Adjectival passives in Hebrew: Evidence for parallelism between the adjectival and verbal systems*

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Abstract. This article focuses on Hebrew adjectival passives. It shows that, as was claimed for other languages, the class of adjectival passives in Hebrew is not homogenous, but rather consists of two sub-classes. Former attempts to capture the non-homogenous nature of the class of adjectival passives in different languages relied mainly on the existence versus absence of an event in their interpretation. However, I argue that the criterion distinguishing the two sub-classes of adjectival passives in Hebrew is the presence versus absence of an implicit Agent or Cause argument. Thus, the split parallels a very well-known split in the verbal system – that between passive and unaccusative verbs. Once this parallelism between the adjectival and the verbal systems is recognized, it is possible to claim that the same valence-changing processes (namely, *saturation* and *decausativization*) are operative in both systems. This assumption can predict the syntactic and semantic behavior of the two sub-classes of adjectives, as well as their composition, without resorting to operations unique to adjectival passive formation.

Keywords: adjectival passives, adjectival decausatives, Hebrew, saturation, decausativization

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1. Introduction

Since Wasow (1977), the distinction between verbal and adjectival passives is widely recognized, and the formation of adjectival passives has been discussed by various authors (Levin & Rappaport 1986, Dubinsky & Simango 1996, Horvath & Siloni 2008, among others). Moreover, several recent studies have pointed out finer distinctions within the class of adjectival passives in different languages (see Kratzer 2000 for German, Anagnostopoulou 2003 for Greek, Embick 2004 for English, Sleeman 2007 for English, German and Dutch). These studies have suggested that adjectival passives can be split along one main axis - whether or not the adjective entails a prior event. Moreover, an assumption shared by most of these analyses is that the interpretation of adjectival passives does not include an Agent or a Cause argument (but see Anagnostopoulou 2003). Under the widely accepted hypothesis that verbal passives do have an (implicit) Agent or Cause argument (Roeper 1987, among many others), this makes adjectival passives fundamentally different from verbal ones, and closer to unaccusative verbs. The result of these studies, therefore, is that adjectival passives are characterized and classified using criteria different from those used in the characterization and classification of verbs, and that adjectival passive formation is radically different from verbal passive formation.

In this paper I argue that, at least for Hebrew this conclusion is uncalled for. First, it is shown that a partition within the class of adjectival passives exists in Hebrew as well, a fact not acknowledged before. Then, it is argued that this split is best analyzed as an exact parallel of a very well-known partition in the verbal system – that between passive and unaccusative verbs. The proposed split is motivated by the novel observation that, contrary to common claim, certain adjectival passives in Hebrew (labeled here *'true' adjectival passives*) actually do have an implicit Agent or Cause argument, on a par with verbal passives, while other so-called adjectival passives lack such an argument altogether, much like unaccusative verbs

(these are labeled *adjectival decausatives*). Crucially, I will show that the verbs giving rise to 'true' adjectival passives are exactly those which can form verbal passives, and the verbs giving rise to adjectival decausatives are those able to form unaccusative verbs.

Once these generalizations are revealed, an elegant analysis of the process of adjectival passive formation suggests itself, namely, that the adjectives are derived not by processes unique to the adjectival system, but rather by the well-known processes deriving the parallel verb types. Thus, I claim that 'true' adjectival passives are derived by *saturation* (existential closure of the external θ-role, Chierchia 2004), also deriving verbal passives, and adjectival decausatives are formed by *decausativization* (elimination of the external θ-role, Reinhart 2002), also deriving unaccusative verbs.

As in Wasow (1977), Levin & Rappaport (1986), Horvath & Siloni (2008) and others, I assume a lexical derivation of adjectival passives, and a syntactic one for verbal passives, the difference from these former studies being that there is not one, but two available lexical operations forming adjectival passives, namely one forming 'true' adjectival passives, and the other forming adjectival decausatives.

The picture that emerges is presented in table 1. Instead of having a class of 'adjectival passives', whose members exhibit properties of both unaccusatives (e.g. lack of an Agent or Cause argument) and of passives (e.g. morphology) in an unpredicted manner, we now have two well-defined adjective classes, each paralleling a verbal class. The columns in table 1 present natural classes, consisting of predicates resulting from the same operation, therefore sharing numerous syntactic and semantic properties. It is not the case that the adjective is derived from the parallel verb type, or vice versa. Rather, the two predicate types are derived directly from the root, via the same argument-structure changing operation.

The differences between predicates in the same column, for example the fact that verbal passives always license instrument phrases, while 'true' adjectival passives often prohibit

them (as discussed in 3.2) stem only from the difference in lexical category between verbs and adjectives, roughly, that adjectives invariably denote states, while verbs denote events.

Table 1: Predicate types according to formation process and lexical category

Operation / Category	Saturation	Decausativization
Verb	Verbal passives	Unaccusatives
Adjective	'True' adjectival passives	Adjectival decausatives

More generally, the paper shows that the study of the argument structure and formation processes of adjectives (and potentially other lexical categories, i.e. nouns) can profit from using known criteria and operations from the verbal system, since the latter may underlie generalizations that cut across all categories.

The paper is organized as follows: section 2 provides the necessary facts regarding the passive in Hebrew. Based on this, section 3 presents evidence that there are two types of adjectival passives in Hebrew – one which entails the existence of an Agent or a Cause argument and another which does not. Section 4 presents the main claim of the article, namely, that the two types of adjectives are derived by the operations forming passive and unaccusative verbs, a claim reinforced by the parallelism between the sets of 'true' adjectival passives and verbal passives on the one hand, and adjectival decausatives and unaccusative verbs on the other. Section 5 then specifies in detail the operations which derive the two types of adjectives, and accounts for the differences between adjectives and verbs with regard to the diagnostics for an Agent or Cause argument. Section 6 offers a cross-linguistic perspective, and compares the analysis presented in the paper with former analyses.

2. Morphology and the distinction between verbal and adjectival passives in Hebrew

Hebrew manifests the Semitic root-template morphology, in which words are morphologically composed of tri-consonantal roots, embedded in (mostly-)vocalic templates, also called *binyanim*. The templates relevant for this paper are presented in table 2.

Table 2: Active and passive Hebrew templates

Active verbal template (past tense)	Corresponding verbal passive template (past tense)	Corresponding adjectival passive template
XaXaX (e.g. *katav* 'wrote')	*niXXaX* (e.g. *nixtav* 'was written')	*XaXuX* [1] (e.g. *katuv* 'written')
XiXeX (e.g. *ciyer* 'drew')	*XuXaX* (e.g. *cuyar* 'was drawn')	*meXuXaX* [2] (e.g. *mecuyar* 'drawn')
hiXXiX (e.g. *hidpis* 'typed')	*huXXaX* (e.g. *hudpas* 'was typed')	*muXXaX* (e.g. *mudpas* 'typed')

XaXuX is strictly an adjectival template, whereas forms in *muXXaX* and *meXuXaX* are very often ambiguous between a verbal passive participle and an adjectival passive. Since the current paper discusses only adjectival, not verbal, passives, in what follows I will use either: a) unambiguously adjectival *XaXuX* forms, or b) *muXXaX* and *meXuXaX* forms appearing in a disambiguating context, where the adjectival reading is forced. Two such contexts are the following:[3]

[1] There are also very few adjectival passives in *niXXaX*.

[2] *XiXeX, XuXaX* and *meXuXaX* can host quadri-consonantal roots, in addition to tri-consonantal ones.

[3] One diagnostics which I will not use in order to distinguish adjectives from verbs in Hebrew is appearance in the post-nominal position. This position is sometimes argued to host only adjectives, on a par with the prenominal position in English, which is often used as a diagnostics for adjectivehood (Wasow 1977, Levin & Rappaport 1986 and others). However, there are several reasons to believe that the post-nominal position in Hebrew and the prenominal one in English are not exclusively adjectival. First, some (present) participles which

Following the future copula - according to Doron (2000) and Horvath & Siloni (2008), only adjectives can follow the future copula in Hebrew. Therefore (1), in which a verb appears in this position, is ungrammatical, and (2), which includes the ambiguous form *munax* 'placed', is unambiguous, having only the adjectival reading (unlike its English counterpart):

(1) **ha-yeladim yihiu kotvim et ha-sipur.*
the-children will+be writing ACC the-story

(2) *ha-sefer yihiye munax al ha-šulxan.*
the-book will+be placed on the-table
'The book will be placed on the table.'

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cannot appear in adjectival contexts (i), and therefore cannot be analyzed as adjectives, can appear in this position (ii):

(i) a. **ha-yeled yihiye boxe*.
the-child will+be crying
b. *The boy seems crying.

(ii) a. *yeladim boxim margizim oti.*
children crying upset me
b. Crying children upset me.

Second, contra the claim in Bolinger (1967), many prenominal participles in English (and post-nominal ones in Hebrew) are ambiguous (iii), in exactly the same way that participles used predicatively are (iv):

(iii) the evacuated house
'The house which is in the state of being evacuated, the empty house, the unpopulated house'
'The house which has been evacuated, even if it has since been re-populated, and is not longer empty'

(iv) The house was evacuated.
'The house was in the state of being evacuated, empty, unpopulated.'
'Someone evacuated the house (and perhaps the house was re-populated since).'

It is natural to conclude, therefore, that the prenominal participle in (iii) is ambiguous between a verbal and an adjectival reading, just like the predicative participle in (iv).

Following nir'e ('seems') - Wasow (1977) claims that certain verbs, such as *seem* and *become*, can take as complements only APs, and not VPs. Doron (2000) suggests that the test applies to Hebrew as well. For example, in (3) a VP cannot follow *nir'e* 'seem'.

(3) **ha-yeladim nir'im kotvim et ha-sipur.*
the-children seem writing ACC the-story

Since *nir'e* 'seem' can be followed only by APs, the sentence in (4), which includes the ambiguous form *mecuyar* 'drawn', is unambiguous, and has only the adjectival reading:

(4) *ha-tmunot nir'ot mecuyarot.*
the-pictures seem drawn
'The pictures seem drawn.

3. Evidence for two types of adjectival passives in Hebrew

As mentioned in the introduction, adjectival passives are widely assumed to lack an Agent or a Cause argument, unlike verbal passives. This assumption is based on contrasts such as the one illustrated in (5)-(6). In (5), which contains a verbal passive, the addition of a *by*-phrase, an Agent-oriented adverb such as *be-tsumet lev* 'carefully', or an instrumental phrase, is grammatical. On the other hand in (6), which contains an adjectival passive, *by*-phrases, adverbs like *be-tsumet lev* and instrumental phrases are ruled out.

(5) *ha-mexonit nirxaca al-yedey maks / be-tsumet lev / be-cinor.*
the-car was+washed(V) by Max in-attention / in-hose
'The car was washed by Max / carefully / with a hose.'

(6) *ha-mexonit rexuca (*al-yedey maks / *be-tsumet lev / *be-cinor).*
the-car washed by Max in-attention / in-hose

Since *by*-phrases, Agent-oriented adverbs and instrumental phrases are generally assumed to be licensed by Agent arguments (Dubinsky & Simango 1996, among many others), such

contrasts were taken as evidence that adjectival passives, unlike verbal passives, lack an implicit Agent argument (see Levin & Rappaport 1986, Grimshaw 1990, Kratzer 2000, Embick 2004)[4]. Examples to the opposite effect, in which adjectival passives do behave as if they have an implicit Agent argument (such as *unchallenged by experts* and *untouched by human hands*, from Levin & Rappaport 1986), were rarely cited, and were regarded as a sporadic, insignificant phenomenon (except in Anagnostopoulou's 2003 analysis for Greek, which will be discussed in section 6.2). Another argument against assuming an implicit argument in adjectival passives (see Kratzer 2000) was that they do not exhibit disjoined reference effects, a phenomenon attributed to the presence of an implicit argument (Baker, Johnson & Roberts 1989).[5]

Thus, Grimshaw (1990, p. 127) claims that "…the adjectival passive loses the suppressed external argument of the verbal passive completely" and Kratzer (2000, p. 391) notes that "…in adjectival passives, the verb's external argument is truly missing. It's not that it has been eliminated or suppressed. It was never there to begin with".

Nonetheless, in this section I will argue that there is a class of adjectival passives in Hebrew which include the verb's external argument. In section 3.1 I will show that many adjectival passives are *interpreted* as having an implicit Agent or Cause argument. In section 3.2 I will show that additionally, when the right conditions are met, these adjectives license *by*-phrases, instruments, and Agent-oriented adverbs. In section 3.3 I will argue that the lack of disjoined reference effects cannot serve as an argument against positing an implicit argument for adjectival passives.

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[4] To be precise, Levin & Rappaport (1986) claim, that as a consequence of the affixation of the passive morpheme, adjectival passives cannot assign the external role of their corresponding verbal form to an external position. However, the authors do not take a stand as to the semantic status of this θ-role – whether an implicit argument bearing it exists or not.

[5] I would like to thank an NLLT reviewer for pointing out the importance of this issue.

3.1 The interpretation of adjectival passives

Consider sentences (7)-(8). Although the sentences are adjectival, the vast majority of Hebrew speakers judge their interpretation as including an implicit argument. It is understood from the sentences that a prior event took place in which either an Agent or a Cause participated. (7) entails that someone wrote the book, and (8) - that someone or something cooled the water.[6]

(7) *ha-sipur katuv.*
the-story written
'The story is written.'

(8) *ha-mayim ba-brexa yihiyu mekorarim.*
the-water in+the-pool will+be cooled
'The water in the pool will be cooled.'

Notice, that it cannot be claimed that the implicit argument interpretation arises solely because of our world knowledge. Whereas this may be possible for *katuv* 'written' (and other Agentive verbs), since we know that things are not created written and someone must have written them, the same cannot hold for *mekorar* 'cooled'. Things can be cold without ever

[6] Interestingly, there is a significant subset of Hebrew speakers (including myself) who necessarily get an Agent entailment in (8), namely, necessarily understand that someone, rather than something, cooled the water. Importantly, these speakers have the same exclusively Agentive interpretation in the Hebrew verbal passive, even for verbs whose transitive alternate is not necessarily Agentive. So, whereas *kerer* 'cool' can take as an external argument either an Agent or a non-volitional Cause (e.g. the wind), for these speakers the verb *korar* 'was cooled' entails that a volitional Agent cooled the water. See Doron (2003) for further discussion of this observation. In this paper I limit discussion to the remaining group of speakers, namely those for whom the passive – verbal as well as adjectival – entails an implicit argument which can be either an Agent or a Cause (when the transitive alternate permits this).

being cooled by someone or something. The difference between *kar* 'cold' and *mekorar* 'cooled' is exactly that the latter entails an additional argument, Agent or Cause.

Note also that what is entailed in (7)-(8) is the existence of an implicit argument, not merely of a previous event. In the case of Agentive verbs, e.g. *katav* 'write', this in inevitable: if the adjective entails a previous event of writing, it necessarily entails an Agent, since a writing event necessarily involves the Agentive argument, the writer. But in the case of verbs such as *cool* (verbs that can have an inanimate, non-volitional Cause as their external argument) it is in principle possible that a previous, inchoative, event of *cooling* took place, which had no Cause or Agent. However, this is not the case with (8): when using the adjectival passive *mekorar* 'cooled', it is impossible to assert the existence of a prior event (using an unaccusative verb), while denying the existence of an Agent or Cause argument; 31 of the 33 speakers which I consulted judged (9) as contradictory. This shows that an implicit argument, rather than merely a previous event, is entailed here.

(9) *ha-mayim ba-brexa yihiyu mekorarim le-axar še-yitkareru kol hayom; af exad / šum davar lo yekarer otam.*

the-water in+the-pool will+be cooled after that-will+cool down all day no one nothing not will+cool it

'The water in the pool will be cooled after cooling down all day; no one / nothing will cool it.'

Similar judgments were given to sentences with the adjectives *memula* 'filled', *munupax* 'pumped', *mekucar* 'shortened', *mexumam* 'heated' and *mudbak* 'attached'. In all these cases, the contradictory sentences cannot be argued to simply be implausible in view of world knowledge, since, for example, things can be full without ever being filled by anything or anyone. Judgments were the same also for adjectival passives based on Agentive verbs, e.g. *raxuc* 'washed' and *kašur* 'tied'.

Importantly, however, the implicit argument entailment does not exist for all adjectival passives in Hebrew. Some adjectives bearing what is usually referred to as 'passive' morphology are not interpreted as having an implicit argument (neither Agent nor Cause). For example, adjectival passives like *akum* ('crooked') do not entail the existence of an Agent or a Cause argument, hence (10) is not a contradiction. The same judgments are given with the adjectives *davuk* 'stuck', *nafuax* 'swollen' and others.

(10) *ha-madaf akum, lamrot še-af exad / šum davar lo ikem oto.*
the-shelf crooked though that-no one nothing not bent it
'The shelf is crooked, though no one / nothing bent it.'

At least in Hebrew, these adjectives do not entail an event at all. This is shown by the fact that (11) is not contradictory either.

(11) *ha-madaf akum, aval hu me'olam lo hit'akem; hu yucar kaxa*.
the-shelf crooked but it never not bent it was+made so
'The shelf is crooked, but it never became bent; it was made that way.'

Consider next (12). (12a) contains the adjectival passive *kafu*, while (12b) contains the adjectival passive *mukpa*. Both adjectives are related to the verb *kafa* ('freeze'), and are glossed as *frozen*. However, while *kafu* does not have an implicit argument entailment, *mukpa* does. Therefore, (12b) is contradictory, while (12a) is not. This strongly reinforces the claim that the implicit argument entailment, when it exists, is part of the core meaning of the adjective, and does not merely stem from world knowledge.

(12) a. *ha-mayim yihiyu kfu'im, lamrot še-šum davar / af exad lo yakpi otam.*
b. *#ha-mayim yihiyu mukpa'im, lamrot še- šum davar / af exad lo yakpi otam.*
the-water will+be frozen, though that-nothing no one not will+freeze them
'The water will be frozen, though nothing / no one will freeze it.'

It can be also observed, in (13), that *kafu* is compatible with a prior event with no Agent or Cause argument, while *mukpa* is not, namely, the latter adjective does not merely entail an event, but rather, an implicit argument.

(13) *ha-mayim yihiyu kfu'im / #mukpa'im le-axar še-yikpe'u kol hayom;*
the-water will+be frozen after that-will+freeze(UNACC) all the-day
šum davar / af exad lo yakpi otam.
nothing no one not freeze them
'The water will be frozen after freezing all day; no one / nothing will freeze them.'

Hebrew minimal pairs of this type will be discussed further in section 4.2.2.

The situation is, therefore, that some Hebrew adjectival passives do not entail an event or an implicit argument at all, whereas others do entail an event, which necessarily involves an Agent or a Cause argument.[7]

3.2 Diagnostics for an implicit argument

I have shown above that based on their interpretation, some adjectival passives have an implicit argument in the semantics. This predicts that these adjectives will pass the standard tests for detecting an Agent argument: license *by*-phrases (e.g. Grimshaw 1990), Agent-oriented adverbs (e.g. Dubinsky & Simango 1996) and instrumental phrases (e.g. Embick 2004, Reinhart & Siloni 2005). Contrary to common claim, this is indeed so in many cases, as seen from the grammaticality of (14), including *by*-phrases, (15), including Agent-oriented adverbs, and (16), including instruments.[8]

[7] Logically, there could exist a third class of adjectives, namely adjectives which entail a prior event, but do not necessarily entail an implicit argument. Such a class does not exist in Hebrew, where every adjective which entails a previous event entails an implicit argument, as shown in (9).

[8] Another diagnostics for an implicit argument is the grammaticality of purpose clauses (see, for example, Anagnostopoulou 2003). The assumption is that a purpose clause is licensed only if there is an Agent, explicit or implicit, that can control the PRO subject of the clause. This test is somewhat controversial. Lasnik (1988), for

(14) a. *ha-sefer arux al-yedey orex mecuyan.*

the-book edited by editor excellent

'The book is edited by an excellent editor.'

b. *ha-ictadion šamur al-yedey šotrim xamušim.*

the-stadium guarded by policemen armed

'The stadium is guarded by armed policemen.'

(15) a. *ha-sefer katuv be-kišaron.*

the-book written in-talent

'The book is written with talent.'

b. *ha-xulca ha-zot tfura be-xoser mikco'iyut.*

the-shirt the-this sewn in-lack professionalism

'This shirt is sewn unprofessionally.'

(16) a. *ha-mixtav katuv be-et.*

the-letter written in-pen

'The letter is written with a pen.'

b. *ha-kelev kašur be-recu'a.*

the-dog tied in-leash

'The dog is tied with a leash.'

Observe also the minimal pairs in (17)-(19): the two sentences in each example are glossed the same, but one adjective allows an Agent-oriented adverb or an instrument, and the other

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example, suggests that it is the event in the matrix clause, rather than an implicit argument, which controls the PRO. Looking at Hebrew, we find that a purpose clause can never appear with an adjectival passive:

(i) **ha-uga axula kedey PRO le-hašmin.*

the-cake eaten for to-get fat

This is predicted by the current theory, see footnote 11.

does not. This shows again that the implicit argument entailment is a matter of core meaning, rather than world knowledge.

(17) a. *ha-poster yihiye mudbak be-rašlanut.*
the-poster will+be attached in-carelessness
'The poster will be attached carelessly.'

b. **ha-poster yihiye davuk be-rašlanut.*
the-poster will+be attached in-carelessness

(18) a. *ha-kufsa tihiye mudbeket be-devek plasti.*
The-box will+be glued in-glue plastic
'The box will be glued with plastic glue.'

b. **ha-kufsa dvuka be-devek plasti.*
the-box glued in-glue plastic

(19) a. *ha-rekamot ba-mišloax yihiu mukpa'ot be-xankan nozli.*
the-tissues in+the-shipment will+be frozen in-nitrogen liquid
'The tissues in the shipment will be frozen with liquid nitrogen.'

b. **ha-rikma kfu'a be-xankan nozli.*
the-tissue frozen in-nitrogen liquid

We can safely conclude, then, that some adjectival passives have an implicit argument. Nonetheless, it is true that some adjectival passives which semantically entail an Agent or a Cause argument, e.g. *mexumam* 'heated' mentioned in 3.1 above, seem not to license these elements. (20a) shows that *mexumam* entails an implicit argument; denying the existence of this argument leads to a contradiction. Still, as shown in (20b), *by*-phrases, the relevant adverbs, and instruments are illicit with this adjective.

(20) a. *ha-mayim ba-yam yihiyu mexumamim le-axar še-yitxamemu kol ha-yom; af*
the-water in+the-sea will+be heated after that-will+heat all the-day no

exad / šum davar lo yexamem otam.

one nothing not will+heat them

'The water in the sea will be heated after heating all day; no one / nothing will heat it.'

b. **ha-mayim yihiyu mexumamim al-yedey dan / be-zehirut / be-sir.*

the-water will+be heated by Dan carefully with-pot

(20) shows that the ungrammaticality of elements detecting an Agent argument with some adjectives should not lead to the conclusion that these adjectives lack an implicit argument, as this can be established independently, on semantic grounds, as shown in (20a). Rather, I hold that the licensing conditions for *by*-phrases, Agent-oriented adverbs and instruments are different for adjectives and verbs, and that this stems from a basic difference between the two categories, namely, that adjectives denote states, while verbs can denote other types of eventualities. In the verbal domain, *by*-phrases, instruments and Agent-oriented adverbs are assumed to be modifying the event. My suggestion is that these elements are licensed with adjectival passives (that have an implicit argument) only if they can modify the state denoted by the adjective. Let us see this generalization at work.

Compare the two examples in (21). Although, according to speakers' intuitions about their semantics, both of the adjectival passives in (21) have an implicit argument (in this case an Agent, since the transitive verbs *raxac* 'wash' and *kašar* 'tie' are Agentive)[9], an instrument phrase is licensed only in (21b):

(21) a. **ha-mexonit rexuca be-cinor.*

[9] 26 of the 31 speakers consulted judged (i) as contradictory:

(i) *ha-mexonit rexuca lamrot še-af exad lo raxac ota.*

the-car washed though that-no one not washed it

'The car is washed though no one washed it.'

the-car washed in-hose

Intended meaning: 'The car is washed(ADJ) with a hose.'

b. *ha-kelev kašur be-recu'a.*

the-dog tied in-leash

'The dog is tied with a leash.'

I suggest that the contrast stems from the fact that the hose does not participate in the state of a washed car, while the leash does participate in the state of a tied dog. The instrument in the latter case forms part of the description of the state, and therefore, it is licensed. Consider also the contrast in (22) (Julia Horvath, p. c.). (22a) is ungrammatical because the beautiful pen is not part of the description of a written letter. (22b), however, is grammatical, but crucially, only under the reading in which *kaxol* 'blue' refers to the color of the ink, rather than of the pen itself. The ink's color is, naturally, part of the description of a written letter.

(22) a. **ha-mixtav katuv be-et yafe.*

the-letter written in-pen beautiful

b. *ha-mixtav katuv be-et kaxol.*

the-letter written in-pen blue

'The letter is written with a blue pen.'

The situation with adverbs is similar. Only Agent-oriented adverbs that form part of the description of the state denoted by the adjective are allowed with adjectival passives (see Anagnostopoulou 2003). Consider (23). The description of the state of a written book can include its being written with talent, since this is manifested in the book itself, hence (23a) is grammatical. On the other hand, whether or not the author made an effort in writing a book is not visible from the written book (it can only be guessed), thus (23b) is ungrammatical.

(23) *ha-sefer katuv be-kišaron / *be-ma'amac.*

the-book written in-talent in effort

'The book is written with talent / *with effort.'

Consider also (24), which shows nicely that the adverbial description is predicated of the state, rather than of the event leading to it. (24) can be uttered truthfully if the poster will be attached unevenly, with loose ends etc., even if the person who attached it in fact did it with great care. On the other hand, if the person was very careless, but the attached poster looks good and does not give it away, (24) will be false.

(24) *ha-poster yihiye mudbak be-rašlanut.*

the-poster will+be attached in-carelessness

'The poster will be attached carelessly.'

The situation with *by*-phrases is very much the same. In verbal environments, a *by*-phrase introduces the saturated external argument, a participant in the event. In the adjectival case, a *by*-phrase will only be licensed either when the Agent can be detected from the state, as in (25), where the editor's being excellent is observable from the state of an edited book, or in rare cases such as the one in (26), in which the Agent actually participates in the state[10]:

(25) *ha-sefer arux al-yedey orex mecuyan.*

the-book edited by editor excellent

'The book is edited by an excellent editor.'

(26) *ha-ictadion šamur al-yedey šotrim xamušim.*

the-stadium guarded by policemen armed

'The stadium is guarded by armed policemen.'

In (27), On the other hand, the identity of the eater is not observable from the state of an eaten apple, hence the sentence is ungrammatical.

(27) **ha-tapuax axul al-yedey maks.*

[10] These are cases of 'true' adjectival passives derived from atelic roots. As discussed in 5.3 below, this is a rare situation since as a rule, adjectival passives in Hebrew are derived only from telic roots.

the-apple eaten by Max

The generalization that a *by*-phrase is licensed with adjectives only when the participant introduced by it can be detected from the state, accounts also for the often noted fact that when *by*-phrases are possible with adjectival passives, they are in many cases generic rather than specific (Grimshaw 1990, among others). This is exemplified by the contrast between (28a) and (28b):

(28) a. The island was uninhabited by humans.

b. *The island was uninhabited by John.

Clearly, what can be observable from a state with regard to the Agent causing it is not much, and while it is possible to observe that no human inhabited the island, it is much harder to conclude that some specific human, say John, did not inhabit it.

To summarize, I have shown in this section that it is not true that adjectival passives generally prohibit the addition of *by*-phrases, instruments and Agent-oriented adverbs. Adjectival passives that have an implicit argument in their interpretation (according to the semantic intuition of speakers) in fact license these elements, under the additional requirement that they modify the state denoted by the adjective, rather than the event leading to it.[11] This difference in the application of the diagnostics for an implicit argument stems directly from the semantic difference between adjectives and verbs. The generalization suggested here will be formalized in section 5.6.1.

3.3 Disjoined reference effects

[11] It was mentioned in footnote 8 that purpose clauses can never be adjoined to adjectival passives (i):

(i) **ha-uga axula kedey PRO le-hašmin*

the-cake eaten for to-get fat

It is now clear why this is so. In order for such a clause to appear, the purpose should be observable in the state. It seems highly unlikely, however, that the purpose of an action could be observed by looking at its result. For example, the state of an eaten cake tells us nothing of why the cake was eaten.

One of the arguments against positing an implicit argument in adjectival passives, discussed in Kratzer (2000), is based on the difference between them and verbal passives with regard to disjoined reference effects, as can be observed in (29). While (29a) does not have the interpretation where the child combed himself, (29b) is compatible with this reading.

(29) a. *ha-yeled sorak.*

the-child was+combed(V)

'The child was combed.'

b. *ha-yeled mesorak*.

the-child combed(ADJ)

'The child is combed.'

Baker, Johnson & Roberts (1989) take the incompatibility of verbal passives with self-action (e.g. (29a)) as evidence for the existence of an implicit argument in their syntactic representation. Hence, if their analysis is adopted, the fact that adjectival passives allow a self-action reading rules out an analysis in which they too have implicit arguments, as I am claiming.

Importantly, Baker, Johnson and Roberts (1989) derive the impossibility of self-action in verbal passives from the ungrammaticality of the configuration in (30) (argued for in Rizzi 1986). They suggest that if one takes *–en* to be a realization of the implicit external argument, then verbal passives are represented as in (31), which is an instance of (30), hence ungrammatical. Supposedly, if adjectival passives had implicit arguments too, then they too would violate (30) in the case of self-action, and accordingly, this reading should have been impossible.

(30) * X_i Y_i t_i

Where X c-commands Y, Y c-commands t, and there is movement from t to X

(31) *The child*$_i$ was comb-*en*$_i$ t_i

Note, however, that in fact, the illicit configuration of (30) will not arise with adjectival passives, even in the case of self-action. This is so because unlike verbal passive sentences, sentences with adjectival passives do not include a trace at all; the Theme argument is merged in subject position (as discussed in Levin & Rappaport 1986, Cinque 1990 and others, see 5.3 below). The representation of an adjectival passive with a reflexive meaning will be as in (32), which is not an instantiation of the illicit (30).

(32) *The child*$_i$ was comb-*en*$_i$

In fact, my analysis of adjectival passives (in 5.5 below) follows Chierchia (2004), Reinhart (2002) and others in not assuming at all a structural representation of the external argument in passives, only a semantic one. Under such an analysis, even Baker, Johnson and Robert's (1989) account for the disjoined reference effect in verbal passives cannot be maintained. In section 5.6.2 I will offer an alternative account for the disjoined reference effect in verbal passives, and the lack of it in adjectival ones.

Evidence from disjoined reference effects therefore cannot lead to the conclusion that adjectival passives must lack an implicit argument. I conclude then, contrary to common claim, that some adjectival passives do have implicit arguments, whereas others do not.

4. Capturing the split in the class of adjectival passives

4.1 'True' adjectival passives and adjectival decausatives: the parallelism with verbs

Before turning to analyze the difference between the two types of adjectives presented in 3.1 above, it is worth examining their common properties. In other words, why were these two types of adjectives continually grouped together under the title 'adjectival passives'? There seem to be two reasons for that. First, the subject of both types of adjectives corresponds semantically to the object of their active verb alternate, a property characteristic also of passive verbs. Second, both classes manifest so-called 'passive' morphology.

However, the fact that an adjective has these two attributes should not automatically lead to the conclusion that it is passive. To understand that, let us look at the verbal system. Not every verb whose subject is associated with an internal θ-role is passive; unaccusative verbs manifest this property as well. Looking at morphology, the *niXXaX* template, which traditionally was referred to as a passive template (based on examples such as *nivna* 'was built', *nixtav* 'was written'), can clearly host unaccusative verbs as well, e.g. *nišbar* 'broke.UNACC', *nixnas* 'enter.UNACC' etc. In light of this, how can one determine, when presented with a verb in *niXXaX*, whether it is passive or unaccusative? The decision is based on semantics, namely, a verb whose internal argument surfaces in subject position is passive if it has an implicit external argument; otherwise, it is unaccusative. What defines passive verbs is their implicit argument entailment.

I suggest that in the adjectival system as well, the decision whether an adjective is passive or not should be based solely on the presence of an Agent or Cause argument in its interpretation. If the term *passive* is taken to encode the requirement for an implicit argument, then only adjectives that entail such an argument are genuinely passive. In what follows, I will refer to these adjectives as *'true' adjectival passives*.

What about the second type of adjectives presented above, which do not have an implicit argument entailment? Bearing in mind the verbal system, it is reasonable to claim that these adjectives are parallel not to passive verbs, but rather to unaccusative ones, which, like them, lack an implicit argument altogether. I will term these adjectives *adjectival decausatives*, a name reflecting the parallelism between these adjectives and unaccusative verbs, which I consider to be decausativized versions of transitive verbs (see section 5.1). Just as, with the discovery of unaccusative verbs, it was realized that the *niXXaX* template can give rise to unaccusative as well as passive verbs, so now, with the concept of adjectival decausatives put forth, the so-called adjectival passive templates (and in particular *XaXuX,* the adjectival

parallel of *niXXaX,* which hosts most adjectival decausatives), should be viewed differently, as giving rise to adjectival decausatives, in addition to 'true' adjectival passives.

My main claim is, therefore, that the class of adjectives commonly referred to as 'adjectival passives' in Hebrew in fact consists of two groups: 'true' adjectival passives, which resemble passive verbs in having an implicit argument, and adjectival decausatives, which parallel unaccusative verbs in lacking such an argument.

Crucially, I further suggest that this similarity between verbal passives and 'true' adjectival passives, and between unaccusative verbs and adjectival decausatives, is not accidental. Rather, it emerges from the claim that 'true' adjectival passives are derived by the same process deriving verbal passives, and adjectival decausatives - by the process deriving unaccusative verbs. Hence, the current analysis does not share the view that adjectival passives are fundamentally different from verbal passives in lacking an implicit argument, and a different mechanism is needed in order to derive them (Levin & Rappaport 1986, Dubinsky & Simango 1996, Kratzer 2000, Embick 2004). The central piece of evidence reinforcing the claim that the split in the adjectival system should be treated on a par with the split in the verbal system comes from the composition of the different sets of predicates, as shown in the following section.

4.2 The sets of 'true' adjectival passives and adjectival decausatives

This section shows that the set of adjectival decausatives is analogous to that of unaccusative verbs, and the set of 'true' adjectival passives – to that of verbal passives. (For considerations of space, I will limit the discussion to verbs whose external θ-role is either Agent or Cause).

Let us look at the verbal system. Passive verbs are derived both from verbs whose external θ-role is Agent only ('Agent verbs') (33), and from verbs whose external θ-role is Cause ('Cause verbs') (34). A Cause, unlike an Agent, is a thematic role which is indifferent to animacy, and

can be realized either by an animate, volitional agent (34a), or by an inanimate, non-volitional cause (34b).

(33) a. *ha-yalda axla / parsa / ciyra / kanta et ha-tapuax.*
the-girl ate sliced drew bought ACC the-apple
'The girl ate / sliced / drew / bought the apple.'

b. *#ha-ruax axla / parsa / ciyra / kanta et ha-tapuax.*
the-wind ate sliced drew bought ACC the-apple

c. *ha-tapuax ne'exal / nifras / cuyar / nikna.*
the-apple was+eaten was+sliced was+drawn was+bought
'The apple was eaten / sliced / drawn / bought.'

(34) a. *ha-yalda hipila / gilgela / heziza / yibša et ha-kos.*
the-girl dropped rolled moved dried ACC the glass
'The girl dropped / rolled / moved / dried the glass.'

b. *ha-ru'ax hipila / gilgela / heziza / yibša et ha-kos.*
the-wind dropped rolled moved dried ACC the glass
'The wind dropped / rolled / moved / dried the glass.'

c. *ha-kos hupla / gulgela / huzeza / yubša.*
the-glass was+dropped was+rolled was+moved was+dried
'The glass was dropped / rolled / moved / dried.'

The situation with unaccusative verbs is different. Levin & Rappaport-Hovav (1995) and Reinhart (2002), among others, observe that the transitive alternates of unaccusative verbs systematically have a Cause role. That is, while the Cause verbs in (34) above have unaccusative counterparts (in (35)), the Agent verbs in (33) above do not (36):

(35) *ha-kos nafla / hitgalgela / zaza / hityabša.*
the-glass fell rolled moved dried

'The glass fell / rolled / moved / dried.'

(36) **hit'akel* ('eat UNACC') **hitpares* ('slice UNACC'), **hictayer* ('draw UNACC'), **hitkana* ('buy UNACC')

The generalization, therefore, is that in the verbal system, an Agent verb has only a passive alternate (and not an unaccusative one), while a Cause verb has both passive and unaccusative alternates.[12]

Importantly, if the two types of adjectival passives discussed above parallel passive and unaccusative verbs, the same generalizations should hold in the adjectival domain. In what follows I will show that this is indeed the case. Agent verbs have only a 'true' adjectival passive alternate (and no adjectival decausative one), while Cause verbs have both a 'true' adjectival passive and an adjectival decausative alternate.

4.2.1 Agent verbs

The class of Agent verbs includes such verbs as *katav* ('write'), *kašar* ('tie'), *šamar* ('guard'), *hidpis* ('type'), etc. All of these verbs have 'true' adjectival passive alternates, which are interpreted as entailing an implicit argument (specifically an Agent, since the transitive base is Agentive). Thus, the sentences in (36) are necessarily contradictory, according to the vast majority of the speakers consulted (see footnote 8).

(36) a. *ha-tasrit katuv, aval af exad lo katav oto.*

the-script written, but no one no wrote it

'The script is written, but no one wrote it.'

b. *ha-mexonit rexuca, lamrot še-af exad lo raxac ota.*

[12] This generalization exhibits a number of random, language-specific gaps. For example, the Cause verbs *destroy* and *kill* do not have unaccusative alternates in English. However, Hebrew has *neheras* 'destroy.UNACC' and *neherag* 'kill.UNACC'. The existence of several idiosyncratic exceptions is compatible with a lexical analysis of unaccusative formation, such as Reinhart's (2002), to be presented in 5.1 below

the-car washed though that-no one not washed it

'The car is washed, though no one washed it.'

In addition, many of these adjectives pass various tests detecting an implicit Agent:

(37) a. *ha-ictadion šamur bi-kfida / al-yedey šotrim xamušim.*

the-stadium guarded impeccably by policemen armed

'The stadium is guarded impeccably / by armed policemen.'

b. *ha-daf nir'e mudpas be-rašlanut / be-mexonat ktiva.*

the-paper seems typed in-carelessness in-typewriter

'The paper seems typed carelessly / with a typewriter.'

c. *ha-tmunot yihiyu meculamot be-mikco'iut / be-maclema digitalit.*

the-photos will+be photographed in-professionalism in-camera digital

'The photos will be photographed professionally / with a digital camera.'

Note that Agent verbs do not have an additional adjectival alternate which is decausative (not entailing an implicit argument), corresponding to their lack of verbal unaccusatives. Also, it is impossible to claim (as will be claimed for certain forms in 4.2.2 below) that forms such as *katuv* 'written', *raxuc* 'washed' etc. are ambiguous between a 'true' passive and a decausative reading. If that was the case, the sentences in (36) should not have been contradictions necessarily, since the decausative reading would have allowed a non-contradictory reading for the sentences. This, however, is not the case.

4.2.2 Cause verbs

In this subsection I will show that, as predicted, Cause verbs such as *hikpi* ('freeze'), *sibex* ('complicate'), *ximem* ('heat') and *sagar* ('close') have two adjectival alternates: one passive and one decausative, similarly to their having both passive and unaccusative verbal alternates. This is manifested in one of four ways, detailed in (a)-(d).

(a) Two adjectival forms: passive and decausative

Some Cause verbs have two morphologically distinct adjectival alternates, one passive and the other decausative, as shown in (38):

(38)

Transitive verb	'True' adjectival passive	Adjectival decausative
hikpi 'freeze'	*mukpa* 'frozen'	*kafu* 'frozen'
nipeax 'inflate, blow up'	*menupax* 'inflated'	*nafuax* 'swollen, inflated'
histir 'hide'	*mustar* 'hidden'	*nistar* 'hidden'
hidbik 'glue, attach'	*mudbak* 'glued, attached'	*davuk* 'attached, stuck'
hevix 'embarrass'	*muvax* 'embarrassed'	*navox* 'embarrassed'
pišet 'simplify'	*mefušat* 'simplified'	*pašut* 'simple'
hiciv 'place, position'	*mucav* 'placed, positioned'	*nicav* 'placed, standing'
himliax 'salt'	*mumlax* 'salted'	*maluax* 'salty'

The adjectives in the second column all entail an implicit argument, while those in the third do not. So, for example, (39a) is a contradiction, and (39b) is not (see also example (12) above):

(39) a. *maks yihiye muvax, lamrot še-af exad / šum davar lo yavix oto.*

b. *max yihiye navox, lamrot še-af exad / šum davar lo yavix oto.*

Max will+be embarrassed, though that-no one nothing not will+embarrass him

'Max will be embarrassed, though no one / nothing will embarrass him.'

In addition, the adjectives in the second column pass various tests detecting an implicit argument (40a), while those in the third column never do (40b) (see also examples (17)-(19) above):

(40) a. *ha-bama tihiye musteret be-emca'ut pargod.*

b. **ha-bama tihiye nisteret be-emca'ut pargod.*

the-stage will+be hidden by means of screen

'The stage will be hidden with a screen.'

(b) Two adjectival forms: ambiguous and decausative

Other Cause verbs also have two morphologically distinct adjectival alternates, but in this case, one is unambiguously decausative, and the other is ambiguous between a passive reading and a decausative reading. Examples are given in (41):

(41)

Transitive verb	Ambiguous form	Adjectival decausative
sibex 'complicate'	*mesubax* 'complicated, complex'	*savux* 'complicated, complex'
pizer 'scatter'	*mefuzar* 'scattered'	*pazur* 'scattered'
šilev 'combine'	*mešulav* 'combined'	*šaluv* 'integrated, interwoven'
ikem 'bend, twist'	*me'ukam* 'curved, bent, twisted'	*akum* 'crooked, twisted, bent'
hitrid 'bother'	*mutrad* 'bothered'	*tarud* 'busy, occupied'

The forms in the third column are unquestionably decausative, not entailing an implicit argument. This can be deduced from the fact that denying the existence of this argument does not result in a contradiction (e.g. (42a)), as well as from the fact that these adjectives uniformly fail tests detecting an implicit argument (e.g. (42b,c)).

(42) a. *ha-macav savux, lamrot še-af exad / šum davar lo sibex oto.*
the-situation complicated though that-no one nothing not complicated it
'The situation is complicated, though no one / nothing complicated it.'

b. **ha-sukar yihiye pazur be-nedivut.*
the-sugar will+be scattered in-generosity

c. **mot ha-barzel nir'e akum be-ko'ax.*
pole the-iron seems bent in-power

The forms in the second column present an interesting case. On the one hand, they do pass tests detecting an implicit argument, as seen in (43):

(43) a. *ha-sukar yihiye mefuzar be-nedivut.*
the-sugar will+be scattered in-generosity

'The sugar will be scattered generously.'

b. *mot ha-barzel nir'e me'ukam be-ko'ax.*

pole the-iron seems bent in-power

'The iron pole seems forcefully bent.'

On the other hand, these adjectives, like the ones in the third column, do not obligatorily entail an implicit argument, so that both variants of the sentences in (44) are not contradictory.

(44) a. *ha-alim mefuzarim / pzurim po, lamrot še-šum davar / af exad lo pizer*

the-leaves scattered here, although that-nothing no one not scattered

otam.

them

'The leaves are scattered here, though nothing / no one scattered them.'

b. *ha-anaf ha-ze me'ukam / akum, lamrot še-šum davar / af exad lo ikem oto.*

the-branch the-this bent, although that-nothing no one not bent it

'This branch is bent, though nothing / no one bent it.'

Note, however, that these adjectives entail an implicit argument (an Agent) when a *by*-phrase, an Agent-oriented adverb or an instrumental phrase is present in the sentence. So, (45) is contradictory:[13]

(45) *ha-sukar yihiye mefuzar be-nedivut, aval af exad lo yefazer oto.*

the-sugar will+be scattered in-generosity but no one not will+scatter it

'The sugar will be scattered generously, but no one will scatter it.'

It seems, then, that the adjectives in the second column have two readings: a passive one, which entails an implicit argument, and a decausative one, which does not. Namely, the two adjectives – the 'true' passive and the decausative - are homophonous in these cases.[14]

[13] Thanks to Eitan Zweig for pointing this out to me.

(c) One ambiguous form

Some Cause verbs have only one adjectival alternate. Examples are given in (46):

(46)

Transitive verb	Adjectival alternate
šavar ('broke')	*šavur* ('broken')
sagar ('close')	*sagur* ('closed')
patax ('open')	*patuax* ('open, opened') [15]
lixlex ('dirty, sully')	*meluxlax* ('dirty, sullied')
kilkel ('damage, spoil')	*mekulkal* ('damaged, broken, out of order')
gilgel ('roll')	*megulgal* ('rolled')

I argue, however, that adjectives such as the ones above are ambiguous between a passive and a decausative reading, namely, in these cases as well the two adjective types are homophonous. First, as in the previous case, while these forms do not necessarily entail an implicit argument ((47) is not contradictory), they do pass tests detecting an implicit Agent (48).

(47) *ha-kufsa ptuxa / švura / meluxlexet, aval šum davar / af exad lo patax / šavar / lixlex*

the-box open broken dirty but nothing no one not opened broke sullied

ota.

it

[14] Unlike in the cases to be discussed immediately below in (c), where there are morphological reasons for the homophony between the two adjectives, I do not have at this stage an explanation for the homophony exhibited by the adjectives in the second column of (41).

[15] In this case, English can be more revealing that Hebrew. If the analysis presented in this paper extends to English (as will be suggested in section 6.2), it is not surprising that, as pointed out by Embick (2004), the Cause verb *open* has two adjectival alternates: *open* and *opened*, just like it has both passive and unaccusative verb alternates. This lends further support to the claim being made here, that forms like *patuax* ('open, opened') in Hebrew are ambiguous.

'The box is open / broken / dirty, but nothing / no one opened / broke / sullied it.'

(48) a. *75 gram korenfleks šavur be-patiš*

75 grams cornflakes broken in-hammer

'75 grams of cornflakes broken with a hammer' (in a recipe)

b. *ha-xalonot sgurim be-rašlanut.*

the-windows closed in-carelessness

'The windows are carelessly closed.'

c. *ha-kovec kvar patuax al-yedey mištameš axer.*

the-file already opened by user different

'The file is already opened by another user.'

d. *ba-tmuna, xof ha-yam lo yihiye mekulkal al-yedey cmigey mexoniot.*

in+the-picture beach the-sea not will+be damaged with tires cars

'In the picture, the beach will not be ruined by car tires.'

e. *ha-sigaria tihiye megulgelet be-meyumanut.*

the-cigarette will+be rolled in-skill

'The cigarette will be skillfully rolled.'

So, the same form embodies both a decausative and a 'true' passive: on the decausative reading, it does not entail an implicit argument; on the passive reading, it passes tests detecting an implicit argument, and obviously, when this is the case, the existence of the this argument (specifically an Agent) is entailed, and denying it results in a contradiction, as in (49).

(49) a. *ha-xalonot sgurim be-rašlanut, aval af exad lo sagar otam.*

the-windows closed in-carelessness but no one not closed them

'The windows are carelessly closed, but no one closed them.'

In fact, the existence of only one morphological form for both adjective types in these cases is completely predictable, because verbs in *XaXaX* (e.g. *patax* 'open') and quadri-consonantal verbs in *XiXXeX* (e.g. *gilgel* 'roll') cannot give rise to two different adjectival forms. Let us see why.

Based on the examples presented until now, we see that 'true' adjectival passives appear in the adjectival passive template corresponding to the active template of the verb (as presented in table 2 above), while adjectival decausatives appear in *XaXuX* (see (38), (41)). The predictions of these generalizations with regard to verbs in *XaXaX* and quadri-consonantal verbs in *XiXXeX* are summarized in table 3.

Table 3: Predicted adjectival alternates for verbs in *XaXaX* and in *XiXXeX*

Active verb	Predicted 'true' adjectival passive	Predicted adjectival decausative
XaXaX	*XaXuX*	*XaXuX*
XiXXeX	*meXuXaX*	**XaXuX* (impossible) → *meXuXaX*

Verbs in *XaXaX* (such as *šavar, patax* etc.) are predicted to have a passive alternate in the adjectival passive template corresponding to *XaXaX*, which is *XaXuX*. But since *XaXuX* is also the template for decausatives, the two adjectives will be homophonous.

Quadri-consonantal verbs (such as *gilgel, lixlex*) are predicted to have a passive alternate in the passive template corresponding to *XiXeX*, which is *meXuXaX*. However, their decausative alternate cannot appear in the predicted *XaXuX* since this template cannot host quadri-consonantal roots, and the only option is for the decausative to appear in *meXuXaX* as well. Hence, this form too will be ambiguous between a passive and a decausative reading.

The existence of ambiguous forms, thus, is a morphological necessity exactly in the cases described here. It is therefore safe to conclude that the Cause verbs discussed above have two adjectival alternates as well. The only difference is that in this case, the two adjectives have the same form.

(d) Decausatives without passive morphology

Consider the following adjectives (some of which appeared above):

(50) *ratuv* 'wet' *patuax* 'open'

pašut 'simple' *mesubax (savux)* 'complex'

tarud 'busy' *meluxlax* 'dirty'

The adjectives in (50) are decausative (or have a decausative reading). Notice, that all these adjectives have passive morphology in Hebrew, but none of them bears such morphology in English. Opposite examples can also be found: the English adjective *tired* bears passive morphology, while its Hebrew counterpart, *ayef*, lacks it. The same phenomenon can also be seen within a language. For example, consider *acuv* ('sad') and *sameax* ('happy') in Hebrew. While the first appears with passive morphology, the second does not. However, in all other respects the two adjectives are completely parallel – both describe a psychological state, without entailing an Agent or Cause argument.

Let us digress again to look at the verbal system. Considering unaccusative verbs, there is no a-priori prediction with regard to their morphology. In Hebrew, some unaccusative verbs appear in forms typical also of passive verbs (*niXXaX)*, while others appear in non-passive morphology, including the most unmarked, non-derived template *XaXaX* (e.g. *nafal* 'fell', *ba* 'came'). It seems, then, that so-called 'passive' morphology is not necessary in order to express decausativity. I propose that the same holds for the adjectival system. Adjectival decausatives need not appear in morphological forms typical also for passive. Therefore, I will refer to any adjective whose subject corresponds to an object of a transitive verb, and

which does not entail an Agent or Cause argument, as an adjectival decausative, regardless of its morphology.[16]

This enables us to complete the picture with regard to Cause verbs. Consider (51):

(51)

Transitive verb	Adjectival passive	Adjectival decausative
kerer ('cool')	*mekorar* ('cooled')	*kar* ('cold')
kicer ('shorten')	*mekucar* ('shortened')	*kacar* ('short')
mile ('fill')	*memula* ('filled')	*male* ('full')

The adjectives in the second column entail an implicit argument, so (52a), for example, is contradictory, while the ones in the third do not - (52b) is not a contradiction.

(52) a. *ha-xulca tihiye mekuceret, aval af exad / šum davar lo yekacer ota.*
the-shirt will+be shortened but no one nothing not will+shorten her
'The shirt will be shortened, but no one / nothing will shorten it.'

b. *ha-xulca tihiye kcara, aval af exad / šum davar lo yekacer ota.*
the-shirt will+be short but no one nothing not will+shorten her
'The shirt will be short, but no one / nothing will shorten it.'

It is clear, therefore, that this subtype of Cause verbs behaves just like the other types, except for the fact that the adjectival decausatives of these verbs lack passive morphology.[17]

[16] As shown by a number of studies (Ornan 1971, Berman 1978, Aronoff 1994, Arad 2005), the relation between morphological form and semantics in Hebrew has both regular aspects (e.g. verbal passive formation) and irregular ones. The case described in the text is one in which semantics and morphology do not exhibit a one-to-one relation: the same decausative interpretation can be expressed either with the *XaXuX* template or without it. As noted by an NLLT reviewer, 'true' adjectival passive formation (like verbal passive formation) does exhibit morphological regularity: a passive template is necessary for 'true' adjectival passive formation.

[17] The derivation of a morphologically simple adjective, e.g. *kar* 'cold', from a more morphologically complex verb, e.g. *kerer* 'cool', can be viewed as problematic, since in morphological derivations, the output should be

The conclusion is that all Cause verbs in Hebrew have two adjectival alternates: passive and decausative, though the specific morphological realization of these adjectives varies.[18] In contrast, Agent verbs invariably only have a 'true' adjectival passive alternate. This situation parallels the situation in the verbal system, thus reinforcing the claim that the two types of adjectival passives parallel the two types of verbs, and are derived by the same processes, which are detailed in the following section.

5. The formation of 'true' adjectival passives and adjectival decausatives

5.1 Operations in the verbal system

Having reached the conclusion that the same operations are at work in deriving the adjectives discussed here and passive / unaccusative verbs, let me first sketch briefly the operations which I take to form these verb types.

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more complex than the input. This is why I suggest that adjectival decausatives (as well as 'true' adjectival passives) are derived from roots, rather than verbs, see section 5.3 below.

[18] An interesting case is presented by so-called 'internally caused change-of-state' verbs (Levin & Rappaport 1995) such as *blossom, wilt, rot* etc. These are unaccusative verbs that are usually taken to lack a corresponding Cause verb. Horvath & Siloni (2008) and Fadlon (to appear) present evidence that transitive alternates of these verbs do exist in the lexicon as 'frozen' entries, which cannot be inserted into syntactic derivations. They further argue that these entries can only give rise to adjectival decausatives, and not to adjectival passives, since the derivation of the latter includes a semantic operation (existential closure, as discussed in 5.4 below), which is inapplicable to 'frozen' entries, which exist only in the lexicon. This is indeed the case in Hebrew.

An NLLT reviewer suggests a counter-example to the generalization above, namely the existence of both the adjectival decausative *rotten* and the adjectival passive *rotted* related to *rot* (Embick 2004). However, a web search reveals that *rot* does exist in English as a non-frozen, syntactically available transitive verb with a Cause role (i)-(ii), and is therefore predicted to have both adjectival passive and adjectival decausative alternates.

(i) The rain rotted the hay.

(ii) He wet the bed until he rotted the mattress.

Following Chierchia (2004) and Reinhart (2002) I assume that verbal passivization involves ***saturation*****:** existential closure of the verb's external θ-role. This role is assigned in the semantics to an existentially bound variable, as in (53). Horvath & Siloni (2008) argue that verbal passive formation is a post-lexical, syntactic operation.

(53) The gangster was murdered.

Interpretation: ∃e∃x.MURDER(e) & Agent(e, x) & Theme(e, the gangster)

In passives, then, the external θ-role is present in the semantics, hence the grammaticality of *by*-phrases, instrument phrases and Agent-oriented adverbs with these verbs.

Following Levin & Rappaport-Hovav (1995) and Reinhart (2002), I assume that unaccusative verbs are derived from their transitive alternates as well. Reinhart (2002) suggests that unaccusatives are derived in the lexicon, by an operation labeled ***decausativization***, which can operate only on verbs whose external θ-role is Cause, and eliminates this role from the input verb's thematic grid, thus reducing its valency, as in (54).[19] As noted in Reinhart (2002), the derivation depicted in (54) is semantically vacuous, namely, it only changes the number of θ-roles that the verb has, but not the basic meaning of the verb: the reduced entry denotes just the property corresponding to a one place verb with the remaining argument. Unlike saturation, which leaves the external θ-role available in the semantics, decausativization eliminates this role completely, so it is not realized syntactically or

[19] An NLLT reviewer notes that positing a unitary direction of derivation, from the transitive alternate to the unaccusative one, is at odds with numerous cases in Hebrew in which the transitive alternate is more morphologically complex than the unaccusative one (e.g. *hikpi* 'freeze.TR' – *kafa* 'freeze.UNACC'). As noted in footnote 15 above, this is not surprising, given the many-to-many relation between form and meaning in certain parts of Hebrew. Reinhart (2000) notices this discrepancy and suggests that in Hebrew, the lexical operation of decausativization is independent of a morphological process; the morphological form may be assigned to lexical entries at a later stage, or may be frozen in the lexicon.

semantically. Therefore, unaccusative verbs are incompatible with *by*-phrases, instrumental phrases and Agent-oriented adverbs.

(54) $V(\theta_{CAUSE}, \theta_2) \rightarrow V_{DECAUS}(\theta_2)$

Doron (2003) claims that reduction analyses of unaccusatives cannot be tenable, since they provide no way to derive the truth conditions of an unaccusative sentence. However, Horvath & Siloni (2010), who discuss the decausativization operation in detail, argue that a lexical reduction of a θ-role is semantically licit. This is because the truth conditions of a sentence with an unaccusative verb are read off directly from the thematic relations the verb has (just as in an analysis where the unaccusative is the basic entry). So, for example, the transitive *break* has two θ-roles: *break* (θ_{CAUSE}, θ_{THEME}); following reduction, the unaccusative *break* is derived: *break* (θ_{THEME}). Accordingly, the correct truth conditions of a sentence with unaccusative *break* (55a) arise, namely, there was an event of breaking of which the vase was the Theme (55b) (assuming a neo-Davidsonian view of θ-roles as relations between events and participants).

(55) a. The vase broke.

b. ∃e [break (e) & Theme (e, the vase)]

The description of decausativization in (54) (as well as that of saturation given above) relies on the assumption that the external θ-role is part of the lexical information carried by the verb and by its category-less root (see 5.3 below). This goes against much recent work which assumes that the external argument is introduced by a separate 'little-*v*' head (as in Kratzer 1996, for example), and that in the transitive-unaccusative alternation, the unaccusative entry is basic, and the transitive is derived from it by the addition of a 'little-*v*' (as in Pylkkanen 2008, among many others).

I nonetheless follow Reinhart (2002) and Horvath & Siloni (2002, and in particular 2010) in not assuming a little-*v* head and in adopting the reduction analysis for the derivation of

unaccusatives. Such an analysis can predict better the syntactic realization of arguments of various verb types. For example, under the reduction analysis it is clear why the Theme argument of unaccusatives is mapped as an internal argument while this argument of 'Theme unergatives' (such as *glitter* and *echo*, see Levin & Rappaport-Hovav 1995) is mapped as an external argument. This is so because only the first type of verbs has a transitive alternate from which it is derived. The internal mapping of the Theme argument thus reflects the derivational history of the verb. The reduction analysis also naturally accounts for the fact that *freeze*, for example, exists as a one-place unaccusative predicate, while *write* does not. *Freeze* has a transitive alternate with a Cause role, which can be reduced, while the transitive *write* has an Agent role, which cannot be reduced. If the one-place version of the predicate is taken to be basic, one would have to assume a principle like the following: verbs which select the addition of a Cause role can merge without the added role, whereas verbs selecting the addition of an Agent role cannot merge without it. This is possible, but it seems conceptually unnatural to determine whether or not a verb can surface as one-place according to the type of role that is added to it when it surfaces as two-place. The problem is "duplicated" once the adjectival system is considered. The fact that *freeze* has an adjectival decausative alternate, *kafu*, while *write* does not, will have to be predicted based on the addition possibilities available for the two predicates.

In what follows I therefore assume that passive formation involves saturation, and unaccusative formation involves decausativization – reduction of an external θ-role.

5.2 Adjectival passive formation as a lexical operation

In defining the operations which form adjectival passives, I adopt the hypothesis that both types of adjectives are formed in the lexicon, which I take to be a computational component of the grammar. This hypothesis was first put forth by Wasow (1977), who showed that the assumption that adjectival and verbal passives are derived in different components of the

grammar (lexicon versus syntax, respectively) can account for various differences between them.[20] The hypothesis that adjectival passives are derived lexically receives additional support in Horvath & Siloni (2008, 2009), who show that adjectival passives, unlike verbal ones, can give rise to idioms not shared by their transitive alternates, and have drifted meanings. For example, Hebrew has the idiom *muvan me-elav* ('self-evident', literally: 'understood.ADJ from-to-it'), but not *huvan me-elav* ('understood.V from-to-it'). Assuming that predicates have to exist in the lexicon in order to give rise to idioms and semantic drifts, these facts strongly suggest that adjectival passives exist in the lexicon, while verbal passives do not (see Horvath & Siloni 2008, 2009 for arguments that the difference between adjectival and verbal passives cannot be reduced to attachment of a passive voice head below or above the category node, as argued for example in Marantz 1997).

Most recent analyses of adjectival passives (see Anagnostopoulou 2003, Embick 2004, Sleeman 2007) adopt a purely syntactic view of word formation, in the spirit of Distributed Morphology (Halle & Marantz 1993, Marantz 1997 and later work). Kratzer (2000) provides an argument for a syntactic analysis of adjectival passives. I believe, however, that when looked at closely, Kratzer's argument can in fact lead to the opposite conclusion, namely, that adjectival passives are derived lexically. Kratzer observes the contrast between (56a) and (56b).[21] She argues that since *schlampig* ('sloppily') cannot modify adjectives, as evident from (56b), the fact that it is grammatical in (56a) must mean that in this case the adverb modified the verbal stem *kämm-* ('comb') before it was stativized. So, adjective formation had to apply after adverb modification, that is, it had to apply syntactically.

(56) a. Die Haare waren schlampig gekämmt.
the hairs were sloppily combed

[20] Wasow of course made no distinction between 'true' adjectival passives and adjectival decausatives, and his claims about adjectival passives hold for both types of adjectives.

[21] See also the discussion of example (24) above.

'The hair was sloppily combed.'

b. *Die Haare waren schlampig fettig.

the hairs were sloppily greasy

But, what does (56a) mean? As Kratzer notes, if the hairdresser worked sloppily when combing the hair, yet the result of his sloppy actions bore the usual signs of careful action, (56a) cannot be uttered. On the other hand, if the hairdresser worked very carefully in order for the result to look as if he worked sloppily, (56a) will be true. This means that the adverb in (56a) does not modify the event of combing, but rather the resulting state (see Anagnostopoulou 2003). If adjective formation was syntactic, following the adjunction of modifiers to a verb, then the adverb would have to be interpreted just as it is interpreted in VPs, namely, it would have to modify the event, contra what we find in (56). Furthermore, such a syntactic analysis would predict, that since there is a stage in the derivation where a VP is available in the syntax, any adverb licensed by the corresponding verb will be able to appear with the adjectival passive. But this is not true, as seen in the Hebrew example (57) (see also section 3.2 above, and 5.6.1 below):

(57) a. *dan katav et ha-mixtav be-mehirut.*

Dan wrote ACC the-letter quickly

'Dan wrote the letter quickly.'

b. **ha-mixtav katuv be-mehirut.*

the-letter written quickly

In light of the above, I conclude that there is no reason to derive adjectival passives syntactically, whereas there are numerous reasons to believe their derivation is lexical. The only exception I find to this generalization is the case of *–menos* adjectival passives in Greek, which will be discussed in 6.2.

5.3 The input for adjectival passive formation

Before turning to describe the derivation of the two types of adjectival passives, it is important to address two issues: (a) what is the input for adjectival passive formation? (b) How is the subject of adjectival passives mapped? Let us address each in turn.

With regard to the input for adjectival passive formation, I propose that adjectival passives are derived from roots, unspecified for category, rather than from verbs. This enables a theory where the simplex adjectives in 4.2.2 are morphologically derived; if these were morphologically derived from verbs, they would be predicted to be more complex from these verbs, which is not the case.

In the spirit of Chomsky (1970), who suggested the existence of lexical items with "fixed selectional and strict subcategorization features, but with a choice as to the features associated with the lexical categories noun, verb, adjective" (p. 190), I hold that roots carry thematic information (θ-grids). As explained in 5.1 above, I adopt the view that the external θ-role, like the internal ones, forms part of the basic semantics of the verb. Since I analyze the root as carrying the same thematic information as the verb, I hold that the external θ-role is listed in the root's θ-grid, along with the internal roles. This is similar to the approach in Marantz (1997), who assumes that roots can restrict or force the merge of an external argument, and in Alexiadou et al. (2006) and Schäfer (2008), where the root is specified, among other things, as selecting an Agent or a Cause as its external argument.

In addition to this thematic specification, the root also carries an aspectual specification. This is necessary, following Bresnan (1996), Doron (2000), Kratzer (2000) and others, who have claimed that there is an aspectual constraint on the input for adjectival passive formation.

Roughly, adjectival passives can be formed only from telic roots, that is, those giving rise to verbs which have a result state as part of their meaning.[22]

An example for an input root is given in (58):

(58) FREEZE (θ_{CAUSE}, θ_{THEME}), telic

The result of syntactically realizing the transitive verb related to the root in (58) (i.e. 'freeze') is represented in (59). The telicity of the root is expressed in the semantic representation (59b) by the fact that the representation includes both an event (e) component, and a result state (s) component.

(59) a. The wind froze the water.

b. Interpretation: λeλs.(Freezing(e) & Cause(e, the wind) & Theme(e, the water) & Frozen(s) & Theme(s, the water) & CAUSE(e,s))

I follow Parsons (1990) in assuming that states have participants of much the same kind as verbs (Theme, Location and others). So, the Theme role of an accomplishment verb translates to the Theme argument of the state resulting from the event. Note that the representation (59b) includes both Cause and CAUSE, and it is important to distinguish between the two. Cause is a θ-role, denoting a relation between a participant and an event; in this case, the wind is the Cause of the freezing event. In contrast, CAUSE is a semantic operator denoting a relation between two events (or an event and a state), the first causing the second. In this case, the event of freezing causes the state of the water being frozen.

With regard to the second issue raised at the beginning of the section, namely the mapping of the adjectival passive's subject, it is important to note that the subject of an adjective is an external argument, namely, it is mapped to subject position (see Levin & Rappaport 1986,

[22] A thorough discussion of this constraint is beyond the scope of this paper. I would like to point out, however, that though the generalization above is generally valid, there are exceptions to it. For example, Hebrew has the adjectival passives *šamur* 'guarded, kept' even though *šamar* 'guard, keep' is atelic.

among others).[23] In this respect, 'true' adjectival passives and adjectival decausatives genuinely differ from passive and unaccusative verbs. Cross-linguistically, adjectival passives fail unaccusativity tests. For example, in Hebrew the word order predicate-subject is possible when the subject is underlyingly internal, as in the case of passive verbs (60). However, an adjectival passive cannot precede its subject, suggesting that the subject is not an internal argument in this case (61).

(60) *nivnu* *xamiša batim.*
were+built(V) five houses
'Five houses were built.'

(61) **bnuyim xamiša batim.*
built five houses

So, in a passive adjectival phrase, the internal θ-role of the corresponding verb is not assigned internally. I assume that since adjectives function as modifiers or predicates, their semantic representation must be a function, a lambda expression. To create such an expression, the internal θ-role undergoes lambda-abstraction. The adjectival projection functions then as a one-place predicate, which can be predicated of a subject, or adjoined to an external head, modifying it, much like a relative clause (under the standard external head analysis). The difference between adjectives and relative clauses is that in the latter, λ-abstraction is achieved syntactically, either by movement or by syntactic binding, whereas in adjectival phrases, the mechanism for λ-abstraction is not syntactic, but rather semantic, as will be shown in 5.4 and 5.5.

I turn now to the details of the operations which form 'true' adjectival passives and adjectival decausatives, starting with the latter case, which is simpler.

[23] A well-known exception to this generalization is the class of so-called "ergative adjectives", whose subject is an underlying object, discussed in Cinque (1990) and Bennis (2004).

5.4 Adjectival decausative formation

For a root to become an adjectival decausative, two things have to happen: it must become an adjective, and it must undergo decausativization. As mentioned in 5.1, decausativization will apply only to roots whose external θ-role is Cause. (62) presents an example of the input for adjectival decausative formation:

(62) FREEZE (θ_{CAUSE}, θ_{THEME}), telic

To become an adjective, the aspectual classification of the root must be changed to 'stative', since adjectives denote states (this will have the consequence that the semantic representation of a sentence containing the adjective will not have an event component, only a state component), and one θ-role of the root (the Theme, in our case) must undergo lambda-abstraction, as explained above (this will be marked with $_{\lambda\text{-ABS}}$ on the relevant role). I call the combination of these two procedures 'adjectivization'.[24]

Importantly, in the case of adjectival decausative formation, decausativization applies, which eliminates the external θ-role from the root's grid. The result of adjectival decausative formation – that is, adjectivization and decausativization - is given in (63):

(63) ADJ: FREEZE ($\theta_{THEME\ \lambda\text{-ABS}}$), stative

The output of the operation is an adjective with a state argument and a thematic grid. The semantic representation of the adjective in (63) will be that in (64):

(64) λx.λs.Frozen(s) & Theme(s,x)

The representation in (64) is that of a one-place predicate: the property x has if s is a state of freezing of which x is the Theme. This is exactly the meaning of *kafu*, 'frozen' (on its

[24] In other cases, adjectivization may include lambda-abstaction over a different role. For example, the derivation of the adjective *revealing* from the root REVEAL seems to involve lambda-abstraction over the external argument of the root, and saturation of its internal argument. See Meltzer-Asscher (in press) for additional discussion.

decausative reading). As was pointed out in 3.1 above, adjectival decausatives have no event implications whatsoever. So, for example, (65) is grammatical, as predicted from the interpretation in (64).

(64) *ha-koxav ha-ze nivra kafu.*
the-planet the-this was+created frozen
'This planet was created frozen.'

5.5 'True' adjectival passive formation

'True' adjectival passive formation is minimally different from adjectival decausative formation in that it involves saturation instead of decausativization. Examples for the input for 'true' adjectival passive formation are given in (65):

(65) a. FREEZE (θ_{CAUSE}, θ_{THEME}), telic

b. WRITE(θ_{AGENT}, θ_{THEME}), telic

We have seen that saturation marks the external θ-role to be assigned to an existentially bound variable in the semantics (I will indicate the effect of saturation by marking this θ-role with $_{SAT}$). In addition, adjectivization applies - the aspect marking is changed to 'stative', and the Theme role is marked to be lambda-abstracted in the semantics. The result of adjectival passive formation, then, will be as in (66):

(66) a. ADJ: FREEZE ($\theta_{CAUSE\ SAT}$, $\theta_{THEME\ \lambda\text{-}ABS}$), stative

b. ADJ: WRITE ($\theta_{AGENT\ SAT}$, $\theta_{THEME\ \lambda\text{-}ABS}$), stative

Here, a problem arises. The semantic representation of the adjectives above includes a saturated θ-role – Agent or Cause – that needs to be assigned in the semantics to an argument. In the case of verbal passives, the existentially-bound variable is an Agent or Cause in the event denoted by the verb, as in (67).

(67) a. The letter was written. (Verbal reading)

b. Interpretation: λe.λs∃y.(Writing(e) & Agent(e, y) & Theme(e, the letter) & Written(s) & Theme(s, the letter) & CAUSE(e,s))

But the adjectives' interpretation in (66) does not include an event, only a state. Accordingly, the semantic representations of *frozen* (on its 'true' adjectival passives reading) and *written* will be the ones given in (68):

(68) a. λx.λs.∃y [Frozen(s) & Theme(s,x) & Cause(s,y)]

b. λx.λs.∃y [Written(s) & Theme(s,x) & Agent(s,y)]

Such a representation is problematic since, as claimed by Parsons (1990), unlike Themes and Locations, which can be participants of states, Agents and Causes cannot normally participate in states, but only in events. What can it mean for someone to be the Agent of a state? Based on the interpretation that speakers attribute to 'true' adjectival passives, I suggest that, when confronted with a θ-role but no appropriate event to accommodate it (namely, when the semantic representation includes the conjunct Agent(s,x) or Cause(s,x)), the semantic component reconstructs an event in which the Agent or the Cause has taken part, and this event is interpreted as causing the state denoted by the adjective. Importantly, as noted by an NLLT reviewer, the reconstructed event should be derived from the same root as the adjective (e.g. a writing event in the case of 'written'), and its Theme should be the same as the resulting state's Theme. This is implemented by the semantic rule presented in (69) (which can be viewed as a meaning postulate that does not relate semantic representations of lexical items, but rather semantic representations of smaller meaning components). The italicized expression in the original representation is replaced, as a result of the operation of this rule, by the italicized expression to the right of the arrow. The application of the rule is exemplified in (70).

(69) λx.λs.∃y [State(s) & Theme(s,x) & *Cause/Agent(s,y)*] →

λx.λs.∃y [State(s) & Theme(s,x) & *∃e [Event(e) & Cause/Agent(e,y) & Theme(e,x) & CAUSE(e,s)]*]

(70) a. λx.λs.∃y [Frozen(s) & Theme(s,x) & *Cause(s,y)*] →

λx.λs.∃y [Frozen(s) & Theme(s,x) & *∃e [Freezing(e) & Cause(e,y) & Theme(e,x) & CAUSE(e,s)]*]

b. λx.λs.∃y [Written(s) & Theme(s,x) & *Agent(s,y)*] →

λx.λs.∃y [Written(s) & Theme(s,x) & *∃e [Writing(e) & Agent(e,y) & Theme (e,x) & CAUSE(e,s)]*]

(70) therefore contain the interpretations of the adjectives in (66), after the application of saturation (resulting also in event reconstruction) and adjectivization. (70a) represents the property that x has if s is a state of freezing such that x is the Theme of this state, and there was a prior event of freezing with a Cause y and the same Theme x, which caused this state. This is precisely the interpretation of the adjectival passive *kafu* 'frozen' on its 'true' adjectival passive reading. The same goes for (70b), which is the representation of *katuv* 'written'.

The mechanism of 'event reconstruction' based on the existence of an Agent/Cause with a stative predicate is highly restricted, and dictated by the rule exemplified in (69)-(70). This mechanism enables the assignment of a θ-role which could not be assigned otherwise, as stative predicates do not assign these roles.[25]

To sum up, both 'true' adjectival passive and adjectival decausative formation involve adjectivization, which marks the entry as stative and turns it into a predicate by lambda

[25] I do not claim that 'event reconstruction' should be tied exclusively to Agentivity. There could in principle be other situations in which event implications arise. As noted by an NLLT reviewer, one study which is relevant to the discussion is Davies & Dubinsky (2003). In this paper, the authors argue that result nominals, e.g. *essay*, entail a prior event (of writing) and the existence of an Agent in this event. It is possible that here, as well, the 'reconstruction' of the event is contingent upon the Agent entailment.

abstraction. The difference between the two processes is that the first one involves saturation, and the second – decausativization. As a result, 'true' adjectival passives include an Agent/Cause in their interpretation, while decausatives do not. The presence of the Agent/Cause in the semantics invokes the entailment of a prior event, with an Agent/Cause, that caused the state. The reconstruction of this event reconciles an Agent/Cause relation with an event-less predicate. Adjectival decausatives do not have event entailments, since their interpretation does not include an external θ-role.

5.6 Accounting for the differences between 'true' adjectival passives and verbal passives

Having formalized the interpretation of 'true' adjectival passives, it is now possible to account for the two differences observed in section 3 between these adjectives and passive verbs, namely, their different behavior with regard to the diagnostics for an implicit argument, and the fact that verbal passives exhibit disjoined reference effects, while 'true' adjectival passives do not. Both of these differences follow straightforwardly from the analysis presented in the previous section.

5.6.1 The difference with regard to tests detecting an implicit argument

We have seen that 'true' adjectival passives have an implicit argument, which is interpreted as participating in an event that caused the state denoted by the adjective. However, as was discussed in section 3.2, not all adjectives which entail an implicit argument pass the standard tests detecting this argument. For example, as discussed in 3.2, *mexumam* 'heated' has an implicit argument, yet (71) (repeated from (20b)) is ungrammatical:

(71) **ha-mayim yihiyu mexumamim al-yedey dan / be-zehirut / be-sir.*

the-water will+be heated by Dan carefully with-pot

I have suggested that in order for instruments, Agent-oriented adverbs and *by*-phrases to be licensed with adjectives, these elements must modify the state denoted by the adjective. Let us see how this follows from the analysis above.

Consider first instrumental phrases. In a verbal environment, an instrument role denotes a relation between an instrumental participant and an event, as shown in (72):

(72) a. The window was closed with a pole.

b. Interpretation: λe.λs.∃x.Closing(e) & Agent(e, x) & Theme(e, the windows) & Closed(s) & Theme(s, the window) & Instrument(e, a pole) & CAUSE(e,s)

Let us consider again the contrast in (21) above, repeated here as (73):

(73) a. **ha-mexonit rexuca be-cinor.*

the-car washed in-hose

b. *ha-kelev kašur be-recu'a.*

the-dog tied in-leash

'The dog is tied with a leash.'

As claimed in 3.2 above, intuitively, the contrast stems from the fact that the hose does not participate in the state of a washed car, while the leash does participate in the state of a tied dog. The instrument in the latter case forms part of the description of the state, and therefore, it is licensed. Consider the semantic representation of (73b) given in (74):

(74) λs.∃y.Tied(s) & Theme(s, the dog) & ***∃e****[Tying(e) & Agent(e,y) & Theme(e,the dog) & CAUSE(e,s)]* & Instrument(s, a leash)

Notice that the instrument does not stand in a relation to the event. All we know about the event is what the event reconstruction process supplied us with: that it is a tying event with an Agent and the dog as a Theme, and that it caused the state denoted by the adjective. The scope of the existential quantifier introducing the event variable is restricted, as marked with bold in (74). Modifying elements cannot modify this event, since they are outside of its scope; they can only modify the state. In (73a), the instrument renders the sentence ungrammatical since on the one hand, it cannot be construed as modifying the event, being

out of its scope, and on the other hand, it cannot be construed as modifying the state, because the hose is not a participant in the state.[26]

The situation with adverbs is similar. Agent-oriented adverbs are usually assumed to be predicated of events (Chierchia & McConnell-Ginet 1990), as represented in (75):

(75) a. The window was closed sloppily. (Verbal reading)

b. Interpretation: λeλs∃x.Closing(e) & Agent(e, x) & Theme(e, the window) & Closed(s) & Theme(s, the window) & Sloppy(e) & CAUSE(e,s)

Again, in the case of adjectives, only Agent-oriented adverbs that form part of the description of the state denoted by the adjective will be allowed. (76a) is ungrammatical since the adverb cannot modify the event, as it is out of its scope (as shown in 76b), but neither can it modify the state, since it is semantically incompatible with it.

(76) a. **ha-sefer katuv be-ma'amac*.

the-book written in-effort

b. λs.∃y.Written(s) & Theme(s, the book) & *∃e[Writing(e) & Agent(e,y) & Theme(e,the book) & CAUSE(e,s)]* & With-effort(s)

By-phrases behave very much the same. In verbal environments, a *by*-phrase introduces the saturated external argument, a participant in the event, as exemplified in (77). Note that in the semantic interpretation (77b) I have not represented *by Dan* as Agent(e, Dan) but rather as By(e, Dan), in order to mark the fact that the *by*-phrase is an adjunct; the verb does not assign the Agent role twice. It is clear however that some mechanism of "θ-transmission" is needed

[26] In a situation in which one can tell the difference between a hose-washed and a machine-washed car from appearances, (73a) is predicted to be grammatical. The same phenomenon is exemplified in (i), which is grammatical, given that a cucumber peeled by a knife looks different than a cucumber peeled by a peeler.

(i) *dan hevi melafefonim klufim be-sakin*.

Dan brought cucumbers peeled in-knife

'Dan brought cucumbers peeled with a knife.'

to link the Agent introduced by the *by*-phrase to the Agent introduced by the existential quantifier, to ensure that x is interpreted as Dan, and I assume the existence of some such mechanism (see discussion in Fox & Grodzinsky 1998).

(77) a. The window was closed by Dan.

b. Interpretation: λeλs∃x.Closing(e) & Agent(e, x) & Theme(e, the window) & Closed(s) & Theme(s, the window) & By(e, Dan) & CAUSE(e,s)

In the adjectival case, a *by*-phrase will only be licensed either when the Agent can be detected from the state, or in rare cases in which the Agent actually participates in the state. So, for example, (78) is grammatical although the *by*-phrase is outside the event's scope, because the identity of the Agent is clear when observing the result state. The θ-transmission mechanism ensures that the Agent of the reconstructed event is the same as the argument introduced in the *by*-phrase.

(78) a. *ha-sefer arux al-yedey orex mecuyan.*

the-book edited by editor excellent

'The book is edited by an excellent editor.'

b. λs.∃y.Edited(s) & Theme(s, the book) & *∃e[Editing(e) & Agent(e,y) & Theme(e, the book) & CAUSE(e,s)]* & By(s, excellent editor)

Importantly, once an adjectival passive is interpreted, existential closure is performed upon its external θ-role, leading to the meaning component *∃e[Event(e) & Agent(e,y) & Theme(e,X) & CAUSE(e,s)]*. The scope of the existential quantifier introduced by 'event reconstruction' contains only these conjuncts. Nothing else – an instrument, an adverb, an argument introduced by a *by*-phrase - can fall inside the scope of this existential quantifier, and hence, nothing can further modify the event. Only the state argument is available for

further modification, and therefore, only elements related to it are licensed.[27] We see, then, that the difference between adjectival and verbal passives with regard to diagnostics for an implicit argument stems directly from the major semantic difference between them, namely, that adjectives invariably denote states, even when they have event implications.

5.6.2 Disjoined reference effects

Recall from section 3.3 that the disjoined reference effect is manifested by verbal passives but not by adjectival ones, so that in (79a) cannot mean that the child combed himself, while (80a) can mean that. In view of the analysis given in 5.5 for 'true' adjectival passives, this situation can be accounted for given Reinhart and Reuland's (1993) Reflexivity framework, and in particular their condition B, which states that a semantic reflexive predicate must be reflexive-marked. Let us look at the semantic representations of the relevant predicates in (79b) and (80b).

(79) a. *ha-yeled sorak.*

the-child was+combed(V)

b. The child (λxλeλs∃y.Combing(e) & Agent(e, y) & Theme (e, x) & Combed(s) & Theme(s, x) & CAUSE(e,s)

(80) a. *ha-yeled mesorak.*

the-child combed(ADJ)

b. The child (λx.λs.∃y.Combed(s) & Theme(s,x) & ∃e [Combing(e) & Agent(e,y) & Theme(e, x) & CAUSE(e,s)]]

If x and y happen to refer to the same individual, then in (79b) we have a semantic reflexive predicate, a predicate with two co-referential arguments, participating in the same event; but

[27] As explained above, once a *by*-phrase is licensed by the state argument, its reference can be transmitted to the Agent variable in the reconstructed event. Still, it is the state argument, not the event argument, which licenses the *by*-phrase.

the predicate denoting this event is not reflexive-marked. Thus, this reading is impossible. What happens in (80b)? x and y are co-arguments of the reconstructed, embedded event. This event is therefore reflexive if the two denote the same individual. But the main eventuality denoted by the adjective, the state s, is not reflexive, since y is not an argument of this state. At this point, I see two possible analyses for the facts of (80): either the reflexivity of an embedded eventuality need not be reflexive marked, only the reflexivity of the main eventuality denoted by a predicate. Thus, (80a) can have a reflexive reading. Alternatively, it is possible that the representation in (80b) does count as reflexive, and the predicate needs to be reflexive-marked. But it is plausible that the so-called 'passive' template *meXoXaX* (and other 'passive' templates) can function as reflexive-markers in the Hebrew adjectival domain. Evidence for this comes from reciprocal adjectives in Hebrew. The semantics of these adjectives involves reciprocity, but their morphology is 'passive': e.g. *xavukim* ('embraced by one another-PL'), *cmudim* ('attached to one another-PL'), *me'ohavim* ('in love-PL').[28] Under the assumption that reciprocity, like reflexivity, must be marked (e.g. Labelle 2008), it seems that 'passive' morphology functions, in this case, as a marker for reciprocity. The decision between these two accounts will have to await further research.

6. The cross-linguistic perspective and comparison with previous accounts

In recent years, several studies have recognized the non-homogeneity of the class of adjectival passives in several languages, suggesting, however, a different split within this class or different mechanisms for the formation of the two adjective types. This section deals shortly with some of these findings and analyses. In 6.1, Anagnoustopoulou's (2003) analysis of adjectival passives in Greek is discussed. While the classification of adjectival passives is

[28] This is one more case in which morphology and semantics do not exhibit a one-to-one relation, see footnote 15.

very similar in Greek and Hebrew, there are important differences between the languages, which must lead to a different analysis for the two cases. In particular, the data of Greek calls for a syntactic derivation of adjectival passives, which I rejected in the analysis of Hebrew. In 6.2, I discuss Embick's (2004) analysis of adjectival passives in English, showing that the analysis presented here seems more promising than Embick's for capturing the data of this language.[29]

6.1 Greek (Anangnostopoulou 2003)

[29] Horvath & Siloni (2008) include a discussion of 'true' adjectival passives and adjectival decausatives in Hungarian, which strongly supports the analysis presented in this paper.

Kratzer (2000) discusses a split in the class of adjectival passives in German. According to her analysis, some adjectival passives denote a state which is transitory and possibly reversible ('target state') and others - a state which corresponds to some event being over, and holds forever after ('resultant state'). For example, *geleert* ('emptied') is a 'resultant state' passive, since it refers to the state that holds following the emptying of something. It is irrelevant whether at the moment of utterance the object is empty or not.

'Resultant state' adjectival passives do not exist in Hebrew. An adjectival passive in Hebrew necessarily asserts something with regard to the state of its subject in the moment of utterance. Unlike in German, the adjective *merukan* 'emptied' in Hebrew can be predicated of a basket only if the basket is empty, not if it was emptied by someone at some time, but is now full. The same is true for the adjective *emptied* in English, as shown in (i), which necessarily means that the speaker's mind is empty of creative ideas in the moment of utterance.

(i) My mind seems emptied of creative ideas.

Granted, some adjectival passives in Hebrew, e.g. *axul* 'eaten', denote irreversible states, and thus can remind one of 'resultant state' passives. Crucially, however, the irreversibility of the state in these cases is a matter of world knowledge. We refer to an apple as *axul* if it is bitten or incomplete. In a world where eaten things can miraculously become whole again, we could not refer as *eaten* to a whole apple that was once eaten. The apple would have to be in an 'eaten' state for the adjective to be used. Kratzer stresses that the irreversibility of the state denoted by 'resultant state' passives, in contrast, is not a matter of world knowledge, but of core meaning.

I conclude than that Kratzer's (2000) analysis cannot replace the one suggested here in explaining the facts of Hebrew, nor can my analysis account for the split found in German.

Anagnostopoulou (2003) discusses two types of adjectival passives in Greek, one suffixed with *–menos*, and the other one with *–tos*. The behavior of the two types undoubtedly resembles that of 'true' adjectival passives and adjectival decausatives, respectively. Consider for example (81)-(82). According to Anagnostopoulou, in (81) the door is open / closed as a result of an opening / closing event, whereas in (82) there is no implication of such an event.

(81) *I porta itan anig-**meni** / klis-**meni**.* (Anagnostopoulou 2003)
the door was opened closed
'The door was opened / closed.'

(82) *I porta itan anix-**ti** / klis-**ti**.*
the door was open closed
'The door was open / closed.'

In addition, while *–menos* forms allow modification by Agent-oriented adverbs, *by*-phrases and instruments (83a), *–tos* forms resist such modifications (83b):

(83) a. *Ta keftedakia ine (prosektika) tiganis-**mena** (apo tin Maria).*
the meatballs are carefully fried by the Mary
'The meatballs are fried (carefully) (by Mary).'

b. *Ta keftedakia ine (*prosektika) tigan-**ita** (*apo tin Maria).*
the meatballs are carefully fried by the Mary

There are, however, two differences between the situation in Greek and the one in Hebrew. First, as shown in section 4.2, adjectival decausatives in Hebrew are derived only from Cause verbs, which are the only verbs that can undergo decausativization. However, Greek has adjectives such as *tiganita* 'fried', *graptos* 'written', and *zografistos* 'painted', which, on the one hand, are related to Agent verbs, and therefore cannot undergo decausativization but only saturation, but on the other hand do not have Agent entailments and do not allow *by*-phrases,

Agent-oriented adverbs and instruments (as shown by (83b)). This is unexpected under the analysis presented here.

The second difference has to do with the availability of *by*-phrases, instrument phrases and Agent-oriented adverbs. As described in section 3.2, in Hebrew these elements are licensed only when they modify the state which the adjective denotes. Greek adjectival passives appear to be more permissive, however; *by*-phrases, adverbs and instruments attach freely, even when they undoubtedly refer to the event which led to the relevant state, and not to the state itself, as seen in (83a) and (84):[30]

(84) *To thisavrofilakio itan prosektika anig-**meno**.*

the safe was cautiously opened

'The safe was cautiously opened(ADJ).'

The Hebrew and English counterparts of (83a) and (84) are ungrammatical. I suggested that this is so because the fact that it was Mary who fried the fish is not visible in the state of the fried fish, and the fact that someone opened the safe cautiously is not visible when observing the opened safe. The situation in Greek is different. In Greek adverbs, instruments, and *by*-phrases seem to be able to modify the event which led to the state denoted by the *–menos* adjectival passive.

This second fact about Greek *–menos* adjectives strongly suggests that there is a syntactic stage in the derivation of these adjectives in which they are verbal, as indeed suggested in Anagnostopoulou (2003). During the syntactic derivation, the event argument of the verb is

[30] Greek also allows purpose clauses to be adjoined to adjectival passives, as in (i):

(i) *Aftos o pinakas ine zografismenos apo mia omadha aktiviston gia na sokarun tus anthropus.*

this the painting is painted by a group activists-GEN for to shock-pl the people

accessible to modification by adverbs, instruments and *by*-phrases, before an adjectival head is attached and the adjective is formed.[31]

As explained in 5.2 above, a syntactic derivation cannot account for the properties of adjectival passives in Hebrew. The idea that adjectival passives are derived lexically in some languages and syntactically in others should not be viewed as problematic. In fact, Reinhart & Siloni (2005) suggest that UG allows for processes operating on argument structure to take place either in the lexicon or in the syntax, and offer the *Lex-Syn Parameter* which is set to the appropriate component of the grammar in each language, permitting the very same operation to occur in different components across languages. Possibly, the fact that *–tos* adjectival passives in Greek are derived from a wider range of verbs than adjectival decausatives in Hebrew, can also be accounted for in terms of a syntactic derivation of the former, in contrast to a lexical one of the latter.

6.2 English (Embick 2004)

English is known to be very poor in its morphology. Even the distinction between verbal passives and adjectival ones is in most cases not marked morphologically, let alone distinctions within the class of adjectival passives. Nevertheless, I believe that the analysis of adjectival passives presented in this article can extend to English, and that in this language as well, evidence can be found showing that there are two types of adjectival passives – 'true' passives and decausatives. Consider the following examples:

(85) a. The rock seems melted by acid.

b. The rock seems molten (*by acid).

[31] It will be interesting to see whether *–menos* adjectival passives in Greek exhibit other properties of syntactic constructions, namely, lack of idioms and semantic drifts (Horvath & Siloni 2008, 2009), licensing of non-thematic subjects (Wasow 1977), etc., but this will have to await further research.

Melted and *molten* are both adjectives (they appear as complements to *seem*). However, only *melted* entails a Cause, which be realized in a *by*-phrase. *Molten*, on the other hand, simply refers to the state of the rock, without entailing a prior causing event. The sentence *Mercury has a molten core* does not entail that someone or something melted the core. It is possible that it was always molten. Therefore, *melted* is an example of a 'true' adjectival passive, the result of saturation, while *molten* is an adjectival decausative. This pair is one of a few rare cases in English where the two types of adjectives have different forms in. In most cases, the same form functions as both the 'true' passive and the decausative, giving rise to the ambiguity illustrated in (86).[32] (86a) is not contradictory, which means that the form *closed* does not necessarily entail an implicit argument: it can be an adjectival decausative. In (86b), however, the same form licenses an Agent-oriented adverb, suggesting that in this case, the form is a 'true' adjectival passive.

(86) a. The door is closed, though no one / nothing closed it.

b. The door remained carefully closed.

This situation is identical to the one we have seen with ambiguous adjectives in Hebrew (section 4.2.2) and it is fully expected in view of the morphological poverty of English.

The fact that there are two types of adjectival passives in English has been acknowledged before, most explicitly in Embick (2004), who labels the two types 'statives' and 'resultatives'. Embick, however, attributes the differences between the two types of adjectives to the existence / lack of an event in their interpretation, rather than to the existence / lack of an implicit argument (see also Sleeman 2007). But, this cannot be the right analysis, since in

[32] In other cases, the adjectival decausative will not bear passive morphology at all, as discussed for Hebrew in 4.2.2. For example, *clean* and *dry* are the adjectival decausatives corresponding to the 'true' adjectival passives *cleaned* and *dried*, respectively.

English, like in Hebrew, many adjectival passives license Agent-oriented adverbs (87a), *by*-phrases (87b) or instruments (87c):

(87) a. The package remained carefully opened. (Embick 2004)

b. The stadium remained guarded by armed policemen.

c. The dog remained tied with a leash.

Embick claims that (87a) is grammatical since 'resultatives' such as *opened* include an eventuality in their semantics. This however is clearly insufficient; Adverbial modification is not automatically licensed by an event variable. Unaccusative verbs, for example, undoubtedly include event variables, but still do not license Agent-oriented adverbs, as seen in (88).

(88) *The door carefully opened.

We must therefore conclude that adjectives such as the ones in (87) include implicit arguments.

Notice also that the numerous examples in which the additions of *by*-phrases, instruments or Agent-oriented adverbs are illicit with adjectival passives do not indicate the lack of an implicit argument. Rather, under the proposal argued for here, these modifiers cannot be used since they do not participate in the state denoted by the adjective.

A clear advantage of the current proposal over Embick's is that the latter does not predict the sets of 'statives' and 'resultatives'. Embick notes (p. 361) that "it seems that not all Roots form pure statives. It does not seem possible to form statives on √DESTROY, √KICK, and certain other Roots"; but nothing in his analysis accounts for this fact. My analysis, on the other hand, predicts this fact straightforwardly. Only roots which can undergo decausativization have adjectival decausative ('stative') alternates. Take for instance *kick*: since its external ⌞-

role is Agent, and not Cause, it cannot undergo decausativization and therefore no decausative form is predicted to exist.[33]

So, English data suggest that the analysis presented in this paper can extend to this language as well. The fact that the two types of adjectives often have the same morphology can obscure the distinction, but a close look at the behavior and interpretation of these adjectives reveals it.

7. Conclusion

The primary focus of this article has been the adjectival passive in Hebrew. I have shown that the class of adjectives traditionally referred to as 'adjectival passives' actually consists of two groups: adjectives that have an implicit argument and adjectives which lack an implicit argument altogether. Given that the semantics as well as the composition of the sets of these two adjective types parallel that of verbal passives and unaccusative verbs, respectively, I have suggested that the adjectival passives are derived by the same valence-changing operations which derive verbs, namely, saturation and decausativization.

While the argument structure of verbs, and to a lesser extent, nouns, was studied thoroughly over the years, the argument structure of adjectives received much less attention. Even the most basic questions in this domain are debated. For example, while Baker (2003) states that adjectives lack any θ-role assigning abilities, scholars such as Bennis (2004), Landau (2009) and others take it for granted that at least some adjectives assign θ-roles, and while Levin &

[33] The case of *destroy* is somewhat different: the external θ-role of *destroy* **is** arguably Cause (ia), and therefore it should have an adjectival decausative alternate, contrary to fact. Note, however, that in English *destroy* does not have a verbal unaccusative alternate as well (ib):

(i) a. The army / the storm destroyed the house.

b. *The house destroyed.

Clearly, something blocks the application of decausativization to *destroy* in general, in this language.

Rappaport (1986) claim that having an argument mapped in subject position is a basic feature of adjectives, Cinque (1990) presents evidence that some adjectives lack it.

The fact that an analysis which attributes the same formation processes to adjectives and verbs can account for so many of the semantic and syntactic properties of the former is therefore very promising. It suggests that operations which affect argument structure (whether lexical or syntactic) are available universally, and are not contingent upon a specific word class. Hopefully, this can help us to gain insight into the argument structure of additional types of adjectives, for example, adjectival present participles (e.g. The book seems *interesting*) and reciprocal participles (e.g. They remained *embraced*). Such an analysis suggests that any divergence from the parallelism between adjectives and verbs should be motivated independently, based on the well-known semantic and syntactic differences between adjectives and verbs. This indeed seems to be the case with adjectival passives, as was shown here. For example, the fact that they are less permissive than verbs with regard to adverbs, instruments etc. follows directly from the fact that adjectives denote states, while verbs denote events. Other differences between adjectives and verbs may possibly follow from the adjectives' lack of an accusative Case feature, etc.

Based on this study, it seems fruitful to adopt the assumption that basically, the argument structure of morphologically-related words of different lexical categories is uniform. Not only does it seem to capture fundamental similarities between adjectives and verbs, as shown here, but it also provides a beneficial guideline for research, since it suggests a restricted and simple theory of argument structure.

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