[š]a[t]a[]	*drink*	hi[š][q]a[]	*make drink*
[g][m][‘]	[g]a[m]a[‘]	*drink*	hi[g][m]ia[‘]	*make drink*
[y][n][q]	[y]a[n]a[q]	*suck*	he[][n]i[q]	*suckle*
[n][š][m]	[n]a[š]a[m]	*breathe*	hi[n][š]i[m]	*respirate*
[r][q][d]	[r]a[q]a[d]	*dance*	hi[r][q]i[d]	*make dance*
[l][b][š]	[l]a[b]a[š]	*put on*	hi[l][b]i[š]	*clothe*
[p][š][t]	[p]a[š]a[t]	*undress*	hi[f][š]i[t]	*undress*
[t][‘][n]	[t]a[‘]a[n]	*carry*	hi[t][‘]i[n]	*load*
[‘][m][s]	[‘]a[m]a[s]	*carry*	he[‘]e[m]i[s]	*load*
[t][r][m]	[t]a[r]a[m]	*donate*	hi[t][r]i[m]	*make donate*

57.

root	*simple verb (transitive)*		*causative verb (transitive)*	<u>*OBL CAUSEE*</u>
[s][n][‘]	[s]a[n]a[]	*hate*	hi[s][n]i[]	*make hate*
[‘][h][b]	[‘]a[h]a[v]	*love*	he[‘]e[h]i[v]	*make love*
[š][m][‘]	[š]a[m]a[‘]	*hear*	hi[š][m]ia[']	*make hear*
[r][‘][y]	[r]a[‘]a[]	*see*	he[r][‘]a[]	*show*
[k][t][b]	[k]a[t]a[v]	*write*	hi[x][t]i[v]	*dictate*
[z][k][r]	[z]a[x]a[r]	*remember*	hi[z][k]i[r]	*remind*
[k][l]	[k]a[l]a[l]	*include*	hi[x][l]i[l]	*include*
[n][s][‘]	[n]a[s]a[]	*take as bride*	hi[][s]i[]	*give away as bride*
[y][l][d]	[y]a[l]a[d]	*give birth*	ho[][l]i[d]	*beget*
[l][b][š]	[l]a[v]a[š]	*dress*	hi[l][b]i[š]	*dress*
[p][š][t]	[p]a[š]a[t]	*undress*	hi[f][š]i[t]	*undress*
[t][m][n]	[t]a[m]a[n]	*conceal*	hi[t][m]i[n]	*conceal*
[m][c][‘]	[m]a[c]a[]	*find*	hi[m][c]i[]	*make available*
[k][p][l]	[k]a[f]a[l]	*multiply*	hi[x][p]i[l]	*multiply*
[š][m][t]	[š]a[m]a[t]	*drop*	hi[š][m]i[t]	*drop*

Example sentences with two simple verbs, the first from (56) and the second from (57), are shown in (58a) and (58b) respectively:

58.a ha-ripud safag et-ha-mayim
the upholstery *absorb-SIMPL* *ACC-the-water*
‘The upholstery absorbed the water.’

a ha-talmid sana et-ha-miqcoa’
the student *hate-SIMPL* *ACC-the-subject*
‘The student hated the subject.’

The subject of (58a) is marked accusative in the corresponding causative sentence (59a), whereas the subject of (58b) is oblique in the corresponding causative sentence (59b):

59.a dani hispig et ha-ripud be-mayim
Dani *absorb-CAUS* *ACC-the upholstery* *with water*
‘Dani soaked the upholstery with water.’

a ha-sefer hisni al-ha-talmid et-ha-miqcoa’
the subject *hate-CAUS* *on-the-student* *ACC-the subject*
‘The book made the student hate the subject.’

I will claim that both arguments of the simple verbs in (56) and in (57) are arguments of the root, and moreover that the root may assign inherent Case to its oblique argument when no structural Case is assigned, as in the causative constructions (59). The direct argument of the root, on the other hand, is always assigned structural Case, because of its "nonrestricted" nature. It can be shown that inherent Case is a property of the root and not a property of the causative verb. The very same inherent Case is already found in the simple template in constructions where no structural Case is assigned, as in the adjectival passives in (60). The inherent Case marking *be-* found in (59a) is also found in (60a), and the inherent Case marking *al-* found in (59a) is also found in (60b):

60.a ha-ripud safug be-mayim
the upholstery *absorb-SIMPL-PASS-PART* *with water*
'The upholstery is soaked with water.'

b ha-miqcoa' sanu al-ha-talmid
the subject *hate-SIMPL-PASS-PART* *on-the-student*
'The subject is hateful to the student.'

I will refer to the simple verbs in (57) as "locative/experiencer subject verbs". The subject of these verbs is the oblique argument of the root, as is evidenced by its inherent Case marking in the causative and adjectival passive constructions. The fact that structurally, locative/experiencer subjects have a difference position from agentive/causative subjects has already been argued for by Landau 1999, 2002, on the basis of idependent sets of data. Landau 1999 investigates the distribution of Possessive Datives (first discussed by Borer and Grodzinsky 1986). According to Landau, Possessive Datives are generated in the specifier of the possessee and raised to SPEC-VP. This position is available as a landing site for raising in structures with agentive verbs such as *qilqel* 'damage', since their own subject does not occupy SPEC-VP, but SPEC-*v*P, as shown in (61a). Landau shows that Possessive Datives never cooccur with locative/ experiencer subjects, as exemplified in (61b) and (61c) respectively:

61.a [[SPEC-*v*P rina] [[V+*v* qilqela] [[SPEC-VP le- gil_i]
Rina *damaged* *to-Gil*

[t_V et [DP [SPEC-DP t_i] ha-ša'on]]]]
ACC *the watch*

'Rina damaged Gil's watch.'

b * ha-xešbon kalal le-rina et-ha- aruxa
the bill *included* *to-Rina* *ACC the meal*
'The bill included Rina's meal.'

c * gil sana le-rina et- ha- tisroqet
Gil *hated* *to-Rina* *ACC the hairstyle*
'Gil hated Rina's hairstyle.'

Landau's account is that locative/experiencer subjects are mapped to SPEC-VP, unlike causative/agentive subjects, thereby filling up the Possessor Dative's landing site and blocking its extraction in (61b-c). My own account will follow Landau's in this respect.

I will refer to the simple verbs in (56) as "consumption verbs". These verbs are special in that it is the direct argument of the root which surfaces as their subjects. Accordingly, it is the object of the simple verb, rather than its subject as in (57), which is inherently Case marked in the causative and

adjectival constructions in (59a) and (60a). Additional evidence is that simple-template adjectival passives may be predicated of the simple verbs' subjects: *axul* 'someone who has eaten, š*atuy* 'drunk', *lavu*š 'dressed', *safug* 'soaked', *ta'un/ amus* 'loaded', *xatum* 'someone who has signed', similarly to our discussion of the examples in (46). There are other languages as well, e.g. Marathi, where the subject of consumption verbs such as *eat* is an internal argument, see Alsina and Joshi 1991.

5. Action and Causality as components of verb meaning

Given a system of verbal templates, there is no need to assume that the lexicon consists of morphemes as fine grained as verbs. Rather, the lexicon of Semitic languages consists of coarser grained *consonantal roots*, whereas verbs are constructed from the roots by merging them with other morphemes realized as the templates.

I assume that all active verbs are constructed in the syntax[12] by combining the root with different *agency-heads*, ι and γ, which first, determine whether this will be a verb of action, a verb of causation or unclassified for these dimensions, and which, second, introduce an external argument. In addition, a derivation may cointain a *voice-head*. I will discuss two voice-heads: the passive voice-head π, and the middle voice-head μ. The lack of a voice-head in a derivation is interpreted by default as active voice.

By principles of distributed morphology (Halle and Marantz 1993, Marantz 1997), the syntactic combination of verb, agency-head and voice-head, is supplied a Vocabulary form by the morphological component of the grammar. Moreover, this model assumes an Encyclopedia, which contains semantic information special to particular syntactic combinations. It is well known that derivational morphology allows a certain amount of deviation from compositional meaning. We will see below that the more local the combination, the more idiosyncrasy is found in meaning. For example, the intensive agency-head ι combines directly with the root, whereas the causative template γ combines with the root together with its arguments. The same difference exists between the middle voice-head μ and the passive voice-head π. Accordingly, the meaning of a root combined with the intensive or the middle template is more idiosyncratic than with either the causative or the passive templates. As a result, many intensive verbs are associated with rich encyclopedic knowledge, witness such intensive examples as *šilem* 'pay' (derived from the root *šlm* 'complete'), *xizer* 'court' (derived from the root *xzr* 'return'), *nice'ax* 'win' (derived from the root *ncx* 'eternity') and many others.

Under the simplest conceivable form-meaning correspondence, every root R fused with ι should always be realized as an intensive verb, a root fused with γ should always be realized as a causative verb, and a root in isolation should always be realized as a simple verb. Yet this is true only in the default case. The default features of the templates are the following:

62.

Templates	**Default features**
INTNS	[+ι]
CAUS	[+γ]
SIMPL	[-ι-γ]

Crucially, templates can be specified to have marked features in the environment of certain roots. According to any existing model of morphology, forms specified for a particular feature override default forms, by the most basic "elsewhere" consideration familiar at least since Kiparsky 1973. Therefore, idiosyncratic verbs have listed templates. The templates of these verbs are completely uninformative, i.e. the form/meaning correspondence is rendered as opaque as in the more familiar languages with poorer morphology. In addition, non-contrastive features are redundant, and therefore not marked, which clarifies

[12] Word-internal syntax is perhaps part of the lexicon, as in Hale and Keyser 1993.

why it is that verbs with unique stems tend to be idiosyncratic. If a single verb stem exists in the root, it will have no contrastive features and will therefore fit any combination of features which appears in the the syntax. Accordingly, the template might as well be idiosyncratic. In addition, it is possible for marked features to be specific to particular environments, which may limit the syntactic feature combination that the template matches. For example the intensive template INTNS has the marked feature specification [-γ] in the environment of the binary root *cl*, which means that the intensive verb *cilcel* 'ring' realizes the root either in isolation or in combination with the intensive agency-head, but not with the causative agency-head (since, similarly to English, this verb is either intransitive or transitive, but the subject of the transitive verb is strictly an actor). The following table of marked choices of features expresses the fact that INTNS realizes the derivations involving non-tripartite roots such as *cl*, and other roots such as *tp*, *dg* and *xb* of the examples (36) - (38) above:

63.

Special environments	**Marked Features**
INTNS / ____ tp, dg...	[]
INTNS / ____ xb,...	[-ι]
INTNS / ____ cl,...	[-γ]

In addition, I adopt the idea of Hale and Keyser 1993 and Kratzer 1994 that the external argument of a verb is introduced by a separate head, the *light verb v*.[13] Under the present account, the internal arguments are arguments of the root R. Semantically, I take a root R to denote either a property of eventualities λe[R(e)] or a relation between individuals and eventualities, e.g. λxλe[R(e,x)]. The light verb head *v* relates an eventuality to its Agent (more precisely Proto-Agent in the sense of Dowty 1991): λyλe[Agent(e,y)]. The agency-head ι classifies the eventuality as an action: ι = λe[Action(e)]. The agency-head γ relates an eventuality to its cause: γ = λyλe[Cause(e,y)]. This is summarized below:

64.

	agency-head	*denotation*	*default template*	*licensing of v*
a.	--	--	SIMPL	depends on R
b.	ι	λe[Action(e)]	INTNS	licensed
c.	γ	λyλe[Cause(e,y)]	CAUS	not licensed

As shown in (64b), the thematic role that we have called Actor can be reduced to the thematic role of Agent (denoted by *v*), in events that are classified as Action by ι. This is expressed in (65):

65. Agent (e,y) & Action (e) → Actor (e,y)

Unlike ι which does not introduce a new thematic relation but just a property of the event, γ introduces a new thematic relation: Cause, as formulated in (64c). The Cause relation is different from the Agent relation introduced by *v*. This is the source of the observation made in section 4 that the Cause thematic role is never assigned to the Agent.

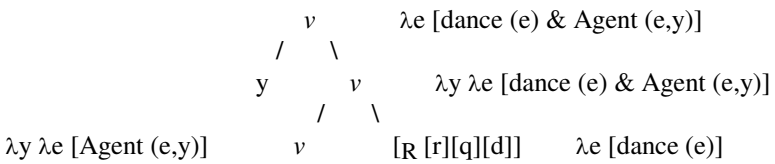
According to Kratzer, functional heads do not combine with their complements by the usual mode of function application, but by a different mode she calls "identification", following Higginbotham 1985. For example, identification takes place in (66) in the subtree where *v* and R are combined, according to the following rule,
ident ($\alpha_{<e, <s, t>>}$, $\beta_{<s, t>}$) ≡ λP λy_e λe_s [α(e,y) & P(e)] (β)
i.e. combing *v* and R in (66) by identification is equivalent to applying λPλyλe[*v*(e,y) & P(e)] to R. The other subtrees in (66) combine by function application. Note that I assume that the event argument is

[13] This idea has already been adopted for Hebrew in recent work: Simmons 1996, Arad 1998 and Landau 1999, 2002, and more radically in the different aspectual model of Borer 1994, 1998.

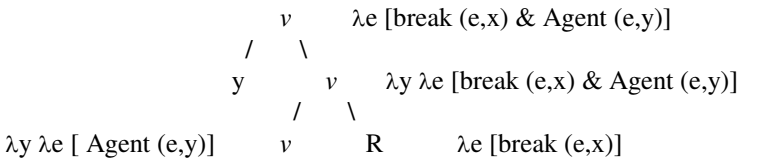
bound by a tense operator presumably higher in the tree, and that I use *x, y, z* ambiguously for variables and names.

As formulated in (64a), whether or not a simple verb contains the light verb *v* is a property of the root. The roots in (66) and (67) licence *v*, whereas the root in (68) does not:

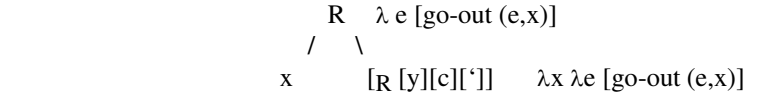
66. y raqad
y dance-SIMPL 'y danced'



67. y šavar et x
y break-SIMPL *ACC-x* 'y broke x'



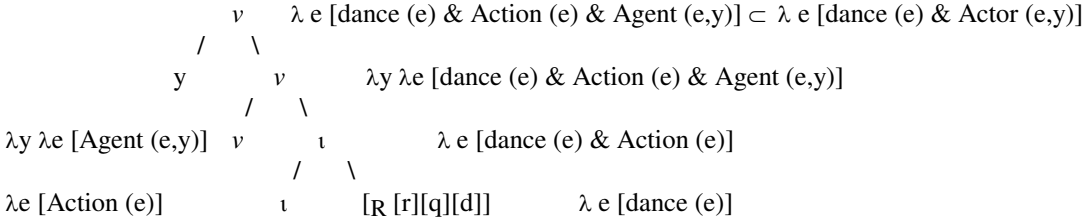
68. x yaca
x go-out-SIMPL 'x went out'



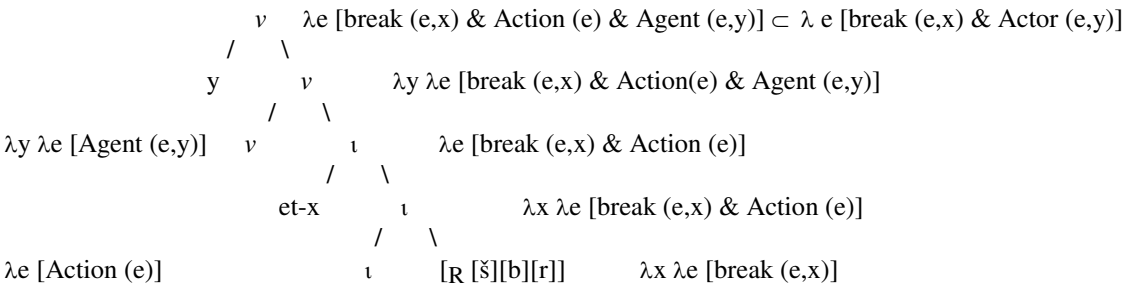
ι, on the other hand, licenses *v*, whether or not the root does (see (64b)). From the familiar requirement that the Agent role is assigned at most once per event, the Agent of (66) and (67) will be the same as the Actor of the corresponding intensive verbs in (70) and (71) below. On the other hand, the Actor of the intensive verb in (72), derived from the unaccusative structure in (68), is an additional argument, since the root in this case does not license *v*. This is summarized in (69):

69. a. y dance-INTNS → y dance-SIMPL (one Agent per event)
b. y break-INTNS x → y break-SIMPL x (one Agent per event)
c. y go-out-INTNS x –/→ y go-out-SIMPL x (root does not license *v*)

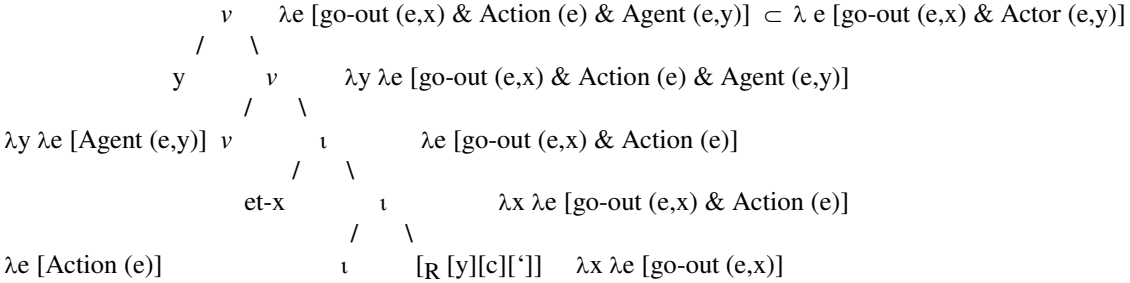
70. y riqed
y dance-INTNS 'y actively danced'



71. y šiber et x
y break-INTNS *ACC-x* ‘y actively broke x’



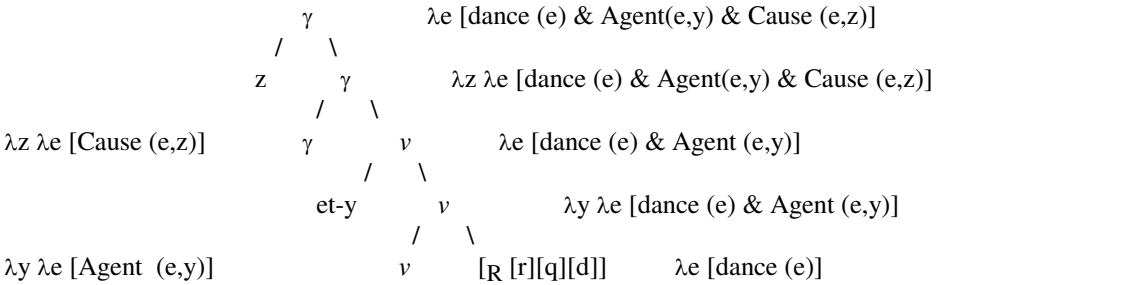
72. y yice et x
y go-out-INTNS *ACC-x* ‘y exported x’



γ does not license *v*, and the thematic role it introduces is Cause, which is different from Agent. γ’s argument is always a different argument from the subject of the simple verb, as observed in section 4:

73. a. z dance-CAUS y –/→ z dance-SIMPL (Cause ≠ Agent)
b. z dance-CAUS y → y dance-SIMPL (root licenses Agent)

74. z hirqid et y
z dance-CAUS *ACC-y* ‘z made y dance’



75. z hoci et x
z go-out-CAUS *ACC-x* ‘z brought-out x’

γ λe [go-out (e,x) & Cause (e,z)]
/ \
z γ λz λe [go-out (e,x) & Cause (e,z)]
/ \
λz λe [Cause (e,z)] γ R λe [go-out (e,x)]
/ \
et-x [R [y][c][‘]] λx λe [go-out (e,x)]

(74) shows γ embedding a structure containing *v*, and (75) shows it embedding a structure containing a root which has an argument. But typically, γ does not embed a structure with both. Presumably, this is so for Case reasons. Though it is beyond the scope of this paper to present an account of Case, suffice it to say that structural accusative Case can only be assigned once in Hebrew, whereas (76) has two arguments x and y which require Case, in addition to the nominative z:

76. * z hišbir et y et x
z break-CAUS *ACC-y* *ACC-x* ‘z made y break x’

But there are verbs where the root has two arguments, one of which an oblique argument which may be assigned inherent Case by the root. There are two classes of binary roots, depending on how their two arguments are mapped to the grammatical fuctions of the simple verb. First, there are roots where the oblique argument is mapped to the subject position of the simple verb. These are the locative/ experiencer subject verbs such as *hate, love, forget, remember, see, hear, contain, include, exclude, wear, borrow, rent*, etc discussed above in (57). As was argued there, the subject of the simple verbs is an oblique argument of the root, rather than an Agent argument of *v*. This is not obvious from Case marking in the case of the simple template, where the two arguments of the root are the only two arguments of the verb, and therefore both are assigned structural Case:

77. y sana et x
y hate-SIMPL *ACC-x* ‘y hated x’

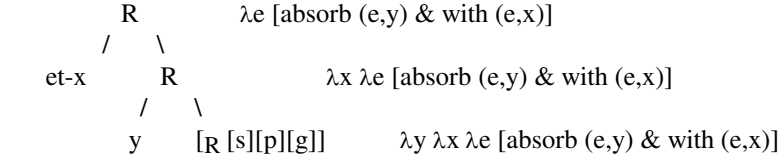
R λe [hate (e,x) & on (e,y)]
/ \
y R λy λe [hate (e,x) & on (e,y)]
/ \
et-x [R [s][n][‘]] λx λy λe [hate (e,x) & on (e,y)]

But when nominative Case is assigned to a higher argument, e.g. the subject of the causative verb, then the inherent Case of the locative/experiencer argument surfaces, *al-* in example (78): (This inherent Case of the oblique argument of the root is also manifested in the adjectival passive counterpart of (77), as was shown in (60b) above.)

78. z hisni et x al-y
z hate-CAUS *ACC-x* *on y* ‘z made y hate x’
γ λe [hate (e,x) & on (e,y) & Cause (e,z)]
/ \
z γ λz λe [hate (e,x) & on (e,y) & Cause (e,z)]
/ \
λz λe [Cause (e,z)] γ R λe [hate (e,x) & on (e,y)]
/ \
al-y R λy λe [hate (e,x) & on (e,y)]
/ \
et-x [R [s][n][‘]] λx λy λe [hate (e,x) & on (e,y)]

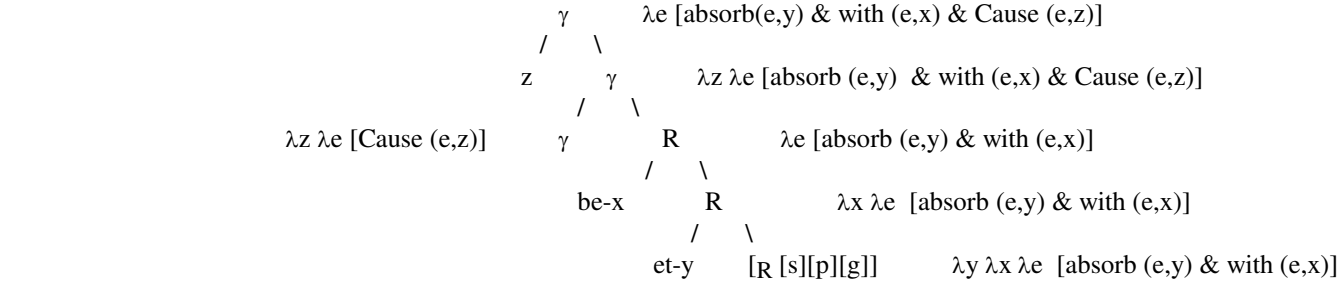
The second class of transitive verbs which causativize in Hebrew was discussed above in (56). These are consumption verbs such as *absorb, eat, drink, taste, breathe, dress, undress, carry, load,* etc. In this case, it is the direct rather than the oblique argument of the root which is mapped to the subject function of the simple verb, as was argued for (56):

79. y safag et x
y absorb-SIMPL ACC-x 'y absorbed x'



In the causative construction, the inherent Case assigned by the root to its oblique arguement surfaces:

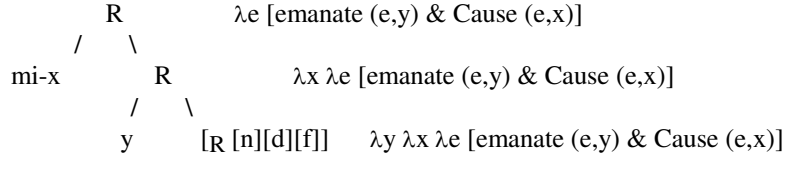
80. z hispig et y be-x
z absorb-CAUS ACC-y with x 'z drenched y with x'



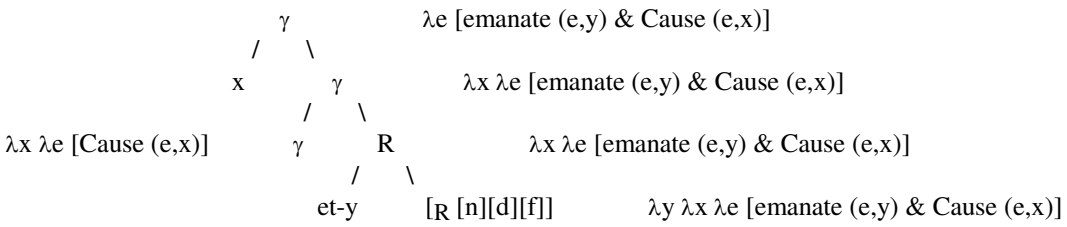
In sum, these two classes of roots give rise to the two patterns of causativization of Hebrew transitive verbs described by Cole 1976, according to whether it is the subject or the object of the simple verb which is inherently Case marked.

Similarly, (81) and (82) are examples of the causative converses discussed in (47)-- (48) above. In these structures, γ and the preposition *from* replace each other. This occurs in the case of roots which themselves assign the Cause (or "Source") thematic role. *from* is the expression of inherent Case assigned by the root to its Cause argument. Since γ assigns the same thematic role, the argument of γ and the Cause argument of the root cannot cooccur in a single event, as was shown above in (49):

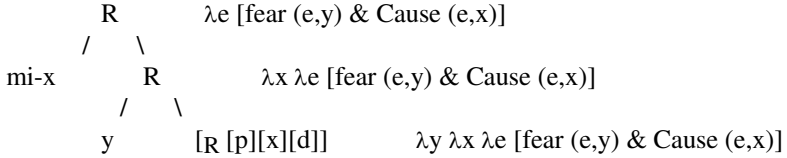
81.a y nadaf mi- x
y emanated-SIMPL from x 'y emanated from x'



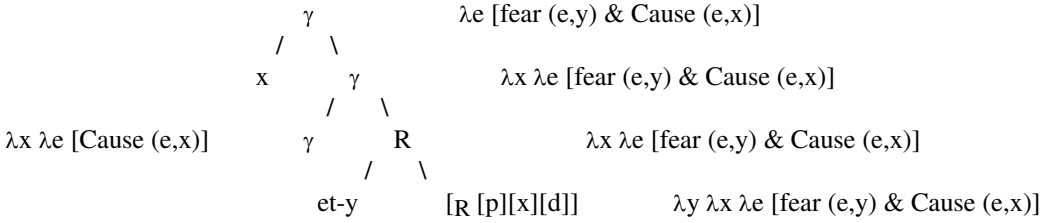
b x hidif et y
x emanated-CAUS ACC-y 'x emanated y'



82.a y paxad mi- x
y fear-SIMPL from x 'y feared x'



b x hifxid et y
x fear-CAUS ACC-y 'x frightened y'



To conclude this section, notice that it follows from the present approach that every intransitive active intensive verb is always unergative, since part of the specification of the intensive template is that of classifying the event as an action, which requires an external argument. This is indeed the case, as far as I can tell:

83.a	diber *speak*	b. zimer *sing*
c	nigen *play an instrument*	d. xilel *play the flute*
e	cilcel *ring*	f. ciyec *chirp*
g	cixqeq, gixex *laugh*	h. yibev *sob*
i	yilel *wale*	j. giheq *burp*
k	šiheq *hiccup*	l. xiyex *smile*
m	kixev *star*	n. dileg *skip*
o	rixef *glide*	p. diyeq *be meticulous*
q	hises *be hesitant*	r. xika *wait*
s	siyem *finish*	t. miher *hurry*
u.	exer *be late*	v. ciyet *obey*
w	nisa *try*	x. viter *give up*
y	bila, kiyef *have a good time*	z. siyer, tiyel *travel*
a	sixeq *play*	b. piheq *yawn*
c	biyec *ovulate*	d. niceax *win*
e	hivhev *flicker*	

6. The Passive Voice

In the preceding sections, only the active templates were discussed. The rest of the Semitic verbal template system consists in voice variation. To each of the active templates there corresponds a passive template and a middle template (Akkadian and Arabic have additional voice templates). A-priori, this allows for nine different templates in Hebrew, but there exist only seven. The simple template lacks the passive voice, and the causative template lacks the middle voice.[14] Accordingly, at most seven different verbal stems can be derived from a given root:

84. **root** [p][n][y] *'face'*

	active	**passive**	**middle**
a. **simple**	[p]a[n]a[]	--	ni[f][n]a[]
	to face/ turn (intrans.)		*to turn oneself*
b. **intensive**	[p]i[n]a[]	[p]u[n]a[]	hit[p]a[n]a[]
	to turn out (trans.) / evacuate	*to be evacuated*	*to vacate/ evacuate*
c. **causative**	hi[f][n]a[]	hu[f][n]a[]	--
	to turn (trans.)	*to be turned*	

I assume the passive morphology to be a morpheme π which modifies the verb, not just the root. This explains why passive verbs are derived strictly only from roots where the active verb exists (unlike the case of middle verbs, discussed in the next section).

Semantically, the function of π is to modify the external argument, which is the original idea of Partee 1976 in a slightly different execution, since I assume that the actual existential binding of this argument is independent of the passive morpheme itself. In addition, I would like to claim that the passive morpheme also modifies the thematic role of the external argument, by assigning it the thematic role of *Actor*, i.e. the thematic role which introduces the same entailments as Agent of Action:

(85) $\pi = \lambda y \lambda e$ [Actor (e,y)]

To see that the passive morpheme indeed assigns the role of Actor, notice first that for many roots the only passive verb is the one derived by the intensive template, which is the only template with an Actor in the first place:

86. **root** [y][l][d] *'birth'*

	active	**passive**	**middle**
a. **simple**	[y]a[l]a[d]	--	no[][l]a[d]
	to give birth		*to be born*
b. **intensive**	[y]i[l]e[d]	[y]u[l]a[d]	hit[y]a[l]e[d]
	to deliver (of) child	*to be delivered*	*to behave childishly*
c. **causative**	ho[][l]i[d]	--	--
	to beget		

87.a avraham holid et-yicxaq
Abraham beget-CAUS ACC Isaac

[14] The vocalic melody of the passive templates is *u-a*, and that of the middle templates is *i-a-(e)*. In the older parts of the Bible, simple passives are still found, e.g. yulad *was born to*. Several frozen stems remain of the Semitic causative middle template, e.g. hištaxava *to bow*. In Arabic and other Semitic languages, both missing templates are attested. In Syriac, not a single passive template remains, but all the middle templates are attested.

b * yicxaq hulad al-yedey avraham
Isaac beget-CAUS-PASS by Abraham

For many other verbs in addition to *beget*, the verb is incompatible with the Actor role, and therefore no passive verb is derived:

88.a psych verbs

active	**passive**
‘inyen *interest*	* ‘unyan
hix’is *annoy*	* hux’as
he’eciv *sadden*	* hu’acav
ošeš *revive*	* ušaš
ši’amem *bore*	* šu’amam
iyem *threaten*	* uyam
hiršim *impress*	* huršam
hidhim *amaze*	* hudham
hig’il *disgust*	* hug’al
yehane *please*	* yehune

b subject-locative verbs

active	**passive**
qibel *receive*	* qubal
ibed *lose*	* ubad
hifsid *lose*	* hufsad
hirviax *gain*	* hurvax
horiš *bequeath*	* huraš
hicmiax *grow*	* hucmax
hišir *shed*	* hušar
ere’ax *host*	* urax
hexil *contain*	* huxal

c subject-experiencer verbs

active	**passive**
biqeš *hope*	* buqaš
qiva *expect*	* quva
cipa *expect*	* cupa
yixel *expect*	* yuxal
te’ev *loathe*	* to’av
he’eric *admire*	* hu’arac
hoqir *respect*	* huqar
hexšiv *consider*	* huxšav

Yet there exist roots for which verbs are derived by both of the two passive templates in the language:

89.a **root** [y][c][‘] *‘leave’*

	active	**passive**
simple	[y]a[c]a[]	--
	to come out	
intensive	[y]i[c]e[]	[y]u[c]a[]
	to export	*to be exported*
causative	ho[][c]i[]	hu[][c]a[]
	to take/bring out	*to be taken/brought out*

b **root** [g][d][l] *'grow'*

	active	**passive**
simple	[g]a[d]a[l]	--
	to grow /increase (intrans.)	
intensive	[g]i[d]e[l]	[g]u[d]a[l]
	to grow (trans.)	*to be grown*
causative	hi[g][d]i[l]	hu[g][d]a[l]
	to increase (trans.)	*to be increased*

But even for these roots, there is a noticeable difference in meaning, not noted so far in the literature, between the causative active verbs and their passive counterparts. To appreciate the meaning difference, let us first use the intensive verbs in (43)--(45) above, repeated below as (90), to distinguish arguments which can be assigned the thematic role of Actor (e.g the landlady) from those which cannot (e.g. unemployment):

90. a. ba'alat-ha-bayit/ * ha-avtala pinta et-ha-dayarim
the landlady / unemployment turned-out-INTNS the tenants

b. medinot aniyot / * maskorot nemuxot meyac'ot po'alim
poor countries / low wages export-INTNS workers

c. ha-agronomit / * eyxut-ha-qarqa gidla et-ha-yevul
the agronomist / the quality of the soil grew-INTNS the crop

As was discussed for (43)—(45), the corresponding causative verbs, unlike their intensive counterparts, may be predicated of both kinds of arguments:

91. a. ba'alat-ha-bayit/ ha-avtala hifneta et-ha-dayarim le-liškat-ha-avoda
the landlady / unimployment turned-CAUS the tenants to the employment agency

b. medinot aniyot / maskorot nemuxot hoci'u po'alim le-hafganot
poor countries / low wages brought-out-CAUS workers to demonstrations

c. ha-agronomit / eyxut-ha-qarqa higdila et-ha-yevul
the agronomist /the quality of the soil increased-CAUS the crop

But when we consider the passive versions of these causative verbs, it turns out that in Hebrew, they are understood as having an implicit Actor, not an implicit Cause:

92. a. ha-dayarim hufnu le-liškat-ha-avoda
the tenants were-turned-CAUS to the employment agency

b. po'alim huc'u le-hafganot
workers were brought-out-CAUS to demonstrations

c. ha-yevul hugdal
the crop was-increased-CAUS

This can be demonstrated by the contrast between (93) and (94). Only possible Actors are felicitous in *by*-phrases, not Causes:

93. a. ha-dayarim hufnu le-liškat-ha-avoda al-yedey ba'alat ha-bayit
the tenants were-turned-CAUS to the employment agency by the landlady

b. po'alim huc'u le-hafganot al-yedey medinot aniyot
workers were brought-out-CAUS to demonstrations by poor countries

c. ha-yevul hugdal al-yedey ha-agronomit
the crop was-increased-CAUS by the agronomist

94. a. * ha-dayarim hufnu le-liškat-ha-avoda al-yedey ha-avtala
the tenants were-turned-CAUS to the employment agency by unemployment

b. * po'alim huc'u le-hafganot al-yedey maskorot nemuxot
workers were brought-out-CAUS to demonstrations by low wages

c. * ha-yevul hugdal al-yedey eyxut-ha-qarqa
the crop was-increased-CAUS by the quality of the soil

In English, on the other hand, non agentive *by*-phrases are well-known to be possible. The acceptability of (95) below contrasts with the unacceptability of (94):

95. a. The tenants were turned to the employment agency by unemployment.
b. Workers were brought out to demonstrations by low wages.
c. The crop was increased by the quality of the soil.

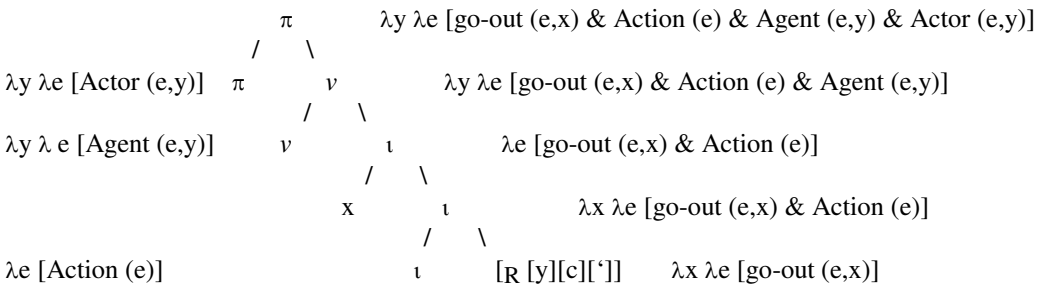
To achieve in English the infelicity of (94), we would need to add to (95) rationale or purpose clauses, so as to force a reading with an implicit Actor:

96. a * In order to help them, the tenants were turned to the employment agency by unemployment.
b. * To scare the investors, workers were brought out to demonstrations by low wages.
c. * In order to feed everyone, the crop was increased by the quality of the soil.

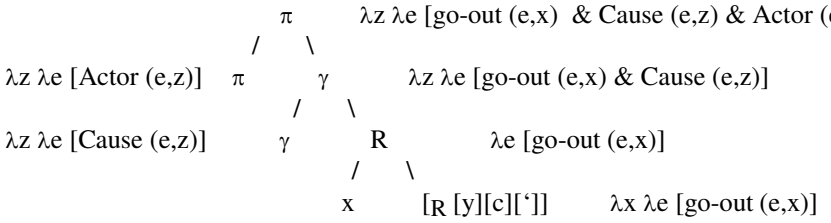
In Semitic, then, passive verbs contain a morpheme assigning the role of Actor to the external argument. Crucially, this is true *irrespective* of the template. If the root itself is somehow incompatible with an Actor subject, ungrammaticality results in the passive voice (see (87)--(88)).

The particular interpretation of the passive finds a natural expression in the present analysis. The passive morpheme is a modifier of the verb, and its semantics is the same throughout the grammar, independently of the templates. The relation denoted by the passive morpheme is Actor. Therefore even in the causative template, the external argument is interpreted as an Actor. Examples are given below. Both in (97) and in (98), the external argument is modified to be an Actor by the passive morpheme π, which combines by identification with the head introducing the external argument:

97. x yuca
x go-out-INTNS-PASS 'x was exported'

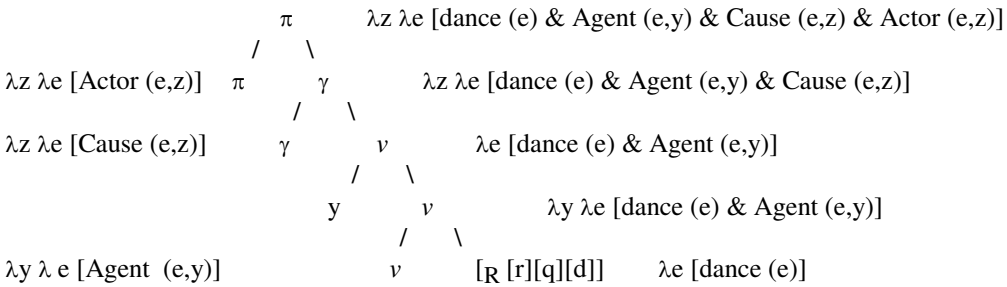


98. x huca
x go-out-CAUS-PASS ‘x was brought out’



Notice that both the events in (96) and (97) are characterized as events where one participant is an Actor, and the other participant goes out. This does not of course exhaust the encyclopedic meaning of these verbs, but neither does it exhaust their compositional meaning, since the event in (97) is further characterized as an action. Though it follows from the present approach that every action has an Actor (cf. (64)-(65)), the converse does not hold. In particular, every Agent of action is an Actor, but not the other way round. An interesting example in this respect is (99), where the Actor and the Agent roles are assigned to two different arguments. This is possible since the event is not characterized as an action:

99. y hurqad
y dance-CAUS-PASS ‘y was made to dance’



Under the present approach, what prevents the attachment of an argument in subject position of a passive verb is not the lack of thematic role, since the thematic role of Actor is assigned by π, but the lack of Case. I assume that structural accusative Case is assigned by the highest functional head in the structure. Therefore, it is necessary to assume that π does not assign Case.

In English, verbal passives do not seem to involve a passive head, since the missing argument is not necessarily Actor but is well known to have the same thematic role as the active subject. Perhaps in nominalizations there is some evidence for a passive head, if the contrast between (101) and (102) indeed holds (examples from Pesetsky 1987 ex. (18), (20), attributed to Chomsky 1970):

101.a * the book's annoyance of John

b * the books' amusement of the children

c * the books' embarrassment of the children

102.a ? Mary's deliberate annoyance of John

b ? Mary's deliberate amusement of the children

c ? Mary's deliberate embarrassment of the censors

7. The Middle Voice

The templates which derive the middle voice in Hebrew are as follows:[15]

103.		**the active voice**	**the middle voice**
a	the **simple** template	[C]a[C]a[C]	ni[C][C]a[C]
b	the **intensive** template	[C]i[C]e[C]	hit[C]a[C]e[C]
c	the **causative** template	hi[C][C]i[C]	--

Unlike the passive verb, which is only derived if the corresponding active verb is derived, many middle verbs are derived independently of the corresponding active verbs, from roots which only derive nouns, or verbs with other templates. This follows if the middle morpheme is not a modifier of the verb, unlike the passive morpheme, but a modifier of the root. In (104), the starred forms are the nonexisting active intensive verbs corresponding to the middle verbs:

104.a hit'alef *faint* (ilafon *fainting*/*ilef)

b hitparec *interrupt* (parac *erupt*/*perec)

c histare'a *extent* (saru'a *spread-out*/*sera)

d hišta'el *cough* (ši'ul *cough*/*ši'el)

e hit'ateš *sneeze* (ituš *sneeze*/*iteš)

f hit'aqeš *insist* ('iqeš *stubborn*)

g hitxaret *regret* (xarata *regret*/*xeret)

h hitvakeax *argue with each another* (*vikeax)

i hitkatev *correspond* (katav *write*/*kitev)

j hitnageš *collide* (nigaš *approach*/*nigeš)

k hitmaker *become addicted* (maxar *sell*/*miker)

l hitmace *be oriented* (maca *find*/*mice)

m hitlabet *have doubts* (levatim *doubts*/ *libet)

n hištaxel *thread oneself* (hišxil *thread*/ *šixel)

o hitbareg *screw oneself* (hivrig *screw*/ *bereg)

As was noted by Reinhart 1996 and Simmons 1996 for intensive verbs, and is true for simple verbs as well, some middle verbs are unaccusative and others are reflexive:

[15] The middle voice is not an aspectual class. Some middle verbs are stative: histare'a, hitpares *extend*, hitnase *tower,* hitmace *be familiar with*, nimca *be found*, nehene *enjoy*, others are activities: hitnadned *swing*, hitnofef *waive*, nilxam *fight*, or telic events: hitkavec *shrink*, nisgar *close*.

106.a	***ACTIVE***		***MIDDLE***	***unaccusative***
		simple template		
	[š][b][r]	[š]a[v]a[r]	*break*	ni[š][b]a[r]	*break*
	[q][r][‘]	[q]a[r]a[‘]	*tear*	ni[q][r]a[‘]	*tear*
	[š][p][k]	[š]a[f]a[x]	*pour*	ni[š][p]a[x]	*pour*
	[m][t][x]	[m]a[t]a[x]	*stretch*	ni[m][t]a[x]	*stretch*
	[m][r][x]	[m]a[r]a[x]	*spread*	ni[m][r]a[x]	*spread*
	[g][m][r]	[g]a[m]a[r]	*finish*	ni[g][m]a[r]	*finish*
	[h][r][s]	[h]a[r]a[s]	*destroy*	ne[h]e[r]a[s]	*get destroyed*
	[h][r][g]	[h]a[r]a[g]	*kill*	ne[h]e[r]a[g]	*get killed*
b		***intensive template***		
	[p][r][q]	[p]e[r]e[q]	*take apart*	hit[p]a[r]e[q]	*fall apart*
	[n][p][c]	[n]i[p]e[c]	*shatter*	hit[n]a[p]e[c]	*shatter*
	[p][c]	[p]o[c]e[c]	*explode*	hit[p]o[c]e[c]	*explode*
	[b][š][l]	[b]i[š]e[l]	*cook*	hit[b]a[š]e[l]	*cook*
	[p][z][r]	[p]i[z]e[r]	*disperse*	hit[p]a[z]e[r]	*disperse*
	[s][y][m]	[s]i[y]e[m]	*end*	hi[s]ta[y]e[m]	*end*
	[q][m][t]	[q]i[m]e[t]	*wrinkle*	hit[q]a[m]e[t]	*wrinkle*
	[š][p][r]	[š]i[p]e[r]	*improve*	hi[š]ta[p]e[r]	*improve*

107.a	***ACTIVE***		***MIDDLE***	***reflexive***
		simple template		
	[d][x][p]	[d]a[x]a[f]	*push*	ni[d][x]a[f]	*push oneself*
	[š][t][p]	[š]a[t]a[f]	*rinse*	ni[š][t]a[f]	*rinse oneself*
	[g][r][]	[g]a[r]a[r]	*drag*	ni[g][r]a[r]	*drag oneself*
	[r][t][m]	[r]a[t]a[m]	*harness*	ni[r][t]a[m]	*harness oneself*
	[t][l][y]	[t]a[l]a[]	*hang on*	ni[t][l]a[]	*hang on to*
	[t][m][k]	[t]a[m]a[x]	*support*	ni[t][m]a[x]	*support oneself*
	[b[l][‘]	[b]a[l]a[‘]	*swallow*	ni[v][l]a[‘]	*make oneself disappear*
	[m][n][‘]	[m]a[n]a[‘]	*prevent*	ni[m][n]a[‘]	*refrain*
	[r][š][m]	[r]a[š]a[m]	*register*	ni[r][š]a[m]	*register*
b		***intensive template***		
	[s][b][n]	[s]i[b]e[n]	*soap up*	his[t]a[b]e[n]	*soap up*
	[n][g][b]	[n]i[g]e[v]	*wipe*	hit[n]a[g]e[v]	*wipe oneself*
	[r][x][x]	[r]a[x]a[c]	*wash*	hit[r]a[x]e[c]	*wash*
	[‘][p][r]	[‘]i[p]e[r]	*put on makeup*	hit[‘]a[p]e[r]	*put on makeup*
	[q][š][t]	[q]i[š]e[t]	*decorate*	hit[q]a[š]e[t]	*decorate oneself*
	[n][‘][r]	[n]i[‘]e[r]	*shake*	hit[n]a[‘]e[r]	*shake oneself*
	[n][d][b]	[n]i[d]e[v]	*volunteer*	hit[n]a[d]e[v]	*volunteer*
	[b][d]	[b]o[d]e[d]	*isolate*	hit[b]o[d]e[d]	*isolate oneself*
	[s][k][n]	[s]i[k]e[n]	*expose to danger*	hi[s]ta[k]e[n]	*expose oneself to danger*

As is known from other languages as well, the middle voice is also interpreted as “medio-passive”:

108.a	***ACTIVE***		***MIDDLE***	***medio-passive***
		simple template		
	[l][q][x]	[l]a[q]a[x]	*take*	ni[l][q]a[x]	*be taken*
	[k][t][b]	[k]a[t]a[v]	*write*	ni[x][t]a[v]	*be written*

	[g][r][]	[g]a[r]a[r]	*drag*	ni[g][r]a[r]	*be dragged*
	[t][l][y]	[t]a[l]a[]	*hang*	ni[t][l]a[]	*be hanged*
	[b][l][‘]	[b]a[l]a[‘]	*swallow*	ni[v][l]a[‘]	*be swallowed*
	[r][t][m]	[r]a[t]a[m]	*harness*	ni[r][t]a[m]	*be harnessed*
	[b[g][d]	[b]a[g]a[d]	*betray*	ni[v][g]a[d]	*be betrayed*
	[b[d][q]	[b]a[d]a[q]	*examine*	ni[v][d]a[q]	*be examined*
b			***intensive template***		
	[q][b][l]	[q]i[b]e[l]	*receive*	hit[q]a[b]e[l]	*be received*
	[b][q][š]	[b]i[q]e[š]	*request*	hit[b]a[q]e[š]	*be requested*
	[b][s][r]	[b]i[s]e[r]	*announce*	hit[b]a[s]e[r]	*be announced*
	[g][l][y]	[g]i[l]a[]	*discover*	hit[g]a[l]a[]	*be discovered*
	[m][n][y]	[m]i[n]a[]	*appoint*	hit[m]a[n]a[]	*be appointed*

I first establish that even for the reflexive verbs, it would be wrong to assign the middle morpheme an argument position in the syntactic structure. By the tests of Sells, Zaenen and Zec 1987, the reflexive reading of the middle verb does not involve a bound argument, unlike verbs with anaphor objects. First, we apply their comparative ellipsis test:

109.a dani raxac et acmo yoter tov me- im-o
Dani washed ACC himself better than mother-his
ambiguous: ‘Dani washed himself better than his mother washed herself.’
‘Dani washed himself better than his mother washed him.’

b dani hitraxec yoter tov me- im-o
Dani washed-MID better than mother-his
unambiguous: ‘Dani washed himself better than his mother washed herself.’

Second, we apply their “statue” test. If Dani were to wash a statue of himself, it would barely be possible to say (110a), but it would be totally impossible to describe this situation with (110b):

110.a dani raxac et acmo
Dani washed ACC himself

b dani hitraxec
Dani washed-MID

Third, reciprocal middles cannot have wide scope, unlike reciprocal arguments (cf. Heim, Lasnik and May 1991). Accordingly, (111b) is not ambiguous, unlike (111a), where the bound argument may have wide scope:

111.a hem racu le-našeq exad et ha-šeni
they wanted to-kiss-INTNS one ACC another
ambiguous: ‘They wanted to kiss.’
‘Each wanted to kiss the other.’

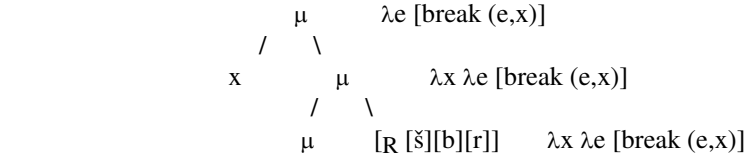
b hem racu le-hitnašeq
they wanted to-kiss-INTNS-MID
unambiguous: ‘They wanted to kiss.’

For these reasons, at least for Hebrew, I reject the solution proposed by Moore 1991 for Spanish and von Stechow 1995 for German, where the reflexive morpheme is introduced in, or corresponds to, an argument position. Rather, I propose that the middle morpheme is the realization of a voice-head μ.

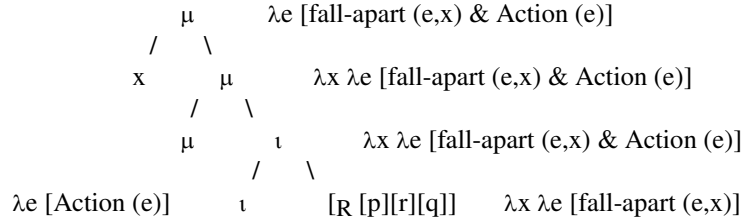
μ modifies the root (or the root already modified by ι) in the following way: it voids the licensing of *v*. As a result, the external agument is missing from the derivation. In addition, depending on the root, μ may assign the thematic role of Agent.

(112) -- (113) are examples of unaccusative derivations, in the simple and intensive templates respectively. In the environment of these roots, μ does not assign an Agent role:

112. x nišbar
x break-SIMPL-MID 'x broke' (unaccusative)

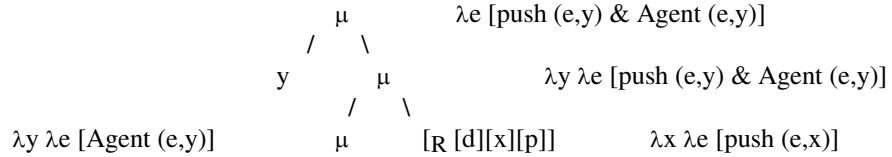


113. x hitpareq
x fall-apart-INTNS-MID 'x fell apart' (unaccusative)



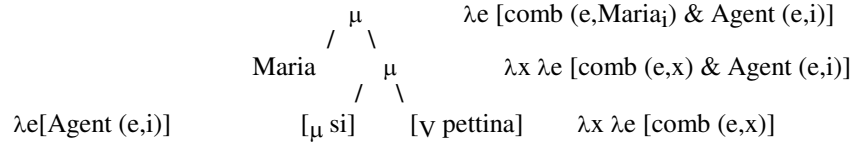
(114)--(115) are unergative derivations, with the same two templates. In the environment of these roots, μ assigns an Agent role. Since μ is a modifier, it does not introduce its own argument, but combines by identifying its argument with the argument of the root:[16]

114. y nidxaf
y push-SIMPL-MID 'y pushed' (reflexive)

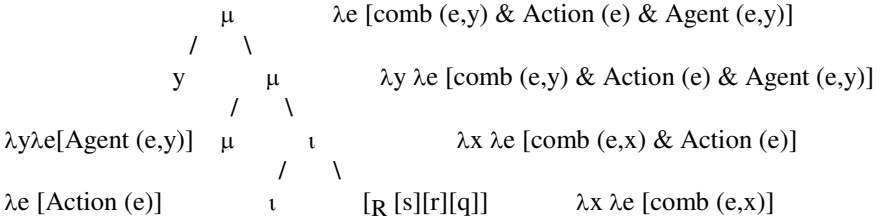


[16] In Romance, reflexive verbs do not have a single argument with two thematic roles, but two separate arguments bound to each other (Cinque 1988, Dobrovie-Sorin 1998). In the present framework, this might be attributed to the clitic nature of the Romance middle-voice head. Being a clitic, it is assigned the thematic role that it itself assigns. Moreover, it is interpreted as an anaphor, here *i*, bound by the root's argument *Maria*$_i$:

Maria si pettina
Maria comb-MID 'Maria combs' (reflexive)



115. y histareq
y comb-INTNS-MID 'y combed' (reflexive)



Yet for other roots, the assignment of the Agent role by μ is optional, allowing such verbs as (116) to be ambiguous:

116. hitmateax
stretch-INTNS-MID
'stretch' or 'do stretching'

For such verbs, it is possible (but not necessary), to interpret the sole argument as being an Agent. Whether such verbs are unergative or unaccusative depends on whether the subject is an Agent or not. For example, the sentence in (117) contains an unaccusative verb, as evidenced by the Possessor Dative test, and that in (118) -- an unergative verb:

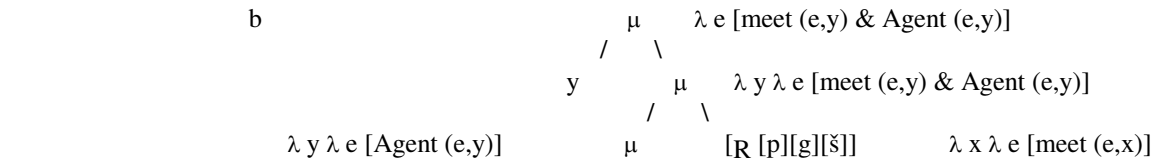
117. ha-bgadim hitmatxu la
the clothes stretched-INTNS-MID to her
'Her clothes stretched.'

118. * ha-yeladim hitmatxu la
the children stretched-INTNS-MID to her
'Her children did some stretching activity.'

The fact that in Hebrew, μ modifies the root R (or R+ι), but not R together with its arguments, accounts for the fact that causative verbs have no middle voice, as γ itself attaches to the root together with its arguments. On the other hand, nothing prevents the causative agency-head from embedding a root modified by μ, such as *meet, separate, distance*:

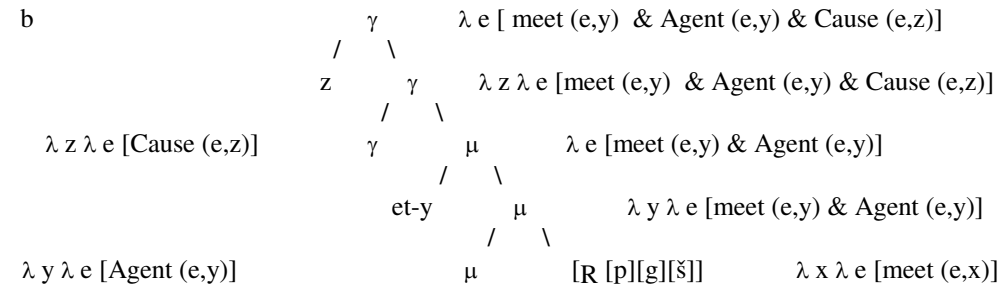
119.a y nifgešu
y met-SIMPL-MID-plural 'y met.'

b



120.a z hifgiš et y
z met-CAUS ACC-y 'z made y meet.'

b



Unlike the many simple and intensive examples, I am not aware of a single causative-template verb interpreted reflexively. This follows if indeed the middle voice-head does not modify γ. But if this is so, then unaccusative causative-template verbs (all of which are deadjectival) are not middles:

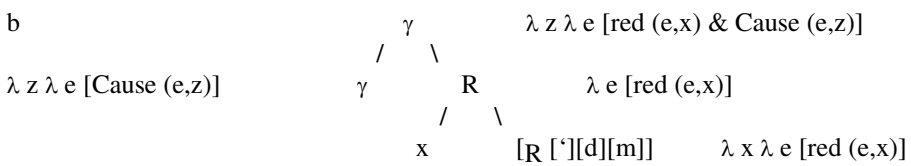
121.

root	*adjective*		*causative verb (unaccusative)*	
[‘][d][m]	[‘]a[d]o[m]	*red*	he[‘]e[d]i[m]	*redden*
[l][b][n]	[l]a[v]a[n]	*white*	hi[l][b]i[n]	*whiten*
[š][x][r]	[š]a[x]o[r]	*black*	hi[š][x]i[r]	*blacken*
[c][h][b]	[c]a[h]o[v]	*yellow*	hi[c][h]i[v]	*yellow*
[x]v][r]	[x]i[v]e[r]	*pale*	he[x][v]i[r]	*grow pale*
[p][š][r]	[p]o[š]e[r]	*tepid*	hi[f][š]i[r]	*thaw*
[q][š][x]	[q]a[š]ua[x]	*tough*	hi[q][š]ia[x]	*toughen*
[x][k][m]	[x]a[x]a[m]	*smart*	he[x][k]i[m]	*grow smart*
[‘][m][q]	[‘]a[m]o[q]	*deep*	he[‘]e[m]i[q]	*deepen*
[š][m][n]	[š]a[m]e[n]	*fat*	hi[š][m]i[n]	*fatten*
[x][m][r]	[x]a[m]u[r]	*grave*	he[x][m]i[r]	*worsen*
[x][m][c]	[x]a[m]u[c]	*sour*	he[x][m]i[c]	*grow sour*
[‘][t]	[‘]i[t]i	*slow*	he[‘]e[t]	*slow*

Since these verbs are not middle verbs, and since γ introduces a Cause argument into the derivation, then the verbs in (121) are all derived with a Cause argument (to be existentially quantified in discourse). Unlike verbs with an Agent external argument, such as *break*, discussed in section 2, for verbs with a Cause external argument, e.g. *redden,* there is no harm in assuming that *x reddened* is equivalent to *Something caused x to redden*:

122.a x he’edim
x redden-CAUS ‘x reddened.’

b



Conclusion

This paper has provided evidence for the syntactic construction of verbs from roots and functional heads. One functional head which has been argued for in the literature is the light verb *v*, which introduces the Agent. The present work has provided evidence, based on the morphology of Semitic verbs, for two

additional kinds of functional heads: *Agency-heads* and *Voice-heads*. These two kinds of heads account for the two orthogonal semantic dimensions in the derivation of verbs from roots: Agency and Voice. These dimensions are mirrored by two morphological dimensions of the template system. This form-function correspondence is mediated by the syntactic structure of the verb, which includes the root and these functional heads.

Agency-heads determine whether the thematic role of the external argument of the verb is Actor or Cause. Neither Actor nor Cause are roles assigned by the root or the light verb *v*. Morphologically, agency-heads mark the verb with intensive or causative morphology. The intensive agency-head is a modifier of the root. The argument of the root that it modifies is not a participant in the event, but the event itself, which it classifies as an Action. The causative agency-head merges with a fully constructed verb. Semantically, it is not a modifier, but introduces its own argument. For morphological reasons, it is incompatible with an intensive agency-head, since a verb cannot be formed by two different templates at the same time.

The second dimension marks the derived verb with voice morphology. This morphology mirrors structures which contain the passive and middle voice-heads. The passive voice-head is a modifier of the fully constructed verb, which is why passive verbs are derived only if their active counterparts exist. Syntactically, the domain of the passive template is the "external" part of the structure. Accordingly, it modifies the external argument of the verb, by assigning it the thematic role of Actor. Since the Actor is indistinguishable in its entailments from the Agent of an event of action, the active and passive intensive verbs are semantically equivalent, but this is not true of active and passive verbs in general.

Middle verbs, on the other hand, are derived independently of active verbs, as the middle voice-head is not a modifier of the verb, but of the root. Indeed, it modifies the argument of the root, unlike the passive morpheme, which modifies the external argument. The middle morpheme may assign the root's argument the thematic role of Agent, which explains why certain middle verbs are interpreted as reflexive.

We have shown that the Agency dimension adds the marked thematic relations of Actor and Cause to the unmarked thematic relation of Agent. The very same relations have turned out to be relevant to the Voice dimension as well. The passive voice-head assigns the thematic role of Actor, and the middle voice-head may assign the thematic role of Agent. This is hardly a surprise. Voice changes the grammatical functions of arguments, and this has always been known to depend on thematic roles. It is therefore natural that voice operators, which alter the assignment of grammatical functions, should presuppose a thematic classification of verbs. Different grammatical operators depend on different classifications of verbs. For example, aspectual operators presuppose the stative/ dynamic and the telic/ atelic classification. Aspectual classification, then, is based on the concepts of change and culmination. Voice classification, on the other hand, is based on the concepts of action and causality.

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