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## **Adjectives and Argument Structure**

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by

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### **Abstract**

The last decades have seen a growing interest in the study of argument structure. The different  $\theta$ -roles assigned by various predicates were identified, the principles governing argument projection to syntactic positions were investigated, and a variety of diathesis alternations were analyzed. However, most of the work in this field focused on verbs.

The present dissertation examines the argument structure of adjectives. Focusing mainly on Hebrew and English, it aims at defining the argument structure of adjectives, and specifying how it differs from that of verbs.

First, I establish the base position of the subjects of adjectives, showing that, unlike subjects of verbs, they are not generated within the projection of the lexical head, namely the AP.

I propose that the externality of an adjective's subject is achieved via lexical marking of one of the  $\theta$ -roles of the base from which it is derived; this role is not syntactically realized in the adjective's projection, and undergoes  $\lambda$ -abstraction in the semantic representation at the AP level. The AP is thus a function, a  $\lambda$ -expression. The lexically marked  $\theta$ -role ends up being interpreted just like it would be in verbal environments, though it is not assigned in a direct manner as it would be in the verbal case, but rather via function application.

I propose further that ergative adjectives, namely adjectives mapping their subject to complement position, can be characterized semantically, as adjectives with an internal Proposition  $\theta$ -role. This observation leads to a refinement of the externalization mechanism. If this mechanism necessarily introduces a variable of the type of individuals or events, then the contrast between ergative and other adjectives is explained: Propositional roles cannot be marked for  $\lambda$ -abstraction, as they present the wrong type of argument to be bound by the  $\lambda$ -operator.

The workings of the marking mechanism are exemplified and further examined in two additional case studies: adjectival passive formation and adjectival present participle formation.

The class of adjectival passives in Hebrew is argued not to be homogenous, but rather to consist of two sub-classes, distinguished by the presence versus absence of an implicit argument in their interpretation, on a par with 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 shown not to be accidental, but rather to stem from the fact that the same valence-changing processes are operative in both systems.

With regard to present participles, I show that while all of them are verbal, a subset of them are ambiguous, having an adjectival reading in addition. This subset is claimed to be constrained aspectually: only stative verbs have adjectival present participle correlates. It is further argued that adjectival present participle formation is a pre-syntactic, lexical operation, involving saturation of an internal  $\theta$ -role, in addition to lexical marking for abstraction.

The central finding of the dissertation is that, taking seriously the well-known claim that adjectives invariably denote states (whereas verbs denote different types of eventualities), and adopting in addition the conclusion that adjective formation involves lexical marking for  $\lambda$ -abstraction, it becomes clear that adjectival argument structure is governed to a large degree by the same principles as verbal argument structure in terms of the inventory of available  $\theta$ -roles, argument mapping, and operations affecting thematic grids.

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# 1 Introduction

The study of argument structure lies at the heart of the inquiry into the lexicon-syntax interface, as it seeks to unravel how lexical properties of predicates determine the syntax of the sentences in which they appear. Over the last thirty years, significant advances were made in many aspects of this field. The different thematic ( $\theta$ -) roles assigned by various predicates were identified, in trying to account, e.g., for contrasts such as (1), in which very similar predicates require their subject position to be realized by different types of noun phrases. The principles governing argument projection (also referred to as mapping or linking) to syntactic positions were thoroughly investigated, seeking to explain, for example, why certain non-agentive predicates such as *fall* (2a) map their subject internally, while others, e.g. *glow*, map it externally (2b). In addition, a variety of diathesis alternations, such as the active-passive (3a) and transitive-unaccusative (3b), were analyzed, the analysis often containing the direction of the derivation (e.g. transitive to unaccusative or vice versa), its effect on the thematic properties of the predicate, and the grammatical component in which it occurs, namely, whether it is lexical or syntactic.

- (1) a. The thief / The illness killed the old man.  
b. The thief / \*The illness murdered the old man.
- (2) a. The diamond<sub>i</sub> fell t<sub>i</sub>.  
b. The diamond glowed.
- (3) a. John broke the window – The window was broken (by John).  
b. John broke the window – The window broke (\*by John).

The investigation of argument structure led to important discoveries about the structure of the mental lexicon, as well as many syntactic phenomena. Moreover, and relevant to this work, this domain can give us insight into the nature of the basic lexical categories – verb, noun and adjective - and the similarities and differences between them.

The bulk of work on argument structure focused on verbs; A few central studies in this domain, among many, are Jackendoff (1990), Hale & Keyser (1993), Levin (1993), Levin & Rappaport (1995), Pesetsky (1995), Reinhart (2002), Borer (2005a,b), Reinhart & Siloni (2005), and Ramchand (2008). Given that the argument structure of verbs was studied extensively, it is only

natural that the study of other categories takes advantage of the results established in the study of verbs, and comparison to this well-studied case is almost unavoidable.<sup>1</sup>

The current dissertation examines the argument structure of adjectives. Focusing mainly on Hebrew and English, it aims to shed light on how adjectives resemble verbs, and in what ways they differ from them, with regard to their argument structure. Three main aspects of the theory of the argument structure of adjectives, presented in (i)-(iii) below, are tackled.

i) *The principles guiding the mapping of arguments to syntactic positions in the adjectival domain.* Are arguments of adjectives mapped to the syntax according to the same principles guiding mapping in the verbal system? If not – how do the two domains differ, and what underlies these differences?

ii) *The inventory of  $\theta$ -roles available for assignment by adjectives.* Are the types of  $\theta$ -roles assigned by adjectives and verbs identical? And more specifically, does a verb-related adjective assign the same  $\theta$ -roles as its verbal counterpart?

iii) *The inventory of operations affecting the  $\theta$ -grid of adjectives.* Are the valence-changing operations familiar from the verbal domain (e.g. passivization) available also in the adjectival domain?

In 1.1 below, I survey the existing literature on the argument structure of adjectives, and present the main results achieved in this field. In 1.2, I outline the structure, goals and main conclusions of the rest of the dissertation.

## **1.1 The argument structure of adjectives – previous work**

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<sup>1</sup> One prominent example of this phenomenon is Grimshaw's (1990) seminal work on argument structure in the nominal domain. Grimshaw shows that in principle, nouns can assign the same thematic roles as verbs. One type of nouns – the so-called 'complex event nominals' - share the argument structure of their verbal alternates in its entirety; moreover, the projection of these arguments is obligatory, just as in the verbal domain. The rest of the nominals denote individuals rather than events, and therefore have a R(eferential)  $\theta$ -role, a role not existent in the verbal domain (possibly in addition to other roles familiar from the verbal domain). Grimshaw further argues that passivization applies in the nominal domain in a manner similar to its application on verbs. This study thus reveals certain common properties of nouns and verbs, as well as significant ways in which they differ, e.g. the existence of the uniquely nominal  $\theta$ -role, R.

Relative to the extensive literature on the argument structure of verbs, there are not a lot of studies which deal, specifically and directly, with the argument structure of adjectives. This section surveys the existing literature on the subject. I will present both general approaches to the argument structure of adjectives (1.1.1-1.1.2), and research of specific types of adjectives - adjectival passives in 1.1.3, and ergative adjectives in 1.1.4. These two types of adjectives figure prominently in this work, and supply the motivation for many of its conclusions.

### 1.1.1 The *Lexicalist Hypothesis* and beyond

Some studies which discuss verbal argument structure mention adjectives briefly, in general implicitly assuming that the argument structure of adjectives parallels that of verbs (e.g. Parsons 1990, Haegeman & Guéron 1999, Emonds 2000 among others). This line of thought can be traced back to Chomsky's "Remarks on Nominalization" (1970). In this paper, Chomsky observes the basic intuition that verbs, nouns and adjectives are very similar in the types of arguments they take and in the way these arguments are projected in the syntax, and formalizes this intuition as follows: "Let us propose... that a great many items appear in the lexicon 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). This proposal, which is sometimes referred to as *the Lexicalist Hypothesis*, is usually taken to mean that morphologically-related items of different categories share an argument structure.

In *Lectures on Government and Binding* (1981), Chomsky further notes that "...adjectives have close to the full range of verbal and nominal complement structures" (p. 49). He argues that the crucial difference between adjectives and verbs is that the former lack the ability to assign accusative Case, which accounts for the fact that nominal complements of adjectives appear as *of*-phrases, with *of* assigning the required Case, rather than as bare NPs (4).

- (4)    a. destroy the city  
       b. proud \*(of) John

It is important to note that *of*-insertion is viewed in Chomsky (1981) as a surface phenomenon, and the basic selectional restrictions of the adjective and the verb are argued to be identical. Indeed, nominal complements aside, it is easy to observe that adjectives, like verbs, can have PP-complements (5), and CP (S' in the terminology of the time) complements (6). In addition, on a

par with raising verbs, there exist raising adjectives, selecting for a "defective" clause (TP, or S) (7).

(5) a. *ha-kelev nikšar* [<sub>PP</sub> *la-gader*].  
the-dog was+tied<sub>VERB</sub> to+the-fence

'The dog was tied to the fence.'

b. *ha-kelev kašur* [<sub>PP</sub> *la-gader*].

the-dog tied<sub>ADJ</sub> to+the-fence

'The dog is tied to the fence.'

(6) a. John thinks [<sub>CP</sub> that he will win].

b. John is certain [<sub>CP</sub> that he will win].

(7) a. John appears [<sub>TP</sub> t to be sick].

b. John is likely [<sub>TP</sub> t to be sick].

A further reinforcement for the *Lexicalist Hypothesis* was offered in Stowell's (1983) paper, "Subjects across Categories". In the spirit of X-bar theory, Stowell argues in this paper that all lexical categories, including adjective, have a structural subject position (specifier), to which their subjects are mapped. The reason why subjects do not usually occur inside APs (while they do appear inside NPs, for example) is that they cannot be Case-marked in this position. This approach thus provided further support for the common view that the argument structure of adjectives parallels that of verbs and that the existent differences between the two categories stem from independent factors, i.e. Case.

However, over the years, several scholars have expressed a certain discomfort with regard to treating adjectives as completely parallel to verbs. Two reasons for this come to mind:

(i) It is not clear what the *semantic content* of the  $\theta$ -roles of adjectives is, and whether it is the same as in the verbal domain. In some cases, the semantic relation between an adjective and its argument seems to parallel quite closely a relation between a verb and its argument. This is so e.g. in the case of adjectival passives compared to verbal passives, where the intuition is that the subjects of both carry the Theme role. But in other cases, it might seem that some type of relation between an adjective and its argument is unique to adjectives, with no clear analogue in the verbal domain. For example, is the relation between *red* and *the car* in *the car is red* familiar from the verbal system? Thus, several scholars have suggested that the semantic roles assigned



by adjectives are different from those assigned by verbs. For example, Pesetsky (1982) assumes that subjects of adjectives receive what he calls an 'attribute' role, unique to adjectives. Rothstein (1999) calls the  $\theta$ -roles of adjectives 'Arg1', 'Arg2', etc., in order not to commit to the exact nature of these roles.

(ii) It is unclear whether the *mode of assignment* of  $\theta$ -roles by adjectives is the same as that of verbs. It seems that what contributes significantly to this uncertainty is that adjectives can function both as attributes and as predicates. Predicative adjectives are found in copular constructions, small clauses, and as complements of raising predicates. Attributive adjectives are noun modifiers. The attributive use of adjectives seems to necessitate a mechanism of association (between the adjective and the noun it modifies) which does not exist in the verbal domain. For example, Higginbotham (1985) proposes that the relation between a modifying adjective and the noun it modifies is one of  *$\theta$ -identification*, in which the open position of the adjective is identified with the open position of the noun.<sup>2</sup>  *$\theta$ -identification* is a mode of thematic discharge different from  *$\theta$ -marking*, known from the verbal domain. If such a mechanism is available, and employed in the attributive case, the question is naturally asked whether in the predicative use, adjectives associate with their subjects like verbs, or rather by using some variant of the attributive modification mechanism.

### 1.1.2 Baker (2003) – adjectives and verbs are different

Baker (2003) presents a hypothesis which capitalizes on the intuition presented just above, namely, that adjectives do not  $\theta$ -mark their subjects like verbs. This is done within a general theory offering a distinctive categorization of verbs, nouns, and adjectives. Abstracting away from nouns, which are irrelevant here, what sets adjectives apart from verbs according to Baker, is that the former do not have a  $\theta$ -marked specifier. So, while verbs project specifiers in which their subjects appear, adjectives never do. Thus, interestingly, Baker opposes the common wisdom, mentioned in section 1.1.1 above, of assigning adjectives the same analysis as verbs, and APs the same structure as VPs.

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<sup>2</sup> Higginbotham suggest also a mechanism of *autonomous  $\theta$ -marking*, by which a gradable adjective (e.g. *big*)  $\theta$ -marks the noun it modifies (with something like a degree  $\theta$ -role), ensuring that the adjective is interpreted relative to the noun (*big butterflies* are butterflies which are big relative to butterflies).

Baker's initial motivation for positing a split between adjectives and verbs comes from the different behavior of the two categories with regard to unaccusativity diagnostics. Thus, for example, as first noted by Belletti & Rizzi (1981), while the Theme argument of the passive verb *riconosciute* 'recognized' is mapped internally (as can be evidenced from (8a), in which *ne*-cliticization, which is possible only from the structural object position, is grammatical), the similar Theme argument of the passive adjective *sconosciute* 'unknown' is mapped externally (hence, the ungrammaticality of *ne*-cliticization in (8b)).

- (8) a. *Ne sarebbero riconosciute molte t (di vittime).*  
of-them would be recognized many of victims  
'Many of them (the victims) would be recognized.'
- b. \**Ne sarebbero sconosciute molte t (di vittime).*  
of-them would be unknown many of victims

Similar facts were observed in Russian (Pesetsky 1982) and in Hebrew (Borer & Grodzinsky 1986). For example, in Hebrew, a predicate can precede its subject in the so-called 'simple inversion' construction only when the subject is an internal argument (Shlonsky 1997). Thus, the verb-subject order in (9a) and (10a), containing unaccusative and passive verbs, is licit. In contrast, as shown in (9b) and (10b), adjectival passives do not license the adjective-subject order, suggesting that their subject is external.<sup>3</sup>

- (9) a. *nišbar mašehu.*  
broke/was broken something  
'Something broke/was broken.'
- b. \**šavur mašehu.*  
broken<sub>A</sub> something
- (10) a. *nixtevu šloša mixtavim.*  
were+written three letters
- b. \**ktuvim šloša mixtavim.*  
written<sub>A</sub> three letters

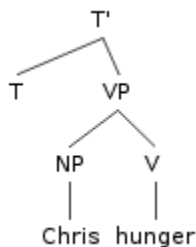
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<sup>3</sup> One could wonder whether these diagnostics are applicable to adjectives at all. In chapter 5, sections 5.1 and 5.2.1 I will show that they are: ergative adjectives allow *ne*-cliticization in Italian, and license the adjective-subject order in Hebrew.

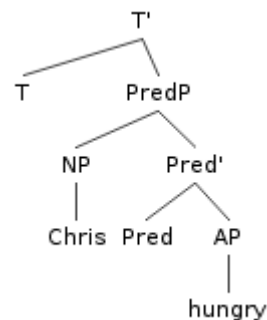
In order to account for the fact that subjects of adjectives, including those of adjectival passives, are external, Baker suggests that subjects of adjectives do not originate within the adjectival projection, but rather in the specifier of a silent functional head, Pred. This head was suggested by Bowers (1993) to be implicated in predication structures with all lexical categories – verbs, nouns and adjectives. Following Chierchia (1988), Bowers claims that lexical categories are not predicates, but rather a special kind of property, "disguised" as an individual. This individual can be made a predicate using Chierchia's "up" operator. Bowers proposes that the semantics of Pred is this operator, namely, Pred takes an individual and turns it into a predicate.

Baker suggests that the assistance of Pred is unnecessary in the case of verbs, which are true predicates and license their own thematic subjects, but is crucial with adjectives, as well as nouns. While these latter categories have selectional properties, they cannot assign thematic roles by themselves. In Baker's implementation, Pred takes an AP (or NP) as a complement, thus becoming a predicate which assigns the  $\theta$ -role Theme to the subject in its specifier position. This is illustrated in (11) (see Baker's (31)).

(11) Verbs: Chris hungers



Adjectives: Chris is hungry



Baker's suggestion automatically accounts for the facts of (8)-(10) above. Subjects of adjectives are external arguments, base-generated in spec,PredP, and are not expected to behave like internal arguments with regard to unaccusativity diagnostics. The analysis also explains several additional phenomena. For example, copula-like elements in certain languages (e.g. *yé* in Edo) which appear with predicative adjectives even in non-tensed clauses (12), and therefore cannot be analyzed as realizations of Tense, are taken to be realizations of Pred (see section 2.4 in Baker for additional discussion).

(12) *úyì yá* [<sub>PredP</sub> *èmátòn* ?(dòó)      *yé* [<sub>AP</sub> *pèrhè*]].      (Baker's (48))

Uyi made metal INCEPTIVE Pred flat

'Uyi made the metal flat.'

Additionally, the existence of an additional head (Pred) between T and AP can account, given some additional assumptions, for the fact that adjectives are not inflected for tense, while verbs are. The argument goes as follows. On the one hand, the adjective cannot skip over Pred on its way to adjoin to T, since this would violate the Head Movement Constraint (Travis, 1984). On the other hand, if the adjective does adjoin to Pred on their way to T, then a complex Pred head is formed. Baker proposes that such a complex head cannot further raise and adjoin to T, since Tense must adjoin to lexical categories, rather than to functional ones (see Baker's section 2.5). Finally, and importantly, Baker's theory accounts for why adjectives, but not verbs, can function as attributive modifiers. If a verb would be directly merged with a noun to form a noun phrase, there would be no NP for the verb to assign its  $\theta$ -role to, and the  $\theta$ -criterion would be violated. On the other hand, an AP which is merged as a noun modifier has no  $\theta$ -role to assign, and no violation arises. This is so since attribution does not involve the functional head Pred, which is the  $\theta$ -assigning head.<sup>4</sup>

Baker's theory will be discussed further in chapter 2, section 2.1.3. Let us now turn to a survey of the literature on two types of adjectives central to this dissertation: adjectival passives and ergative adjectives.

### **1.1.3 Adjectival passives**

With regard to argument structure, adjectival passives are without a doubt the most studied adjective type, beginning with Wasow (1977), who has established that passive adjectives exist as a category distinct from the verbal passive participle. Since then, the properties of adjectival passives and their formation have been the focus of much research (see, among others, Lieber 1980, Wasow 1980 and Bresnan 1982).

A very influential analysis of adjectival passive formation is that of Levin & Rappaport (1986). The authors offer a simple and minimalist rule of adjectival passive formation, which simply re-categorizes a verbal passive participle as an adjective. Like the verbal passive, the adjectival passive will not assign its external  $\theta$ -role, since passivization, in the adjectival as in the verbal domain, includes suppression of that role. What about the verbal passive participle's internal  $\theta$ -

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<sup>4</sup> Adjectival predication, on the other hand, must involve Pred. A sentence must contain a predicate, and since according to Baker (2003) an adjective is not a predicate by itself (since it does not project a specifier), it needs the assistance of Pred in order to become one.

role, the one assigned to its subject? As shown in (8)-(10) above, in the case of adjectival passives, the subject is not an internal argument, and thus, this role must be analyzed as assigned to subject position. To accommodate this fact, Levin & Rappaport assume that it is an inherent property of adjectives that they must have an external argument. Thus, the re-categorization of a passive verb as a passive adjective results in the lexical externalization of one of the verb's internal  $\theta$ -roles. Specifically, the role to be externalized is that which otherwise will be assigned to a direct object (typically, but not necessarily, the Theme; see chapter 6, section 6.1.2.1 for additional discussion). This role is re-labeled as external, and is assigned to subject position by the adjectival passive.

In the following years, a number of additional studies looked at adjectival passive formation in different languages, including Grimshaw (1990) and Bresnan (1996) for English, Dubinsky & Simango (1996) for Chichewa, von Stechow (1998) for German, and Sabbagh (2005) for Tagalog. More recently, several studies have pointed out distinctions within the class of adjectival passives in different languages, suggesting different derivations for different sub-types of the adjectival passive, as in Kratzer's (2000) analysis of German, Anagnostopoulou's (2003) work on Greek, Embick's (2004) work on English, and Sleeman's (2007) study of English, German and Dutch.

An assumption shared by the analyses mentioned above (except for Anagnostopoulou 2003), is that the interpretation of adjectival passives does not include an external argument. This assumption is based on contrasts such as the one illustrated in (13) and (14) (using parallel data from Hebrew). In (13), 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 (14), which contains an adjectival passive, *by*-phrases, adverbs like *be-tsumet lev* and instrumental phrases are ruled out.

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

(14) *ha-mexonit rexuca (\*al-yedey maks / \*be-tsumet lev / \*be-cinor).*  
 the-car washed<sub>ADJ</sub> by Max in-attention / in-hose

Since *by*-phrases, Agent-oriented adverbs and instrumental phrases are generally assumed to be licensed by external arguments (specifically by Agents, at least in the case of adverbs and

instruments, see Dubinsky & Simango 1996, Reinhart & Siloni 2005, among others), such contrasts were taken as evidence that adjectival passives, unlike verbal passives, lack an implicit external argument. Examples to the opposite effect, in which adjectival passives do behave as if they have an external argument, were regarded as a sporadic, insignificant phenomenon.

Let us consider the picture that emerges from the studies mentioned above with regard to the argument structure of adjectival passives, specifically, in comparison with that of verbal passives:

(i) In adjectival passive sentences, just like in verbal passive ones, the subject receives a  $\theta$ -role (e.g. Theme) which, in the transitive alternate, is assigned to the direct object. In addition, indirect arguments such as Source, Goal or Location can appear in both the adjectival and the verbal passive, as shown, for example, in (5) above.

Thus, as far as  $\theta$ -role types are concerned, the adjective and the verb are on a par. However:

(ii) The subject of the adjectival passive is not a derived subject, unlike that of a verbal passive. Thus, the Theme role which is assigned internally in both the transitive and the verbal passive cases, is assigned externally in the adjectival passive case.

(iii) Under the widely accepted hypothesis that verbal passives have an implicit external argument, as supported by the facts of (13) above, the common assumption that adjectival passives lack such an argument (as supported by (14)) marks an additional difference between adjectival and verbal passives.

We are thus faced with two differences between adjectival and verbal passives, which seem to straightforwardly argue against the null hypothesis presented in 1.1.1 above, namely that the argument structure of adjectives and verbs is one and the same.

The difference in (iii) was attributed by different authors to different sources (see for example Grimshaw 1990, Kratzer 2000). I will argue in chapter 3 that this difference is not real; in fact, 'true' adjectival passives always have an implicit external argument, just like verbal passives. The difference in (ii), however, is very real, and it is this fact which motivated Baker's analysis of adjectives as different from verbs. As explained above, Levin & Rappaport (1986) attributed this difference between adjectives and verbs to a general property of adjectives, namely, that adjectives must have an external argument. But this generalization cannot be accurate, in light of the class of *ergative adjectives*, discussed in the next section.

### 1.1.4 Ergative adjectives

Intransitive verbs are well-known to split with regard to whether their sole argument is mapped externally, in spec,VP (unergative verbs) or internally, as a complement to V (passive and unaccusative verbs, see Perlmutter 1978, Burzio 1986). Cinque (1989, 1990) was the first to show that a parallel split exists in the adjectival system as well, at least in Italian and German, and probably also in English. While, as was shown in (8)-(10) above, most adjectives are unergative, mapping their subject externally, there is a small set of adjectives, labeled by Cinque *ergative*, which assign their sole  $\theta$ -role to their complement.

Cinque uses a battery of syntactic diagnostics which separate ergative from unergative adjectives, on a par with the tests distinguishing unaccusative and unergative verbs. For example, turning back to the *ne*-cliticization test mentioned in 1.1.2 above, Cinque shows that while this diagnostic fails with most adjectives (15a), suggesting, as was already discussed, that these adjectives map their subject externally, *ne*-cliticization is possible out of the subjects of certain adjectives (15b), which therefore pattern with internal arguments.

- (15) a. \**Ne sono buone [le intenzioni t]*.  
of-them are good the intentions
- b. *Ne sono note solo alcune (delle sue poesie)*.  
of-them are well-known only some of his poems  
'Only some of his poems are well-known.'

Additional tests used by Cinque to establish the difference between the two types of adjectives include wh-extraction from sentential subjects (only possible when the subject is internal, see discussion in chapter 5, section 5.2.3), the *as*-clause construction (only possible with ergative adjectives, see additional discussion in chapter 5, section 5.2.4), and selection of *di* as a complementizer (complementizer selection in Italian is sensitive to the internality vs. externality of the embedded clause). Following the results of the different tests, Cinque classifies the following Italian adjectives as ergative: *noto* 'well-known', *chiaro* 'clear', *certo* 'certain', *sicuro* 'sure', *oscuro* 'obscure', *probabile* 'likely', *prevedibile* 'foreseeable', *gradito* 'welcome', *implicito* 'implicit', *esplicito* 'explicit', *evidente*, *ovvio* 'obvious'.

Bennis (2000, 2004) extends Cinque's analysis to Dutch, adding some additional diagnostics, such as occurrence of embedded verb second clauses, which is restricted to complement

positions. The Dutch adjectives he classifies as ergative are *duidelijk* 'clear', *onzeker* 'unsure', *aannemelijk* 'plausible', *waarschijnlijk* 'probable' and *bekend* 'well-known'.

As is clear from the discussion above, the existence of the class of ergative adjectives was recognized long after the existence of the class of unaccusative verbs (which likewise take only an internal argument). This is probably because, as noted in Cinque (1990), the "immediate suspects" for belonging to the class of ergative adjectives, namely adjectival passives, are not ergative (see the discussion of examples (8)-(10) above).

Cinque (1990) attempted to pinpoint the difference between ergative adjectives and all other adjectives which causes the former to have an internal subject, and the latter – an external one. He suggested that "externalization" of an internal  $\theta$ -role is not part of adjective formation per se, as claimed by Levin & Rappaport (1986), but rather, that it is a by-product of the morphological derivation of adjectives from verbs. Adopting the view that adjectival passives are derived from verbal passive participles (as in Levin & Rappaport 1986), Cinque claims that what necessitates externalization is the re-bracketing of a V as an A. Externalization is obligatory since after re-bracketing, the verbal predicate can no longer select its complement, which is now a sister to A, not to V, as shown in (16).

(16) [A[v broken]] the window

In contrast, according to Cinque, ergative adjectives are not derived from verbs, but rather, from stems unspecified for category; no category conversion takes place during the derivation, and therefore the adjective can select its complement, and there is no need for externalization.

In chapter 5, section 5.1 I will present my criticism of Cinque's suggestion in detail. For now, let me point out briefly two problems with it. First, the assumption that adjectival passives are derived from verbal passives is problematic. Horvath & Sioni (2008, 2009) provide extensive evidence that adjectival passive formation is a lexical process, while verbal passive formation is post-lexical, i.e. syntactic. Second, consideration of Hebrew shows that the morphological distinction made by Cinque does not hold universally. As will be shown in chapter 5, section 5.2, ergative adjectives exist in Hebrew as well, and in this language, they have the same morphological form as adjectival passives. Since the subject of adjectival passives is external and that of ergative adjectives is internal, it is impossible to tie the externalization process to the morphological derivation of the adjective. The morphological distinction fails also in certain cases in English (the ergative adjective 'well-known' is morphologically related to 'know'), Dutch



(*bekend* 'well-known' is related to the verb *kennen* 'know'), and probably even in Italian (*noto* 'known' is related to the verb *notare* 'notice'). I thus reject Cinque's analysis for the difference between ergative and other adjectives.

Let us review the picture with regard to adjectival passives and ergative adjectives, emerging from the last two sections. As explained in section 1.1.3, the fact that adjectival passives, unlike verbal passives, take an external argument has led Levin & Rappaport (1986) to claim that it is a defining feature of adjectives that their subject is external. But this generalization cannot be maintained in light of the existence of ergative adjectives, as shown above. The question then arises: if adjectives with an internal subject are allowed by the grammar, why is it that adjectival passives "externalize" their subject? And if they externalize it, why don't ergative adjectives do the same? This tension forms one of the most fundamental questions that this study seeks to solve. In essence, I will claim that adjective formation indeed includes some form of "externalization" (section 2.3). However, the properties of this mechanism are such that its application is semantically constrained. The root of the different behavior of ergative adjectives and other adjectives lies, according to my analysis, in their different semantic properties, rather than their different morphological derivation.

## **1.2 Goals, structure and main claims of the study**

### **1.2.1 Delineation of the field of inquiry**

The syntax and semantics of adjectives make up a large domain of linguistic research, posing innumerable intriguing questions. The current work aims to look at a specified sub-domain of this area: the argument structure of adjectives. Other syntactic topics (such as the position of adjectives within the DP or the functional structure involved in adjectival projections) and semantic topics (such as the role of gradation in adjective interpretation) though at times interfacing with the issues at hand, are largely put aside.

As mentioned in the beginning of the introduction, the study of argument structure is most advanced in the verbal domain. I therefore find that the most useful methodology for approaching the study of adjectival argument structure is to exploit, as much as possible, insights and results already achieved in the study of verbs. This methodology determines and restricts both the types of adjectives and the types of  $\theta$ -roles to be examined in the current context. Let me explain how.

The majority of adjectives looked at in the dissertation will be *adjectival participles*. The very existence of adjectival participles is somewhat debated. Since participles cross-linguistically exhibit properties of both verbs and adjectives, traditional grammarians often referred to them as "verbal adjectives", belonging to a "mixed category" with characteristics of both categories. In the same spirit, generative studies sometimes analyzed participles as "neutralized" entries (e.g. Chomsky 1981, Hoekstra 1984), lexically underspecified with regard to the categorial N-feature. Under these views, the category of the participle is determined by the syntactic environment in which it appears. Such analyses, however, were abandoned almost completely in the study of passive participles, and replaced by the understanding that although some passive participles indeed behave both like verbs and like adjectives, this is due to the fact that verbal and adjectival passives are very often homophonous (Wasow 1977, Levin & Rapaport 1986, among many others). There are thus two distinct entries, one verbal and one adjectival, rather than one "mixed" entry. In chapter 4, I argue that the same is true for present participles, namely, adjectival present participles form a class, distinguishable from verbal present participles.

The existence of adjectival participles having been established, it is immediately observable that these adjectives are similar – sometimes identical – to verbal elements in form, and seem to carry along at least some of their thematic properties as well, as exemplified in (17).

- (17) a. *ha-aron hucmad la-kir.*  
           the-cupboard was+placed-next<sub>VERB</sub> to+the-wall  
           'The cupboard was placed next to the wall.'
- b. *ha-aron camud la-kir.*  
           the-cupboard placed-next<sub>ADJ</sub> to+the-wall  
           'The cupboard is placed next to the wall.'

It is precisely this similarity of adjectival participles to verbs which serves as a good starting point for the study of adjectival argument structure, as it reveals the identical aspects in verbal and adjectival argument structure. Even more importantly, whatever properties adjectival participles turn out **not** to share with verbs can supply us with basic insight into the unique nature of adjectives.

Chapters 3, 4 and 5 thus deal mainly with adjectival participles. But some conclusions with regard to the argument structure of adjectives in general are also drawn, and these are discussed in chapter 6.<sup>5</sup>

As mentioned above, the methodology which draws on the comparison with verbal argument structure determines also the range of  $\theta$ -roles to be examined in the current study. Thus, the investigation here will be limited to 'traditional' arguments, denoting participants in eventualities, such as Agent, Theme, Goal etc., which are well-known from the verbal domain. The need for an exclusive adjectival role such as *attribute*, suggested by Pesetsky (1982, see 1.1.1 above), will be discussed in 6.3.<sup>6</sup>

A last remark with regard to the scope of the dissertation is in order here. The data in this study are taken primarily from Hebrew and English, with occasional examples from other languages. The conclusions reached here therefore apply first and foremost to Hebrew and English, but they are very probably relevant to a host of other languages with similar properties. Given that there is an ongoing debate (to which I do not attempt to contribute) on whether the mere existence of a category of adjectives is a universal feature of natural languages, I do not claim that the conclusions of this dissertation are universally valid (but see Baker 2003 for persuasive

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<sup>5</sup> It is important to note here, that these conclusions are not applicable to *relational adjectives*. Relational adjectives, e.g. *industrial* in *industrial output*, are not predicates; on the contrary, they are often analyzed as arguments which satisfy an open position in the noun's  $\theta$ -grid (Kayne 1981a, Giorgi & Longobardi 1991, Bosque & Picollo 1996, Fábregas 2007). Thus, any discussion of argument structure is irrelevant in this case.

Two additional types of adjectives which will not be examined in this study are 'tough' adjectives and evaluative adjectives. 'Tough'-adjectives are characterized by appearing in the alternation in (i). For discussion, see Chomsky 1977, Chomsky 1981, and for a recent analysis and a comprehensive overview of previous accounts, see Hicks 2009.

- (i) a. It is tough to please linguists.
- b. Linguists are tough to please.

'Evaluative' adjectives are discussed in Stowell (1991), Bennis (2000, 2004) and Landau (2006, 2009). These adjectives enter the alternation exemplified in (ii):

- (ii) a. John was clever (to punish the dog).
- b. Punishing the dog was clever (of John).

As mentioned above, I will not discuss these types of adjectives in this work.

<sup>6</sup> Other argument types, which were posited in order to deal with phenomena unique to the adjectival system (e.g. the "degree argument" of gradable adjectives, see Creswell 1977, Heim 1985, Kennedy 1999), will not be discussed in this work.

arguments that adjectives exist in all languages, and exhibit the same properties across them). It is my hope that in the future, observations and analyses presented here will be applied to the study of additional languages.

### **1.2.2 Outline of the study and main claims**

I will now outline the central ideas of this study, and how they are distributed over the following chapters.

The first claim to be made in this work, in the first part of chapter 2, is that subjects of adjectives are not generated inside the adjectival projection, but rather in the specifier of a higher functional projection. Thus, adjectives are different from verbs, whose subject originates in their specifier (or complement) position. This property holds for all adjectives – derived and non-derived, participial and other – except for ergative adjectives, discussed later in the dissertation. This conclusion in chapter 2 is in line with Baker's (2003) presented in 1.1.2 above, but rests on novel empirical arguments.

The second part of chapter 2 is devoted to a presentation of the mechanism responsible for the external status of the subject of adjectives. It suggests that the externality of an adjective's subject is achieved via lexical marking of one of the  $\theta$ -roles of the base from which it is derived; this role is not syntactically realized in the adjective's projection, and undergoes  $\lambda$ -abstraction in the semantic representation at the AP level. The AP is thus a function, a  $\lambda$ -expression. The  $\theta$ -role which was lexically marked ends up being interpreted just like it would be in verbal environments, though it is not assigned syntactically in a direct manner as it would in the verbal case, but rather via function application with the aid of a functional head selecting the function-denoting AP as its complement.

Chapters 3 and 4 include two case studies of adjectival participle formation, that of adjectival passives and adjectival present participles. The chapters exemplify the workings of the "externalization" mechanism.

Chapter 3 focuses on adjectival passives in Hebrew. It shows that the class of adjectival passives in this language is not homogenous, but rather consists of two sub-classes, and argues that the criterion distinguishing these classes is the presence versus absence of an implicit argument in their interpretation. 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 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.

Chapter 4 focuses on present participles in English and Hebrew. Using a large number of diagnostics, I show that while all present participles are verbal, only a subset of them are ambiguous, and have an adjectival reading in addition. I further claim that this subset is constrained aspectually: only stative verbs have adjectival present participle correlates. Having established a categorial split between two types of present participles, I suggest that the former are derived in the lexicon, and the latter – in the syntax, and outline the lexical operation deriving adjectival present participles. The analysis offered reveals substantial parallelisms between present and passive participles.

The discussion in chapters 3 and 4 reveals substantial similarities between the adjectival and verbal domains, both regarding the inventory of  $\theta$ -roles assigned by the two types of predicates, and regarding the operations on  $\theta$ -grids available in the two domains: saturation of a  $\theta$ -role, external or internal, and elimination (reduction) of an external  $\theta$ -role. The conclusion drawn from these two chapters is that the adjectival and verbal domains exhibit a large degree of parallelism, the differences between them stemming from two reasons: i) the aspectual difference between the two categories, namely the fact that adjectives invariably denote states whereas verbs denote different types of eventualities; and ii) the externality of the subjects of adjectives, established in chapter 2.

Chapter 5 turns the attention to ergative adjectives, the only type of adjectives whose subject is internal, mapped to complement position. After establishing the existence of ergative adjectives in Hebrew and English (on a par with their existence in other languages), it is argued that these adjectives can be characterized semantically, as adjectives that have a propositional Theme  $\lambda$ -role (propositional adjectives). This observation enables a refinement of the externalization mechanism presented in chapter 2. If this lambda operator involved in this mechanism necessarily abstracts over a variable of the type of individuals or events (rather than of propositions), then the contrast between ergative adjectives and all other adjectives is explained: a role that needs to be assigned to a proposition cannot be marked for  $\lambda$ -abstraction, as it presents the wrong type of argument to be bound by the  $\lambda$ -operator. The fact that the difference between

ergative and unergative adjectives can be accounted for straightforwardly given this simple constraint on externalization provides further support for the existence of this mechanism and the hypothesis with regard to its specific properties.

Based on the discussion in the previous chapters, chapter 6 summarizes the different options for adjective formation: which roles can be "externalized" using lexical marking for abstraction, and what valence-changing operations accompany "externalization" in each case. The chapter also offers a brief discussion of morphologically non-derived adjectives.

Returning to the three aspects of argument structure presented at the beginning of this introduction, the main conclusions regarding them, which are defended in this study, are the following:

i) *The principles guiding the mapping of arguments to syntactic positions in the adjectival domain.*

- **Adjective formation necessarily includes an externalization of one (non-propositional) role.**

- **Thus, the subject of adjectives (ergative adjectives excluded) is external, merged outside of the adjectival projection.** This property is unique to adjectives, and not shared by verbal projections.

- **Other than that, the mapping of arguments in the adjectival domain is guided by the same principles as in the verbal domain.**

ii) *The inventory of  $\theta$ -roles available for assignment by adjectives.* Chapters 3, 4 and 5 lead to the conclusion that **adjectives and verbs overlap substantially in the types of  $\theta$ -roles they assign.** However, adjectives denote states rather than eventualities involving change. Thus, **the range of  $\theta$ -roles available to adjectives is somewhat restricted - they cannot (directly) include participants causing change.**

iii) *The inventory of operations affecting the  $\theta$ -grid of adjectives.* Here too, the conclusion is that **many of the valence-changing operations known from the verbal domain are manifested also in the adjectival domain. This includes saturation of both external and internal arguments, and elimination of a Cause external argument.**

The general conclusion is that the **adjectival argument structure is guided to a large degree by the same principles guiding verbal argument structure; the differences between the two stem from the following reasons:**

**-Adjective formation involves externalization.**

**-Adjectives invariably denote states whereas verbs denote different types of eventualities**

## **2 The subject of adjectives**

In the last couple of decades, it has become widely accepted that subjects of verbs are base-generated within the maximal projection of the verb ("The VP-Internal Subject Hypothesis", Fukui & Speas 1986, Kuroda 1988, Koopman & Sportiche 1991, among others.)<sup>7</sup> In view of this, as a first step in understanding the argument structure of adjectives and whether it differs from that of verbs, the aim of this chapter is to determine where subjects of predicative adjectives originate: whether they are base-generated within the adjectival projection, on a par with subjects of verbs, or outside this projection. Based on both empirical evidence and theoretical considerations, I will argue here, in line with Baker (2003), that while subjects of adjectives are definitely generated lower than spec,TP, they are not generated within the AP, but rather in the specifier of a higher projection, which I will label Pred, as in Baker (2003) (the properties of Pred according to the current analysis are different, however, than the ones suggested by Baker, as will be explained below).

The chapter begins with a short survey of previous research on the topic, in 2.1. In 2.2, I recapitulate some of the theoretical arguments in favor of the externality of adjectival subjects, and present three novel empirical arguments for this claim. In 2.3, I make a proposal with regard

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<sup>7</sup> It is immaterial at this point whether the subject of a verb is assumed to be introduced by a functional 'little-v' head (Chomsky 1995, Kratzer 1996 and others), or to be generated within the VP (Horvath & Sioni 2002, 2010b). Under both assumptions, the subject of the verb is generated within the extended verbal projection, below e.g. manner adverbs. I argue in this chapter that the same is not true for adjectives. In the remainder of this chapter, 'VP' is used to denote the verbal projection, whether taken to be VP or vP. In section 2.4 I discuss the implications of the proposed analysis for the debate over the existence of 'little-v', showing that it argues against it. In chapter 3, section 3.5 I provide independent evidence that the external  $\theta$ -role must be included in the lexical information carried by a lexical item.

to the nature of the relation between an adjective and its subject, and the mechanism implicated in it, comparing it with Baker's (2003) analysis.

## **2.1 The subjects of adjectives – previous research**

### **2.1.1 Subjects of adjectives originate inside the AP**

The hypothesis that subjects of adjectives are generated in spec,AP dates back to Stowell (1983), and, as is evident, falls within the type of hypotheses which treat adjectives and verbs on a par, as explained in 1.1.1 above. Stowell's "subjects-across-categories" approach holds that all lexical categories - nouns, verbs, adjectives and prepositions - have a structural subject position (specifier), to which their subjects are mapped. The reason why subjects do not usually show up inside APs (while they do appear inside NPs, for example) is that they cannot be Case-marked in this position, since an adjective has no Case to assign to its specifier. However, if Case is available from a different head, e.g. from a preceding verb in ECM constructions, a subject can surface in spec,AP, as in (1), where *Bill absolutely crazy* is an AP, with *Bill* in its specifier.

(1) John finds [<sub>AP</sub> Bill [absolutely crazy]].

The appeal of Stowell's suggestion is clear, as it supplies an analysis which is applicable in the same manner to all categories.

In subsequent years, both theoretical and empirical reasons have led researchers to adopt the hypothesis that subjects of verbs are indeed always generated inside the verbal projection (Fukui & Speas 1986, Kuroda 1988, Koopman & Sportiche 1991, among others). Under the null assumption that all predicates are the same, this conclusion was naturally extended to include the subjects of predicative adjectives, which were taken to originate inside the adjectival projection (Stowell 1991, Sportiche 1995, Bennis 2004 and others).

Some problems with this conclusion exist, though. The arguments in favor of an XP-internal subject, both theoretical and empirical, are based on the verbal domain (as will be discussed in section 2.2 and the Appendix below). The hypothesis was extended to the adjectival domain in order to maintain symmetry between the different lexical categories. However, that such symmetry indeed exists is not a-priori true. In section 2.2 below, I argue that it does not.

As for sentence (1), in which the adjective's subject seems to be AP-internal, this is by no means the only possible analysis of this structure. The constituent [Bill absolutely crazy] (if indeed a constituent, see e.g. Williams 1983) is a small clause (SC), and its exact category is debatable



(e.g. Radford 1988, Aarts 1992, Sportiche 1995, Rothstein 2001). There are some compelling arguments that small clauses are not mere projections of the lexical predicate, but contain additional structure. For example, Sportiche (1995) cites sentences such as (2), where the SC subject appears above its stranded quantifier, as showing that adjectival SCs cannot be simple APs.

- (2) Louis considère [[ces immeubles]<sub>i</sub> [ tous t<sub>i</sub> monumentaux]]  
Louis considers these buildings all monumental  
'Louis considers all these buildings to be monumental.'

Sportiche argues also that the grammaticality of (3) is unpredicted if the two coordinated categories are AP and NP, proposing that SCs are CPs (though see Sag et al. 1985 on the possibility to conjoin constituents of different categories).

- (3) I consider John [[crazy] and [a good doctor]].

Radford (1988) discusses another argument that SCs cannot be simple projections of their main predicates, which is observable when the embedded predicate is a noun, assigning Case to its specifier position (4). Here it is plain to see that there are (at least) two available positions above the predicate, so the SC cannot be NP.

- (4) I consider [<sub>?</sub> John [<sub>NP</sub> Mary's best friend]].

If the same small clause structure is involved when the predicate is an adjective as when it is a noun, the embedded constituent in (1) above must be assumed to be bigger than AP, too.

Given this, we cannot know whether the structure of (1) is that in (5a), with an AP-internal subject, or that in (5b), with an AP-external one.

- (5) a. I consider [<sub>SC</sub> [<sub>AP</sub> Bill crazy]].  
b. I consider [<sub>SC</sub> Bill [<sub>AP</sub> crazy]].

A point of terminology is required here. Arguments originating in the specifier of the predicate, such as *Bill* in (5a), are commonly referred to as 'external', since Williams (1981). In order to distinguish these from arguments which originate outside the projection of the predicate, like *Bill* in (5b), I will call the latter type of argument 'truly external'.

So, although the assumption that subjects of adjectives originate inside the AP is elegant, it is not otherwise motivated. The empirical evidence for an XP-internal subject is limited to verbs, and there are no obvious cases in which the subject of an adjective surfaces inside the adjectival projection; given that additional structure is independently needed in adjectival SCs, it is still

*possible* to assume that the subject is base-generated inside the AP, but nothing forces this conclusion.

### **2.1.2 Some subjects are AP-internal and some are AP-external**

Kratzer (1995) (building on Diesing 1992) suggests that the base-position of subjects depends on the type of predicate in the clause, in the following way:

- i) Subjects of stage-level predicates always originate within the maximal projection of the predicate, that is, within the AP/VP.
- ii) Subjects of individual-level predicates originate within the maximal projection when the predicate is unaccusative, and outside it when it is unergative.

Kratzer derives this difference from the fact that stage-level predicates have a spatiotemporal role (a Davidsonian event argument), which must be mapped externally, forcing the subject to be mapped inside the predicate's projection; Individual-level predicates lack an event argument, and their subject can therefore be truly external.

I find, however, that both the syntactic evidence for such a split and its proposed semantic basis are questionable. With regard to the motivation for the different mapping, it is problematic to treat the spatiotemporal role on a par with other  $\theta$ -roles, claiming that they "compete" for the same syntactic position. This is because event arguments, unlike other arguments, never have a syntactic realization. Kratzer observes that at least in German and English event arguments are always implicit, and that spatial and temporal expressions do not fill argument positions; she does not explain why, given this, the existence of an event argument forces the external argument of stage-level predicates to be mapped inside the VP/AP.<sup>8</sup>

As for the syntactic evidence for the different mapping of stage- and individual-level predicates, as far as I can see, except for two phenomena (mentioned below), the syntactic arguments which were used in order to show that subjects of verbs are VP-internal do not discriminate between stage- and individual- level predicates, and nor do the arguments to be presented in section 2.2 below, showing that subjects of adjectives are truly external.

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<sup>8</sup> Note, in addition, that this argument for the different mapping of the subjects of different predicates crucially presupposes that only stage-level predicates have an event argument. However, Greenberg (1998), Landman (2000), Maienborn (2007) and Rothstein (1999) have all argued that individual-level predicates have event variables as well.

The two syntactic phenomena that **are** sensitive to this difference are *There*-constructions and extraction from subjects in German. Let us look first at *There*-constructions, and see whether they provide evidence in favor of a different mapping of the subject of stage- and individual-level predicates. Milsark (1974) notes that stage-level adjectives can appear in *there*-constructions (6), while individual-level ones cannot (7).<sup>9</sup>

- (6) a. There are firemen available.
- b. There are some students sick.
- (7) a. \*There are firemen altruistic.
- b. \*There are some students intelligent.

Kratzer mentions these facts, but does not provide an account for them or use them as syntactic evidence for the different mapping of subjects of stage- and individual-level predicates. It could be argued, though, that these facts can be explained by Kratzer's hypothesis, in the following way. Suppose that in *There*-constructions, the copula is followed by an AP, e.g. [<sub>AP</sub> fireman available]. Then, (6) is grammatical because the subject of stage-level adjectives occupies the specifier of the AP. But, if subjects of individual-level predicates must merge outside the AP, then there is no structural position for them in (7), hence the ungrammaticality. Thus, the facts of (6)-(7) seem to argue for a different mapping of the subjects of e.g. *sick* versus *intelligent*.

However, the proposed analysis above crucially assumes that the constituent following the copula is an AP, rather than e.g. an NP (as suggested for example in Williams 1984, 1994) or a small clause with some additional functional structure. Independently of that, it is completely unnecessary to stipulate that subjects of stage-level and individual-level predicates are generated in different positions in order to account for the contrast in (6)-(7), as there are various other, semantically-based explanations for it. For example, Milsark (1977) proposes that individual-level predicates require strong subjects (e.g. definite noun phrases) and since these are banned in *There*-constructions, so are individual-level predicates. Felser and Rupp (1997, 2001) adopt Kratzer's (1995) claim that only stage-level predicates have a spatio-temporal argument, and take *there* to be its realization. *There* can thus never co-occur with individual-level predicates.

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<sup>9</sup> In fact, the split demonstrated in (6)-(7) between stage- and individual- level predicates is not as robust as it first seems. Many stage-level predicates cannot appear in *There*-constructions ((i), from Kallulli 2007).

- (i) a. \*There are firemen hungry.
- b. \*There was a child happy.

Another solution is offered by McNally (1997), which analyzes adjectives in *There*-constructions not as small clause predicates, but rather as depictives. The ungrammaticality of individual-level predicates in *There*-constructions thus reduces to their ungrammaticality as depictives in general (*Margaret is drinking her tea cold* vs. \**Margaret is drinking her tea green*). No matter what explanation is adopted, *There*-constructions provide no reason to assume a different mapping for subjects of stage- and individual-level predicates.

Let us turn next to the German extraction facts which Kratzer brings as syntactic evidence for the different mapping of the subject of stage- and individual-level predicates. Following Diesing (1992), Kratzer observes that extraction out of subjects of stage-level predicates (e.g. *help* in (8a)) is possible, whereas extraction out of subjects of individual-level predicates (e.g. *know* in (8b)) is not.

- (8) a. Lehrer haben uns viele geholfen.  
teachers have us many helped  
'As for teachers, many of them helped us.'
- b. \*Lehrer wissen das viele.  
teachers know this many

Kratzer suggests that this is so because the subjects of stage-level predicates are governed in their base position, which is spec,VP, while subjects of individual-level predicates originate in spec,IP, where they are ungoverned.

It is worth noting that these facts seem to be unique to German. For example, wh-extraction in English does not discriminate between subjects of stage-level and individual-level predicates. In both cases, if the predicate is not unaccusative, extraction out of the subject is impossible, as exemplified in (9):<sup>10</sup>

- (9) a. \*Which teacher did [assistants of t] help the students?  
b. \*Which teacher did [assistants of t] know the answer?

I do not have an account for the German facts in (8), but since they are at odds both with data from other languages, and with all other syntactic diagnostics for the base-position of stage- and individual-level predicates, I do not view them as compelling evidence for adopting a different mapping for subjects of stage- and individual-level predicates (and see Jäger 1999 for arguments

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<sup>10</sup> The examples in (9) are due to Julia Horvath.

that the contrast in (8) is not rooted in the different position of the subject, but rather in the optionality or obligatoriness of scrambling).

To conclude, the assumption that the mapping of the subject is different in the case of stage- and individual-level predicates seems uncalled for, both empirically and theoretically.

### **2.1.3 Subjects of adjectives originate outside the AP**

As is clear from the discussion above, as well as from section 1.1.1 above, most analyses treat adjectives on a par with verbs. Baker (2003) is a unique theory in which adjectives are treated as fundamentally different from verbs. To recapitulate Baker's hypothesis which was presented in 1.1.2, it holds that adjectives are different from verbs in that they do not have a  $\theta$ -marked specifier, and their subjects are base-generated in the specifier position of a functional head Pred, which, having merged with the AP, assigns them the Theme  $\theta$ -role.

As observed in 1.1.2, Baker's analysis accounts for the fact that subjects of adjectival passives are external, for the existence of an attributive use for adjectives, and for several other phenomena.

Despite its many advantages, I believe there are some problems with Baker's theory:

(i) First, it seems that the motivation for the theory is insufficient. As explained in 1.1.2 above, the motivation comes from the fact that subjects of adjectives do not behave like subjects of passive or unaccusative verbs with regard to unaccusativity tests. But this fact, though suggesting a different mapping in the two cases, does not necessarily entail that subjects of adjectives are generated outside the AP. They could in principle be generated in spec,AP, and not pass unaccusativity tests, just like subjects of unergative verbs, generated in spec,VP (Baker does not provide independent evidence that APs do not have specifiers). Further evidence is needed in order to distinguish between an analysis in which subjects of adjectives originate in spec,AP, and one in which they originate outside of the AP altogether.

(ii) Second, Baker's assumption that subjects of adjectives uniformly receive the Theme role from Pred raises three problems:

(a) Why is the role Theme? The claim that the role is Theme can perhaps be understood in certain cases, notably adjectival passives (*written*, *broken*), and *-able* adjectives (*edible*, *readable*), whose subjects correspond to Theme objects of transitive verbs. However, in other cases, e.g. *boring* and *confusing*, the  $\theta$ -role of the subject seems to resemble a Subject Matter,

and in others, like *bored* and *confused*, it resembles an Experiencer. Baker briefly mentions the possibility that the subjects of some adjectives receive  $\theta$ -roles other than Theme (p. 36), and that it might be necessary to assume that the role assigned by Pred is a function of the lexical meaning of the adjective, but does not provide a specific mechanism that implements this insight.

(b) Baker briefly discusses ergative adjectives, and acknowledges the fact that they map their subject internally. Why should these adjectives behave differently than all other adjectives? Baker suggests that in fact, his generalization about the externality of the subjects of adjectives applies only to Theme arguments: the Theme argument of an adjective is external (Baker's (95)). He then proposes that the subjects of ergative adjectives do not count as Themes, without further explanation. Baker (2010) suggests that the subject of ergative adjectives is a Path rather than a Theme, again with no further argumentation. But if the subjects of *boring*, *confused* and *weak* are all Themes, why not the subject of an ergative adjective, like *likely*? How can one distinguish between Theme and other  $\theta$ -roles?

In addition, even if it is established that the  $\theta$ -role of *likely* is different from that of *boring* (as I will indeed show in chapter 5, section 5.3.2), there is nothing in Baker's analysis which accounts for why this difference results in a different mapping of the subject in the two cases.

(c) Baker is committed to a strong version of the UTAH (Uniformity of  $\theta$ -assignment Hypothesis, Baker 1988). This formulation of the principle holds that identical  $\theta$ -roles are assigned in identical syntactic configurations, without relativization to lexical categories, with adjectives using different configurations from verbs. This creates a serious complication, since the following three assertions, which Baker argues for, cannot all be true simultaneously:

- Subjects of adjectives receive the Theme role.
- The Theme role is assigned in the same syntactic configuration in the case of VPs and APs (UTAH).
- Subjects of adjectives behave like external arguments with regard to unaccusativity diagnostics, while subjects of verbal passives, which are also Themes, behave like internal arguments in this respect.

Baker is aware of this problem. Focusing on *ne*-cliticization, he recognizes that movement of *ne* is possible out of direct objects of transitive verbs and subjects of unaccusative verbs, and impossible out of subjects of transitive and unergative verbs, as well as subjects of adjectives,

originating in Spec,PredP. He thus needs to draw a structural distinction between spec,VP (where subjects of unaccusative verbs originate in his analysis) on the one hand, and spec,vP (where subjects of unergative verbs originate) and spec,predP (where subjects of adjectives originate) on the other hand. This is achieved by resorting to quite a complicated statement of the Empty Category Constraint (ECP). Baker further assumes that similar accounts can be given to explain all other unaccusativity diagnostics (though these accounts are not provided, see discussion in Baker, pp. 66-69).

Given that the theoretical motivation for the claim that subjects of adjectives are Themes is not very strong to begin with, and that it necessitates non-trivial additional assumptions, this claim is deserving of further examination.

In the following sections I will claim, like Baker, that subjects of adjectives are generated outside the AP. I will present evidence supporting this claim in section 2.2. In section 2.3, I will claim that the relation between an adjective and its subject does not involve  $\theta$ -assignment (of the Theme role), but is rather of a different nature. As I will show in 2.3.5, this solves the various problems raised above with assuming that subjects of adjectives receive the Theme role.

## **2.2 Arguments for the truly external nature of the subjects of adjectives**

This section presents arguments in favor of assuming that the subject of an adjective is not generated inside the adjectival projection. In 2.2.1 I elaborate somewhat on the attributive use of adjectives, recapitulating one of Baker's (2003) theoretical arguments for the truly external status of adjectival subjects. I then turn to some novel empirical argument for the externality of the subjects of adjectives. Over the years, several arguments were provided in the literature which supported the claim that subjects of verbs originate inside the verbal projection. In 2.2.2-2.2.4, three of these arguments are checked against the relevant data with adjectives (both stage- and individual-level), turning out to show that the subject of adjectives, unlike that of verbs, does not originate inside the AP (though it does originate lower than spec,TP).

In the Appendix to this chapter, the rest of the arguments for the VP-Internal Subject Hypothesis are applied to adjectives. The conclusion there is that while the data is compatible with the subject originating inside the AP, it is also compatible with it originating in a higher projection. The data therefore does not contribute to the current investigation.

### 2.2.1. A theoretical argument: attributive modification (elaboration of Baker 2003)

As explained in section 1.1.2, Baker (2003) claims that if adjectives do not  $\theta$ -mark their subjects, this automatically accounts for the existence of adjectival attributive constructions. Let me elaborate some more on why the attributive use of adjectives argues in favor of assuming that they lack the ability to  $\theta$ -mark their subject.

Under the common assumption that the specifier of a lexical category is a thematic position, claiming that subjects of adjectives are generated within the AP amounts to claiming that they receive an external  $\theta$ -role from the adjective, as indeed claimed in Bennis (2004), Landau (2009) and others. What do we know about assignment of external  $\theta$ -roles? For one thing, we know that it is obligatory. (10), in which the subject is an expletive and does not receive the verb's role, is ungrammatical.

(10) \*It eats an apple.

Importantly, since assignment of the external  $\theta$ -role is obligatory, a structural subject (an operator trace) is assumed to exist also in subject relative clauses, where it is not heard, as in (11).

(11) The boy [who [<sub>TP</sub> [<sub>VP</sub> t ate an apple]]] ran away.

Siloni (1995) argues that the same is true with regard to reduced relatives. Here, too, a trace occupies the subject position, as shown in (12).

(12) The boy [OP [<sub>VP</sub> t eating an apple]] ran away.

The trace is assumed in these cases for both empirical and conceptual reasons. Empirically, we know, for example, that relative clauses are constructions sensitive to islands, which means they involve movement, hence a trace; in addition, as pointed out by Siloni (1995), Burzio's generalization states that a verb which assigns accusative Case must also assign an external  $\theta$ -role, and therefore, the embedded verbs in (11)-(12) must have thematic subjects. The conceptual reason for assuming a trace in these cases is the Projection Principle (Chomsky 1981), which dictates that lexical information should be reflected in syntactic structure. Since we know that the lexical information of a verb includes a specification of an external argument, this must be reflected in relative clauses as well. Note that the base-position of the relative operators in (11)-(12) is, according to the VP-Internal Subject Hypothesis, within the verbal projection.



Consider now (13a), with an attributive adjective. In the early days of generative grammar (see e.g. Chomsky 1957), attributive structures like these were given a reduced relative clause analysis, roughly along the lines in (13b).

- (13) a. The [handsome] boy ran away.  
b. The boy [who is handsome] ran away → The boy [□ handsome] ran away → The handsome boy ran away

This relative clause analysis of attributive adjectives was shown in Bolinger (1967) not to be tenable for all adjectives. Among Bolinger's arguments for this, he notes that the analysis predicts that any adjective used attributively could also be used predicatively. But this is not the case, as shown in (14).

- (14) a. the former president  
b. \*the president is former.

Extensive research following Bolinger (1967) has established that in fact, there are two types of modifying adjectives, which have very different syntactic and semantic properties: appositive, indirect, so-called "predicative" modifiers, and restrictive, direct attributes (see Sproat & Shih 1991, Larson & Marušič 2004, Alexiadou et al. 2007, Cinque forthcoming, among others). For example, prenominal adjectives in English are ambiguous between a stage-level and an individual-level reading (15), the first one being the interpretation under a predicative reading, and the second – under an attributive one. Likewise, prenominal adjectives have both a restrictive and a non-restrictive reading (16), the first one arising from the predicative analysis of the adjective, and the second – from its attributive analysis. Many more interpretive differences between the two exist, and these are accompanied in different languages by syntactic differences (e.g. in English, a post-nominal adjective only has the predicative reading, see elaborate discussion in Cinque forthcoming, Chapter 2).

- (15) a. The **visible** stars include Aldebaran and Sirius (*ambiguous*)  
b. Possible readings:  
'The stars that are generally visible include Aldebaran and Sirius' (individual-level)  
'The stars that happen to be visible now include Aldebaran and Sirius' (stage-level)
- (16) a. All of his **unsuitable** acts were condemned (*ambiguous*)  
b. Possible readings:  
'All his acts were condemned; they were unsuitable' (non-restrictive)

'All (and only) his acts that were unsuitable were condemned' (restrictive)

Whereas "predicative" adjectival modifiers are often analyzed as manifesting some form of a reduced relative clause containing a predicative adjective, attributive adjectives are assigned the structure in (17), in which the AP does not contain any internal structure or trace. If the same structure was attributed to both uses of the adjective, then the various syntactic and semantic differences between the two would be very difficult to capture.

(17) The [<sub>AP</sub> handsome] boy ran away.

The important conclusion from the discussion above is that there are structures (i.e. 17) in which the specifier of AP is left empty; assuming a trace in these structures will not enable us to maintain the differences between attribution and predication. But, as shown above, the same is not true for verbal projections – the projection of a non-unaccusative verb always contains a thematic specifier, even when this element is not phonetically realized.

The situation therefore is the one depicted in (18).

(18)

	Adjectives	Verbs
Predicative use?		Thematic subject is obligatory in the verbal projection
Attributive use	Subject does not occur in the adjectival projection	(Relative clauses): Thematic subject is obligatory in the verbal projection

The question which remains is, what about predicative adjectives? Do they have a subject in spec,AP, on a par with verbs, or no subject in spec,AP, on a par with attributive adjectives?

I believe that the second option is preferable. Assuming that predicative adjectives license a subject in their specifier position would mean that there are cases – the predicative ones - in which adjectives have a subject internal to the phrase, and other cases – the attributive ones - in which the same adjectives do not project a subject. Under the assumption that an AP-internal subject receives a  $\theta$ -role from the adjective, much like a VP-internal subject, this entails one of two options:

(i) Either we have to posit two different lexical entries for each adjective, one with an external  $\theta$ -role, used in predicative contexts, and another without it, used in attributive contexts. This is of course problematic, since an entire class of words is duplicated.

(ii) Otherwise, we need to assume that the lexical information encoded on the adjective is realized in different ways, depending on the structure. This outcome is problematic as well, since it is at odds with the Projection Principle, or any other principle holding that structure reflects lexical information.

One could claim that maintaining symmetry between adjectives and verbs should be an important guideline for the theory, and therefore an AP-internal subject for predicative adjectives should be assumed. However, as the table in (18) reveals, the existence of attributive adjectives already forces us to assume a difference between verbs and adjectives. I find it desirable, therefore, to at least maintain identity between the different uses of adjectives.

I now turn to three empirical arguments reinforcing the conclusion that subjects of adjectives originate outside the lexical projection, unlike subjects of verbs.

### 2.2.2 Across-the-board movement

The grammaticality of (19) was considered for years to be problematic. Under the assumption that subjects are generated in spec,TP (or spec,IP, or most generally, as daughters of the clausal node), (19) is predicted to be ungrammatical, since movement out of a coordinate structure is licit only when extraction takes place out of both conjuncts ('across-the-board movement', ATB, Ross 1967).

(19) The girls will [<sub>VP</sub>[<sub>VP</sub> write a book] and [<sub>VP</sub> be awarded t a prize for it]].

However, Burton & Grimshaw (1992) observed that under the VP-Internal Subject Hypothesis, the grammaticality of (19) is predicted, since the first VP conjunct contains a trace as well, in spec,VP (20). This provides a strong argument in favor of the hypothesis.

(20) The girls will [<sub>VP</sub>[<sub>VP</sub> t write a book] and [<sub>VP</sub> be awarded t a prize for it]].

Let us now consider parallel examples with adjectives. The sentences in (21) contain coordination of two adjectival phrases, the second one headed by *likely*. *Likely* being a raising adjective, the AP headed by it contains a trace in the subject position of the clausal complement.

(21) a. The prices are [[high] and [likely t to get higher]].

b. The book is [[interesting] and [likely t to sell well]].

Based on (21), it seems that coordination with an AP headed by a raising adjective is possible, and thus we should assume that the first conjuncts in (21) contain traces as well, namely, that the subject of the adjective is internal to the AP ([<sub>AP</sub> t high]).

However, it is not impossible that the coordination in (21) is not of APs, but rather of some larger projections, containing the APs. We would like to force coordination at the AP level.

Abney (1987) and Corver (1997) argue that the AP in English is dominated by a functional projection DegP hosting degree modifiers (with possibly another functional head, Q, hosting quantifiers, between Deg and A). Thus, degree modifiers can serve to mark the left edge of the AP.<sup>11</sup> Let us therefore use *very*, as in (22), in order to delineate the adjectival phrase. Crucially, while (22a) is grammatical, it only has one meaning, where *very* modifies only *high*, as sketched in (22b). The interpretation in (22c) is impossible. The same is true for (23). Note, that there is no general problem with *very* modifying an AP headed by *likely* (24).<sup>12</sup>

- (22) a. The prices are very high and likely t to get higher.  
b. The prices are [[very high] and [likely t to get higher]].  
c. \*The prices are [very [AP[AP high] and [AP likely t to get higher]].
- (23) \*The book is [very AP[AP[interesting] and AP[likely t to sell well]].
- (24) John is very likely t to succeed in life.

Why are the structures in (22c) and (23) impossible? I suggest that this is so because subjects of adjectives are not generated inside the AP. If APs do not contain traces of their subject, the ungrammaticality of (22c), (23) is fully predicted: in these structures there is necessarily a coordination of two APs, but only the second conjunct contains a trace, in violation of the ATB. If the first AP contained a trace, the interpretations in (22c), (23) should have been available. Note that this means that the coordination in (22a) is of constituents larger than AP. Evidently, these constituents are smaller than TP, meaning that the subjects of adjectives do not originate in spec,TP either, but rather in some intermediate position between TP and AP.

Note also, that the conclusion that APs do not contain traces of their subjects holds for both stage- and individual-level adjectives (*high* and *interesting*, respectively), in contrast to Kratzer's (1995) prediction, and also that it holds for both underived adjectives and for participles (again,

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<sup>11</sup> Degree modifiers serve to mark the left edge of the adjectival phrase also if they are analyzed as phrases adjoined to the AP, or as specifiers of AP (as in Jackendoff 1977).

<sup>12</sup> There is also no problem with *very* modifying a coordination of adjectives, provided that the adjectives are semantically related; otherwise, as noted by Mark Baker (p.c.), modification will be infelicitous (compare (ia) with (ib)). In the text examples, the two APs are always semantically related.

- (i) a. John is very [tall and strong].  
b. ?John is very [tall and intelligent].

*high* and *interesting*, respectively), a fact which will become relevant in chapters 3, 4 and 6 below.

It is interesting to compare this data about adjectives to the situation with verbs. Compare (22) with (25), which includes a coordination of verb phrases. In order to force coordination at the VP-level, I have used in (25) a manner adverb. Manner adverbs such as *quickly* or *reluctantly* are "low" adverbs, modifying the action denoted by the verb, and are therefore assumed to mark the left edge of the VP (see e.g. Ernst 2002). Unlike (22) above, (25) is ambiguous. Crucially, it does have the reading in (25b), where the adverb modifies both conjuncts. This suggests that unlike an AP, a verbal projection contains a trace of its subject. Otherwise, coordination at the VP level would have been impossible.<sup>13</sup>

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<sup>13</sup> In Hebrew, coordination of two seemingly adjectival phrases, one headed by a raising adjective, on a par with (21), is possible as well (i). However, it is harder to force coordination of APs by delineating the AP with a degree modifier, as in English. This is because most degree modifiers must follow raising adjectives in Hebrew, and cannot precede them (ii). The reason for this is unclear to me. Possibly, raising adjectives obligatorily raise to T in Hebrew for some reason, but further research is needed to determine whether this is true and if so – why.

- (i) a. *ha-kelev* [[*ragiš la-trufa ve-alul t la-xlot*]].  
       the-dog sensitive to+the-medicine and-could to-get sick  
       'The dog is sensitive to the medicine and could get sick.'  
   b. *ha-kaduraglan* [[*pacu'a ve-alul le-hafsid kama misxakim*]].  
       the-soccer player injured and-might to-miss several games  
       'The soccer player is injured and might miss several games.'
- (ii) \**ha-kelev me'od alul la-xlot*.  
       the-dog very might to-get sick

For certain speakers the degree modifier *mamaš* 'really, very' can precede raising verbs (I thank Tal Siloni for pointing this out). For these speakers, the English pattern in (22) is replicated (iii): *mamaš* can modify only the first conjunct, not both, suggesting that the first AP does not contain a trace:

- (iii) a. *ha-kelev mamaš ragiš la-trufa ve-alul t la-xlot*.  
       the-dog very sensitive to+the-medicine and-could to-get sick  
   b. *ha-kelev* [*mamaš ragiš la-trufa ve-alul t la-xlot*].  
   c. \**ha-kelev mamaš* [*ragiš la-trufa ve-alul t la-xlot*].

However, it is still impossible to compare the adjectival domain to the verbal domain in Hebrew. This is so since examples parallel to (25) do not exist in Hebrew. Manner adverbs in this language appear either after the verb or after the entire VP, rather than before it. Other types of adverbs in Hebrew (e.g. frequency adverbs such as *tamid* 'always') can precede the verb, but it is not at all clear which one of them, if any, is the lowest, and can mark the left edge of the VP. For some discussion of Hebrew adverbs see Cinque (1999).

- (25) a. The girls will quickly write a book and be awarded t a prize for it.  
 b. The girls will quickly [<sub>VP</sub>[<sub>VP</sub> t write a book] and [<sub>VP</sub> be awarded t a prize for it]].

### 2.2.3 Floating quantifiers

Sportiche (1988) argued that sentences such as (26a) provide further evidence that the base-position of the subject of verbs is in spec,VP. Assuming this, the subject can be analyzed as originally forming a DP with the quantifier in the specifier of VP, stranding the quantifier upon movement to spec,TP (26b).

- (26) a. The children have been all drinking juice.  
 b. The children<sub>i</sub> have been [<sub>VP</sub> [all t<sub>i</sub>] [drinking juice]].

The same phenomenon of so-called "floating quantifiers" can be observed with adjectives, as in (27). This, again, might suggest an AP-internal subject, marked by the position of the stranded quantifier.

- (27) a. His hip and his femur seemed [[both t] broken].  
 b. The children are [[both t] sick/intelligent].  
 c. The films were [[all t] interesting].

However, as with coordination, while showing that the subject originates lower than spec,TP (and lower than the copula), the facts in (27) do not necessarily show that it originates in spec,AP. They are compatible also with an analysis where it is generated in the specifier of a higher projection, which is still lower than the copula, namely that e.g. [[both t] broken] in (27a) is not an AP, but some larger projection.

In order to delineate the AP, let us use degree modifiers again, as in (28). This results in ungrammaticality.

- (28) a. \*The children are so [<sub>AP</sub> both sick/intelligent].  
 b. \*The films were very [<sub>AP</sub> all interesting].

The ungrammaticality of the sentences in (28) is easily explained if subjects of adjectives do not originate within the AP, but rather in a higher projection, above DegP. The stranded quantifier, which is part of the subject, thus has no structural position inside the AP. Note again, that this conclusion holds for stage- and individual-level adjectives, participial or other. In line with that, we have to conclude that in (27), the bracketed constituents are not APs, but some larger projections, within which the subject of the adjective originates.

Again, the comparison with VPs is telling. Unlike with adjectives, floating quantifiers can follow "low", manner adverbs, marking the left edge of the VP, as shown in (29). This reinforces the conclusion that while VPs contain a trace of their subject, APs do not.<sup>14 15</sup>

- (29) a. The bars have slowly<sub>VP</sub>[all become very similar].  
 b. They quickly<sub>VP</sub>[all agreed on one thing].

## 2.2.4 Anaphora in coordinate structures

<sup>14</sup> The examples in (29) and many similar examples were found on the web.

<sup>15</sup> As in English, it can be observed in Hebrew that whereas floating quantifiers can surface below the subject position both with verbs and with adjectives (ia-b) they cannot surface below degree modifiers of adjectives (ii), suggesting that the original position of the subject is not inside AP.

- (i) a. *ha-yeladim kulam t ohavim et safta.*  
 the-children all love ACC grandma  
 'The children all love grandma.'  
 b. *ha-yeladim kulam t xolim.*  
 the-children all sick  
 'The children are all sick.'
- (ii) \**ha-yeladim me'od kulam xolim.*  
 the-children very all sick

However, as mentioned in footnote (12), it is impossible to construct examples parallel to (ii) in the verbal domain in Hebrew, since manner adverbs in this language do not appear before the VP.

One may try and use for this purpose the same degree modifier *me'od* 'very' used in the adjectival case, which in Hebrew can modify also verbs, preceding them. When this adverb is used, however, we find no contrast between verbs and adjectives: it seems that in the verbal domain as well, a floating quantifier cannot appear below the degree adverb (iii).

- (iii) \**ha-yeladim me'od kulam ohavim et safta.*  
 the-children very all love ACC grandma

The reason for this may be that in Hebrew, unlike in English, *me'od* 'very' does not head a DegP, but rather projects a phrase which is adjoined to the A' or V' level (as claimed by Borer 1995). Motivation for this analysis comes from the fact that this modifier can either precede the adjectival or verbal phrase, follow it, or intervene between the lexical A/V head and its complement. If indeed *me'od* is an adjunct to A' or V', the subject is not predicted to originate under it, as indeed (ii) and (iii) show. The study of the adverbial system in Hebrew requires further research, before it can be used as a reliable diagnostics for syntactic structure.

Guglielmo Cinque (p.c.) notes that in Italian verb phrases, a floating quantifier cannot appear after low adverbs such as *completamente* 'completely'. I do not have an explanation for this fact at this point.

Rothstein (1999) suggests an additional argument in favor of assuming a VP-internal subject. Consider (30). As Rothstein notes, (30) means that John ate something and forgot that he has done it.

(30) John [[ate something] and [forgot about it]].

What is the antecedent for *it*? The intuition is that it should be a constituent whose meaning is 'the event of John eating something'; not a constituent referring to the event of eating something, in general. John did not forget about the set of events of eating something, but rather about the fact that he himself ate something. Under the assumption that a pronoun cannot have as antecedent a constituent which contains it, it must take as antecedent some constituent within the conjunction, namely, the first conjunct. Assuming that the first conjunct does not contain a trace of the subject, i.e. that it is [ate something], its meaning is something like  $\lambda x \lambda e. EATING(e) \ \& \ Agent(e) = x \ \& \ Theme(e) = something$ , namely 'an event of eating something', which is not the desired reading. Assuming, on the other hand, that the first conjunct does contain a trace, the antecedent for *it* is [t ate something], where *ate something* is predicated of a variable dependent on John. This gives us the reading that we want: John forgot about x having eaten something, where x is John.

As before, the same phenomenon can be observed with adjectives. Consider (31), containing a coordination of adjectival phrases. In order to get the right meaning, namely, that John is proud of himself being rich, not of the property of richness by itself, the antecedent of *it* must be [t rich].

(31) John is [[t rich] and [proud of it]]. (Rothstein 1999)

However, again, in (31) we have no way of determining whether the constituent [t rich] is an AP or some larger constituent containing an AP. Let us use *very*, as in (32a), in order to mark the left edge of the AP. We find that while (32a) is grammatical, it only has one meaning, where *very* modifies only *rich* (32b). It cannot modify both conjuncts (32c).

- (32) a. John is very rich and proud of it.  
b. John is [[very rich] and [proud of it]].  
c. \*John is very [<sub>AP</sub> [<sub>AP</sub> rich] and [<sub>AP</sub> proud of it]].

Note that there is nothing problematic with *very* modifying a coordinated AP structure, as can be observed in (33a), which is ambiguous between the readings (33b) and (33c).

- (33) a. John is very rich and proud of himself.  
b. John is [[very rich] and [proud of himself]].



c. John is very [<sub>AP</sub> [<sub>AP</sub> rich] and [<sub>AP</sub> proud of himself]].

Presumably, then, the pattern in (32) again arises from the fact that APs do not contain traces of their subjects, namely, that subjects of adjectives are not AP-internal. Coordination under *very* must be of APs, and thus, *it* cannot have an antecedent of the right kind. The only antecedent available for it is [rich], without a trace, which denotes the property of richness, rather than a state of affairs of John being rich, which is the semantically required antecedent.

Julia Horvath (p.c.) suggests another way to distinguish the two coordination possibilities, which does not rely on the interpretation possibilities of *very*. Note the contrast in (34):

(34) [<sub>DegP</sub> HOW [<sub>AP</sub> [<sub>AP</sub> rich] and [<sub>AP</sub> proud of himself]] is John?

(35) a. \*How rich and proud of it is John?

b. \*[[<sub>DegP</sub> [<sub>DegP</sub> HOW [<sub>AP</sub> rich]]] and [<sub>DegP</sub> proud of it]] is John?

c. \*[[<sub>DegP</sub> HOW [<sub>AP</sub> [<sub>AP</sub> rich] and [<sub>AP</sub> proud of it]]] is John?

In (34), the entire AP coordination is pied-piped with *how*. This means that *how* heads the entire coordination, as the representation shows. Otherwise, i.e., if *how* headed the first conjunct only, pied-piping of the entire coordination would be ruled out, as explained in Horvath (2006). Why is (35) ungrammatical? If *how* heads the first conjunct only (as in (35b)), then, as just mentioned, it cannot pied-pipe the entire coordination. But what rules out the structure in (35c), in which *how* heads the entire coordination? Again, this is explained if APs do not contain traces of their subject: the first AP conjunct in (35c) is thus not of the right semantic type to serve as the antecedent for *it*.

Once more, let us contrast the adjectival case (32) with the verbal case, (36). Unlike (32a), (36) is ambiguous: *quickly* can modify either only the eating (36b), or both the eating and the forgetting (36c). The latter reading necessitates that the VP *ate something* contains a trace of its subject.<sup>16</sup>

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<sup>16</sup> Again, in Hebrew the adjectival paradigm is like that in English, but the verbal cases are different. When two adjectival phrases are coordinated under *me'od* 'very' (ia), the only reading is the one in which *me'od* modifies only the first conjunct (ib); the second reading is impossible, as in English (ic).

(i) a. *Dan me'od ašir ve-ge'e be-ze.*

Dan very rich and-proud in-it

'Dan is very rich and proud of it.'

b. *Dan [[me'od ašir] ve-[ge'e be-ze]].*

c. \**Dan me'od [[ašir] ve-[ge'e be-ze]].*

- (36) a. John quickly ate something and forgot about it.  
 b. John [[quickly ate something] and [forgot about it]].  
 c. John quickly [<sub>VP</sub> [<sub>VP</sub> t ate something] and [<sub>VP</sub> t forgot about it]].

In all three constructions described above, the data will receive no natural explanation under the assumption that there is a trace of the subject in spec,AP. However, the assumption that the subject does not originate within the AP (though it does originate lower than TP) straightforwardly accounts for the data.

In light of this, as well as the theoretical consideration in 2.2.1 and Baker's additional arguments, I hold that subjects of adjectives do not originate inside the adjective's projection, and that therefore, their relation with the adjective does not involve  $\theta$ -role assignment, but rather a different mechanism, which I present in the following section.

## 2.3 How adjectives are associated with their subjects

### 2.3.1 $\theta$ -assignment in the verbal domain

In recent literature, the lexical representation of verbs is often assumed to be a lambda-expression, as exemplified in (37). Under these views, when a predicate combines with an argument, the syntactic merge operation is accompanied by semantic function application, in which one of the variables in the lambda-expression is replaced by the argument, incrementally building the semantic representation of the actual sentence. In essence, then,  $\theta$ -role assignment is semantically implemented by function application.

- (37) write:  $\lambda y \lambda x \lambda e. \text{WRITING}(e) \ \& \ \text{Agent}(e, x) \ \& \ \text{Theme}(e, y)$

---

Hebrew parallels of the examples in (36) cannot be constructed, however, since manner adverbs in Hebrew do not precede the verb. Trying to use *me'od* 'very', we get sentences as in (ii). But, as was the case in the floating quantifiers test discussed in footnote (14), the judgments about (ii) are the same as about (i), namely, *me'od* can modify only the first conjunct.

- (ii) *Dan me'od ohev et axiv ve-mitpale al kax.*  
 Dan very loves ACC brother+his and-is surprised(V) about that  
 'Dan loves his brother very much and he is surprised that this is so.'

Once again, these facts need more study, but they might emerge from the fact that *me'od* in these sentences is a phrase adjoined to V'/A'.

Following Dimitriadis (2004) and Horvath & Siloni (2010a), however, I hold that neo-Davidsonian semantic representations of predicates as in (37) are built only during the syntactic and semantic derivation of the sentence. The lexical information of the verb is represented as in (38). The thematic role notation (e.g. *AGENT*) means that the predicate introduces a variable bearing the specified (e.g. ‘Agent’) relation to the eventuality denoted by it; *e* stands for the event variable introduced by the verb

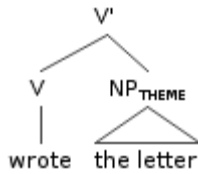
(38) write (*AGENT*, *THEME*, *e*)

Why should the representation in (38) be preferable to that in (37)? As explained in Dimitriadis (2004) and Horvath & Siloni (2010a),  $\lambda$ -expressions are inherently ordered – the representation in (37), for example, determines the order in which the arguments of *write* should be merged in the structure: Theme first, Agent later. But, in actuality, there are cases in which the order of the merging of arguments is variable for one and the same verb. For example, Reinhart (2002) discusses object-Experiencer verbs like *worry*, showing that the syntactic position of the Experiencer argument – external or internal - is determined based not only on lexical factors, but also on syntactic considerations, i.e. Case. As noted by Horvath & Siloni (2010a), building the syntactic hierarchy into lexical semantic representations, as in (37), renders the syntactic component redundant.

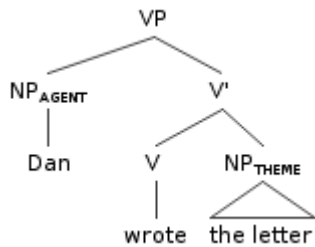
I therefore adopt the view that verbs are not represented lexically as semantic formulas but rather as items carrying a thematic grid.

Given this view,  $\theta$ -role assignment cannot be equated with function application, since at the point of merger the verb is not represented as a semantic function. Rather, I suggest that when a predicate is combined with one of its arguments, the  $\theta$ -role, which is a syntactic diacritic, is assigned, or transferred, to the argument, which keeps carrying it. At the VP-level (which forms a phase, labeled by Horvath & Siloni 2010b the *thematic phase*), the syntactic structure is passed to the semantic interface. Here, each argument is interpreted according to the  $\theta$ -role diacritic it carries, and the conjunction of these expressions provides the interpretation of the verbal phase. A derivation of a simple sentence with a verb is given in (39).

- (39) a. Lexical array: Dan, wrote(*AGENT*, *THEME*, *e*), the letter  
b. Projection of the object:



c. Projection of the subject:



d. Interpretation of the VP at LF:  $\exists e.$ Write(e) & Agent(e, Dan) & Theme(e, the letter).<sup>17</sup>

## 2.3.2 Externalization in the adjectival domain

### 2.3.2.1 Thematic features and thematic roles in the adjectival domain

Before turning to discuss the mechanism by which an adjective is associated with its subject, it is important to say a few words about the  $\theta$ -role inventory of adjectives. What  $\theta$ -roles can adjectives assign? Can they assign the exact same  $\theta$ -roles as verbs? Can they assign the role Agent? Theme? Goal? Since the latter are merely descriptive labels, it is unclear how to determine whether the roles assigned by adjectives are really the same as those assigned by verbs. I therefore adopt a more accurate characterization of thematic roles, offered in Reinhart (2000, 2002).

In Reinhart's framework, *The Theta System*,  $\theta$ -roles are not mere labels given to participants in an eventuality. Rather, they are clusters of the valued features C(ause change) and M(ental state), specifying logical entailments that hold for different types of participants:

- A role including the valued feature +c entails that the participant receiving the role causes the change involved in the event; if the participant did not cause change, the role includes the valued feature –c.
- The valued feature +m entails that the participant's mental state was relevant in the eventuality denoted by the predicate. Otherwise, the role includes the valued feature –m.

<sup>17</sup> The existential closure of the Davidsonian event argument probably happens at a later stage (i.e. with the projection of T), but this is immaterial to the issue at hand.

So, for example, an Agent in this framework is a [+c+m] participant, namely a participant who causes change and whose mental state is relevant for the eventuality denoted by the verb, since his action was deliberate. A Theme is represented as [-c-m], a participant not causing change, whose mental state is irrelevant to the event.

The value of a feature can remain unspecified. Thus, for example, in the case of the role [+c], corresponding roughly to the Cause role, the value of the m feature is not specified. This means that the verb is oblivious with regard to whether the mental state of the participant receiving this role is relevant or not in the event. [+c] is the external role of verbs such as *break*, whose external argument can be realized either as a conscious Agent [+c+m], as in *Dan broke the window*, or as an inanimate, non-volitional Cause [+c-m], as in *the storm broke the window*.

The feature system presented above thus enables us to identify thematic roles according to the entailments they invoke, and this can be done in the adjectival domain as well. For example, we can identify the  $\theta$ -roles of the adjective *proud*, based on sentences such as *Dan is proud of his achievements* or *The father is proud of his son*. We can observe that the first participant in the eventuality undergoes some mental experience, as thus its role should include the valued feature +m (whether the role is [+m] or [-c+m] is immaterial here). This role is therefore just like the Experiencer role known from the verbal domain. The internal argument of the adjective is a participant whose mental state is irrelevant for the eventuality (-m). With regard to its c value, the participant can be constructed as causing the pride or not; hence, this feature is unvalued. The role is thus a unary role, [-m], which is the feature composition argued by Reinhart (2002) to correspond to the Subject Matter role assigned by object-Experiencer verbs, suggested by Pesetsky (1995). We thus see that in general, adjectival  $\theta$ -roles can have the same sorts of entailments that verbal  $\theta$ -roles have, and thus in many cases the  $\theta$ -roles in the two domains can be treated as identical. Further examples of  $\theta$ -roles assigned by different types of adjectives are provided in the following chapters.<sup>18</sup>

A last word on the semantic representation of adjectival phrases is in order, before turning to the discussion of externalization. Parsons (1990) shows that like verbs, adjectives should be represented as having a Davidsonian variable ranging over states, labeled *s*. The existence of this variable must be assumed, since it can be modified by spatial and temporal modifiers. Kratzer

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<sup>18</sup> In what follows, I will sometimes refer to  $\theta$ -roles by their feature composition and at other times, for ease of presentation, by their traditional labels (Agent, Theme etc.).

(1995) argues that only stage-level adjectives, namely adjectives that denote temporary states or properties, include such a spatiotemporal role. However, Greenberg (1998), Maienborn (2007), Landman (2000) and Rothstein (1999) argue that all adjectives have a state argument, and I follow these authors in including a state variable in the representation of all adjectives.

### 2.3.2.2 Externalization – the basic mechanism

We have seen in section 2.2 that there are good reasons to assume that an adjective does not bear the same relation to its subject as a verb. In order to implement this insight, I suggest that whereas the lexical representation of verbs includes a list of thematic roles, all of which are to be assigned syntactically,<sup>19</sup> **it is a defining property of adjectives, that one of their thematic roles is marked to be unavailable for syntactic assignment.** This role is lexically marked to undergo lambda-abstraction at the semantic interface. This marking bans the role from being syntactically assigned to an argument within the AP. Only after the AP is constructed, and the structure is passed to LF,  $\lambda$ -abstraction over the marked role occurs. The resulting interpretation of the AP is a function, a  $\lambda$ -expression. This function is then applied to the subject with the help of a functional head, Pred, whose function it is to apply its complement to its specifier.

Let us see a schematic illustration of how this mechanism works. Consider the derivation of a sentence with the adjective *proud*, in (40). Anticipating somewhat, let us assume that the adjective is derived from a category-less root, which nonetheless has a thematic grid (see discussion in 2.3.4 below). The root PROUD has two thematic roles, Experiencer and Subject Matter (40a). As part of adjective formation, one of the roles, in this case the Experiencer, is marked for  $\lambda$ -abstraction (a discussion of which role can be thus marked is offered in chapter 6, section 6.1) (40b). The lexical array of the sentence is given in (40c). During the syntactic derivation, the adjective is merged with an object, assigning it the Subject Matter role (40d).<sup>20</sup> A subject, however, cannot be projected, since the original external  $\theta$ -role is marked for abstraction in the semantics, and is hence unavailable for syntactic assignment (40e). Once the AP level is projected (40f), the structure is sent to the semantic interface. There, the object is interpreted as carrying the Subject Matter role; and the variable within the Experiencer role undergoes  $\lambda$ -

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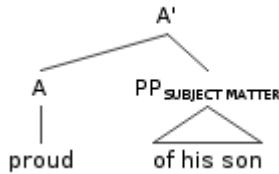
<sup>19</sup> Except for  $\theta$ -roles marked for saturation, see chapter 3, section 3.5.1.

<sup>20</sup> The object is realized as an *of*-phrase, because of the adjective's lack of accusative Case feature (see further discussion in chapter 6, section 6.2.2).

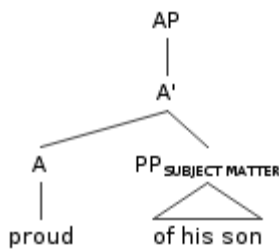
abstraction, as dictated by its lexical marking. The resulting interpretation (40g) is a function: the property  $x$  has if there is a state of being proud, such that  $x$  is the Experiencer of that state, and his son is the Subject Matter of that state. This is the correct interpretation of the adjectival phrase *proud of his son*. The head Pred is then merged with the AP, and makes this function available for application (40h); it will be interpreted as applying to the argument merged in *spec,PredP*, *the father* (40i).

(40) **Derivation of a sentence *The father is proud of his son*:**

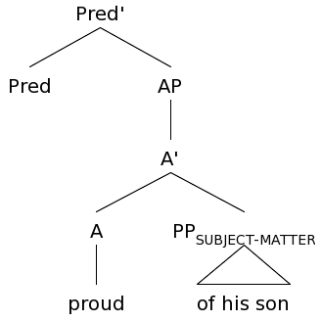
- a. The root: PROUD (EXPERIENCER, SUBJECT MATTER,  $s$ )
- b. Adjective formation: proud.ADJ (EXPERIENCER  $\rightarrow$   $\lambda$ -ABS, SUBJECT MATTER,  $s$ )
- c. Lexical array: the father, proud(EXPERIENCER  $\rightarrow$   $\lambda$ -ABS, SUBJECT MATTER,  $s$ ), his son
- d. Syntactic derivation - projection of the object:



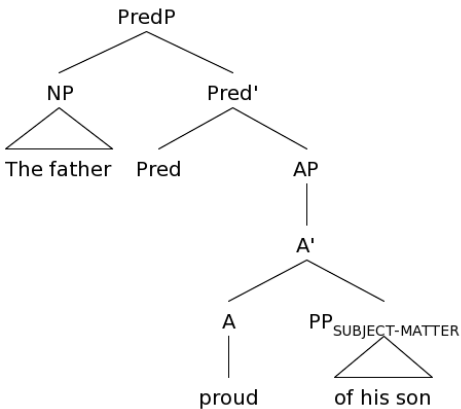
- e. Syntactic derivation - projection of the subject: inapplicable, no  $\theta$ -role available for assignment
- f. Syntactic derivation - projection of the AP level:



- g. Interpretation of the AP at LF:  $\lambda x \lambda s$ .Proud( $s$ ) & Experiencer( $s$ ,  $x$ ) & Subject Matter( $s$ , his son)
- h. Syntactic derivation – merge of AP with Pred:



i. Final syntactic structure:



Final semantic interpretation:  $\lambda s.Proud(s) \ \& \ Experiencer(s, \text{the father}) \ \& \ Subject \ Matter(s, \text{his son})$

It is important to note here that I do not claim, by any means, that the derivation of the adjective, depicted in (40a-b), takes place each time a speaker uses the adjective *proud*. On the contrary, the adjective is a lexical item, stored as is in the mental lexicon. The marking mechanism exemplified in (40b) occurs only when a speaker analyzes a novel adjective, and during the language acquisition process. In the mental lexicon of adult speakers, the basic entry PROUD and the adjective *proud* are connected by a redundancy rule, representing the nature of the relation between them.

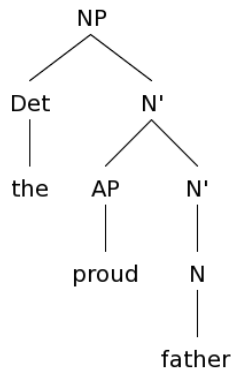
### 2.3.3 Externalization and the attributive use of adjectives

It is important at this stage to compare the above to the syntactic derivation of modified noun phrases. In this case, too, the AP has no realized specifier, and its interpretation is a function, a  $\lambda$ -expression. The derivation of the AP itself is thus identical to its derivation in predicative environments, as detailed in (40) above. However, by hypothesis, in this case the AP is not



merged with Pred – Pred is involved only in predicative structures, not in attributive ones. The AP is thus directly adjoined to the nominal projection. As is the case with adjunction structures in general, this gives rise semantically to the intersection of the set denoted by the noun and the set denoted by the AP, as exemplified in (41).<sup>21 22</sup>

(41) *the proud father*



Interpretation of the AP *proud*:  $\lambda x \lambda s. \text{Proud}(s) \ \& \ \text{Experiencer}(s, x)$

Interpretation of the N/N' *father*:  $\lambda x. \text{Father}(x)$

Interpretation of the N' *proud father*:  $\lambda x \lambda s. \text{Father}(x) \ \& \ \text{Proud}(s) \ \& \ \text{Experiencer}(s, x)$

From this section and the previous one, we can draw the following conclusions: whereas a VP is not a function, but rather a semantically closed expression (with all  $\theta$ -roles of the verb discharged and interpreted), an AP is a semantically open expression (a function), though syntactically it is a maximal projection. When an AP is used predicatively, it needs the help of a functional head, Pred, in order for the function it denotes to apply to an additional argument, the subject. Namely, unlike  $\theta$ -role assignment, which is 'spontaneous', so to speak, function application requires the intervention of a specialized head. Intersection, or concatenation, of two functions (as shown in (41)), is like  $\theta$ -assignment in not requiring an additional head. This system maintains a one-to-

<sup>21</sup> Example (41) includes *proud* rather than *proud of his son*, since due to the adjacency restriction in English (further discussed in chapter 4, section 4.5.1.2) the latter AP must follow the noun, and this may force a predicative reading for it (see discussion in section 2.2.1 above).

<sup>22</sup> I refer here to the simple case of simple intersective adjectives. Relative intersective adjectives (e.g. *big*) require some additional mechanism for their interpretation, e.g. Higginbotham's (1985) *autonomous  $\theta$ -marking* or introduction of a degree argument (see footnotes (2) and (6)), and non-intersective adjectives (e.g. *alleged*) require a different mechanism altogether (see discussion in Partee 1995).

one relation between syntactic structure and semantic interpretation: when Pred appears, function application occurs. Otherwise, the result is function concatenation, namely, modification, rather than predication.

#### 2.3.4 The basic entry in adjective formation

Let me now address in some more detail the question of the basic lexical entry from which an adjective is derived.

Whereas in many cases, notably the cases of different types of adjectival participles, *-able* adjectives, *-ive* adjectives and others, the adjective can plausibly be analyzed as derived morphologically from a corresponding verb, for other adjectives it is unclear whether the adjective should be analyzed as derived morphologically from the verb, or vice versa (e.g. in the case of *proud* and *pride oneself in*). In other cases, it seems to be the case that it is the verb which is morphologically derived from the adjective (e.g. *weak* - *weaken*). Even if we divorce morphological derivation from semantic derivation (as suggested e.g. in Reinhart 2002, Horvath & Siloni 2010a), thus being able to maintain that even in the latter case, the adjective is derived from the corresponding verb, we are still left with adjectives that do not have any verbal alternate (e.g. *possible*).

I thus propose that adjective formation applies to an abstract lexical entry, unspecified for category, but nonetheless with a fixed thematic grid. As mentioned in section 1.1.1, the existence of such lexical entries was suggested in Chomsky (1970), and they are assumed to exist ever since, in different frameworks, including e.g. Distributed Morphology (in which they are called *roots*). In what follows, such abstract basic lexical entries will appear in capital letters. So, for example, the adjective *proud* is derived from the category-less entry PROUD, as in (42), repeated from (40a-b) above.

(42) PROUD (EXPERIENCER, SUBJECT MATTER, s) → proud.ADJ (EXPERIENCER→λ-ABS, SUBJECT MATTER, s)

#### 2.3.5 Comparison with Baker's (2003) analysis

As explained in sections 1.1.2 and 2.1.3, Baker (2003) has also suggested a theory in which adjectives are different from verbs in that they do not have a  $\theta$ -marked specifier, and their subjects are base-generated in the specifier position of a higher functional head Pred. However,

Baker's analysis is different from mine in several respects. Most notably, in my analysis the AP denotes a function, and the thematic role assigned to the variable in this function is one of the  $\theta$ -role of the base from which the adjective was derived, the role which was marked for abstraction. Pred, in my analysis, is not a  $\theta$ -role assigner, but rather a completely functional head, which is responsible for applying the function denoted by the AP to its subject. In contrast, Baker holds that the AP is not a function, namely, that it is a saturated expression, and the subject's thematic role is assigned it by Pred (even though it can be understood from Baker that its origin is probably in the adjective itself). Importantly, Baker claims that Pred assigns the Theme  $\theta$ -role to the subject of the adjective.

In 2.1.3, we have seen that Baker's assumption that subjects of adjectives uniformly receive the Theme role raises three problems:

- (a) It is unclear why the role assigned by Pred is assumed to be Theme for all adjectives.
- (b) It is unclear why ergative adjectives should behave differently than all other adjectives, mapping their subject internally – how is their thematic role different than that of all other adjectives?
- (c) Furthermore, Baker's commitment to the UTAH proves to be problematic for him, since it is impossible to maintain the following three claims simultaneously:
  - Subjects of adjectives receive the Theme role.
  - The Theme role is assigned in the same syntactic configuration in VPs and APs (UTAH).
  - Subjects of adjectives are external arguments, while subjects of thematically-identical verbal passives are internal arguments.

Let us see how the current proposal solves these problems raised by Baker's analysis.

### **2.3.5.1 The content of the adjective subject's $\theta$ -role**

As noted in 2.1.3, Baker's assumption that the subjects of all adjectives (except for ergative ones) receive the Theme  $\theta$ -role seems incompatible with our intuitions with regard to the interpretation of certain adjectives. It is true that in some cases the subject is understood as Theme (43b), (44b) on a par with its interpretation in a corresponding verbal sentence (43a), (44a).

- (43) a. John has written the letter.  
b. The letter seems written.
- (44) a. John locked the door.

b. The door is lockable.

However, in other cases, the situation is different. Under most current theories, in (45a) the object receives the Experiencer role. Why then should the subject in (45b) be a Theme, rather than an Experiencer? Likewise, in (45a) the subject receives the Subject Matter role, and it is interpreted just the same in (45c), so how could it be assigned a different role there?

(45) a. The movie confused John.

b. John is very confused.

c. The movie is very confusing.

The same is true for (46). If *protects* assigns the Cause (or Agent) role in (46a), it seems only natural that *protective* should assign the same role to its subject, rather than the Theme role.

(46) a. The mother protected her children.

b. The mother is protective of her children.

If we adopt Baker's analysis, we in fact empty the label *Theme* of all content. But *Theme* is a very specific role; according to Reinhart's feature system, it is the role assigned to a participant which does not cause change, and whose mental state is irrelevant to the eventuality denoted by the predicate. Note that the problem would arise also if Pred was hypothesized to assign any other  $\theta$ -role uniformly, since, as seen in (43)-(46), subjects of different adjectives are interpreted as carrying different roles.

On the other hand, under my analysis, the interpretation of the subject of the adjective is dependent on the root's thematic grid and on the process of lexical marking. One of the root's  $\theta$ -roles undergoes lambda-abstraction in the semantic component. Pred itself does not assign a  $\theta$ -role, but rather just applies to the subject the function denoted by the AP, whose variable carries a  $\theta$ -role determined by the adjectivization process. This automatically explains the difference in interpretation that exists between the subjects of the adjectives in (43)-(46) above.

### 2.3.5.2 Ergative adjectives

Baker's analysis does not provide an account for the difference between ergative adjectives, mapping their subject internally, and all other adjectives. Baker suggests that the generalization about the externality of the subjects of adjectives applies only to Theme arguments, and proposes that subjects of ergative adjectives do not count as Themes. But this still leaves two questions unanswered. First, why do ergative adjectives not assign the Theme  $\theta$ -role (remember that all

other adjectives are analyzed in Baker as assigning it)? Second, Baker does not show how the proposed thematic difference between ergative adjectives and other adjectives, given that it does exist, actually leads to the different mapping.

Remember that in my analysis, the role assigned to the subject is one of the root's  $\theta$ -roles. In chapter 5, I will argue that ergative adjective indeed have a special thematic property – unlike all other adjectives, they select propositions. More accurately, as will be explained in section 5.4 below, these adjectives have a Theme  $\downarrow$ -role that has to be assigned to a proposition, namely, they introduce a proposition variable that is assigned the Theme role (I mark this as  $\text{THEME} \gg \text{PROPOSITION}$ ).

Once this is established, a straightforward account for the fact that ergative adjectives map their subject internally suggests itself. Recall that "externalization" of a role depends on lexical marking, followed by lambda-abstraction. The lambda-operator abstracts over the variable occurring within the marked thematic role, as in (47).

(47)  $\lambda x. \dots \text{Theme/Subject Matter/Experiencer}(s, x) \dots$

We can now make the additional assumption that in the context of adjective formation, abstraction over a proposition variable is not possible. Rather, the lambda-operator can abstract only over individuals or events. If  $x$  is of the type of propositions, it cannot be abstracted over, and externalization will not take effect.

So, a role assigned to a proposition cannot be externalized. In fact, I propose that it cannot even be marked for abstraction. The lexical marking " $\text{THEME} \gg \text{PROPOSITION} \downarrow \text{-ABS}$ " is impossible, since propositions cannot be abstracted over in the process of adjective formation.

This accounts for why ergative adjectives are in fact ergative. Since their role is propositional, it cannot be externalized, and the subject is merged as an internal argument. The thematic difference between ergative adjectives and other adjectives, coupled with the properties of the abstraction mechanism, specifically, that it affects only individual/event variables, provides a simple explanation for the behavior of the different adjective types.

### 2.3.5.3 UTAH?

As explained above, Baker wants to maintain the following three claims:

- Subjects of adjectives receive the Theme role.
- The Theme role is assigned in the same syntactic configuration in VPs and APs (UTAH).

- Subjects of adjectives are external arguments, while subjects of the thematically identical verbal passives, are internal arguments.

This creates a sort of "catch-22", which requires adding some complications to the theory.

Note, first of all, that under my analysis, not all subjects of adjectives receive the Theme role. However, some of them are interpreted as Themes, or, just as problematically in this aspect, as other roles that are assigned to internal arguments in the VP case, but externally in APs (e.g. the Experiencer subject of the adjective *bored*).

This leads to the suspicion that the UTAH, at least in its strict form, should be abandoned.

In fact, even looking exclusively at the verbal domain, there seem to be good reasons to rethink the UTAH. Certain thematic roles can be assigned to arguments in different structural positions. For example, the Experiencer role is assigned internally in (48a), and externally in (48b). The fact that the role is indeed assigned externally in e.g. (48b) can be shown using unaccusativity diagnostics. In (49), for example, we can see that the subject of *hitragez* 'got annoyed' does not pass the possessive dative test, namely, a dative argument interpreted as possessing (in a broad sense) the Experiencer argument cannot be added to the sentence. This shows that this argument is external (see Borer & Grodzinsky 1986).

(48) a. *ha-ne'um hirgiz et ha-xayalim.*

the-speech annoyed ACC the-soldiers

'The speech annoyed the soldiers.'

b. *ha-xayalim hitragzu.*

the-soldiers annoyed(INTR)

'The soldiers were annoyed.'

(49) \**le-mi ha-xayalim hitragzu?*

to-whom the-soldiers annoyed(INTR)

Intended reading: 'Whose soldiers were annoyed?'

Likewise, the Instrument role is assigned to the object in (50a), and to the subject in (50b)

(50) a. Dan drilled a hole in the wall with the drill.

b. The drill drilled a hole in the wall.

Even the Theme role, which is canonically an internal role as in (51a), is sometimes assigned externally, as in (51b) (see discussion in Reinhart 2002).<sup>23</sup>

- (51) a. They lit the bulb.  
b. The bulb glowed.

Obviously, there are certain roles which are uniformly assigned to a specific syntactic position, e.g. an Agent is always an external argument. However, this is not true for all roles. The UTAH, it seems, should be replaced by a more sophisticated mapping procedure.

Note, however, that given my analysis, once a mapping procedure is adopted, its principles are implemented for verbs and adjectives alike. In other words, in the current system, the problem raised above, namely that Theme is assigned internally in verbal passives and externally in adjectival passives, does not arise. This is since the mapping procedure only regulates syntactic  $\theta$ -assignment. For example, for a verb like *build*, the mapping procedure determines that its Theme role is internal, namely must be assigned to an internal argument. This is what happens also in the verbal passive *is built*. Note, however, that when the adjectival passive 'built' is formed, the Theme role is not assigned syntactically at all. Rather, it is  $\lambda$ -abstracted over, and the resulting function applies to the subject argument. There is no  $\theta$ -assignment of the role, external or any. So, it would not be right to say that the Theme role is assigned internally in one case and externally in the other. True, the subject of the adjective ends up being interpreted as though it was assigned the Theme role, but the process leading to this was not one of  $\theta$ -assignment.

To conclude, we have seen that the UTAH cannot be maintained. However, once an accurate mapping procedure is found, then as far as adjectives vs. verbs are concerned, it need not be revised. The procedure by which the subject of an adjective receives its interpretation is not  $\theta$ -assignment. There is thus nothing problematic with the fact that the subject of a passive verb, receiving the Theme role, is internal, while the subject of an adjectival passive, likewise interpreted as a Theme (though not assigned this role in the same manner), is external.

## 2.4 Conclusion and theoretical implications

This chapter focused on the base position of the subjects of adjectives. After providing theoretical and empirical arguments for the truly external nature of the subjects of adjectives, I have

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<sup>23</sup> Though see Potashnik (2010), who argues that the role assigned in (51b) is not Theme, but rather an Instrument-like role, [+c-m].

proposed a mechanism of lexical marking which implements this externality. Crucially, this mechanism makes use of the thematic properties of the base from which the adjective is derived, yet it does not involve  $\theta$ -assignment. Thus, it avoids the problems raised by Baker's analysis of the relation between the adjective and its subject.

The discussion in this chapter has interesting consequences with regard to the debate over the base position of the subjects of verbs. In many recent studies, the external argument in the verbal projection is assumed to be introduced by a functional 'little-*v*' or Voice head, rather than by the lexical verb itself (Chomsky 1995, Kratzer 1996, Marantz 1997, among many others). In contrast, Horvath & Siloni (2002, 2010b) provide extensive argumentation against the 'little-*v*' hypothesis, showing that the arguments that led to the adoption of this hypothesis are inadequate. For example, one of the persistent arguments for not including the external  $\theta$ -role in the verb's thematic grid is due to Marantz's (1984) observation, that whereas there are many idioms including an object and missing a subject, the reverse is impossible – there are no idioms that have a fixed subject but no fixed object. This can suggest the external argument is independent of the verb. Horvath & Siloni (2002, 2010b) note, however, that the generalization is inaccurate: idioms of the latter type do exist, in English and cross-linguistically, as exemplified in (52). The tendency for idioms with a fixed object to be more common than idioms with a fixed subject can be explained on independent grounds. The rarity of fixed subjects is predicted, for example, since subjects tend to be animate, and animates are less prone to acquire a metaphorical meanings, essential for idiom formation (Nunberg, Sag & Wasow 1994).

(52) A little bird told me...

Further, Horvath & Siloni (2010b) point out that information about the external  $\theta$ -role of a verb must be listed in the lexicon, since a number of independently motivated lexical operations, e.g. reflexive verb formation (Reinhart & Siloni 2005), must involve the external role. In the next chapter, focusing on the operations forming adjectival passives, I show that the external  $\theta$ -role is involved also in these lexical operations, and that the application of any of these operations crucially relies on the nature of this role. This provides further reinforcement for the conclusion that external  $\theta$ -roles must be listed on the lexical verb.

The present chapter provides a different type of argument against assuming a 'little-*v*' or Voice head introducing the external arguments of verbs, independently of the lexical verb.



We have seen how a predicative phrase that does not project a thematic specifier, namely the adjective phrase, behaves:

(i) Projection of the subject does not occur in all cases: the subject is not projected in the attributive use of adjectives. This is predicted since projection of the subject is not contingent upon the lexical A head, but rather upon an independent functional head, which may occur in the structure or not.

(ii) Certain elements, i.e. degree modifiers, appear between the subject in its base position and the adjectival predicate.

These two properties stem from the fact that the Pred projection (including the subject) and the adjective phrase are two independent entities.

In contrast, the projection of a verbal subject is obligatory even in the 'attributive' use of verbs (namely as relative clauses), as explained in 2.2.1. In addition, no material ever appears between the base position of the subject and the verb. Even the lowest modifiers (manner adverbs) appear above both.

If subjects of verbs were introduced by an independent functional head, on a par with the situation in the adjectival domain, then we would expect to find at least some parallel evidence for the dissociation between the two projections. There is no such evidence, however. Thus, if a 'little-*v*' head is adopted, *v*P and VP must be assumed to form one integral unit (unlike PredP and AP), with no apparent reason. The difference between adjectival projections and verbal projections seems to be captured much more naturally under the assumption that in the verbal case, the external argument is projected in the specifier of the lexical head. This is why its projection is necessary in all cases, and no material can appear between the subject and the verb.

Taken together with the conclusion in chapter 3, namely that the external  $\theta$ -role must be part of the lexical information carried by a verb, the simplest analysis is that the subject of a verb is merged in the specifier of the lexical verbal head, receiving its  $\theta$ -role from this verb itself.

### **Appendix – Additional arguments for the VP Internal Subject Hypothesis**

Sections 2.2.2-2.2.4 in this chapter presented three cases in which adjectives behave differently from verbs with regard to tests diagnosing the base-position of their subjects. The diagnostics showed that unlike subjects of verbs, subjects of adjectives are not generated inside the adjectival projection. Here, I discuss four more tests which were suggested in the literature as reinforcement

for the VP Internal Subject Hypothesis. In each case, it will be shown that no clear conclusion can be drawn with regard to the position of adjectival subjects. Thus, the data in this appendix cannot serve as arguments for or against the truly external status of the subjects of adjectives.

### 1. Scope of quantifiers

It is generally accepted that certain elements - such as modals, adverbs and negation - have a fixed scope, determined by their position in the syntactic structure (see e.g. Ladusaw 1988). Therefore, the fact that (1) is ambiguous – either 'always' takes scope over 'one player', or the other way around - was taken as evidence that the subject originates inside VP, thus giving rise to the reading in which it has narrow scope (Aoun & Li 1989, Koopman & Sportiche 1991).

(1) At least one player always t loses.

The same ambiguity can be observed with adjectives, both stage-level and individual level, as seen in (2).

(2) a. One player is always t sick.

b. Some clerks are necessarily t reliable.

This points again to the conclusion that the subject of an adjective must originate lower than spec,TP, and, in fact, that it must originate lower than negation and certain adverbs such as *always* and *necessarily*, since a reading is available in which these elements take scope it.

However, again, it does not necessarily show that the subject originates inside AP; it can still be the case that it is generated in spec,PredP, PredP appearing right above AP, namely lower in the structure than negation and adverbs.

In section 2.2, I have used *very* to delineate the adjectival projection. However, this cannot help us here since degree modifiers and quantifiers delineating the AP such as *very*, *so*, *how* etc. do not give rise to ambiguity when they interact with noun phrases the same way that adverbs of quantification (e.g. *always*) do. Consider for example (3). There would be no difference in meaning if *very* scoped over *one player* (in the hypothesized structure [<sub>DegP</sub> very [<sub>AP</sub> one player sick]]), rather than vice versa.

(3) One player is very sick.

Hence, we cannot detect the exact base position of the adjective's subject using these elements. Note, also, that in the verbal domain as well, the test shows only that the subject originates lower than negation and adverbs like *always*. Manner adverbs like *quickly* cannot give rise to the same

type of ambiguity, not necessarily because the subject does not originate below them, but simply because the meaning of *quickly one player ran* (with *quickly* interpreted as a manner adverbs) is the same as that of *one player quickly ran*.

## 2. VSO languages

Structures in which the finite verb precedes the subject (in Irish, standard Arabic etc.) were argued by McCloskey (1991), Mohammad (2000), Shlonsky (1997) and others to be best analyzed under the VP-internal subject hypothesis, as cases in which the verb raises to T, while the subject remains in situ, inside the VP, as shown for standard Arabic in (4a)<sup>24</sup> and for Irish in (4b). This constitutes another argument in favor of the VP-internal subject hypothesis.

- (4) a. *ganna* [VP 'al 'awlaaduu t].  
       sang-M.SG the children  
       'The children sang.'
- b. Cheannaigh [VP Ciarán t teach].  
       bought Ciaran house  
       'Ciaran bought a house.'

Looking now at word order in sentences with adjectival predicates, the situation is different than the one with verbs.

In standard Arabic, the predicative adjective cannot appear before the subject, as shown by the contrast between (5a) and (5b).

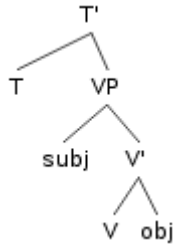
- (5) a. *zaid-un jamil-un*.  
       boy-NOM beautiful-NOM  
       'The boy is beautiful.'
- b. \**jamil(-un) zaid(-un)*.  
       beautiful boy

What can we learn from these data about the position of the subjects of adjectives? The mere fact that adjectives and verbs do not behave on a par is suggestive. In fact, under the assumption that APs are embedded under a functional projection PredP, the fact that an adjective cannot raise to T like a verb is easily accounted for. Consider the structures in (6), of a VP and a PredP.

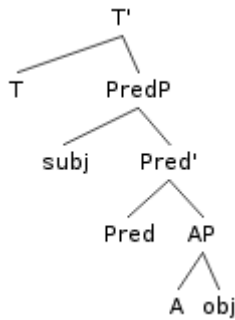
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<sup>24</sup> In VS order in standard Arabic, the verb agrees with the subject only in gender and is marked in the singular, whether the subject is singular or plural.

(6) a.



b.



In the verbal case (6a), the V moves and adjoins to T to form a tensed verb. If the same structure was assumed to exist for adjectives, then it is not clear what would prevent the adjective from likewise raising to T. However, things are different if we assume the structure in (6b) for adjectives. As explained in Baker (2003), this structure enables us to explain why adjectives do not raise to T. On the one hand, they cannot skip over Pred, since this would violate the Head Movement Constraint (Travis, 1984). On the other hand, if they do adjoin to Pred on their way to T, then a complex Pred head is formed. Baker proposes that such a complex head cannot further raise and adjoin to T, since Tense must adjoin to lexical categories, rather than to functional ones. Thus, an analysis assuming the more complex structure (6b) for adjectives is preferable.

Interestingly, in several other verb-initial languages, e.g. Irish, what appears before the subject in inversion constructions with adjectives is not only the predicate head (A), as in the case of verbs, but rather the copula plus the entire predicate (AP), as seen in (7) (McCloskey 2005).

- (7) Is    cos'uil le    taibhse 'e  
      COP like   with ghost him  
      'He is like a ghost.'

Again, the contrast between APs and VPs suggests that a different structure is involved in the two phrase types. McCloskey (2005) suggests that this contrast can be accounted for in the following

manner. A line of research advanced by e.g. Massam (2000) and Travis & Rackowski (2000) argues that sentences such as (4b) above, repeated here as (8), are not the result of verb movement, but rather the result of phrasal movement of the entire VP, preceded by extraction of the subject and object from it, as depicted in (8).

- (8)  $[_{VP} \text{Cheannaigh } t_i t_j]_k \text{ Ciarán}_i \text{ teach}_j t_k].$   
       bought                    Ciaran    house  
       'Ciaran bought a house.'

McCloskey suggests that (7) and (8) can be subsumed under the same explanation: in languages such as Irish, it is always the phrasal predicate (VP or AP), rather than the head, which is fronted. However, only in the case of VPs, all non-head constituents must be moved out of the phrase before it can be fronted. McCloskey notes that it remains to be understood why VPs and APs should differ in this respect.

But, given their respective structures in (6a) and (6b), there is no need to assume that VPs and APs differ. We can simply assume that in Irish and similar languages it is always the predicate phrase which is fronted, after all its sub-constituents have been moved out of it. In the case of VPs, the subject and the object are thus both moved, followed by VP movement, resulting in a VSO order, as depicted in (8). In contrast, in the case of APs, only the object is a constituent in the AP, thus only it is moved out of the AP, before the AP is fronted. This results in the observed AOS order, as shown in (9). The copula may be assumed in these cases to move to C.

- (9) Is  $[\text{cos}'\text{uil } t_j]_k [\text{le } \text{taibhse}]_j [_{\text{PredP}} \text{'e } t_k]$   
       COP like            with ghost            him  
       'He is like a ghost.'

There is undoubtedly need for much further research on word-order possibilities in different languages and what they can tell us about the structure of AP versus that of VP. The aim of this section was to show, without going into a detailed discussion, that the facts here are at least compatible with, if not pointing to, an analysis in which AP, unlike VP, is embedded under PredP and does not project a subject.

### 3. Binding

The contrast between the ambiguous (10a) and the unambiguous (10b) was also taken to support the VP-Internal Subject Hypothesis (Huang 1993). While in (10a) the reciprocal expression

inside the fronted DP can have as an antecedent either *the teachers* or *the kids*, depending on whether it is interpreted in its base position or in its intermediate position in the lower spce,CP, in (10b) the reciprocal in the fronted VP can have as its antecedent only *the children*. Presumably, this is so since the fronted VP includes a trace, which is the immediate binder of the anaphor. No other antecedent is possible.

- (10) a. [which stories about each other<sub>i/j</sub>]<sub>k</sub> did the teachers<sub>i</sub> think [t<sub>k</sub> that the kids<sub>j</sub> prefer t<sub>k</sub>]?  
 b. They told us that the children might obey the teacher, but [t<sub>j</sub> listen to each other\*<sub>i/j</sub>]<sub>k</sub> they<sub>i</sub> said the children<sub>j</sub> won't t<sub>k</sub>.

Let us consider now the examples in (11), which contain fronted APs.

- (11) a. [how proud of themselves<sub>j</sub>]<sub>k</sub> did the kids<sub>i</sub> think [t<sub>k</sub> that the teachers<sub>j</sub> were t<sub>k</sub>]?  
 b. [how close to each other<sub>?i/j</sub>]<sub>k</sub> did the mom and dad<sub>i</sub> think [t<sub>k</sub> that the kids<sub>j</sub> were t<sub>k</sub>]?  
 c. ?They told us that the children occasionally spoke, but [close to each other<sub>j</sub>]<sub>k</sub> they<sub>i</sub> said the children<sub>j</sub> never were t<sub>k</sub>.

The judgments here are not uniform. However, at least some of the sentences are unambiguous, suggesting that the moved adjectival phrase includes a local binder – a trace of the subject.

However, here, as in previous cases, it is not evident that the fronted constituent is an AP and not some projection containing the AP. Unlike in the chapter examples, however, *very* or *so* cannot be used here, since fronting an AP while stranding these elements is ruled out independently:

- (12) a. \*Handsome he was so.  
 b. \*They told us that the children occasionally spoke, but [close to each other<sub>j</sub>]<sub>k</sub> they<sub>i</sub> said the children<sub>j</sub> never were very t<sub>k</sub>.

Hence, binding facts cannot provide conclusive evidence with regard to the mapping of the subject of adjectives.

## 3 Adjectival passives

### 3.1 Introduction

This chapter focuses on the well-studied class of adjectival passives, as a case study arguing for the view of the argument structure of adjectives advocated in the previous chapters. In particular, the aims of the chapter are twofold:

- (i) Establishing the existence of a basic parallelism between the adjectival and verbal domain with regard to argument structure, both in terms of the thematic roles verbs and adjectives assign, and in terms of the valence-changing operations available in the two domains.
- (ii) Exemplifying the details of the externalization mechanism explained in chapter 2, in this case applying to an internal argument of the root.

The distinction between verbal and adjectival passives is widely recognized at least since Wasow (1977), 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 implicit argument (but see Anagnostopoulou 2003). Under the widely accepted hypothesis that verbal passives do have an implicit 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 chapter I argue that at least for Hebrew this conclusion is uncalled for. First, it is shown that there is a partition within the class of adjectival passives in Hebrew, 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 argument, on a par with verbal passives, while other so-called adjectival passives lack an implicit 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  $\theta$ -role, Chierchia 2004), also deriving verbal passives, and adjectival decausatives are formed by *decausativization* (elimination of the external  $\theta$ -role, Reinhart 2002), also deriving unaccusative verbs. We see, then, that the same range of valence-changing operations is available in order to eliminate an external argument in the adjectival domain and in the verbal domain.

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, further arguing 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.



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

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

Instead of having a class of 'adjectival passives', whose members exhibit properties of both unaccusatives (e.g. lack of external 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 transitive root, via the same argument-structure changing operation.

Crucially, the chapter shows that the differences between predicates in the same column stem only from the difference in lexical category between verbs and adjectives. For example, the fact that verbal passives always license instrument phrases, while 'true' adjectival passives often prohibit them (as discussed in 3.3.2) stems roughly from the fact that adjectives invariably denote states, while verbs denote events. And the fact the adjectival passives, unlike verbal ones, merge their subject externally, is rooted in the defining characteristic of adjectives, namely that their formation includes marking one of their  $\theta$ -roles for  $\lambda$ -abstraction, as explained in chapter 2.

The chapter thus reinforces the view presented in the introduction that the study of the argument structure and formation processes of adjectives can profit from using known criteria and operations from the verbal system, since the latter may underlie generalizations that cut across all categories.

The chapter is organized as follows: section 3.2 provides the necessary facts regarding the passive in Hebrew. Based on this, section 3.3 presents evidence that there are two types of adjectival passives in Hebrew – one which entails the existence of an implicit argument and another which does not. Section 3.4 presents the main claim of the chapter, 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 3.5 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 implicit argument. Section 3.6 offers a cross-linguistic perspective, and compares the analysis presented in the chapter with former analyses.

### 3.2 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 chapter 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
<i>XaXaX</i> (e.g. <i>katav</i> 'wrote')	<i>niXXaX</i> (e.g. <i>nixtav</i> 'was written')	<i>XaXuX</i> (e.g. <i>katuv</i> 'written')
<i>XiXeX</i> (e.g. <i>ciyer</i> 'drew')	<i>XuXaX</i> (e.g. <i>cuyar</i> 'was drawn')	<i>meXuXaX</i> (e.g. <i>mecuyar</i> 'drawn')
<i>hiXXiX</i> (e.g. <i>hidpis</i> 'typed')	<i>huXXaX</i> (e.g. <i>hudpas</i> 'was typed')	<i>muXXaX</i> (e.g. <i>mudpas</i> '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 work 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:<sup>25</sup>

**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

<sup>25</sup> Additional adjective diagnostics are discussed in chapter 4, section 4.2.2.

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.'

**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 (for further discussion of this test see section 4.2.2.1).

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

### 3.3 Evidence for two types of adjectival passives in Hebrew

As mentioned in the introduction, adjectival passives are widely assumed to lack an implicit 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 (possibly implicit) external arguments (Dubinsky & Simango 1996, among many others), such contrasts were taken as evidence that adjectival passives, unlike verbal passives, lack an implicit argument (see Levin & Rappaport 1986, Grimshaw 1990, Kratzer 2000, Embick 2004)<sup>26</sup>. Examples to the opposite effect, in which adjectival passives do behave as if they have an implicit 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 3.6.2). Another argument against assuming an implicit argument in adjectival passives (see Kratzer 2000) was that they do not exhibit disjoint reference effects (see 3.3.3 below), a phenomenon attributed to the presence of an implicit argument (Baker, Johnson & Roberts 1989). 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 an implicit argument. In section 3.3.1 I will show that many adjectival passives are **interpreted** as having an implicit argument. In section 3.3.2 I will show that additionally, when the right conditions are met, these adjectives license *by*-phrases, instruments, and Agent-oriented adverbs. In section 3.3.3 I will argue that the lack of disjoint reference effects cannot serve as an argument against positing an implicit argument for adjectival passives.

### 3.3.1 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

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<sup>26</sup> 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  $\theta$ -role – whether an implicit argument bearing it exists or not.

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.<sup>27</sup>

(7) *ha-sipur katuv.*

the-story written

'The story is written.'

(8) *ha-mayim ba-brexa yihyu 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 being cooled by someone or something. The difference between *kar* 'cold' and *mekorar* 'cooled' is exactly that the latter entails an implicit argument.

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 is 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, whose linguistic expression does not involve any 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 external argument; 31 of

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<sup>27</sup> 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 work I limit discussion to the remaining group of speakers, namely those for whom the passive – verbal as well as adjectival – entails an external argument which can be either an Agent or a Cause (when the transitive alternate permits this).

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 yihyu mekorarim le-axar še-yitkareru kol hayom; af exad*  
 the-water in+the-pool will+be cooled after that-will+cool down all day no one  
 / *šum davar lo yekarar otam.*

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', *menupax* '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 Agent or Cause 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 implicit 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 Agent or Cause 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 external argument, while *mukpa* is not, namely, the latter adjective does not merely entail an event, but rather, an external 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 3.4.2.2.

The situation is, therefore, that some Hebrew adjectival passives do not entail an event or an Agent or Cause argument at all, whereas others do entail an event that necessarily involves an external argument.<sup>28</sup>

### 3.3.2 Diagnostics for an implicit argument

I have shown above that based on their interpretation, some adjectival passives have an Agent or Cause argument in the semantics. This predicts that these adjectives will pass the standard tests for detecting such an 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

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<sup>28</sup> Logically, there could exist a third class of adjectives, namely adjectives which entail a prior event, but do not necessarily entail an external argument. Such a class does not exist in Hebrew, where every adjective which entails a previous event entails an external argument, as shown in (9).

grammaticality of (14), including *by*-phrases, (15), including Agent-oriented adverbs, and (16), including instruments.<sup>29</sup>

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

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<sup>29</sup> 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 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-šašmin.*  
 the-cake eaten for to-get fat

This is predicted by the current theory, see footnote 9.



- (17) a. *ha-poster yihiye mudbak la-kir be-rašlanut.*  
the-poster will+be attached to+the-wall in-carelessness  
'The poster will be attached to the wall carelessly.'
- b. *ha-poster yihiye davuk la-kir (\*be-rašlanut).*  
the-poster will+be attached to+the-wall in-carelessness
- (18) a. *ha-kufsa tihye mudbaket 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 Cause argument, e.g. *mexumam* 'heated' mentioned in 3.3.1 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 implicit argument with some adjectives should not lead to the conclusion that these adjectives lack such an 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)<sup>30</sup>, an instrument phrase is licensed only in (21b):

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

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<sup>30</sup> 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.'

(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 Agent/Cause 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<sup>31</sup>:

(25) *ha-sefer arux al-yedey orex mecuyan.*  
the-book edited by editor excellent

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<sup>31</sup> These are cases of 'true' adjectival passives derived from atelic stems. As discussed in 3.5.3 below, this is a rare situation since as a rule, adjectival passives in Hebrew are derived only from telic stems.

'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.<sup>32</sup>

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

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.<sup>33</sup> This difference in the

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<sup>32</sup> As noted by Susan Rothstein (p.c.), if the identity of the eater is observable, the sentence becomes much better. For example, (i) is possible if one actually sees the worm holes in the apple.

(i) *ha-tapuax axul al-yedey tola 'at.*

the-apple eaten by worm

'The apple is eaten by a worm.'

<sup>33</sup> It was mentioned in footnote (29) 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

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 3.5.6.1. Thus, there is a basic symmetry between verbs and adjectives: both may have an implicit Agent or Cause argument, and this argument can be detected using the same tests, provided that the test is suited to the relevant lexical category.

### 3.3.3 Disjoint reference effects

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 disjoint 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 external argument in their syntactic representation. They derive the impossibility of self-action in verbal passives from the ungrammaticality of the configuration in (30) (argued for in Rizzi 1986a). They suggest that if one takes *-en* to be a realization of the external argument, then verbal passives are represented as in (31), which is an instance of (30), hence ungrammatical. Supposedly, if adjectival passives had external 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<sub>i</sub> was comb-en<sub>i</sub> t<sub>i</sub>*

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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.

In contrast to Baker, Johnson & Roberts, Chierchia (2004), Reinhart (2002) and others do not assume a structural representation of the external argument in verbal passives, only a semantic one. Under such an analysis, Baker, Johnson and Roberts' account for the disjoint reference effect in verbal passives cannot be maintained. My analysis of adjectival passives (in 3.5.5 below) follows Chierchia (2004) and Reinhart (2002), suggesting that the external argument is not structurally present in adjectival passives as well. In section 3.5.6.2 I will offer an alternative account for the disjoint reference effect in verbal passives, and the lack of it in adjectival ones.<sup>34</sup> Evidence from disjoint 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.

### 3.4 Capturing the split in the class of adjectival passives

#### 3.4.1 'True' adjectival passives and adjectival decausatives: the parallelism with verbs

Before turning to analyze the difference between the two types of adjectives presented in 3.3.1 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  $\theta$ -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

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<sup>34</sup> In fact, the illicit configuration of (30) will not arise with adjectival passives, even if they are assumed to entail a syntactically realized external argument. This is so because unlike verbal passive sentences, sentences with adjectival passives do not include a trace at all; the subject is merged as a truly external argument (see chapter 2). The representation of an adjectival passive with a reflexive meaning will be as in (i), which is not an instantiation of the illicit (30).

(i) *The child<sub>i</sub> was comb-en<sub>i</sub>*

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 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 implicit argument in its interpretation. If the term *passive* is taken to encode the requirement for an implicit argument, then only adjectives that entail an implicit 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 3.5.1). 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 an implicit 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 fact 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.

### 3.4.2 The sets of 'true' adjectival passives and adjectival decausatives

This section shows that the set of adjectival decausatives is identical to that of unaccusative verbs, and the set of 'true' adjectival passives – to that of verbal passives. (For the sake of simplicity, I limit the discussion to verbs whose external  $\theta$ -role is either Agent or Cause).

Let us look at the verbal system. Passive verbs are derived both from verbs whose external  $\theta$ -role is Agent, namely [+c+m], only ('Agent verbs') (32), and from verbs whose external  $\theta$ -role is [+c] ('Cause verbs') (33). As explained in section 2.3.1.1 above, [+c] is a thematic role which is indifferent to animacy, and can be realized either as an animate, volitional agent ([+c+m] (33a), or as an inanimate, non-volitional Cause ([+c-m]) (33b).

(32) 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.'

(33) 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 (1995) and Reinhart (2002), among others, observe that the transitive alternates of unaccusative verbs systematically have a [+c] role. That is, while the Cause verbs in (33) above have unaccusative counterparts (in (34)), the Agent verbs in (32) above do not (35):

(34) *ha-kos nafla / hitgalgela / zaza / hityabša.*

the-glass fell rolled moved dried

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

(35) \**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.<sup>35</sup>

Importantly, if the two types of adjectival passives discussed above parallel passive and unaccusative verbs, a priori 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.

### 3.4.2.1 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 (30)).

(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.'

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<sup>35</sup> 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 3.5.1 below

- b. *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.'

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), on a par with their lack of an unaccusative verbal alternate for them. Also, it is impossible to claim (as will be claimed for certain forms in 3.4.2.2 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.

### 3.4.2.2 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

<i>hikpi</i> 'freeze'	<i>mukpa</i> 'frozen'	<i>kafu</i> 'frozen'
<i>nipeax</i> 'inflate, blow up'	<i>menupax</i> 'inflated'	<i>nafuax</i> 'swollen, inflated'
<i>histir</i> 'hide'	<i>mustar</i> 'hidden'	<i>nistar</i> 'hidden'
<i>hidbik</i> 'glue, attach'	<i>mudbak</i> 'glued, attached'	<i>davuk</i> 'attached, stuck'
<i>hevix</i> 'embarrass'	<i>muvax</i> 'embarrassed'	<i>navox</i> 'embarrassed'
<i>pišet</i> 'simplify'	<i>mefušet</i> 'simplified'	<i>pašut</i> 'simple'
<i>hiciv</i> 'place, position'	<i>mucav</i> 'placed, positioned'	<i>nicav</i> 'placed, standing'
<i>himliax</i> 'salt'	<i>mumlax</i> 'salted'	<i>maluax</i> '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 tihye musteret be-emca'ut pargod.*  
 b. \**ha-bama tihye 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) <u>Transitive verb</u>	<u>Ambiguous form</u>	<u>Adjectival decausative</u>
<i>sibex</i> 'complicate'	<i>mesubax</i> 'complicated, complex'	<i>savux</i> 'complicated, complex'
<i>pizer</i> 'scatter'	<i>mefuzar</i> 'scattered'	<i>pazur</i> 'scattered'
<i>šilev</i> 'combine'	<i>mešulav</i> 'combined'	<i>šaluv</i> 'integrated, interwoven'
<i>ikem</i> 'bend, twist'	<i>me'ukam</i> 'curved, bent, twisted'	<i>akum</i> 'crooked, twisted, bent'
<i>hitrid</i> 'bother'	<i>mutrad</i> 'bothered'	<i>tarud</i> '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)).

- (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 otam.*  
 the-leaves scattered here, although that-nothing no one not scattered  
 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 Agent when a *by*-phrase, an Agent-oriented adverb or an instrumental phrase is present in the sentence. So, (45) is contradictory.<sup>36</sup>

- (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.<sup>37</sup>

**(c) One ambiguous form**

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

<u>Transitive verb</u>	<u>Adjectival alternate</u>
<i>šavar</i> ('broke')	<i>šavur</i> ('broken')
<i>sagar</i> ('close')	<i>sagur</i> ('closed')
<i>patax</i> ('open')	<i>patuax</i> ('open, opened') <sup>38</sup>
<i>lixlex</i> ('dirty, sully')	<i>meluxlax</i> ('dirty, sullied')
<i>kikel</i> ('damage, spoil')	<i>mekulkal</i> ('damaged, broken, out of order')
<i>gilgel</i> ('roll')	<i>megulgal</i> ('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*

<sup>36</sup> Thanks to Eitan Zweig for pointing this out to me.

<sup>37</sup> 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).

<sup>38</sup> In this case, English can be more revealing than Hebrew. If the analysis presented in this chapter extends to English (as will be suggested in section 3.6.3), 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 open broken dirty but nothing no one not opened broke sullied  
*ota.*

it

'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 such an argument, and obviously, when this is the case, the existence of this argument 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, since it is a morphological impossibility for verbs in *XaXaX* (e.g. *patax* 'open') and quadri-consonantal verbs in *XiXXeX* (e.g. *gilgel* 'roll') to 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 passive template corresponding to the active template of the verb, while adjectival decausatives appear in *XaXuX* (see (38), (41)). Thus, 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 (as well as *muXXaX*) 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) | <i>ratuv</i> 'wet'    | <i>patuax</i> 'open'                      |
|      | <i>pašut</i> 'simple' | <i>mesubax</i> ( <i>savux</i> ) 'complex' |
|      | <i>tarud</i> 'busy'   | <i>meluxlax</i> 'dirty'                   |

The adjectives on the left are decausative, and those on the right are, as shown above, ambiguous, but I will focus here on their 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 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 implicit 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 implicit argument, as an adjectival decausative, regardless of its morphology (see chapter 2, section 2.5 for additional discussion).<sup>39</sup>

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

(51) <u>Transitive verb</u>	<u>Adjectival passive</u>	<u>Adjectival decausative</u>
<i>kerer</i> ('cool')	<i>mekorar</i> ('cooled')	<i>kar</i> ('cold')
<i>kicer</i> ('shorten')	<i>mekucar</i> ('shortened')	<i>kacar</i> ('short')
<i>mile</i> ('fill')	<i>memula</i> ('filled')	<i>male</i> ('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 tihye 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 tihye 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.<sup>40</sup>

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<sup>39</sup> 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. 'True' adjectival passive formation (like verbal passive formation) does exhibit morphological regularity: a passive template is necessary for 'true' adjectival passive formation.

<sup>40</sup> 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 more



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.<sup>41</sup> 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.

### 3.5 The formation of 'true' adjectival passives and adjectival decausatives

#### 3.5.1 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.

Following Chierchia (2004) and Reinhart (2002) I assume that verbal passivization involves **saturation**: existential closure of the verb's external  $\theta$ -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:  $\exists e \exists x [\text{MURDER}(e) \ \& \ \text{Agent}(e, x) \ \& \ \text{Theme}(e, \text{the gangster})]$

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

Following Levin & Rappaport (1995) Reinhart (2002), Reinhart & Siloni (2005) I assume that unaccusative verbs are derived from their transitive alternates as well. Reinhart & Siloni (2005) suggest that unaccusatives are derived in the lexicon, by an operation labeled **decausativization**,

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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 3.5.3 below.

<sup>41</sup> 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 3.5.4 below), which is inapplicable to 'frozen' entries, which exist only in the lexicon. This is indeed the case in Hebrew.

which can operate only on verbs whose external  $\theta$ -role is Cause, and eliminates this role from the input verb's thematic grid, thus reducing its valency, as in (54).<sup>42</sup> As noted in Reinhart (2002), the derivation depicted in (54) does not have a semantic effect, other than the one correlated with the reduction of  $\theta$ -role: the reduced entry denotes just the property corresponding to a one place verb with the remaining argument. Unlike saturation, which leaves the external  $\theta$ -role available in the semantics, decausativization eliminates this role completely, so it is realized neither syntactically nor semantically. Therefore, unaccusative verbs are incompatible with *by*-phrases, instrumental phrases and Agent-oriented adverbs.

$$(54) \quad V_{(\text{CAUSE}, \theta_2)} \rightarrow V_{\text{DECAUS}(\theta_2)}$$

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 (2010a), who discuss the decausativization operation in detail, argue that a lexical reduction of a  $\theta$ -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 (remember that the lexical entry does not contain a semantic formula, but rather a  $\theta$ -grid, as explained in 2.3.1 above). So, for example, the transitive *break* has two  $\theta$ -roles: *break* ( $\theta_{\text{CAUSE}}, \theta_{\text{THEME}}$ ); following reduction, the unaccusative *break* is derived: *break* ( $\theta_{\text{THEME}}$ ). 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  $\theta$ -roles as relations between events and participants).

- (55) a. The vase broke.  
       b.  $\square_e$ .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  $\theta$ -role is part of the lexical information carried by the verb and

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<sup>42</sup> 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 (38) above, this is not surprising, given the many-to-many relation between form and meaning in certain Hebrew paradigms. 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 (see also discussion in Horvath & Siloni 2010a), or may be frozen in the lexicon.

by its category-less root (see 3.5.3 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. Let me explain why.

For one, 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 other intransitive verbs whose sole argument is reasonably also a Theme (such as *glitter* and *echo*, see Reinhart 2002) map it externally. 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.

More importantly for the issue at hand, the reduction analysis and the assumption that the external  $\theta$ -role is part of the lexical information carried by a lexical item can naturally account for the makeup of the set of unaccusative verbs. For example, it can account for the fact that *freeze* exists as a one-place unaccusative predicate, while *write* does not. This is so since *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. My analysis and the predictions it makes thus crucially rest on the premise that the external  $\theta$ -role is part of the lexical information carried

by lexical items. This serves as an additional argument that external  $\theta$ -roles are listed in a lexical entry's thematic grid.

In what follows I therefore assume that passive formation involves saturation, and unaccusative formation involves decausativization – reduction of a Cause  $\theta$ -role.

### 3.5.2 Adjectival passive formation as a lexical operation

Some important analyses of adjectival passive formation, mainly Levin & Rappaport (1986) (discussed in chapter 1, section 1.1.3 above) and Dubinsky & Simango (1996) held that adjectival passives are formed in the lexicon, by a lexical operation. However, following Baker (1988), and then Hale & Keyser (1993) and the development of the Distributed Morphology framework (Halle & Marantz 1993, Marantz 1997), word-formation processes in general are often analyzed as occurring in the syntax. Accordingly, in recent years adjectival passive formation was most commonly analyzed as the result of syntactic composition (Anagnostopoulou 2003, Embick 2004, among others).

Still, there are extremely strong arguments that word-formation processes can be lexical (Siloni 2002, Reinhart & Siloni 2005, Williams 2007, Aronoff 2007). In the realm of adjectival passives, Horvath & Siloni (2008, 2009) show that numerous differences between adjectival and verbal passives fall out naturally if one assumes that the former are derived pre-syntactically, by a lexical operation, and the latter - by a syntactic one. In Horvath & Siloni (2008), the authors present three arguments leading to this conclusion:

(i) Semantic drifts: only adjectival passives may exhibit drifted meanings, not shared by the active verb; verbal passives can never show such a drift. For example, the Hebrew adjectival passive *mufnam*, literally 'internalized' (derived from *hifnim* 'internalize'), has an additional meaning, 'introverted'; the corresponding verbal passive, in contrast, has only the expected meaning, 'internalized'. This is easily explained under the hypothesis that adjectival passives are derived lexically while verbal passives are created syntactically. Stored lexical items can undergo semantic drifts and acquire additional meanings, but the result of a syntactic operation must have a compositional meaning, and cannot undergo meaning drifts.

(ii) Idiom formation: adjectival passives, unlike verbal ones, can give rise to idioms not shared by their transitive alternates. 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, these facts strongly suggest that adjectival passives exist in the lexicon, while verbal passives do not. Horvath & Siloni (2009) contains a quantitative survey showing that adjectival and verbal passives are indeed significantly different in this respect.

(iii) Frozen entries: Horvath & Siloni (2008) argue in favor of *frozen* lexical entries, entries which exist in the lexicon (and can therefore serve as input for lexical operations) but are not available for insertion to syntactic derivations (for a study establishing the psychological reality of frozen entries see Fadlon to appear). For example, the transitive alternate of *fall* in English is analyzed by the authors as a frozen entry – an existing lexical entry that nonetheless will never appear in a sentence. Importantly for the case at hand, such frozen entries can only have adjectival passive alternates, never verbal ones. For example, while the Hebrew adjectival passive *navul* ('wilted'), by hypothesis an alternate of the frozen entry *hibil* ('wilt-TR.') exists, there is no verbal passive alternate to this frozen entry (*\*hubal* 'was wilted', does not exist). This is naturally explained if adjectival passive formation occurs lexically, taking as input lexical entries – whether frozen or not – while verbal passive formation is a syntactic process, whose input must consist of vocabulary items available for syntactic insertion.

Horvath & Siloni (2008, 2009) also argue that the differences 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).

As mentioned above, 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. 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).<sup>43</sup> 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.

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<sup>43</sup> See also the discussion of example (24) above.

the hairs were sloppily combed  
'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 (56a). Note that given my analysis, (56b) does not show that adverbs cannot modify adjectives, but rather that they can modify only a certain type of adjectives – those that have an implicit argument in their interpretation.

Furthermore, a syntactic analysis such as Kratzer's 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 5.3.2 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 3.6.2.

### 3.5.3 The input for adjectival passive formation

Before turning to describe the derivation of the two types of adjectival passives, it is important to address one further issue: what is 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 3.4.2.2 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 ( $\theta$ -grids). As explained in 3.5.1 above, I adopt the view that the external  $\theta$ -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  $\theta$ -role is listed in the root's  $\theta$ -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 verbs with an affected object, that is, verbs which have a result state as part of their meaning. This constraint can account for contrasts such as the one observed in (58)-(59):

- (58) a. *maks afa et ha-uga.*  
Max baked ACC the-cake  
'Max baked the cake.'
- b. *ha-uga afuya.*  
the-cake baked(Adj.)  
'The cake is baked.'
- (59) a. *maks daxaf et ha-agala.*  
Max pushed ACC the-cart  
'Max pushed the cart.'
- b. \**ha-agala dxufa.*  
the-cart pushed(Adj.)

While *afa* 'bake' is telic, *daxaf* 'push' is an activity verb; it lacks an adjectival passive since it specifies no endpoint which can be referred to by the adjective.<sup>44</sup>

An example for an input root is given in (60):

(60) FREEZE (CAUSE, THEME, e), telic

The result of realizing syntactically the transitive verb related to the root in (60) is (61), in which the telicity of the root is expressed in the fact that the semantics includes both an event (e) component, and a state (s) component.

(61) a. The wind froze the water.

b. Interpretation:  $\lfloor e \rfloor_s$ .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 it is important to distinguish between Cause and CAUSE in (61b): while the former is a  $\theta$ -role, denoting a relation between an event and a participant, the latter denotes a relation between two events (or an event and a state), the first causing the second.

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.

### 3.5.4 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 3.5.1, decausativization will apply only to stems whose external  $\theta$ -role is Cause. (62) presents an example of the input for adjectival decausative formation:

(62) FREEZE (CAUSE, THEME, e)

To become an adjective, the event argument of the root must be changed to a state argument, since adjectives denote states (this will have the consequence that the semantic representation of

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<sup>44</sup> A thorough discussion of this constraint is beyond the scope of this chapter. 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' and *meyusam* 'implemented', even though *šamar* 'guard, keep' is atelic, and the status of the object of *yisem* 'implement' as affected is arguable at best.



a sentence containing the adjective will not have an event component, only a state component), and one  $\theta$ -role of the root, in this case the internal one, must undergo lambda-abstraction, as explained in chapter 2 (this will be marked with  $\downarrow_{-ABS}$  on the relevant role). I call the combination of these two procedures 'adjectivization'.

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

(63) ADJ: FREEZE ( $\text{THEME} \rightarrow \downarrow_{-ABS}, s$ )

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)  $\downarrow x \downarrow s.$ Frozen(s) & Theme(s,x)

The representation in (64) is that of a relation between an individual  $x$  and a state  $s$ , where  $s$  is a state of freezing of which  $x$  is the Theme. This is exactly the meaning of *kafu*, 'frozen' (on its decausative reading). As was pointed out in 3.3.1 above, adjectival decausatives have no event implications whatsoever. So, for example, (65) is grammatical, as predicted from the interpretation in (64).

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

### 3.5.5 '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 (66):

(66) a. FREEZE ( $\text{CAUSE}, \text{THEME}, e$ )  
 b. WRITE( $\text{AGENT}, \text{THEME}, e$ )

We have seen that saturation marks the external  $\theta$ -role to be assigned to an existentially bound variable in the semantics (I will indicate the effect of saturation by marking this  $\theta$ -role with  $\text{SAT}$ ). In addition, adjectivization applies - the event argument is changed to a state argument, and the Theme role is marked to be lambda-abstracted in the semantics. The result of adjectival passive formation, then, will be as in (67):

- (67) a. ADJ: FREEZE (CAUSE<sub>→SAT</sub>, THEME<sub>→[-ABS, s]</sub>)  
 b. ADJ: WRITE (AGENT<sub>→SAT</sub>, THEME<sub>→[-ABS, s]</sub>)

Here, a problem arises. The semantic representation of the adjectives above includes a saturated  $\theta$ -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 (68).

- (68) a. The letter was written. (Verbal reading)  
 b. Interpretation:  $\exists e \exists s. \exists y$ [Writing(e) & Agent(e, y) & Theme(e, the letter) & Written(s) & Theme(s, the letter) & CAUSE(e,s)]

But the adjectives' interpretation in (67) 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 (69):

- (69) a.  $\lambda x \lambda s. \exists y$ [Frozen(s) & Theme(s,x) & Cause(s,y)]  
 b.  $\lambda x \lambda s. \exists y$ [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  $\theta$ -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, 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 exemplified in (70)-(71) (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 bold-faced expression in the original representation is replaced, as a result of the operation of this rule, by the bold-faced expression to the right of the arrow.

- (70)  $\lambda x \lambda s. \exists y$ [Frozen(s) & Theme(s,x) & **Cause(s,y)**]  $\rightarrow$   
 $\lambda x \lambda s. \exists y$ [Frozen(s) & Theme(s,x) &  $\exists e$  [**Freezing(e) & Cause(e,y) & Theme(e,x) & CAUSE(e,s)**]]

(71)  $\lambda x \lambda s. \square y [\text{Written}(s) \ \& \ \text{Theme}(s,x) \ \& \ \text{Agent}(s,y)] \rightarrow$   
 $\lambda x \lambda s. \square y [\text{Written}(s) \ \& \ \text{Theme}(s,x) \ \& \ \square e [\text{Writing}(e) \ \& \ \text{Agent}(e,y) \ \& \ \text{Theme}(e,x) \ \& \ \text{CAUSE}(e,s)]]$

(70)-(71) therefore contain the interpretations of the adjectives in (67), after the application of saturation (resulting also in event reconstruction) and adjectivization. (70) represents the relation between an individual  $x$  and a state  $s$ , 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 (71), 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  $\theta$ -role which could not be assigned otherwise, as stative predicates do not assign these roles.

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 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  $\theta$ -role.

### 3.5.6 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 disjoint reference effects, while 'true' adjectival passives do not. Both of these differences follow straightforwardly from the analysis presented in the previous section.

#### 3.5.6.1 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 3.3.2, not all adjectives that entail an implicit argument pass the standard tests detecting this argument. For example, as discussed in 3.3.2, *mexumam* 'heated' has an implicit argument, yet (72) (repeated from (20b)) is ungrammatical:

(72) \**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, two conditions must be met: the adjective must have an implicit argument, and further, 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 (73):

(73) a. The window was closed with a pole.  
 b. Interpretation:  $\square x \square s \square e$ [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 (74):

(74) 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 3.3.2 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 (74b) given in (75):

(75)  $\square s \square y$ [Tied(s) & Theme(s, the dog) &  $\square e$ [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 (75). Modifying elements cannot modify this event, since they are outside of its scope; they can only modify the state. In (74a), 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. The situation with adverbs is similar. Agent-oriented adverbs are usually assumed to be predicated of events (Chierchia & McConnell-Ginet 1990), as represented in (76):

- (76) a. The window was closed sloppily. (Verbal reading)  
 b. Interpretation:  $\exists e \exists s \exists x$ [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. (77a) is ungrammatical since the adverb cannot modify the event, as it is out of its scope (as shown in 77b), but neither can it modify the state, since it is semantically incompatible with it.

- (77) a. \**ha-sefer katuv be-ma'amac*.  
 the-book written in-effort  
 b.  $\exists s \exists y$ [Written(s) & Theme(s, the book) &  $\exists e$ [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 Agent/Cause argument, a participant in the event, as exemplified in (78). Note that in the semantic interpretation (78b) 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" (see Fox & Grodzinsky 1998) is needed to link the Agent introduced by the *by*-phrase to the Agent introduced by the existential quantifier. We can simply assume that *by* signals that the participant included in its conjunct (*Dan*) should be identified with the participant introduced by the existential closure (x).

- (78) a. The window was closed by Dan.  
 b. Interpretation:  $\exists e \exists s \exists x$ [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. As in the other cases, this element is only licensed in the presence of an implicit argument. So, for example, (79) 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  $\theta$ -transmission mechanism ensures that the Agent of the reconstructed event is the same as the argument introduced in the *by*-phrase.<sup>45</sup>

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

the-book edited by editor excellent

'The book is edited by an excellent editor.'

b.  $\exists s \exists y [\text{Edited}(s) \ \& \ \text{Theme}(s, \text{the book}) \ \& \ \exists e [\text{Editing}(e) \ \& \ \text{Agent}(e, y) \ \& \ \text{Theme}(e, \text{the book}) \ \& \ \text{CAUSE}(e, s)] \ \& \ \text{By}(s, \text{excellent editor})]$

Importantly, once an adjectival passive is interpreted, existential closure is performed upon its external argument, leading to the meaning component  $\exists e [\text{Event}(e) \ \& \ \text{Agent}(e, y) \ \& \ \text{Theme}(e, X) \ \& \ \text{CAUSE}(e, s)]$ . The scope of the existential quantifier introduced by 'event reconstruction' contains only these conjuncts. Nothing else – an instrument, an adverb, an external 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. 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.

### 3.5.6.2 Disjoint reference effects

Recall from section 3.3.3 that the disjoint reference effect is manifested by verbal passives but not by adjectival ones, so that in (80a) cannot mean that the child combed himself, while (81a) 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

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<sup>45</sup> So, once a *by*-phrase is licensed by the state argument, its reference can be transmitted to the Agent variable inside the scope of the reconstructed event. It is important however to note that still, it is the state argument, not the event argument, which licenses the *by*-phrase.

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 (80b) and (81b).

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

the-child was+combed.V

b. The child ( $\lambda x \lambda e \lambda s. \square y [\text{Combing}(e) \ \& \ \text{Agent}(e, y) \ \& \ \text{Theme}(e, x) \ \& \ \text{Combed}(s) \ \& \ \text{Theme}(s, x) \ \& \ \text{CAUSE}(e, s)]$ )

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

the-child combed.ADJ

b. The child ( $\lambda x \lambda s [\square y. \text{Combed}(s) \ \& \ \text{Theme}(s, x) \ \& \ \square e [\text{Combing}(e) \ \& \ \text{Agent}(e, y) \ \& \ \text{Theme}(e, x) \ \& \ \text{CAUSE}(e, s)]]$ )

If  $x$  and  $y$  happen to refer to the same individual, then in (80b) we have a semantic reflexive predicate, a predicate with two co-referential arguments, participating in the same event; but the predicate denoting this event is not reflexive-marked. Thus, this reading is impossible. What happens in (81b)?  $x$  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 (81): either the reflexivity of an embedded eventuality need not be reflexive marked, only the reflexivity of the main eventuality denoted by a predicate. Thus, (81a) can have a reflexive reading. Alternatively, it is possible that the representation in (81b) 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. Strong evidence for this comes from reciprocal adjectives in Hebrew. The semantics of these adjectives involves reciprocity, but their morphological is 'passive': e.g. *xavukim* ('embraced by one another-PL'), *cmudim* ('attached to one another-PL'), *me'ohavim* ('in love-PL').<sup>46</sup> The decision between these two accounts will have to await further research.

### 3.6 The cross-linguistic perspective and comparison with previous accounts

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<sup>46</sup> This is one more case in which morphology and semantics do not exhibit a one-to-one relation, see footnote 37 above.

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 these findings and analyses. In 3.6.1, I discuss Kratzer's (2000) analysis of adjectival passives in German, concluding that the split in German is different from that in Hebrew, and therefore, my analysis cannot extend straightforwardly to German, nor Kratzer's analysis to Hebrew. In 3.6.2, Anagnostopoulou's (2003) analysis of adjectival passives in Greek is discussed. While the classification of adjectival passives is 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 3.6.3, 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. The section suggests that the proposed analysis might be relevant for additional languages, bringing Hungarian as one relevant case.

### **3.6.1 German (Kratzer 2000)**

Kratzer (2000) discusses a split in the class of adjectival passives in German. According to her, the defining difference between the two sub-classes of adjectives in this language is whether they denote a state which is transitory and possibly reversible ('target state', in her terminology) or a state which corresponds to some event being over, and holds forever after ('resultant state'). The second type of adjectives has the interpretation of the verbal perfect construction in English. For example, *geleert* ('emptied') is a 'resultant state' passive, since it refers to the state that holds following the emptying of something, a state which is by definition irreversible, since the event has already taken place. It is irrelevant whether at the moment of utterance, the object of the emptying is empty or not: a bucket can be referred to as *geleert* if it was emptied yesterday, even if now it is full of water again.

'Resultant state' adjectival passives do not exist in Hebrew. Importantly, adjectival passives in Hebrew are derived only from telic verbs with affected objects (as discussed in 5.3 above), and when an adjectival passive is used, it necessarily asserts something with regard to the state of this object 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. To convey this latter meaning in Hebrew, one can only use a past tense verb. The same, incidentally, is true for the adjective *emptied* in English. Consider (82):

(82) My mind seems emptied of creative ideas.

(82) necessarily means that the speaker's mind is empty of creative ideas in the moment of utterance. It cannot be uttered if the speaker's mind was once emptied, but is now full of ideas again. This meaning can be conveyed only by a verb, which is ruled out in (82) which contains an adjectival context.

Granted, some adjectival passives in Hebrew, e.g. *axul* 'eaten', denote irreversible states, thus reminding 'resultant state' passives. Crucially, however, the irreversibility of the state in these cases is a matter of world knowledge, rather than of core meaning. 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, on the other hand, is not a matter of world knowledge, but a matter of meaning.<sup>47</sup>

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<sup>47</sup> Kratzer also shows that in German, the two types of adjectives differ in their behavior with respect to the adverb *immer noch* ('still'); resultant state passives license it (ia), while target state ones do not (ib):

- (i) a. *Die Geisslein sind immer noch versteckt.*  
the little goats are still hidden  
'The little goats are still hidden.'  
b. *\*Der Briefkasten ist immer noch geleert.*  
the mailbox is still emptied

In Hebrew, both adjectival decausatives (ia) and 'true' adjectival passives (iib-c) are compatible with *adayin* 'still'.

- (ii) a. *ha-agam adayin kafu.*  
the-lake still frozen  
'The lake is still frozen.'  
b. *ha-kelev adayin kašur be-recu'a.*  
the-dog still tied in-leash  
'The dog is still tied with a leash.'  
c. *ha-ictadion adayin šamur al-yedey šotrim xamušim.*  
the-stadium still guarded by policemen armed  
'The stadium is still guarded by armed policemen.'

I conclude that 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, since the two languages are clearly different with respect to adjectival passives.

### 3.6.2 Greek (Anagnostopoulou's 2003)

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 (83). According to Anagnostopoulou, in (83a) there is no implication of an opening / closing event, while in (83b) the door is open / closed as a result of an opening / closing event.

(83) a. *I porta itan anix-ti / klis-ti.* (Anagnostopoulou 2003)

the door was open closed

'The door was open / closed.'

b. *I porta itan anig-meni / klis-meni.*

the door was opened closed

'The door was opened / closed.'

In addition, while *-menos* forms allow modification by Agent-oriented adverbs, *by*-phrases and instruments (84a), *-tos* forms resist such modifications (84b):

(84) 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 3.4.2, 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 (84b)). 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 3.3.2, 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 (84a) and (85):<sup>48</sup>

(85) *To thisavrofilakio itan prosektika anigmeno.*

the safe                      was cautiously opened

'The safe was cautiously opened.ADJ.'

The Hebrew and English counterparts of (84a) and (85) 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 accessible to modification by adverbs, instruments and *by*-phrases, before an adjectival head is attached and the adjective is formed.<sup>49</sup>

As explained in 3.5.2 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

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<sup>48</sup> 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

<sup>49</sup> 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.

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.

### 3.6.3 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:

- (86) a. The rock seems melted by acid.  
b. The rock seems molten (\*by acid).

*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 most cases, the same form functions as both the 'true' passive and the decausative, giving rise to the ambiguity illustrated in (87).<sup>50</sup> (87a) 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.

- (87) a. The door is closed, though no one / nothing closed it.  
b. The door remained carefully closed.

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<sup>50</sup> In other cases, the adjectival decausative will not bear passive morphology at all, as discussed for Hebrew in 3.4.2.2. For example, *clean* and *dry* are the adjectival decausatives corresponding to the 'true' adjectival passives *cleaned* and *dried*, respectively.

This situation is identical to the one we have seen with ambiguous adjectives in Hebrew (section 3.4.2.2) 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 English, like in Hebrew, many adjectival passives license Agent-oriented adverbs (88a), *by*-phrases (88b) or instruments (88c):

- (88) 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 (88a) 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 (89).

- (89) \*The door carefully opened.

We must therefore conclude that adjectives such as the ones in (88) 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  $\sqrt{\text{DESTROY}}$ ,  $\sqrt{\text{KICK}}$ , 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  $\setminus$ -role is Agent, and not

Cause, it cannot undergo decausativization and therefore no decausative form is predicted to exist.<sup>51</sup>

So, English data suggest that the analysis presented in this work 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.

In fact, nothing prevents the analysis presented here from potentially applying to many other languages. As a last cross-linguistic observation, let us look at Hungarian. Hungarian seems to exhibit exactly the same split between 'true' adjectival passives and adjectival decausatives as in Hebrew. Consider the following examples, taken from Horvath & Siloni (2008):

(90)	<u>Transitive V</u>	<u>Unaccusative V</u>	<u>'True' adj. passive</u>	<u>Adj. decausative</u>
	<i>megszárit</i> 'dry'	<i>megszárad</i>	<i>megszárit-ott</i>	<i>megszárad-t</i>
	<i>kinyit</i> 'open up'	<i>kinyíl(-ik)</i>	<i>kinyit-ott</i>	<i>kinyíl-t</i>
	<i>fagyaszt</i> 'freeze'	<i>fagy</i>	<i>fagyasztott-ott</i>	<i>fagy-ott</i>
	<i>megrongál</i> 'damage'	<i>megrongálód(-ik)</i>	<i>megrongál-t</i>	<i>megrongálód-ott</i>

The forms in the third column entail an implicit argument, while those in the fourth do not. So, in (91a) an instrument phrase is licensed, whereas in (91b) the same phrase is illicit:

- (91) a. *a késsel megrongál-t asztal*  
the knife-with perf.-damage.trans.-adj.part. table  
'the damaged with a knife table'
- b. *a (\*késsel) megrongálód-ott asztal*  
the knife-with perf.-damage-unacc.-adj.part table (Horvath & Siloni 2008)

Importantly, note that all the verbs in (90) are Cause verbs, thus predicted to have two adjectival alternates.

Moreover, the Hungarian facts are striking in an additional respect. Observe the second column in (90) above. It can be seen that in Hungarian, there is no uniform way of marking unaccusative

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<sup>51</sup> The case of *destroy* is somewhat different: the external  $\downarrow$ -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.

verbs. In some transitive-unaccusative pairs it is the transitive version which is marked with a causative morpheme, and in others, the unaccusative version is marked. But, crucially, whatever the form of the unaccusative verb, the adjectival decausative is identical to it, with the addition of the adjectival participle marker *-t/-ott*. This marker is attached to the transitive version of the verb to give adjectival passives. We see, then, that in Hungarian there is a striking morphological similarity between adjectival decausatives and unaccusative verbs. This lends further support to the claim that there are two classes of adjectival passives, one of which parallels unaccusative verbs, rather than passive ones, and to the analysis deriving adjectival decausatives via decausativization, just like unaccusative verbs.

### **3.7 Conclusion**

The primary focus of this chapter 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.

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 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. 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.

## **4 Adjectival present participles**

### **4.1 Introduction**

This chapter focuses on the categorial classification and the derivation of present participles in Hebrew and English. It presents another case study of adjective formation, including lexical



marking of a  $\theta$ -role (either external or internal) for  $\lambda$ -abstraction, and saturation of the remaining role. Again, we observe that the inventory of  $\theta$ -roles and the possible manipulations of  $\theta$ -grids are essentially the same in the adjectival and the verbal domains; and again, the differences between the two categories (e.g. the fact that not all roots give rise to adjectival present participles, whereas they all give rise to verbal ones) stem from independent well-established properties of the categories, namely, that adjectives invariably denote states. The chapter also unravels some significant similarities between passive and present participles.

As mentioned in the introduction, section 1.2.1, participles cross-linguistically exhibit properties of both verbs and adjectives. Traditional grammarians often referred to them as "verbal adjectives", belonging to a "mixed category" with characteristics of both categories. In the same spirit, generative studies sometimes analyzed participles as "neutralized" entries (e.g. Chomsky 1981, Hoekstra 1984), lexically underspecified with regard to the categorial N-feature. Under these views, the category of the participle is determined by the syntactic environment in which it appears.

As discussed in chapter 3, such analyses were abandoned almost completely in the study of passive participles, and replaced by the understanding that although some passive participles indeed behave both like verbs and like adjectives, this is due to the fact that verbal and adjectival passives are very often homophonous.

Present participles have been the focus of less research. While it is commonly agreed that they exhibit verbal properties, it is still debated whether some or all of them display adjectival properties in addition. Some researchers (Borer 1990, Bresnan 1996, Parsons 1990 and others) claim that all present participles are adjectival in addition to being verbal; In contrast, Chomsky (1957), Fabb (1984), Brekke (1988), Bennis & Wehrmann (1990) and others claim that only some present participles are adjectival, Brekke (1988) being the only study trying to characterize this class precisely. In addition, although there are several attempts at a comprehensive study of the present participle morpheme *-ing* (see in particular Milsark 1988, Emonds 1991), none of them present a detailed account of the process of adjectival present participle formation.

Focusing on Hebrew and English, in this chapter I show that only some present participles are adjectival in addition to being verbal. I then suggest a semantic, aspectual constraint of the class of verbs giving rise to adjectival present participles, namely, that only stative verbs can form such

adjectives. The constraint is shown to have a much wider coverage than Brekke's (1988) thematic constraint on adjectival present participle formation. Further, it turns out to derive naturally from the properties of the present participle morpheme. In addition, I outline the operation that derives adjectival present participles, arguing that it applies in the lexicon.

The view of present participles advocated here is therefore on a par with the common view of passive participles, namely that some such participles double as both verbs and adjectives (since the verbal and adjectival forms are homophonous), while others are only verbal. The claim to be presented, that the class of verbs giving rise to adjectival present participles is restricted aspectually, likewise echoes some recent claims with regard to adjectival passives (Bresnan 1996, Doron 2000), namely that the class of stems forming them can be defined aspectually. Finally, the claim that adjectival present participles are derived lexically (while verbal ones are derived syntactically), parallels the split suggested by Horvath & Siloni (2008) with regard to the derivation of adjectival versus verbal passive participles. The current study therefore complements the vast ongoing study of passive participles and argues for a minimally different analysis of these and present participles.

The chapter proceeds as follows: in section 4.2 I present the relevant data concerning present participles in Hebrew and English, focusing on their distribution. These data reveal that while all present participles have the distribution of verbs, only a subclass of them has, in addition, the distribution of adjectives. In section 4.3 I show that the class of adjectival present participles is restricted aspectually, namely, that only stative verbs have adjectival present participle counterparts. Section 4.4 addresses the formation of adjectival present participles, presenting arguments in favor of their lexical derivation, in contrast to a syntactic derivation of verbal present participles. The section presents the aspectual and thematic details of the derivation of adjectival present participles, as well as a suggestion with regard to the derivation of verbal ones. Section 4.5 contains a discussion of participles in the prenominal position, whose status is reconsidered in light of the conclusions reached in the previous sections, and section 4.6 considers the question of why certain stative verbs do not lend themselves to the formation of adjectival present participles.

## **4.2 Determining the category of present participles**

What is the categorial status of present participles? The "verbal adjective" or "neutralized category" intuition with regard to present participles emerges from the fact that these participles appear both in sentences such as (1), in which they denote an event, therefore resembling verbs, and in sentences such as (2), in which they denote some property of an individual, like adjectives:

(1) Dan saw John **annoying** the children.

(2) Dan met an **annoying** man.

However, verbs can denote permanent properties (as in *god exists*), and stage-level adjectives denote transitory eventualities (as in *John is hungry*), and thus, the syntactic behavior and distribution of the participles must be examined, rather than their interpretation.

Before turning to present the syntactic facts regarding present participles, a brief remark with regard to their morphology is in order. As is well-known, in English, present participles are forms suffixed with *-ing*. In Hebrew, present participles appear in a morphological form identical to that of verbs in the present tense, in any one of the five non-passive verbal templates of the language (*XoXeX*, *niXXaX*, *meXaXeX*, *maXXiX*, and *mitXaXeX*). Note however that despite the morphological identity to the present tense verbal form, present participles such as the one in (3) are in fact uninflected for tense, as in English. (3) contains a non-tensed small clause, rather than a tensed sentential complement, the participle receiving its temporal interpretation from the main verb.

(3) *dan ra'a et dina kotevet mixtav.*

Dan saw ACC Dina **writing** letter

'Dan saw Dina writing a letter'.

Let us now turn to examining the distribution of present participles.

#### 4.2.1 Syntactic evidence for the verbal status of present participles

In this section I would like to establish the following claim:

(4) *All* present participles behave syntactically like verbs.<sup>52</sup>

Importantly, the generalization in (4) does not mean that the same forms cannot have an additional, adjectival reading.<sup>53</sup> In fact, in 4.2.2 it will be shown that many, though not all, present participles behave also like adjectives, namely, correspond to two homophonous entries.

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<sup>52</sup> There are a handful of exceptions to this generalization, discussed in section 4.4.1.2.

There are several reasons for claiming that all present participles are verbal. As noted by Bennis & Wehrmann (1990), the verbal status of present participles of transitive verbs can be deduced from the fact that, as seen in (5), they check accusative Case. This is true for all present participles of transitive verbs. In contrast, as shown in (6), adjectives in Hebrew and English cannot check accusative Case.

- (5) a. *hem šam'u ota xosefet et sodoteha.*  
 they heard her revealing ACC secrets+her  
 'They heard her reveal her secrets.'
- b. The girls saw Dina **supporting him**.
- (6) a. *ha-viduy šela haya xosfani (\*et sodoteha).*  
 the-confession hers was revealing(ADJ) ACC secrets+her
- b. Dina is supportive \*(of) him.

Present participles of intransitive verbs can be shown to be verbal, too. Laskova (2007) argues that in English only verbs, not adjectives, allow post-modification by adverbs. This is evidenced, for example, from the incompatibility of *seem*, which selects only APs, not VPs (see 4.2.3.2 below), with a post-modified participle:

- (7) \*The silver seems polished carefully. (cf.: The silver seems carefully polished.)

Present participles can be readily post-modified by adverbs in English, as exemplified in (8). This shows that such participles necessarily have a verbal reading.

- (8) a. I saw him walking idly.  
 b. I saw the diamond glimmering magnificently.

Verbs of temporal aspect in English provide us with another verbal context, as their complement can be only a verb phrase (9a), not an adjective phrase (9b) (Emonds 1991). Again, all present participles can appear as complements of these verbs (10), reinforcing the conclusion that they are verbal.

- (9) a. John {kept / resumed / ceased} watching / annoying me.  
 b. \*John {kept / resumed / ceased} intelligent / mad at Sam.

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<sup>53</sup> I use the phrase 'has a verbal/adjectival reading/use' descriptively, to mean that the participle behaves like a verb/adjective with regard to the relevant syntactic property. As explained in the introduction though, I do not view an ambiguous participle as one lexical entry with two readings, or with one "mixed" reading, but rather as representing two homophonous entries – one verbal and one adjectival.

(10) John {kept / resumed / ceased} walking / jumping.

All present participles, therefore, are verbal. In the following section I will argue that only some present participles have an additional, adjectival reading.

#### 4.2.2 Syntactic evidence regarding the adjectival status of present participles

Former studies have used various adjectivehood diagnostics in order to determine which present participles have an adjectival reading. The studies differed in their conclusion, depending on the diagnostics they perceived as most central or reliable. Brekke (1988) and Emonds (1991) seem to attribute much importance to *-ly* suffixation and the degree modifiers data (to be presented in 4.2.2.2 and 4.2.2.5), therefore concluding that not all present participles have an adjectival reading. On the other hand, Borer (1990), Bresnan (1996), and Parsons (1990) took the prenominal modification facts (to be presented in 4.2.2.8 below) to be crucial, and concluded that all present participles are adjectival. In fact, as will be shown in 4.2.2.8, even the prenominal position test does not diagnose **all** present participles as adjectives, but it is true that it diagnoses as adjectives a superset of the participles so diagnosed by the other tests. I return to this issue at the end of this section, where I conclude that this test is not a reliable one.

##### 4.2.2.1 Complement of *seem*, *become* etc.

Wasow (1977), Levin & Rappaport (1995) and others mention the fact that certain raising verbs, such as *seem*, *become* and others, take as their complements only APs, not VPs<sup>54</sup> (11) (*seem* selects clauses as well, but this is irrelevant here).

- (11) a. The boy seems / became beautiful / smart / rude.  
b. \*The boy seems / became chewing gum / folding his papers.

Looking at present participles, as noted by Fabb (1984), some of them can appear as complements to *seem* or *become* (12), whereas others cannot (13):

- (12) a. The movie seems interesting / amazing / amusing / annoying.  
b. The food seems appetizing.  
c. The town became flourishing.

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<sup>54</sup> These verbs can take as a complement any AP that appears predicatively. Adjectives that have only an attributive function, such as *former*, cannot appear in this context. This, however, is immaterial here, since adjectival present participles can always be used predicatively.

- d. Your remark seems fitting.
- e. Your friend has become understanding.
- f. After a few days, he became sparing of the bread.
- g. "... and his raiment became shining" (Mark 9:3)

(13) \*The boy seems / became jumping / growing / crying / eating / writing.

A similar test applies to Hebrew, at least for some speakers. The verb *nir'a* in Hebrew is ambiguous between the raising verb meaning 'seems/seemed' and the passive perceptual reading 'was seen'. The verb *nišma* is likewise ambiguous, between 'sounds/sounded' and 'is heard/was heard'. When these verbs are followed by an adjectival phrase, they only have the first meaning, that of a raising verb (14a); when followed by a verb phrase, they only have the second, perceptual meaning (14b):

(14) a. *ha-yeled nir'a / nišma nexmad.*

the-boy seems sounds nice

'The boy seems / sounds nice.'

b. *ha-yeled nir'a / nišma lo'es mastik.*

the-boy was+seen is/was+heard chewing gum

'The boy was seen / is/was heard chewing gum.'

When Hebrew present participles are preceded by *nir'a / nišma*, some of the sentences are interpreted with 'seems' / 'sounds', as expected if the participles are adjectives (15), while others are interpreted with 'was seen' / 'is/was heard', as expected if the participles are verbs (16)<sup>55</sup>. The split between the different participles is just like the one observed in English.

(15) *ha-seret nir'a / nišma me'anyen / madhim / meša'aše'a.*

the-movie seems sounds interesting amazing amusing

'The movie seems / sounds interesting / amazing / amusing.'

(16) *ha-yeled nir'a / nišma kofec / oxel / holex.*

the-boy was+seen is/was+heard jumping eating walking

'The boy was seen / is/was heard jumping / eating / walking.'

#### 4.2.2.2 –ly suffixation

<sup>55</sup> For some speakers, *nir'a / nišma* cannot be followed by a VP at all. In this case the test is clearer: for such speakers (15) will be grammatical, while (16) will be ungrammatical.

The English suffix *-ly* is a very productive suffix which attaches to adjectives, and turns them into adverbs (17a); the suffix cannot attach to verbs (17b).<sup>56</sup>

- (17) a. beautifully, smartly, rudely  
 b. \*eatly, \*walkly, \*thinkly

As noted by Fabb (1984) and Brekke (1988), here as well present participles behave non-uniformly: some of them allow *-ly* suffixation (18), while others disallow it (19):

- (18) interestingly, surprisingly, excitingly, pleasingly, fittingly, lastingly, compromisingly, forgivingly, shiningly, glimmeringly, inspiringly...  
 (19) \*sittingly, \*cryingly, \*jumpingly, \*walkingly, \*writingly, \*chewingly, \*drawingly, \*findingly, \*foldingly...

In this case too Hebrew provides a similar test. While in Hebrew there is no productive morphological operation that forms adverbs from adjectives, adverbs can be formed periphrastically using *be-ofen Adj* ('in a Adj manner'). Verbs, on the other hand, cannot serve as input for such adverb formation. Looking at present participles, we observe again that some of them can form adverbs in this way (20), while others cannot (21):

- (20) *be-ofen me'anyen / mafti'a / merageš / mitxašev / matmid*  
 in-manner interesting surprising exciting understanding lasting  
 'interestingly / surprisingly / excitingly / understandingly / lastingly'  
 (21) \**be-ofen boxe / kofec / holex / kotev*  
 in-manner crying / jumping / walking / writing

#### 4.2.2.3 Following the future copula

An additional adjectival test exists in Hebrew. As claimed in Doron (2000), in Hebrew, only adjectives (and nouns), not verbs, can follow the future copula, as seen in (22):

- (22) a. *ha-yeled yihiye yafe / xaxam / xacuf.*  
 the-boy will+be beautiful smart rude  
 'The boy will be beautiful / smart / rude.'  
 b. \**ha-yeled yihiye lo'es mastik / mekapel niyarot.*  
 the-boy will+be chewing gum folding papers

<sup>56</sup> There is a second *-ly* in English that forms adjectives from nouns, as in e.g. *earthly, monthly*. This suffix is irrelevant for the current discussion.

Present participles behave non-uniformly in this context, some following the future copula (23) and others not (24). Again, the same participles are diagnosed as adjectives by this test as by the preceding ones.

(23) a. *ha-yeled yihiye me'anyen / mafti'a / meša'aše'a / margiz.*

the-boy will+be interesting surprising amusing annoying

'The boy will be interesting / surprising / amusing / annoying.'

b. *ha-ir tihye mesageget.*

the-town will+be flourishing

'The town will be flourishing.'

c. *ha-oneš yihiye mat'im (la-avera).*

the-punishment will+be fitting to+the crime

'The punishment will be fitting (to the crime).'

d. *ha-xaver šelxa yihiye mitxašev.*

the-friend yours will+be considerate

'Your friend will be considerate.'

(24) \**ha-yeled yihiye kofec / holex / gadel / boxe.*

the-boy will+be jumping / walking / growing / crying

#### 4.2.2.4 *un-* prefixation

As was noted by Wasow (1977), there are two *un-* prefixes in English. One is prefixed to verbs, with the resulting form expressing the reversal of the action denoted by the original verb (*dress – undress, lock – unlock*). The relevant prefix for the current discussion is the one which attaches to adjectives to create a form expressing the opposite property or state from that denoted by the original adjective (*happy – unhappy, intelligent – unintelligent*). Prefixation of this second *un-* can distinguish adjectives from verbs. Note that adjectivehood is not a sufficient condition in this case, since *un-* does not attach to all adjectives (\**unsmart, unrude*). Still, it attaches only to adjectives. (25)-(26) show that present participles exhibit here the same split observed above:

(25) uninteresting, unsettling, unsurprising, unexciting, unpleasing, unfitting,  
uncompromising, unforgiving, unsuspecting, unassuming, unreasoning, unsparing,  
unrevealing



- (26) \*uncrying, \*ungrowing, \*unjumping, \*unwalking, \*unwriting, \*unchewing,  
\*undrawing, \*unstanding, \*unfinding.

Notice, that it is impossible to claim that in (25) *un-* is prefixed to verbs, since such an analysis would predict also the existence of the non-existing verbs \**uninterest*, \**unsurprise* etc.

In this case, too, Hebrew offers a parallel test. The negative prefix *bilti-* attaches only to adjectives, though, as in English, not productively (Doron 2000). Again, this prefix can attach to certain present participles, showing that they are adjectival (27), and not to others (28).

- (27) *bilti-mexayev*, *bilti-mazik*, *bilti-mat'im*  
unbinding undamaging unfitting

- (28) \**bilti-mecayer*, \**bilti-kofec*, \**bilti-boxe*  
undrawing, unjumping, uncrying

#### 4.2.2.5 Modification by degree modifiers

The diagnostics most frequently used in order to determine the adjectival status of present participles (Brekke 1988, Milsark 1988, Emonds 1991 and others) is their compatibility with degree modifiers such as *very*, *rather*, *so* etc. The same pattern observed above repeats itself in this case: some present participles are compatible with such modifiers (29) and others are not (30).

- (29) a. The movie is very interesting / amusing / boring.  
b. Florence is very flourishing.  
c. Your brother was very understanding.

- (30) \*Max is very jumping / growing / crying.

Borer (1990) questions the validity of this test as a criterion for adjectivehood. She argues that the compatibility of a participle with *very* and other degree modifiers has nothing to do with its categorial status, but rather depends on other, semantic factors, those that determine whether the verb related to the participle is compatible with the modifier *very much*. Hence, the sentences in (29) above are grammatical in correspondence to those in (31), and the ungrammaticality of the sentences in (30) above corresponds to that of (32):

- (31) a. The movie interested / amused / bored me very much.  
b. Florence flourished very much in the middle ages.  
c. Max understood what I said very much.

- (32) a. \*This car jumped very much.  
 b. \*This girl slept very much (with the reading synonymous with *very much slept*)  
 (Borer 1990)

While this correlation between *very* and *very much* clearly holds, it is nonetheless true that *very* can serve as a test for adjectivehood, since in its bare form (without *much*) it can attach only to adjectives, and it is only adjectives that it can precede, and not follow, as shown in (33).

- (33) a. Max is very pale / tall.  
 b. \*Max very loves / interests Lucy.  
 c. Max loves / interests Lucy very much.

It is likewise true, that as in the case of *un-* prefixation, adjectivehood is only a necessary condition for modification by *very*, not a sufficient one. Non-gradable adjectives cannot be modified by *very*, as is evident from (34).

- (34) a. \*Romeo is very dead.  
 b. \*The number seven is very prime.

In view of all this, participles that can be modified by *very* (as in (29) above) can safely be classified as adjectives; Borer (1990) is right in claiming that participles that cannot be modified by *very*, as in (30), cannot be automatically classified as verbs. There may be another reason for the failure of modification by *very*, as in (34).

Again Hebrew presents a similar test. The modifier *kaze* 'so' can, in most registers, attaches only to adjectives, and not to verbs, as in (35):

- (35) a. *maks kaze xiver / gavoha*.  
 Max so pale tall  
 'Max is so pale / tall.'  
 b. \**maks kaze lo'es mastik / ohev et lusi*.  
 Max so chews gum loves ACC Lucy

As expected, the same present participles which behaved as adjectives in the previous contexts allow modification by *kaze* (36), while the rest do not (37).

- (36) *ha-seret kaze me'anyen / macxik / merageš*.  
 the-movie so interesting funny (lit. makes laugh) exciting  
 'The movie is so interesting / funny / exciting.'

- (37) \**maks kaze kofec / boxe / gadel*.

Max so jumping / crying / growing

#### 4.2.2.6 Coordination with adjective phrases

Another piece of evidence, not discussed in previous studies, which points to the conclusion that some present participles are not adjectives, comes from coordination facts. Some present participles cannot appear in coordination structures with adjectives, both in English and in Hebrew (38)-(39):

- (38) a. ??a crying and beautiful girl  
b. \**yalda boxa ve-yafa*  
girl crying and-beautiful
- (39) a. ??a rude and jumping boy  
b. \**yeled xacuf ve-kofec*  
boy rude and-jumping

Note that although the conjuncts' being of the same category is not a necessary condition for the grammaticality of a coordination structure (as shown in Sag et al 1985, cf. *Pat is a republican and proud of it*), it is a sufficient one: if two elements are of the same category, they can be coordinated.<sup>57</sup> Therefore, if two elements cannot be coordinated, it is safe to conclude that they are not of the same category. Thus, participles such as *crying* and *jumping* cannot be adjectives.

Note, on the other hand, that some present participles can be coordinated with adjectives:

- (40) a. an interesting and beautiful girl  
b. *yalda me'anyenet ve-yafa*  
girl interesting and-beautiful  
'an interesting and beautiful girl'
- (41) a. a big and flourishing town  
b. *'ir gdola ve-mesagseget*

---

<sup>57</sup> As noted by Julia Horvath (p.c.), there could in principle exist additional conditions on coordination. For example, one might suspect that what is responsible for the ungrammaticality of (38)-(39) is a constraint against coordination of stage-level predicates (*crying, jumping*) with individual-level predicates (*beautiful, rude*), or of dynamic predicates with stative ones. However, such coordinations are possible, when both predicates are of the same lexical category (i).

- (i) a. an interesting and available position  
b. Max likes Lucy and often invites her to his house.

town big and-flourishing

'a big and flourishing town'

(42) a. clever and understanding man

(40)-(42) do not prove that *interesting*, *flourishing* and *understanding* are adjectives since, as mentioned above, there are coordination structures in which the conjuncts are not of the same category. However, the facts are compatible with the claim that these participles are adjectives.

#### 4.2.2.7 Complementation

Another observation with regard to the split in the behavior of present participles has to do with their complementation options. Consider the sentences in (43)-(45), which are ungrammatical since they contain verbs with an unassigned obligatory internal  $\theta$ -role:

(43) a. \*The boy interested / amazed / loved.

b. \*The boy folded / locked / tamed.

(44) a. \**ha-yeled inyen* / *hifia* / *hidhim* / *hevin*.

the-boy interested / surprised / amazed / understood.

b. \**ha-yeled kipel* / *maca* / *na'al* / *ilef*.

the-boy folded / found / locked / tamed.

Now let us look at sentences containing the present participles of these verbs. Some such sentences are completely grammatical without complementation (45a), (46a), while others are not (45b), (46b).

(45) a. The boy is interesting / surprising / amazing / loving.

b. \*The boy is folding / locking / taming.

(46) a. *ha-yeled me'anyen* / *mafti'a* / *madhim* / *mevin*.

the-boy interesting surprising amazing understanding

'The boy is interesting / surprising / amazing / understanding.'

b. \**ha-yeled mekapel* / *moce* / *no'el* / *me'alef*.

the-boy folding finding locking taming

Given that all the verbs in question have an obligatory internal  $\theta$ -role, the split in their behavior may seem surprising. However, it can receive a natural account under the assumption that the participles in the (a) sentences are adjectival, since it is well-known that adjectives (at least in English and Hebrew), unlike verbs, do not have obligatory complements. In section 4.3.1 I

discuss the operation which derives adjectival present participles, showing that it includes saturation of the internal  $\theta$ -role of the related verb, leading to the intransitivity of the adjective. The present participles in the (b) sentences, in contrast, are verbal, and as such have the original thematic grid of the verb. These sentences are ungrammatical for precisely the same reason as in (43)-(44), namely, the verbs in them have an unassigned obligatory  $\theta$ -role.

#### 4.2.2.8 The prenominal position

Wasow (1977) mentions the prenominal position in English as a position allowing only adjectives, and not verbs (47):

- (47) a. a beautiful / smart / rude boy  
 b. \*a drinks / drank boy

The ability to appear prenominally was since often used as a diagnostics for the adjectival status of a word (e.g. in Levin & Rappaport 1986). Doron (2000) adapted the generalization to Hebrew, claiming that in this language, only adjectives can appear in the post-nominal position (48):

- (48) a. *yeled yafe / xaxam*  
 boy beautiful / smart  
 'a beautiful / smart boy'  
 b. \**yeled šata*  
 boy drank

Turning now to present participles, many of them can appear in the prenominal position in English and in the post-nominal position in Hebrew. In (49), (50), we see that the participles passing the adjective diagnostics in 4.2.2.1-4.2.2.7 can appear prenominally in English, or post-nominally in Hebrew.

- (49) the interesting / amusing / charming boy, the disgusting / annoying / engaging movie, the flourishing town, the glimmering diamond, the fitting remark, the understanding friend, the appetizing meal...

- (50) *yeled me'anyen / macxik, seret me'acben, 'ir mesagseget, yahalom nocec*  
 boy interesting / funny movie annoying town flourishing diamond glimmering

Interestingly, however, these positions can host also additional participles, which do not pass the other adjective diagnostics. Specifically, as shown in (51), (52), all participles of intransitive verbs can appear in them.

(51) the jumping / crying / growing / eating / writing boy

(52) *yeled kofec / boxe / oxel*  
boy jumping / crying / eating

If these positions are indeed exclusively adjectival, these facts unequivocally suggest that all these participles have an adjectival reading (in addition to their verbal one). This is what led Borer (1990), Bresnan (1996) and Parsons (1990) to claim that all present participles can be adjectives. There are, however, two caveats to this generalization. First, there is a considerable group of present participles (of transitive verbs) which cannot appear prenominal in English, as exemplified in (53a).<sup>58</sup> Note, that transitivity is not to blame for the ungrammaticality here, since participles of other transitive verbs do occupy this position (53b) (see also the discussion in 4.2.2.7).

(53) a. \*The locking / folding / taming boy  
b. The interesting / annoying boy

Second, as mentioned above, many participles appearing in the prenominal position (e.g. those in (51), (52)) do not pass any other diagnostics for adjectivehood, as shown in 4.2.2.1-4.2.2.6.

To conclude this section, I have shown firstly that all present participles have a verbal reading. When one examines their adjectival status, the following picture emerges: all the diagnostics both in English and in Hebrew, except for the prenominal/post-nominal position one, diagnose only a certain subset of present participles as adjectives. The prenominal position test diagnoses a bigger set of these participles as adjectives. This is summarized in the table in (54).

(54) Summary of the diagnostics presented in this section

Diagnostics	Participles passing the diagnostics
Verbal diagnostics: - post-modification - complementation of temporal aspect verbs	All participles

<sup>58</sup> Some of these have a limited prenominal use as part of specific, fixed noun phrases (e.g. *folding chair*).

Adjectival diagnostics: - complementation of <i>seem</i> etc. -- <i>ly</i> suffixation -following the future copula - <i>un-</i> prefixation -modification by degree modifiers -coordination with VPs -complementation options	A subset of the participles (to be defined in section 4.3)
Prenominal position	The subset above + all intransitive participles

These data lead to the conclusion that, contra Borer (1990), Bresnan (1996) and Parsons (1990), not all present participles are adjectival, but rather only the subset of the participles passing all the diagnostics. Though in some of the tests adjectivehood is only a necessary, not a sufficient condition, when taken together the tests clearly show that some present participles do not have an adjectival reading.

Given that the prenominal position test is the only one which is inconsistent with the rest, I suggest that it is not a reliable adjectivehood diagnostics. This suggestion receives independent support, which I present and discuss in section 4.5.

A natural question which arises at this point is: what restricts the class of verbs which give rise to adjectival present participles? The following section offers an answer to this question.

### 4.3 Restricting the class of verbs giving rise to adjectival present participles

#### 4.3.1 Brekke's (1988) *Experiencer Constraint*

Having reached the conclusion that not all present participles are adjectival (based on modification by degree modifiers and *-ly* suffixation), Brekke (1988), building on Chomsky (1957), attempts to define the set of verbs giving rise to adjectival present participles, and suggests the *Experiencer Constraint*: only verbs with an internal Experiencer  $\theta$ -role can derive adjectival present participles. Brekke's generalization accounts for a substantial part of the data presented in section 4.2.2 above: it draws a clear distinction between participles of object-Experiencer verbs (*amazing, amusing, interesting, boring, exciting, fascinating, etc.*), which consistently pass tests for adjectivehood, and participles of verbs denoting eventualities whose

objects do not involve mental states (*jumping, growing, writing, walking, drawing* etc.) which consistently fail them. The constraint, therefore, seems quite promising.

However, Brekke's generalization raises both a theoretical and an empirical problem. The theoretical problem is that the analysis does not provide any insight as to *why* it should be the case that only participles of object-Experiencer verbs can be adjectival. The *Experiencer Constraint* can be attributed neither to some property of object-Experiencer verbs, nor to some property of adjectives. In this respect, it seems accidental that it is precisely this type of verbs which have corresponding adjectival participles.

The empirical problem is even more disturbing. Brekke himself notes that there are many adjectival present participles which are not derived from object-Experiencer verbs, in contrast to his prediction. He classifies these additional verbs into three classes (the following names and characterizations of the classes, as well as the examples, are taken from Brekke, pp. 175-176):

(55) Non-object-Experiencer verbs with adjectival present participles:

- a. "Manner" verbs – "verbs that describe the manner in which some event proceeds, or evaluate some psychological or social phenomenon": enduring, fitting, flourishing, lasting, telling, revealing, etc.
- b. "Impact" verbs: blazing, dashing, glimmering, glistening, sparkling, shining, etc.
- c. "Disposition" verbs – "verbs that describe the psychological character of a human being": compromising, condescending, daring, forgiving, knowing, loving, caring, understanding, yielding, etc.

It can be noted that the second class is the class of "verbs of light emission" (Levin and Rappaport Hovav 1995), whereas the third class is a subclass of subject-Experiencer verbs, where the sentient argument is external. The first class, however, seems to have no natural characterization, other than the fact that all of its members have corresponding adjectival present participles. Observing the different classes, which have very different thematic properties, Brekke notes that a generalization is probably missed here.

### **4.3.2 An aspectual constraint on the formation of adjectival present participles**

#### **4.3.2.1 The *Stativity Constraint***

Brekke's constraint on the formation of adjectival present participles is thematic, in that the possible input for the operation is constrained based on the  $\theta$ -grid of the verb. However, the four



verb classes: object-Experiencer, "disposition", "impact" and "manner", when looked at thematically, do not form a natural class. I suggest instead that in order to define the properties of the stems giving rise to adjectival present participles, it is worth looking at the aspectual properties of these stems. After all, the main difference between verbs and adjectives lies in their aspectual features (roughly, events versus states). Therefore, as noted in Bennis (2000, footnote 22), this seems like a natural domain to look into for the definition of the set of adjectival present participles, as well as of other sets of adjectives.

Verbs denote different kinds of eventualities. According to the traditional, "Aristotelian" classification (Vendler 1957, Dowty 1979, among many others), verbs can denote four types of eventualities: dynamic verbs denote accomplishments, achievements or activities / processes, and stative verbs denote states. Stative verbs refer to static, unchanging eventualities, which do not result in the creation, change of state or change of location of any of their participants. According to Kearnes (1991) "states have no essential changes or transitions", and Comrie (1976) suggests that states do not require an input of energy for the maintenance of the eventuality. In the often-used system of semantic decomposition proposed by Dowty (1979), to be presented in more detail in (95) below, a stative eventuality is one which does not include a DO or a BECOME operator. Hence, it never entails active causation (represented by DO) or change-of-state (represented by BECOME). *Know*, *own* and *love* are some prototypical stative verbs.

Several diagnostics were suggested in the literature for identifying stative verbs. Kenny (1963) notes, that in the simple present tense, sentences with dynamic verbs have a frequentative interpretation, namely, are understood as involving more than one event. On the other hand, sentences with stative verbs do not have this interpretation. Therefore, (56a), with a dynamic verb, is interpreted as habitual, while (56b), which contains a stative verb, is understood as involving a single event of John knowing the answer.

(56) a. John runs.

b. John knows the answer.

Another stativity diagnostic is the ability of a verb to appear in *do* constructions; as noted by Dowty (1979), stative verbs are ungrammatical in these structures (57).<sup>59</sup>

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<sup>59</sup> Levin & Rappaport (1995) show that this test is indeed sensitive to stativity / non-stativity rather than to agentivity / non-agentivity, citing (i), which shows that a non-agentive yet dynamic verb can appear in this construction:

(i) What the rock did was roll down the hill.

(57) \*What John did was know the answer.

Another diagnostic for stativity is provided by the often-noted observation (e.g. Dowty 1979) that stative verbs are incompatible with the progressive in English (58). It is important to note, however, that the progressive test is inconclusive, since, as shown by Mufwene (1984), Van Voorst (1992) and others, many stative verbs do appear in the progressive under certain circumstances.

(58) \*John is knowing the answer.

Given the discussion of stativity above, I suggest the following constraint on the formation of adjectival present participles:

(59) The *Stativity Constraint*

Only stative verbs give rise to adjectival present participles.

Note that (59) provides a necessary, not a sufficient condition for the existence of an adjectival present participle alternate for a verb, as it does not state that *all* stative verbs give rise to adjectival present participles. I return to this issue in section 4.6.

In what follows I will show how the current hypothesis deals with the problems mentioned above with regard to the *Experiencer Constraint*. In the following subsection I will consider whether (59) captures the data presented in section 4.2 above, and show that it is superior to the *Experiencer Constraint*, since it accounts for more data. The rationale behind the stativity constraint will be presented in section 4.4.2.

#### **4.3.2.2 The empirical coverage of the *Stativity Constraint***

In section 4.3.1 it was noted that four types of verbs have corresponding adjectival present participles: object-Experiencer, "manner", "impact" (namely, light emission) and "disposition" (namely, subject-Experiencer) verbs (in Brekke's terms). I claim that what is common to all of these verbs is that they are all stative, or at least have a stative reading. Let us look at each group separately.

##### **Object-Experiencer verbs.**

It has been repeatedly suggested in the literature (Dowty 1979, Pesetsky 1995, Arad 1998 among others) that many object-Experiencer verbs have both an eventive and a stative interpretation. In

the eventive interpretation, the object undergoes a change of mental state. In contrast, the stative interpretation merely asserts that the object is in a specific mental state.<sup>60</sup>

Let us try to isolate the stative reading of object Experiencer verbs, in order to test the *Stativity Constraint*. Importantly, when the subject of an object-Experiencer verb is animate and interpreted as an Agent, an eventive reading of the verb must arise (Arad 1998). On the other hand, a non-volitional subject may give rise to two interpretations (Pesetsky 1995, Reinhart 2002). It can either be the Cause of emotion, in which case a change of mental state is entailed (60a). In this case, the subject matter of the emotion may be something else than the subject, as shown by the possible continuation in (60b). Alternatively, the inanimate subject of an object-Experiencer verb may receive the Subject Matter (SM) role (Pesetsky 1995) (61a). In this case, of course, the subject must be interpreted as the subject matter of the emotion (61b).

- (60) a. The letter<sub>CAUS</sub> worried the patient.  
b. ... but he was not worried about the letter<sub>SM</sub>.
- (61) a. His health<sub>SM</sub> worried the patient.  
b. #... but he was not worried about his health<sub>SM</sub>.

It can be observed intuitively that whereas (60a) is eventive, denoting a change of mental state, (61a), with a SM subject, merely states the preoccupation of the patient with his health, and is thus stative. Let us see whether object-Experiencer verbs with SM subjects indeed pass stativity tests. First, it can be observed that present simple sentences with object-Experiencer verbs and SM subjects do not have a frequentative, habitual interpretation (62), thus showing that the verbs here are stative.

- (62) John's behavior<sub>SM</sub> interests / amuses / frightens the children. (#but they are not interested in / amused at / frightened of his behavior<sub>SM</sub>).

Further, (63) shows that object-Experiencer verbs with SM subjects are ungrammatical in the *do*-construction, suggesting again that they are stative.

- (63) \*What John's behavior<sub>SM</sub> did was amuse / frighten / worry the children.

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<sup>60</sup> As noted by e.g. Pesetsky (1995), some object-Experiencer verbs are more strongly eventive, others are more strongly stative, and yet others – relatively neutral. Important for the present discussion, however, is the fact that all of these verbs, including the strongly eventive ones (e.g. *frighten*, according to Pesetsky), have a stative reading, and it is this reading which gives rise to the adjectival present participle, as shown in the section.

As noted by Pesetsky (1995), certain Object-Experiencer verbs also resist the progressive, a fact reinforcing the existence of a stative reading for them (64).

(64) ?? Odd noises were continually depressing Sue. (Pesetsky 1995)

I conclude that object-Experiencer verbs have a stative reading, and it is thus predicted by *the Stativity Constraint* that they give rise to adjectival present participles.

Importantly, note that it is indeed only the stative variant of the verb, where the subject receives the SM role, which gives rise to the adjective. Thus, as noted by Landau (2006), object-Experiencer adjectival present participles are not causative, as can be deduced from the contrast between (65a) and (65b).

(65) a. The article<sub>CAUS</sub> irritated Bill, but he wasn't irritated at the article<sub>SM</sub>.  
b. #The article<sub>SM</sub> was irritating to Bill, but he wasn't irritated at the article<sub>SM</sub>.  
(Landau 2006)

### "Manner" verbs

According to Brekke (1988), the class of "manner" verbs includes verbs such as *fit*, *flourish*, *last* and *reveal*. Clearly, these verbs denote a state of affairs or a property of their subject, without entailing any change of state.<sup>61</sup> In fact, it is hard to find a common property of the verbs in this group, thematic or other, besides their stativity.

Again, the fact that these verbs are stative can be demonstrated in several ways. It is easy to see that they are incompatible with the progressive (66); Simple present tense sentences including them do not have a habitual interpretation (67); and they are ungrammatical in the *do* construction (68).

- (66) a. \*The shirt is fitting her.  
b. \*The war was lasting 3 years.  
c. \*This dress is revealing your neck.
- (67) a. The shirt fits her.  
b. The town flourishes.  
c. The shirt reveals her neck.
- (68) a. \*What the shirt did was fit her.

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<sup>61</sup> *Reveal* has also an eventive reading, irrelevant here, as in *The spy was revealing state secrets to the enemy for three years*.

- b. \*What the war did was last 3 years.
- c. \*What the town did was flourish.

### "Disposition" verbs

Brekke's class of "disposition verbs" consists of verbs like *compromise, love, understand, know, dare, spare*, etc. These are, in fact, a sub-class of the class of subject-Experiencer verbs, which are traditionally classified as stative (Dowty 1979). These verbs denote the mental state of their subject, without entailing any change of state in either the subject or the object, as seen in (69).

- (69) a. John loves Mary.  
 b. John dares to jump in the pool.  
 c. John understands me.<sup>62</sup>

As predicted, simple present tense sentences with subject-Experiencer verbs (such as those in (69) above) do not have a habitual interpretation. In addition, these verbs are ungrammatical in the *do* construction (70) and many of them cannot appear in the progressive (71). All of this points to the conclusion that these verbs are stative.

- (70) ??What Mary did was love / hate / understand me.  
 (71) a. \*My friend is knowing the answer.

- b. \*John is daring to do it. (meaning: John dares to do it)

Interestingly, subject-Experiencer verbs present a case where thematic classification and aspectual classification do not coincide, in that not all these verbs are stative. For example, the subject-Experiencer verbs *forget* and *realize* undeniably denote a change of (mental) state. That these verbs are dynamic can be deduced from their compatibility with the *do* construction:

- (72) a. We waited for the waiter to get our food, but instead, what he did was forget half our order.  
 b. What Newton did was realize that the force of gravity follows the same mathematical rules as light.

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<sup>62</sup> As noted by Julia Horvath (p.c.), *understand* seems to be ambiguous between a stative reading (exemplified in (69c)), in which the subject is in a state of understanding something, and an accomplishment reading, as in e.g. *He suddenly understood what happened*, in which the subject comes to understand something.

The *Stativity Constraint* predicts that such verbs, though thematically identical to subject-Experiencer verbs like *love*, will not have adjectival present participle alternates, since they are not stative. As shown in (73), this is indeed the case.

- (73) a. \*This teacher seems forgetting.  
b. \**ha-more yihiye šoxeax*.  
the-teacher will+be forgetting  
c. \*He finally seems realizing.

Thus, the class of "disposition verbs", giving rise to adjectival present participles, is not identical to the class of subject-Experiencer verbs, but rather consists of the stative sub-class of the latter. This further reinforces the claim that the constraint on adjectival present participle formation is aspectual rather than thematic.

At this point it must be acknowledged that some exceptions exist, in both directions. Some stative subject-Experiencer verbs do not give rise to adjectival present participles. For example, while *loving* has an adjectival reading, *hating* does not; the Hebrew analogue of *loving*, 'ohev', is likewise only verbal. *Like* and *feel* are additional examples. It is important to note, however, that such gaps are compatible with a lexicalist view of the derivation of adjectival present participles, as discussed in 4.4.1. Conversely, *forgive*, which is not naturally perceived as stative, does have the adjectival counterpart *forgiving*. Again, if adjectival present participles exist as lexical items, it is possible for such exceptions to be listed. Section 4.6 offers further discussion of the exceptions to the *Stativity Constraint*.

### "Impact" verbs

The fourth class of verbs giving rise to adjectival present participles, according to Brekke, is that which he names "impact verbs", including *blaze*, *dash*, *gleam*, *glimmer*, *glisten* etc. These are the verbs labeled by Levin & Rappaport (1995) "verbs of light emission". Let us first consider whether these verbs indeed have corresponding adjectival present participles, and then turn to the discussion of their aspectual classification.

In his discussion of "impact" verbs, Brekke notes that in order for a verb of this class to give rise to a true adjective, the noun modified by the adjective should have a "psychological denotation". According to him, examples such as (74) show that these stems form adjectival present participles only under a drifted, metaphoric reading, not under the literal "light emission" reading.

This casts doubt on the general availability of adjectival present participle counterparts to light emission verbs.

- (74) a. We were enjoying a very sparkling conversation / \*champagne.  
b. The performance / \*new lamp was very glittering.

However, it is important to check whether Brekke's generalization regarding the psychological character of the modified noun does not stem from the specific adjectivhood diagnostics he is employing (modification by *very*). Namely, it is possible that both a conversation and a champagne can be modified by the adjective "sparkling", but that the difference in grammaticality between the two options in (74a) stems from the fact that only in the former case can the adjective be further modified by "very", since a conversation can sparkle to different degrees, while a champagne either sparkles or not.

Let us therefore look at the other diagnostics for adjectivhood presented in section 2, and see whether they classify participles of light emission verbs as adjectival.

- **Complement of *seem* / *become*:** Present participles based on verbs of light emission are possible as complements to *seem* and *become*, as seen in (75). The modified noun can be a concrete noun like *wine*, with no psychological properties, as in (75b), where the stem *sparkle* is used in its literal meaning.<sup>63</sup>

- (75) a. Everything seems shining to me.  
b. The wines were bottled and became sparkling.

- **-ly suffixation:** *-ly* can be suffixed to present participles corresponding to light emission verbs, both in metaphorical (76a) and literal (76b-c) readings, though the latter are perhaps less than perfect:

- (76) a. The film remains a shimmeringly lovely coming-of-age portrait.  
b. ?the airport, with its shiningly clean and modern terminal...  
c. ?skin that appears supple, hydrated and **glimmeringly** smooth...

- **Un- prefixation:** just like with *-ly*, *-un* can be prefixed to the relevant participles, whether carrying a metaphorical (77a) or a literal (77b) sense, again, the latter being a little degraded:

- (77) a. an unsparkling report  
b. ?He saw the dull, unshining armor.

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<sup>63</sup> The sentences in (75)-(78) were found on the web; a web search reveals many similar examples.

- **Following the future copula in Hebrew:** present participles of light emission verbs can follow the future copula in Hebrew, both when used metaphorically (78a) or non-metaphorically (78b):<sup>64</sup>

(78) a. *tekes ha-oskar ha-šana yihiye nocec me-ha-ragil.*

ceremony the-Oscar the-year will+be shining than-the-usual

'The Oscars ceremony this year will be more shining than usual.'

b. *be-ta'arix ze koxav ma'adim yihiye bohek me'od bi-šmey ha-layla.*

in-date this star Mars will+be gleaming very in-skies the-night

'On this date, Mars will be very gleaming in the night skies.'

It seems, then, that verbs of light emission do generally give rise to adjectival present participles, though perhaps their metaphorical reading lends itself to adjective formation slightly more easily. Given this conclusion, the *Stativity Constraint* predicts that light emission verbs are stative. Is this really the case?

Levin & Rappaport (1995) discuss in detail the aspectual status of emission verbs. With regard to light emission verbs, they conclude that at least some of them, i.e. *gleam*, *glisten*, *glow* and *shine* ought to be classified as stative. These verbs attribute some steady property to their subject without entailing any change of state (e.g. *The floor shines*). Levin & Rappaport further note that when considering a change of state or lack thereof in the context of emission verbs, it is important to distinguish the emitter from what is emitted, since the former does not undergo any change, while the latter is typically depicted as undergoing a change, namely, flowing. Verbs of light emission are intransitive, and therefore denote an eventuality including only one participant – the emitter. This participant does not undergo any change. Hence, the eventuality denoted by these verbs is stative. They further claim that using Comrie's (1976) criterion mentioned in 4.3.2.1 above, these verbs are stative since maintaining the eventuality denoted by them (such as shining or glowing) does not require an input of energy.

Other tests also point to the stativity of these verbs. They are ungrammatical in the *do* construction (79), and their interpretation in the present simple tense (e.g. as in *The floor shines*) is not habitual, and does not involve more than one event.<sup>65</sup>

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<sup>64</sup> In fact, (78b) shows an additional thing: these adjectives can also be modified by *very*, even when predicated of concrete, non-psychological nouns. Indeed, many examples can be found that show this, as exemplified in (i).

(i) a. very sparkling earrings

b. Avoid very gleaming shoes that were perceptibly planned for more elegant outfits.



(79) ??What the spotlight did was shine on the parking lot. (Levin & Rappaport 1995)

Levin & Rappaport do not discuss the stativity of other light emission verbs, e.g. *shimmer*, *glimmer* and *sparkle*. It seems to me, however, that these verbs should be classified as stative as well, given that it is not apparent what kind of change they entail, and that the eventuality denoted by them does not require an input of energy for its maintenance. It is possible, however, that certain verbs are perceived by some speakers as stative and by others as dynamic, or that the same verb is perceived as stative in its metaphorical reading, and as dynamic in its literal reading. The *Stativity Constraint* predicts that a correlation will exist between a speaker's perception of a verb as stative and his having an adjectival present participle alternate for that verb. So, for example, a speaker for whom *unsparkling* or *very sparkling* are odd probably perceives the verb *sparkle* as dynamic, rather than stative.

It is interesting to discuss at this point also verbs of sound, substance and smell emission. Levin & Rappaport (1995) claim that verbs of sound and substance emission are eventive, whereas verbs of smell emission are stative. As expected, participles of sound and substance emission verbs generally do not pass adjectivehood diagnostics (80), while those of smell emission do (81).<sup>66</sup>

- (80) a. \*The teapot became whistling.  
b. \*The volcano became spewing.  
c. \**ha-mamtera tihye matiza*.  
the-water sprinkler will+be squirting

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<sup>65</sup> Verbs of light emission do appear in the progressive, as seen in (ia-b), which deliberately contain verbal environments. However, as mentioned in 4.3.2.1, the progressive diagnostics is not a conclusive one.

- (i) a. The moon was shining magnificently.  
b. His eyes kept glimmering.

<sup>66</sup> Here too there are several exceptions. For example, the sound emission verb *buzz* gives rise to an adjectival present participle, as can be seen in (i). The reason for this may be that *buzz* has a stative reading, i.e. 'be filled with a sound of buzzing or whispering'.

- (i) The place became buzzing at around 3pm.

On the other hand, the smell emission verb *smell* probably does not give rise to an adjectival present participle (ii).

- (ii) ??The room became smelling after the party.

Such gaps are not unexpected given the lexical derivation of adjectival present participles to be discussed in section 4.4.

- (81) a. *ha-xeder yihiye masriax / macxin.*  
       the-room will+be stinking malodorous  
       b. The surroundings have become stinking and unhealthy.  
       c. The drink had a reekingly bitter after-taste.

To conclude, the common feature of object-Experiencer, "manner", "disposition" and "impact" verbs, as well as smell emission verbs, is that they are all stative, thus conforming to the Stativity Constraint.<sup>67</sup> The question that arises next is *why* it should be that only stative verbs have corresponding adjectival present participles. This will become clear once the process of adjectival present participle formation is discussed.

#### 4.4 The formation of adjectival present participles

Having established that present participles of a subset of the class of stative verbs have an adjectival reading, the next step is to describe the details of the derivation of these adjectives. Section 4.4.1 argues that the derivation of adjectival present participles must be a pre-syntactic, lexical operation, supporting a view of the lexicon as a computational component of the grammar. Section 4.4.2 offers a discussion of the properties of the participial morpheme. 4.4.3 then presents sample derivations of adjectival and verbal present participles.

##### 4.4.1 Lexical derivation for adjectival present participles, syntactic derivation for verbal ones

As discussed in chapter 3, section 3.5.2, the debate with regard to the component of the grammar in which word formation processes take place has been very vivid with regard to adjectival and

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<sup>67</sup> Certain complex participial forms can appear as complements of *seem* (i), though headed by participles related to dynamic verbs, thus suggesting that not only stative verbs can give rise to adjectival present participles:

(i) The color seems eye-catching.

Note, however, that this behavior is limited to a number of idiomatic expressions (e.g. *eye-catching*, *mind-opening*), and does not extend to other phrases headed by the same dynamic participles, as shown in (ii).

(ii) \*This player seems football-catching.

In general, then, dynamic verbs do not give rise to adjectival participles. This is true in spite of the fact, that certain idiomatic adjectival phrases contain dynamic participles. The characteristics and formation process of these idioms are beyond the scope of this research.

verbal passives. In that section, I have presented Horvath & Siloni's (2008, 2009) arguments in favor of assuming that verbal passives are derived syntactically, and adjectival passives – lexically. I believe that a parallel analysis should be given to present participles. In what follows I will show that adjectival present participles exhibit the types of idiosyncrasies which are characteristic of lexical items, whereas verbal present participles are completely systematic in both form and meaning. The most natural account for this contrast is the assumption that adjectival present participles are derived lexically and stored in the mental lexicon, while verbal ones are built in the syntactic component.

#### 4.4.1.1 Semantic drifts

One of the arguments used by Horvath & Siloni (2008) to establish the claim that adjectival passives are derived lexically and verbal passives syntactically is based on semantic drifts. The authors show that only adjectival passives may exhibit drifted meanings, not shared by the active verb; verbal passives can never show such a drift. For example, the Hebrew adjectival passive *mufnam*, literally 'internalized' (derived from *hifnim* 'internalize'), has an additional meaning, 'introverted'; the corresponding verbal passive, in contrast, has only the expected meaning, 'internalized'. This is easily explained under the hypothesis that adjectival passives are derived lexically while verbal passives are created syntactically. Stored lexical items can undergo semantic drifts and acquire additional meanings independently of their derivationally related alternate, but the result of a syntactic operation must have a compositional meaning.

Examples (82)-(86), with present participles, illustrate the same phenomenon. The (a) sentences show adjectival present participles with drifted meanings. The (b) sentences show that this meaning is not shared by the related verbs, which exhibit only the original meaning (c).

- (82) a. *ha-nituax yihiye mavrik.*  
           the-analysis will+be brilliant  
           'The analysis will be brilliant'.  
       b. \**ha-nituax yavrik.*  
           the-analysis will+shine  
       c. *ha-xalon yavrik.*  
           The-window will+shine  
           'The window will shine.'

- (83) a. *ha-seret yihiye marhiv.*  
the-movie will+be spectacular  
'The movie will be spectacular.'
- b. \**ha-seret yarhiv.*  
the-movie will+dare
- c. *ha-xayal yarhiv le-hitnaged la-mefaked.*  
the-soldier will+dare to-oppose to+the-commander.  
'The soldier will dare oppose the commander.'
- (84) a. *ha-saxkanit tihye lohetet.*  
the-actress will+be attractive  
'The actress will be attractive.'
- b. \**ha-saxkanit tilhat.*  
the-actress will+burn
- c. *ha-šemeš tilhat.*  
the-sun will+burn  
'The sun will burn.'
- (85) a. The colonel seems dashing.  
b. \*The colonel dashed.  
c. The colonel dashed their hopes.
- (86) a. Her smile was very fetching.  
b. \*Her smile fetched him immediately.  
c. She fetched him home from school.

In contrast, I could not find any examples where a verbal present participle had a meaning not shared by the other, tensed verbal forms.

The data is accounted for under the assumption that adjectival present participles, like adjectival passives, exist in the lexicon, and are thereby prone to undergoing drift processes, while verbal present participles, like verbal passives, are formed in the syntax, and are not stored in the lexicon at all.

#### 4.4.1.2 Frozen entries

Another argument presented in Horvath & Siloni (2008) for the split between lexical and syntactic derivation of passives is based on the notion of *frozen entries*. According to the authors, *frozen entries* are lexical entries which exist in the lexicon, and can therefore serve as input for lexical operations, but are not available for insertion to syntactic derivations. For example, the transitive alternate of *fall* in English is analyzed by Horvath & Siloni as a frozen entry – an existing lexical entry that nonetheless will never appear in a sentence.

Given this, if some predicate is derived from a frozen entry (say *navul* 'wilted', derived from the frozen *\*hibil* 'wilt trans.'), it must be the case that its derivation is lexical, since the frozen entry is not available in the syntax. If a word is formed syntactically, then necessarily the alternate which serves as input for its derivation must be inserted into the syntax.

In view of the above, consider (87)-(93). The first form in each (a) example is exclusively adjectival, lacking a verbal reading (as established in (b) and (c)), and the second is the hypothetical verb from which the adjective was derived. All those verbs, however, are frozen, in that although we can predict their form and meaning, they never appear in sentences.<sup>68</sup>

*English:*

- (87) a. cunning - \*cuns  
 b. The prisoner seems (completely) cunning.  
 c. \*The prisoner is cunning proudly.
- (88) a. grueling - \*gruels  
 b. The schedule seems grueling.  
 c. \*The work was grueling us.
- (89) a. fleeting - \*fleets  
 b. All beauty seems fleeting and fragile.  
 c. \*The moments are fleeting quickly.

*Hebrew:*

- (90) a. šomem - \*šamam

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<sup>68</sup> With regard to the Hebrew forms in (90)-(93), the (b) examples show that they are adjectival. There is, however, no way to establish beyond doubt that they do not have verbal reading, since Hebrew does not have a diagnostics identifying intransitive forms as verbal (on a par with adverbial post-modification or complementation of verbs of temporal aspect in English). However, the fact that they cannot appear in any tensed form strongly undermines the possibility that they exist as verbal participles.

desolate

b. *ha-bayit yihiye šomem.*

the-house will+be desolate

(91) a. boded - \*badad

lonely

b. *ha-na'ar yihiye boded.*

the-boy will+be lonely

(92) a. nimhar - \*yimaher

hasty

b. *ha-ca'ad yihiye nimhar*

the-step will+be hasty

(93) a. hogen - \*hagan

fair

b. *ha-misxak yihiye hogen.*

the-game will+be fair

Again, no parallel examples can be found with verbal present participles. Any existing verbal present participle has a corresponding verb in the actual vocabulary. This provides further evidence in favor of a lexical derivation for adjectival present participles, and a syntactic one for verbal present participles.

#### 4.4.1.3 Cross-linguistic morphological evidence

A final piece of evidence which provides support for the lexical nature of adjectival present participles vs. the syntactic nature of verbal ones has to do with the morphology of the forms. Laks (2007) argues that there are two types of morpho-phonology, each interacting with a different component of the grammar: the lexicon and the syntax. One of the differences between the two types is that lexical items can present morphological idiosyncrasies not existent in items derived syntactically. For example, Laks shows that the morphology of verbal passives in Hebrew is very systematic, a fact consistent with the view that they are derived in the syntax. On the other hand, the morphology of unaccusatives in Hebrew is much less predictable. This is expected under the view of morphology advocated in Laks, and the assumption (adopted by him) that unaccusative verbs are derived in the lexicon (Reinhart 2002, among others).

(94) presents examples of Hebrew adjectival present participles, whose English counterpart is a non-participial adjective. (95) presents opposite examples. The same phenomenon however is not found with verbal elements: the counterpart of a verbal present participle in the other language will always have a participial form as well, as exemplified in (96).

- (94) a. *mošex* - attractive  
b. *mitxašev* – considerate  
c. *koren* – radiant  
d. *so'er* – stormy

- (95) a. revealing - *xosfani*  
b. lasting – *kavu'a*  
c. yielding – *kanu'a, caytan*  
d. enduring - *tmidi*

- (96) a. jumping - *kofec*  
b. crying – *boxe*  
c. growing – *gadel*

The assumption that adjectival present participles are derived lexically and verbal ones syntactically can naturally account for the data above. The verbal elements are completely regular, their morphology systematic: they are part of the verbal paradigm of the language. In contrast, the adjectives, as lexical items, exhibit idiosyncratic morphology; some of them have participial morphology and others do not.

Note that the analysis in section 3 predicts that a participle such as *revealing* is ambiguous between a verb (since all participles are verbal) and an adjective (since *reveal* is stative). And indeed, this participle translates to Hebrew in two ways, either as *xosfani* (which is only adjectival) or as *xosef* (which is only verbal). The verbal alternate presents the predicted, participial morphology, while the adjectival alternate exhibits non-participial morphology.

To conclude this section: adjectival present participles display idiosyncrasies typical of lexical items, which are not found with verbal present participles.<sup>69</sup> The facts would automatically fall in place if verbal and adjectival present participles are derived in different components of the grammar. One important implication of this outcome is that adjectival present participles cannot

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<sup>69</sup> Notice also that all of the idiosyncrasies are found with participles derived from stative verbs, a fact which reinforces *The Stativity Constraint*.

be analyzed as derived from verbal participles (as in Bresnan 1996, for example), since the latter are not stored in the lexicon at all, while the derivation of the former is lexical. Adjectival present participles are therefore derived either from a verbal stem, or from a category-less root. In what follows I will adopt the latter option, as I did in the case of adjectival passives.

#### **4.4.2 Adjective formation – the aspectual distinction between adjectives and verbs**

As a first step in describing the derivation of adjectival present participles, let us examine more closely the aspectual distinction between adjectives and verbs. As noted in section 4.3.2.1, verbs denote different types of eventualities: states, processes/activities, achievements and accomplishments.

Adjectives, unlike verbs, invariably denote states. Parsons (1990) suggests that adjectives are just like stative verbs, and that both have a Davidsonian state argument, which ranges over stative eventualities (unlike dynamic verbs, which have a Davidsonian event argument, ranging over dynamic eventualities). So, the representation of both stative verbs and adjectives is  $\lambda s.STATE(s)$ . (Another view on adjectives is defended in Rothstein 1999. See the Appendix for an implementation of adjectival present participle formation under Rothstein's analysis.)

Since verbs can pick up different types of eventualities, while adjectives always pick up states, in order to derive an adjective from a verb, the eventuality which the verb denotes must somehow be converted into a state. In the case of stative verbs, this process is vacuous: the eventuality denoted by the verb is a state to begin with.

I suggest that *-ing* (or present participial morphology in Hebrew) is a "minimal" morpheme in that it takes a verb denoting a state and turns it into an adjective (denoting a state). What *-ing* does is merely mark the categorial change from verb to adjective. It does not cause, because it in fact is incapable of causing, any aspectual change. The *Stativity Constraint* then follows: *-ing* can attach only to stative verbs, since these are the only verbs which denote states to begin with, and can therefore give rise to adjectives without any aspectual change. Unlike the *Experiencer Constraint* presented in 4.3.1 above, *the Stativity Constraint* is thus motivated, straightforwardly falling out from the properties of the relevant morpheme.

Though not attempting here a unified analysis for the various functions of *-ing* (for two such attempts see Milsark 1988 and Emonds 1991), it is worth mentioning that the impoverished semantic contribution of *-ing* in the case of adjectival present participle formation (namely, its



inability to perform aspectual manipulation) is not surprising, given that *-ing* is in many respects neutral, lacking specific semantic import.<sup>70</sup> This neutral nature is manifested for example in the fact that it derives words of different lexical categories: verbs (verbal present participles) adjectives, and nominal elements (*-ing* nominalizations and gerunds).<sup>71</sup> The same is true for present participial morphology in Hebrew, which gives rise to verbs, adjectives and nouns. In view of this impoverished nature of the morpheme, the *Stativity Constraint* is very natural. The morpheme selects only stative verbs, since only in this case can it derive adjectives without aspectual manipulation.

It is interesting to compare the present participles morpheme with the passive participle one in this respect. As was mentioned in chapter 3, section 3.5.3, Bresnan (1996), Doron (2000) and Kratzer (2000) suggest that in several languages, adjectival passives can be formed only from telic verbs, which have a result state as part of their interpretation.

Note, incidentally, that roots which have a double aspectual classification, both as telic and as stative, are predicted to serve as input to both adjectival passive formation and adjectival present participle formation. This prediction is borne out. As explained in 4.3.2.2, object-Experiencer verbs have both a stative and an eventive (telic) reading. And indeed, these stems systematically give rise to both passive and present adjectival participles (*The teacher seemed confused and confusing*). Verbs which do not display an aspectual ambiguity do not have these two adjectival counterparts.

#### 4.4.3 Sample derivations

##### 4.4.3.1 Adjectival present participles

We have seen that the formation of adjectival present participles does not induce aspectual change.<sup>72</sup> The process, however, may have thematic effects.

The derivation of the adjective *shining* from the root SHINE is shown in (95). As in chapter 3, I assume that roots carry both thematic information and aspectual information. Hence, the lexical information of SHINE includes both the fact that it is a one-place predicate with an external

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<sup>70</sup> Thanks to Julia Horvath for pointing this out to me.

<sup>71</sup> Milsark (1988) suggests that *-ing* affixation is involved in deriving prepositions as well, e.g. *concerning* and *regarding*.

<sup>72</sup> See the Appendix for a different analysis, along the lines of Rothstein (1999).

Theme  $\theta$ -role (see Levin & Rappaport 1995, Reinhart 2002), and that it is stative. The operation changes the lexical category of the entry to adjective. As explained in the previous section, no aspectual manipulation takes place. As explained in chapter 2, the lexical representation of an adjective includes one  $\theta$ -role which is marked for  $\lambda$ -abstraction, in this case, the Theme, which is the only available role.

(97) SHINE<sub>(THEME, s)</sub>, stative

→

ADJ: SHINE<sub>(THEME<sub>→</sub>λ-ABS, s)</sub>, stative

The interpretation of the AP *shining*, after  $\lambda$ -abstraction, is given in (98).

(98)  $\lambda x \lambda s. \text{SHINE}(s) \ \& \ \text{Theme}(s, x)$

'The relation between  $x$  and  $s$  if  $s$  is a state of shining of which  $x$  is the Theme.'

A similar derivation can be given to the rest of the participles related to emission verbs, and to participles related to other stative one-place verbs (e.g. *flourishing*).

Things are somewhat more complicated with two-place roots, as exemplified for UNDERSTAND in (99). As mentioned in 2.3.5.1, in these cases the external role is marked for abstraction. However, as explained in 2.4.2, something must happen to the internal  $\theta$ -role as well, since it cannot be assigned to an accusative-marked direct object in the adjectival case. Note, that the sentence *your friend is very understanding* means that **there is** something which your friend understands, namely, the internal  $\theta$ -role is interpreted as existentially bound (and likewise for *revealing fitting, enduring, loving* etc.).<sup>73</sup> I conclude that the operation marks the internal  $\theta$ -role for existential closure (indicated here as  $\rightarrow$ SAT). Existential closure of an internal  $\theta$ -role is available in the verbal domain too, and operative in null object constructions in English, e.g. *John ate*, which is interpreted as *John ate something* (Rizzi 1986b). In the case described here, the saturated argument cannot be traced using the standard tests detecting an implicit argument (e.g. purpose clauses etc.), since these apply only to Agents (but see the discussion of *confusing* right below, where the presence of the saturated argument can be detected).<sup>74</sup>

<sup>73</sup> The saturated role is in some cases interpreted in some predetermined, normative way; for example, *a loving mother* is a mother who loves her children (and not e.g. some singer).

<sup>74</sup> With regard to *reveal, fit, endure* and other seemingly two-place roots, it is unclear what their original thematic grid is. On the one hand, since these verbs assign accusative Case, their external  $\theta$ -role must be a [+ ] cluster

(99) UNDERSTAND (EXPERIENCER, THEME, s), stative

→

ADJ: UNDERSTAND (EXPERIENCER<sub>→</sub>[-ABS] THEME<sub>→</sub>SAT, s), stative

(100) Interpretation of *understanding*:

$\lambda x \lambda s. \exists y [\text{UNDERSTAND}(s) \ \& \ \text{Experiencer}(s, x) \ \& \ \text{Theme}(s, y)]$

'The relation between x and s if there is a y and s is a state of understanding y and x is the Experiencer of that state'

Let us now look at object-Experiencer verbs. As mentioned in 4.3.2.2 above, Reinhart (2002) argues that such verbs have both a Cause role and a Subject Matter role, as shown in (101), though they cannot both be realized in the same sentence.

(101)  $\theta_{\text{cause}}, \theta_{\text{experiencer}}, \theta_{\text{subject matter}}$

As explained in 4.3.2.2, the stative interpretation of object-Experiencer verbs arises when the Subject Matter role is realized. In this case, the Cause role simply remains unrealized

How are adjectival present participles derived from these roots? as noted above, the Cause role is irrelevant to the stative reading, and it remains unmarked and unrealized. The Subject Matter role is marked for  $\lambda$ -abstraction (it is this role which ends up being related to the subject of the adjective). And, as above, a closure of the remaining internal  $\theta$ -role must take place, since the role cannot be otherwise realized. Note however that the interpretation of adjectival participles of object-Experiencer verbs is different from that of e.g. *understanding*, since in order to call a book *confusing*, for example, it is not enough that **there is** someone that the book confuses. It must confuse a certain number of people to be called *confusing*. What seems to be at work in deriving the interpretation of the adjective here is binding by a generic quantifier, a quasi-universal

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according to the Theta System. On the other hand, intuitively, it cannot be [+c], since the verbs are stative, and no change is caused (see Meltzer to appear), and of course it cannot be [+m] either, since the verbs can select inanimate subjects. It might be that on a par with object-Experiencer verbs, these verbs have three  $\theta$ -roles: [+c], [-c-m], [-m], where the first and third role cannot both be realized. This grid ensures that the verbs have an accusative feature. The realization of the two first roles gives rise to an agentive, dynamic reading of the verb (in e.g. *reveal*), and the realization of the two last ones gives rise to the non-agentive, stative reading of the verb. If this is true then the derivation of adjectival present participles from these roots is parallel to that from object-Experiencer roots, to be described immediately below. The issue requires further research.

quantifier that has some modal force and that allows for exceptions (see e.g. Krifka 1995). I mark such closure as  $\rightarrow\text{SAT}_{\text{GEN}}$ .

(102)  $\text{CONFUSE}(\theta_{\text{CAUSE}}, \theta_{\text{EXPERIENCER}}, \theta_{\text{SUBJECT MATTER}, s})$ , stative

$\rightarrow$

ADJ:  $\text{CONFUSE}(\theta_{\text{CAUSE}}, \theta_{\text{EXPERIENCER}_{\rightarrow\text{SAT-GEN}}}, \theta_{\text{SUBJECT MATTER}_{\rightarrow\lambda\text{-ABS}, s})$ , stative

(103) interpretation of *confusing*

$\lambda x \lambda s. \text{GEN}(y)[\text{CONFUSE}(s) \ \& \ \text{Subject Matter}(s, x) \ \& \ \text{Experiencer}(s, y)]$

'The relation between an individual  $x$  and a state  $s$  is for any generic individual  $y$ ,  $s$  is a state of confusing  $y$  and  $x$  is the Subject Matter of  $x$ '

Note that in these cases, the presence of the implicit Experiencer can be detected. As shown in Epstein (1984) and Landau (2009) with regard to different types of adjectives, PRO in the clausal subject of these adjectival present participles is controlled by the understood Experiencer. Thus, for example, in (104), the readers of the book are necessarily the ones being interested. (104) cannot mean that for  $x$  to read the book is interesting to  $y$ .

(104) [PRO reading a book] is interesting.

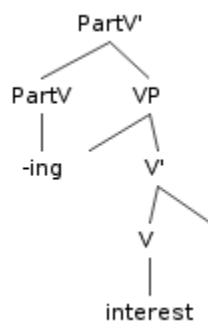
As a side note, the fact that Experiencer arguments undergo existential closure of  $x_{\text{arb}}$  whereas other arguments are closed existentially using a regular variable can be seen also in the case of adjectival passive formation. The stem *build*, with an Agent external  $\theta$ -role which undergoes closure, gives rise to the adjectival passive *built*, and 'The wall is built' simply entails that there is someone who built the wall. In contrast, the stem *admire*, with an Experiencer external  $\theta$ -role undergoing closure, gives rise to the adjectival passive *admired*, which cannot be predicated of something which only one person admires. Rather, a fair amount of people have to admire something for it to be referred to as *admired*.

In conclusion, adjectival present participle formation induces category-change from verb to adjective. The nature of the present participle morpheme dictates that the operation applies only to stative verbs, and hence no aspectual modification takes place. However, since adjectives do not check structural Case, a thematic manipulation is required when the input is transitive, in order to suppress one of the roles, making it unavailable for syntactic realization. The nature of the closure imposed on this role is dependent on the nature of the role – whether it is a Theme or an Experiencer.

### 4.4.3.2 Verbal present participles

As shown in section 4.4.1 above, the properties of verbal present participles suggest that they are a result of syntactic derivation. I assume here that the bound morpheme *-ing* is inserted under a functional head (PartV) taking the VP headed by the lexical verb as its complement (105). As noted by Kratzer (2000), the participial morphology is meaningless, and its only function is to license the absence of verbal inflection. With regard to Hebrew, adopting the assumption that verbal templates can be realizations of functional heads (as in e.g. Doron 2003, Arad 2005), it is the participial template which appears under PartV.

(105)



## 4.5 The prenominal position

### 4.5.1 The category of prenominal dynamic participial phrases

As was shown in section 4.2.2.8, present participles of intransitive verbs can appear prenominally in English, and post-nominally in Hebrew, even if the verbs are dynamic, as exemplified in (106).

(106) a. The [<sub>XP</sub> jumping] boy is my cousin.

b. *yeladim* [<sub>XP</sub> *boxim*] *me'acbenim oti*.

children crying annoy me

'Crying children annoy me.'

If the prenominal position is exclusively adjectival, then my analysis does not predict this fact, since dynamic verbs are not predicted to give rise to adjectival present participles (and recall that they do not pass any other adjective diagnostics). I therefore conjecture that the prenominal position must be able to host categories other than AP (see Laskova 2007).

Emonds (1985) suggests that XP in (106) is a bare VP. As noted by Siloni (1995), however, such an analysis presents a problem to the Projection Principle, since according to it the participial verb *jumping* does not assign in (106) an external  $\theta$ -role, which it does assign in other structures.

Emonds (1991) revises his analysis, claiming that *jumping* in (106) is a verb projecting an adjective phrase, so that XP=AP. Such an analysis introduces an obvious complication to the familiar merging procedures (e.g. as in Chomsky 1995), in which the label of a phrase must be determined based on the label of its head (under the x-bar theory, it presents a problem for the generalization that phrases are projections of the categorial features of their head), and runs the risk of over-generation.

I suggest that in (106), XP is a clausal constituent, namely, a reduced, participial relative clause, adopting the analysis of reduced relatives proposed in Siloni (1995). Siloni analyses present participial clauses in Hebrew and French, arguing that the participle is a verbal form, uninflected for tense. Furthermore, it is argued that the subject position of the clause must be syntactically realized, and suggested that it is realized by a phonologically null relative operator which then moves to a higher SPEC. With regard to the specific projections involved in the structure, abstracting away from irrelevant details, Siloni argues that the head of the clause is a Comp-like D(eterminer), rather than a standard C(omplementizer). The choice between the two is determined by the presence or absence of tense. In reduced relatives the clause is tenseless (no TP is projected), and thus D serves as the complementizer. The structure is given in (107).<sup>75</sup>

(107) a. *iš* <sub>DP</sub>[OP *ha* [*t* *kore iton ba-rexov*]] *hu meragel*.

man *ha* reading newspaper in+the-street is spy

'A man reading a newspaper in the street is a spy.'

b. Un homme <sub>DP</sub>[OP [*t* *lisant un journal dans la rue*]] est un espion.

a man reading a newspaper in the street is a spy

'A man reading a newspaper in the street is a spy.'

I suggest that the same reduced participial clausal structure can be present in the prenominal position in English, as in (108).

(108) The <sub>DP</sub>[OP [*t* *jumping*]] boy is my cousin.

Note, that I am not suggesting, as was believed in the early days of generative grammar, that prenominal adjectives have a reduced relative clause origin. Adjectives, whether non-participial (*white, sleepy*) or participial (*interesting, flourishing*) appear prenominal as APs, without

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<sup>75</sup> Siloni further argues that D in this occurrence has the feature [+mod], which determines that it heads a modifier, rather than a referential argument.

further clausal projections (though see Cinque forthcoming for a revival of the reduced relative analysis for certain attributive adjectives).

It is worth mentioning that the reduced relative origin analysis of attributive adjectives was rejected (by Bolinger 1967 and others) because, among other things, it was noted that there are adjectives which can appear attributively, but not predicatively (*the former president* vs. *\*the president who is former*), and therefore, a predicative source for the attributive function, at least for these adjectives, cannot be maintained. However, all the dynamic participles to which I attribute a reduced relative analysis are perfectly grammatical in predicative positions, e.g. in copular constructions, in small clauses and as secondary predicates (*He arrived crying*), so this problem does not arise here.

If dynamic prenominal present participles are reduced relative clauses, not adjectives, we automatically have an account for the fact that these elements do not appear in any adjectival context, as detailed in 4.2.2.1-4.2.2.6 above. It is now also clear why only intransitive dynamic participles appear prenominally. Transitive dynamic participles, as in (109), are necessarily verbal, and thus have an obligatory internal  $\theta$ -role, which remains unassigned (the same explanation is applicable for the facts of 4.2.2.7 above).

(109) *\*the locking boy*

Of course, (110), where a complement does appear, is also ungrammatical:

(110) *the [locking the door] boy*

This, however, is due to the adjacency requirement, as explained in 4.5.1.2 below. If adjacency is not violated, as in (111), the phrase's grammaticality is improved. For lack of space, I do discuss structures such as (111) further.

(111) *the door-locking boy*

#### **4.5.1.1 Additional evidence for the clausal nature of prenominal dynamic participles**

The assumption that the prenominal position can host verbal-clausal projections as well as adjectival ones can also account for certain ambiguities which received little attention in the literature (see Laskova 2007). In order to present these ambiguities, I will digress and discuss passive participles. The reasons for this will become clear below.

As mentioned in the introduction, it is well known (at least since Wasow 1977) that many passive participles are ambiguous between a verbal and an adjectival reading, as exemplified in (112):

(112) The house was evacuated.

Reading 1: The house was in the state of being evacuated, empty, unpopulated.

Reading 2: Someone evacuated the house (which perhaps was re-populated since).

It is less acknowledged (but see Laskova 2007) that DPs such as (113) are likewise ambiguous:

(113) the evacuated house

Reading 1: the house which is in the state of being evacuated, the empty house, the unpopulated house

Reading 2: the house which has been evacuated (even if it has since been re-populated, and is no longer empty)

The first reading of (113) corresponds to the adjectival, state reading of (112), while the second one corresponds to the verbal, event reading. It is possible that for some reason (possibly pragmatic), the first reading is more salient. However, the second, verbal-clausal reading is also available. As shown by Laskova (2007), this can be seen clearly in examples such as (114a). The prenominal passive participle in this case cannot be adjectival (as can be seen in (114b)), since it is based on an atelic verb (see chapter 3, section 3.5.3). However, it can appear prenominally, and is interpreted as referring to an event, rather than to a state:

(114) a. The carts adjacent to the pushed cart were all empty.

b. \*The cart seems pushed.

If the prenominal position is taken to be exclusively adjectival, it is hard to explain why (114a) as opposed to (114b) is grammatical, as well as how the two readings of (113) arise. On the other hand, if we accept that reduced relative clauses can appear prenominally, then (114a) presents no problem, and given that in (113) the participle is ambiguous between an uninflected verb and an adjective, we straightforwardly predict the ambiguity of the DP.

The reason why it is hard to show the same ambiguity with present participles is that the adjectival reading and the verbal reading of the participle will always be very similar. This is because by hypothesis, the participles which have an adjectival reading correspond to stative verbs, and so their verbal reading is stative, just like their adjectival reading. For example, according to my analysis, the participle in *the flourishing town* is ambiguous. However, the two readings are very tough to tease apart.

#### 4.5.1.2 Evidence that reduced relatives are generated prenominally



In English, full relative clauses appear post-nominally. Nonetheless, I have suggested here that in this language reduced relatives can precede the head they modify. I would like to suggest further that in fact, the prenominal position is the base position for reduced relatives in English (see also Cinque forthcoming, who claims, on different grounds, that reduced relative clauses are merged preminally cross-linguistically). Support for this idea comes from the paradigm in (115)-(116). Under the assumption that reduced relatives are merged post-nominally in English, namely, that the structures in (115) are the basic ones, there is no natural explanation for the ungrammaticality of (115a). Possibly, an ad-hoc rule should be postulated which filters out one-word reduced relatives, or moves them to the left of the head they modify. Such a rule is not needed anywhere else in the grammar. If, on the other hand, we assume that the structures in (116) are basic, the grammatical status of all four sentences falls out naturally.

- (115) a. ?The boy [jumping] is my cousin.  
       b. The boy [jumping in the yard] is my cousin.
- (116) a. The [jumping] boy is my cousin.  
       b. \*The [jumping in the yard] boy is my cousin.

(116a) is base-generated as is, and is grammatical. (116b), in contrast, violates a very well-known constraint on left-adjoined modifiers, namely, the adjacency requirement between a modified head and the head of the phrase modifying it (Williams 1982, among many others), and is therefore ungrammatical. (115b) is a result of applying extraposition to (116b), and is therefore predicted to be grammatical. Extraposition needs to be assumed in the theory anyway, as a mechanism that "salvages" structures violating the head-adjacency requirement (117).

- (117) a. \*a [proud of his son] father  
       b. a father [proud of his son].

In (115a), on the other hand, unnecessary extraposition took place, since the original structure, (116a), did not violate any principle. The fact that the sentence is not ruled out, but is still dispreferred by many speakers, can perhaps be attributed to the fact that extraposition per se is a legitimate operation, but that due to economy considerations speakers will avoid it when it is unnecessary.

I therefore conclude that prenominal dynamic participles in English are clausal constituents base-generated to the left of the noun they modify.

#### 4.5.2 The reduced relative analysis of dynamic participles in Hebrew

I propose that Hebrew post-nominal dynamic participles, like English prenominal ones, are verbal forms projecting a reduced clausal structure, as exemplified in (118).

- (118) *yeladim* <sub>DP</sub>[<sub>OP</sub> [<sub>t</sub> *boxim*]] *me'acbenim oti*.  
children crying annoy me  
'Crying children annoy me.'

Such an analysis poses one immediate problem. Participial relatives in Hebrew are usually analyzed (see Siloni 1995) as obligatorily manifesting an overt determiner-complementizer, *ha-* in *D*<sup>o</sup>, as in (107a) above. If *ha-* is taken to be a necessary element in reduced relatives in Hebrew, then the fact that there is no complementizer in (118) is at first sight puzzling.

However, when observed closely, it seems that the phonetic realization of the determiner-complementizer *ha-* is not necessary in Hebrew reduced relatives; its realization seems to be related to phonological, rather than syntactic, factors. Specifically, as pointed out by Tali Siloni (p.c.), as the reduced relative clause gets phonologically "heavier", *ha-* becomes obligatory, as seen in (119).

- (119) *yeladim \*(ha-)boxim be-kol ram mad'igim et ha-rofe*.  
children *ha* crying in+voice loud worry ACC the-doctor  
'Children crying loudly worry the doctor.'

In fact, it is possible that this "heaviness" effect affects not only participial clauses, but also APs. Siloni (1995) suggests that a complementizer-like element (*ha-* or its phonetically null equivalent) introduces not only reduced relatives, but also adjectival phrases. In the case of APs, unlike in the case of reduced relatives above, *ha-* never needs to surface, no matter how long the AP is (120a). But, *ha-* can surface with long APs (120b). Admittedly, (120b) is not extremely natural, partly because *ha-* is hardly used in spoken Hebrew. However, it is undoubtedly much better than the completely ungrammatical (120c), with a short AP.

- (120) a. *mixnasayim kcarim be-šloša sentimetrim hayu nir'im yoter tov*.  
pants short in-three centimeters were looking more good  
'Pants three centimeters shorter would have looked better.'
- b. ?*mixnasayim ha-kcarim be-šloša sentimetrim hayu nir'im yoter tov*.  
pants *ha*-short in-three centimeters were looking more good
- c. \**mixnasayim ha-kcarim hayu nir'im yoter tov*.

pants      *ha*-short    were looking more good

While the syntactic and phonological conditions under which *ha-* occurs in Hebrew clearly demand further study, it seems that this element cannot be taken simply as a marker of reduced relative clauses. Under my analysis, such clauses, when short, can appear without the complementizer.

An additional piece of evidence that post-nominal dynamic participles form clausal constituents rather than APs comes from negation. In Hebrew, post-nominal adjectives can be negated, as in (121a). In contrast, as pointed out in Siloni (1995), negation is impossible in Hebrew reduced relatives, as seen in (121b).

(121) a. *baxurot lo razot lo yexolot lihiot dugmaniot.*

girls    not thin not can    be    models

'Girls who are not thin cannot be models.'

b. \**iš    ha-lo kore      iton    ba-rexov...*

man that-not reading paper in+the-street

As can be seen in (122), post-nominal participles of dynamic verbs do not allow negation. In that, they behave just as expected if they are reduced relative clauses. If these participles were adjectives, we would predict that they could be negated.

(122) \**yeladim lo boxim mad'igim et    ha-rofe.*

children not crying worry    ACC the-doctor

To conclude, in this section I claimed that the prenominal (or post-nominal) position can host both APs and reduced relatives. Although superficially looking the same, participles of dynamic verbs are exclusively verbal, and can appear prenominally only inside a reduced relative clause. Participles of stative verbs, on the other hand, have both a verbal and an adjectival reading. On their verbal reading, they appear prenominally as reduced relatives, whereas on their adjectival one, they form prenominal APs.

#### **4.6 Stative verbs with no adjectival present participle alternates**

As mentioned in section 3.2.1, the *Stativity Constraint* provides a necessary, but not sufficient, condition on verbs for having an adjectival present participle counterpart. There are numerous stative verbs which do not have corresponding adjectival participles. This section deals with these exceptions.

Some of the stative verbs not giving rise to adjectival present participles, e.g. those in (123), fall within the classes of stative verbs described in 4.3.1 above (e.g. object-Experiencer or "manner" verbs). *Bothering*, for example, does not exist as an adjective (*\*This boy seems bothering*), although *bother* is an object-Experiencer verb.

(123) bother, suit, inform...

It may be that the reason for the non-existence of adjectival present participle alternates for these verbs is "blocking", as in Aronoff (1976). Note that for all these verbs, there is a different adjective with a similar meaning, namely *bothersome*, *suitable* and *informative*. The existence of these items in the lexicon may "block" the formation of the adjectival present participles *bothering*, *suiting*, *informing*.<sup>76</sup> The existence of these exceptions is thus accommodated under a lexical account of adjectival present participle formation, lending further support to adopting a lexical derivation for these adjectives.

Another noticeable class of stative verbs lacking an adjectival present participle counterpart is the class of relational verbs, containing both verbs of possession and part-whole relations (124a) and verbs of abstract relationship, that are not perceived as affecting the object (124b).

(124) a. own, have, possess, contain, consist of, involve,  
b. cost, weigh, equal, measure, resemble, mean, sound, reflect, underlie

In addition, verbs of spatial configuration (125) lack adjectival present participle alternates, as do perception verbs and certain subject-Experiencer verbs (126).

(125) stand, sit, lie

(126) hear, see, taste, smell, feel, hate, like, detest, want..

What distinguishes the stative verbs in (124)-(126) from the stative verbs mentioned throughout the chapter? Two divisions in the class of stative verbs come to mind as possible answers: that between stage- and individual-level predicates, and that between Davidsonian and Kimian states. However, neither one is satisfying. Let us see why.

The distinction between stage-level and individual-level predicates was introduced by Carlson (1980). Whereas individual-level predicates denote inherent properties of an individual, such as *tall* and *intelligent*, stage-level ones denote transitory states, such as *hungry* or *available*. It is easy to observe that most stative verbs, both those which give rise to adjectival present participles and those which do not, belong to the class of individual-level predicates (Rothmayr 2009). Only

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<sup>76</sup> Thanks to Julia Horvath (p.c.) for suggesting this explanation.

a few stative verbs, such as the spatial configuration ones as in (125), are stage-level (see Dowty 1979). Thus, the split between stage- and individual-level does not reflect the split between verbs which do or do not give rise to adjectives.

Maienborn (2007) argues for an additional, different split within the class of stative verbs, between Davidsonian-statives and Kimian-statives. Davidsonian statives have a Davidsonian state argument in their representation, and although they do not denote an observable action, they refer to an event. This event can be modified by manner and location adverbials, which are therefore licensed by Davidsonian-statives. Examples are given in (127).

- (127) a. Carol sat motionless / at the table.  
b. The candle shone brightly / in the dark room.

In contrast, Kimian-statives have an ontologically different argument, the so-called Kimian state argument, denoting a property. Since the representation of these predicates does not involve an event variable, manner or locative adverbs, which modify the event, are illicit with them. This is shown in (128).

- (128) a. \*John (generously) owns a lot of money in his house.  
b. \*The grinning (inappropriately) annoyed Irmay under a tree.

(Adapted from Rothmayr 2009)

(127)-(128) suffice in order to conclude that the Davidsonian / Kimian split, like the Stage- / Individual-level split, cannot capture the desired division of stative verbs, since adjectival present participles are derived from both Davidsonian statives (*shine*) and Kimian statives (*annoy*), though some Davidsonian (*sit*) as well as Kimian (*own*) statives do not give rise to the relevant adjectives.

I believe that there is no uniform reason for which the verbs in (124)-(126) lack adjectival present participles: the reason may be different for different verb types. Consider first the verbs in (124), in light of the derivation of adjectival present participles in 4.4.3.1 above, which, I suggested, includes existential closure of the internal  $\theta$ -role. The verbs in (124) are hardly meaningful or informative when their internal role is existentially bound.<sup>77</sup> Thus *owning* as an adjective would mean "who owns something", but this is true about (almost) everyone. The same can be said about *resemble*, *consist*, *mean*, *equal*, *weigh* and the other verbs in (124), given that everything resembles something, consists of something, means something, and so on. What seems to be at

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<sup>77</sup> Thanks to Mark Baker for suggesting this account.

work here is a grammaticalization of the pragmatic constraint that utterances have to be informative (see Goldberg & Ackerman's 2001 discussion of *?headed boy*, p. 811). Since the output of adjective formation for these stems is uninformative, the operation is blocked.<sup>78</sup>

With regard to the verbs of spatial configuration in (125), as was already pointed out above, they are the only stative verbs which are stage-level. This special property of these verbs may prevent them from giving rise to adjectival present participles, for some yet unknown reason.

We are thus left with the verbs in (126). As already mentioned, since under the current analysis adjectival present participle formation is lexical, it is in principle possible that these verbs are simply listed as idiosyncratic exceptions. However, as noted by Julia Horvath (p.c.), this seems improbable, since the Hebrew parallels of the verbs in (126) do not give rise to adjectival present participles as well. At the moment, I can think of no reason for why these verbs reject adjective formation, and further research is required here.

#### 4.7 Conclusion

This chapter focused on present participles, and aimed firstly to clarify their categorial status. It was suggested that while all participles have a verbal reading, only a subset of them have an additional, adjectival reading. It was shown that the set of verbs giving rise to adjectival present participles can be constrained aspectually. Although *the Stativity Constraint* has several exceptions, it is nonetheless a step forward in comparison with previous attempts to delineate the class of verbs giving rise to adjectival present participles, as it predicts more of the data, while also suggesting an explanation for it: since the adjectival present participle morpheme *-ing* cannot perform any aspectual manipulation, it can only attach to verbs which are stative to begin with.

The notion of a "mixed" or "neutralized" category was shown here to be not only unnecessary, but practically inapplicable in the case of present participles. Besides the fact that not all present participles exhibit both readings (rather only stative ones do), it was argued that adjectival present participles are listed in the lexicon, whereas verbal ones are not stored at all but rather derived syntactically. Hence it cannot be claimed that there exists one present participle entry, neutralized with regard to category, which displays a "mixed" behavior. For example, such an analysis has no

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<sup>78</sup> As noted by Susan Rothstein (p.c.), *seem*, which is also a verb of abstract relationship, does have an adjectival present participle counterpart, *seeming*, although this verb too is uninformative after existential binding of its object.

way of explaining why only the adjectival reading of the participle, and never the verbal one, can exhibit drifted meanings.

The chapter brought to light many aspects in which adjectival present participles and adjectival passive participles are parallel. The two types of adjectives exhibit the same kinds of idiosyncrasies pointing to a lexical, rather than syntactic, derivation. Both are derived from verbs which include a state component in their semantics, the difference between the two emerging from the fact that the adjectival present participle morpheme is incapable of aspectual modifications, a fact resulting in the *Stativity Constraint*. Additionally, the formation of both types of adjectives includes marking of a  $\theta$ -role for  $\lambda$ -abstraction and, in certain cases, saturation of one of the input verb's  $\theta$ -roles. The difference between the two here is that this closure is performed upon an internal  $\theta$ -role in the case of present participles, whereas in passive participles it is the external  $\theta$ -role which is saturated.

#### **Appendix – The derivation of adjectival present participles under Rothstein's (1999) aspectual analysis of stative verbs**

Section 4.4.2 presented an analysis for the derivation of adjectival present participles from stative verbs, under Parson's (1990) assumption, that stative verbs and adjectives should be analyzed the same, both having a Davidsonian state argument.

Rothstein (1999), however, claims that stative verbs and adjectives are not identical in their aspectual nature. Rothstein presents several respects in which stative verbs behave like non-homogenous, count entities, while adjectives behave like homogenous, mass entities. She thus concludes that while stative verbs have an *e(vent)* argument ranging over count-like stative eventualities (and should be represented as  $\lambda e.STATE(e)$ ), adjectives, at least in English, have a *s(tate)* argument ranging over non-atomic, mass-like states, which she labels *M-states* (and will be represented as  $\lambda s.STATE(s)$ ).

In section 4.4.2 I have suggested that the adjectival present participle morpheme *-ing* is incapable of any aspectual manipulation, and is thus the simplest, most impoverished adjectival morpheme. This conclusion is not changed under Rothstein's analysis. Given this analysis, any process of adjective formation from verbs has to take count entities and turn them into mass entities, and must therefore involve the 'grinding function' of Lewis (cited in Rothstein 1999) – a function

which maps count entities into mass entities composed of the same stuff. The operation of this function in the nominal domain can be seen in sentences such as (1):

(1) After he had been working for an hour, there was bicycle all over the garage floor.

(Rothstein 1999)

Given this, the adjectival passive morpheme, for example, would not only isolate the STATE component of the verb's meaning from the other components, but would also "grind" this count state to give rise to a mass (M-)state. The present participle morpheme *-ing* is still the simplest adjectival morpheme, since it performs *only* the grinding function, not any other aspectual manipulation. In other words, it cannot change the meaning of the predicate, but only what Rothstein refers to as the "perspective" on it (whether it is a count entity or a mass entity). It selects only stative verbs, because they are the only verbs which can become adjectives simply by grinding, without additional change.

The existence of a grinding operation from count- to mass-states is predicted according to Rothstein's analysis. Since such an operation exists in the nominal domain (as in (1)), Rothstein notes that one should expect to find it in the domain of events as well, but hesitates with regard to where it applies. The analysis presented above of *-ing* attributes to it exactly this function, suggesting that it is the missing element in Rothstein's analysis.

In the sample derivations given in section 4.4.3.1 above, the input verb was marked as having a Davidsonian state argument, *s*, just like the derived adjective. Under Rothstein's analysis, the Davidsonian argument of the input verb will be an event argument *e*, as in (2). The application of the grinding operation will result in this argument becoming a state argument.

(2) SHINE (THEME, *e*)

→

ADJ: SHINE (THEME, *s*)



## **5 Ergative adjectives as proposition-selecting predicates**

This chapter focuses on ergative adjectives, a class of adjectives which map their subject internally. The term 'ergative' rather than 'unaccusative' is commonly used to refer to these adjectives since, as noted by Cinque (1990) adjectives (in many languages) fail to check accusative Case; the term 'unaccusative', therefore, does not seem applicable to adjectives.

As noted in section 1.1.4, the existence of the class of ergative adjectives is surprising, given that most adjectives, including e.g. adjectival passives whose subject is a Theme argument, map their

subject externally. Therefore, figuring out what sets apart ergative adjectives and all other adjectives is crucial for understanding the basic facts of the argument structure of adjectives in general.

The chapter is structured as follows. 5.1 contains a brief reminder of the existing literature on ergative adjectives and the challenges they pose for a theory of the argument structure of adjectives. In 5.2 it is shown that a class of ergative adjectives exists in Hebrew and English, consisting of adjectives which are semantically analogous to the ergative adjectives found in other languages. In 5.3, I suggest that what distinguishes ergative adjectives from other adjectives is that their internal Theme  $\lambda$ -role must be assigned to a proposition, namely, they denote properties of propositions (or relations between propositions and individuals). In 5.4, I suggest that this semantic property of ergative adjectives is the reason for their unique syntactic behavior. Specifically, whereas other  $\lambda$ -roles are "externalized" (namely, marked for  $\lambda$ -abstraction) during the lexical derivation of the adjective, the role that has to be assigned to a proposition cannot be externalized, since the  $\lambda$ -operator necessarily abstracts over a variable of the type of individuals or events, not propositions. Section 5.5 presents some remaining problems and possible directions for their solution.<sup>79</sup>

### **5.1 Ergative adjectives and implications for the theory of argument structure of adjectives**

Intransitive verbs split with regard to whether their sole argument is mapped externally, in spec,VP (unergative verbs) or internally, as a complement to V (unaccusative verbs, Perlmutter 1978). Cinque (1989, 1990) was the first to show that a parallel split exists in the adjectival system as well, at least in German and Italian. While unergative adjectives map their subject externally, ergative ones map it internally. Cinque (1990) uses a battery of syntactic diagnostics which separate ergative from unergative adjectives in Italian, on a par with the tests distinguishing unaccusative from unergative verbs. For example, given that *ne*-cliticization is

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<sup>79</sup> 'Tough'-adjectives, mentioned in footnote (5) above, have also been argued to assign their  $\theta$ -role internally. However, these adjectives differ both syntactically and semantically from the adjectives to be examined below, and are therefore excluded from the discussion. Raising adjectives, which are very similar to ergative adjectives both in their semantic properties and in the fact that their clausal subject is mapped internally are likewise not discussed here, since their syntactic behavior differs in significant ways from other ergative adjectives, as mentioned for example in footnote (81) below.

possible only from the structural object position (Burzio 1986), the contrast in (1) shows that *probabili* 'likely' is ergative, whereas *ingiuste* 'unjust' is not.

- (1) a. *Ne sono probabili ben poche (di dimissioni).*  
of-them are likely really few of resignations  
'Really few of the resignations are likely.'  
b. *\*Ne sono ingiuste molte (di condanne).*  
of-them are unjust many (of condemnations)

Likewise, given that the complementizer *di* is used only when the infinitival clause it introduces is an object, the contrast in (2) shows that *chiaro* 'clear' is ergative, whereas *pericoloso* 'dangerous' is not.

- (2) a. *Non mi era affatto chiaro \*(di) non poterlo prendere.*  
not me was at all clear that not could+it take  
'It wasn't clear at all to me that I could not take it.'  
b. *E' pericoloso \*(di) sporgersi dal finestrino.*  
is dangerous that lean-out of+the window

Additional tests used by Cinque will be discussed as they become relevant to the discussion. Based on the results of the different diagnostics, Cinque classifies the adjectives in (3) as ergative (though he does not intend to provide a comprehensive list of ergative adjectives in Italian).

- (3) *noto* 'well-known', *chiaro* 'clear', *certo* 'certain', *sicuro* 'sure', *oscuro* 'obscure', *probabile* 'likely', *prevedibile* 'foreseeable', *gradito* 'welcome', *implicito* 'implicit', *esplicito* 'explicit', *evidente*, *ovvio* 'obvious'

Bennis (2000, 2004) extends Cinque's analysis to Dutch, using some of Cinque's tests in addition to other tests, unique to this language (or based on German tests discussed in Cinque 1989). Consider, for example, the sentences in (4). Bennis suggests that the presence of the expletive subject *het* is obligatory when the subordinate clause is a deep subject, and optional when the clause is an object (see 5.5.1 and 5.5.2 for discussion of similar facts in Hebrew and French). Thus, (4) shows that the clausal subject of *duidelijk* 'clear' is an object, while the clausal subject of *pijnlijk* 'embarrassing' is an external argument.

- (4) a. *Nu is (het) duidelijk dat wij hem moeten helpen.*  
now is it clear that we him must help  
'Now it is clear that we must help him.'

b. *Nu is \*(het) pijnlijk dat wij hem moeten helpen.*

now is it embarrassing that we him must help

'Now it is embarrassing that we must help him.'

Based on the various tests, Bennis argues that *duidelijk* 'clear', *onzeker* 'unsure', *aannemelijk* 'plausible', *waarschijnlijk* 'probable' and *bekend* 'well-known' are ergative.

The existence of the class of ergative adjectives is somewhat surprising. This is so since in general, adjectives have an external argument, and this is true even for adjectival passives, whose subjects receive a Theme role, and whose verbal counterparts map their subjects internally. Thus, to repeat example (8) from the introduction, section 1.1.2, *ne*-cliticization is possible out of the subjects of verbal passives (5a), but not of adjectival ones (5b), suggesting that the latter are external, rather than internal, arguments.

(5) a. *Ne sarebbero riconosciute molte t (di vittime).*

of-them would be recognized many of victims

'Many of them (the victims) would be recognized.'

b. *\*Ne sarebbero sconosciute molte t (di vittime).*

of-them would be unknown many of victims

The fact that cross-linguistically adjectives, including adjectival passives, take an external argument has led several scholars to claim that it is a defining feature of adjectives that their subject is external. For example, as discussed in 1.1.3, Levin & Rappaport (1986) propose a mechanism of "externalization" of an internal  $\theta$ -role which is part of adjectival passive formation, and whose existence is entailed by the fact that adjectives always have an external argument. A similar externalization mechanism is assumed in Borer & Grodzinsky (1986).

However, in light of the existence of the class of ergative adjectives, this conclusion cannot hold. The question then arises: if adjectives with an internal subject are allowed by the grammar, then why is it that adjectival passives "externalize" their subject? And if they externalize it, why don't ergative adjectives do the same? In short, what is the difference between ergative adjectives and all other adjectives which cause the former to have an internal subject, and the latter – an external one?

Trying to answer this question, Cinque (1990) suggests that "externalization" of an internal  $\theta$ -role is not part of adjective formation per se, but is a by-product of the morphological derivation of adjectives from verbs. Cinque adopts the view that adjectival passives are derived from verbal

passive participles (as in Lieber 1980, Levin & Rappaport 1986), and claims that such re-bracketing of a V as an A necessitates externalization, because the verbal predicate can no longer select for a complement, since the complement is now a sister to A, not to V. On the other hand, according to Cinque, ergative adjectives are derived from stems unspecified for category; no category conversion takes place during the derivation, and therefore the adjective can select its complement, and externalization is not required. This morphologically-motivated explanation is put to use also in Sabbagh's (2005) account for why a large group of Tagalog adjectives exhibit an ergative behavior, though their analogues in other languages are unergative.

As mentioned in 1.1.4, there are some problematic aspects in Cinque's account.

First, the assumption that adjectival passives are derived from verbal passives is problematic. As discussed in 3.5.2, Horvath & Sioni (2008, 2009) provide extensive evidence that adjectival passive formation is a lexical process, while verbal passive formation is post-lexical, i.e. syntactic. Hence, verbal passive do not exist as lexical entries at all, and cannot serve as input for the lexical operation of adjectival passive formation. This leaves us with two options with regard to the input for this operation: either the input consists of active verbs, or it consists of roots, unspecified for category. In section 3.5.3 I argue that the second option is preferable. If this is the case, then adjectival passive formation does not involve category change and should not induce externalization according to Cinque.

Independently of the previous argument, consideration of Hebrew shows that the morphological distinction made by Cinque, namely that adjectival passives are morphologically derived from verbs while ergative adjectives are not, does not hold universally. As will be shown in section 5.2 below, Hebrew too has ergative adjectives (which are semantically analogous to the Italian and Dutch adjectives noted by Cinque 1990 and Bennis 2000, 2004). Importantly however, most of these adjectives have the same morphological form as adjectival passives. For example, *banuy* 'built' and *katuv* 'written' are adjectival passives, while *yadu'a* 'well-known' and *cafuy* 'foreseeable' are ergative adjectives, but all appear in the same template, *XaXuX*, a prototypical adjectival passive template which is morphologically related to the verbal template *XaXaX* (cf. *bana* 'built', *yada* 'knew'). Since the subject of adjectival passives is external and that of ergative adjectives is internal, it is impossible to tie the externalization process to the morphological derivation of the adjectives, which is identical in both cases. The morphological distinction fails also in certain cases in English (the ergative adjective 'well-known' is morphologically related to

'know'), Dutch (*bekend* 'well-known' is related to the verb *kennen* 'know'), and probably even in Italian (*noto* 'known' is related to the verb *notare* 'notice').

Note also that importantly, Cinque's analysis predicts that any adjective which is derived from a category-less root, rather than from a verb, will be ergative, since its derivation will not include category-change, and hence will not involve externalization. However, if *probabile* 'probable' and *certo* 'certain' are derived from category-less roots, there is no reason to analyze *buono* 'good' or *giusto* 'just' as derived from anything else. Thus, *buono* and *giusto* are predicted to be ergative, just like *probabile* and *certo* – but they are not. I thus reject Cinque's account for the difference between ergative and unergative adjectives.

Cinque attributes the syntactic difference between ergative adjectives and other adjectives to a morphological difference between them, rather than a possible semantic one. Bennis (2004), who presents an analysis of ergative adjectives in Dutch, briefly mentions the option that the relevant difference is semantic-thematic. Discussing the contrast between *trouw* ('loyal'), a regular adjective, and *bekend* ('known') an ergative adjective, he notes that the subject of the former has a 'possessive' interpretation, much like that of the subject of stative verbs: the interpretation of *John* is similar in *John is loyal* and in *John knows the answer*. In contrast, the subject of ergative adjectives lacks this interpretation, and is understood as a theme which expresses the adjectival property. Adopting the view that syntactic structure reflects thematic organization, this may explain the different mapping in the two cases.<sup>80</sup> As mentioned in sections 1.1.2, 2.1.3, Baker (2003, 2010) also attributes the syntactic difference between ergative and other adjectives to a thematic difference between them – that the latter assign the Theme role, whereas the former assign a different (possible Path) role. In 5.3, I suggest a different thematic explanation for the difference between ergative and other adjectives. But before that, let us see whether ergative adjectives exist in Hebrew and English as well.

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<sup>80</sup> Bennis distinguishes between 'simplex ergative adjectives', such as *bekend* 'known', and 'complex ergative adjectives'. The latter class includes evaluative adjectives, e.g. *trouw* 'loyal', in the reading manifested in *his behavior was loyal* (rather than in *John was loyal*, where the adjective is unergative). Bennis proposes that complex ergative adjectives include a projection of a specifier-less aP, the subject originating as a complement to the adjective. This analysis implies that the subject of complex ergatives, like that of simplex ergatives, should behave like an internal argument with regard to unaccusativity diagnostics, but Bennis does not discuss this issue. At least in Hebrew, this does not seem to be the case.

## 5.2 Ergative adjectives in Hebrew and English

Hebrew has two well-known tests distinguishing internal subjects from external ones. Note that it is not a-priori clear that these tests are even applicable to adjectives. Let us discuss each in turn to see whether they distinguish ergative and unergative adjectives, and then proceed to additional possible tests for internality in the case of adjectives, based on Cinque (1990) and Bennis (2000) (note that some diagnostics suggested by these authors, i.e. *ne*-cliticization, complementizer selection, embedded verb second and long-distance anaphor binding, are irrelevant in Hebrew and English, which do not exhibit these syntactic phenomena at all).

### 5.2.1 Simple Inversion

As explained in section 1.1.2, In Hebrew, only internal subjects (namely, subjects of unaccusative and passive verbs) can appear in post-verbal position in the "simple inversion" construction ((6a), (6b) vs. (6c)) (Shlonsky 1997, Reinhart & Siloni 2004).

- (6) a. *naflu xameš kufsa'ot.*  
fell five boxes  
'Five boxes fell.'
- b. *nivnu xamiša batim.*  
were+built five houses  
'Five houses were built.'
- c. *\*rakdu xameš yeladot.*  
danced five girls

Under one influential analysis, in simple inversion structures, both the verb and the subject remain in-situ, in their base position (7a). This contrasts with so called 'triggered inversion' structures (Doron & Shlonsky 1992), in which the verb raises to C, and the subject occupies spec,TP, as exemplified in (7b).

- (7) a. [<sub>TP</sub> *pro* [<sub>VP</sub> *naflu xameš kufsa'ot*]].  
fell five boxes  
'Five boxes fell.'
- b. [<sub>CP</sub> *etmol* [<sub>C</sub> *sixek* [<sub>TP</sub> *dan* [<sub>VP</sub> *t ba-xacer*]]].  
yesterday played Dan in+the-yard  
'Yesterday Dan played in the yard.'

Is the 'simple inversion' test relevant to adjectives?

Note, that adjectives are not predicted to allow the 'triggered inversion' construction. This is so since adjectives do not raise to T (they cannot be inflected for tense), and therefore naturally cannot raise to C. Under the analysis advanced in this work, namely that APs are embedded under PredPs, the impossibility of A raising to T (or C) is explained (see section 1.1.2). And indeed, adjectives are banned from the triggered inversion construction, as shown in (8), in contrast to verbs, which can all participate in it, as exemplified in (7b).

(8) \**axšav xivrim kama yeladim*.  
now pale some children

However, since in simple inversion constructions the predicate remains in-situ, there is a-priori no reason why adjectives cannot appear in this construction, like verbs.

Most adjectives are completely ungrammatical in the simple inversion structure. These include simple adjectives (9a), and also adjectival passives (9b,c).

(9) a. \**xivrim kama yeladim*.  
pale some children  
b. \**bnuyim kama batim*.  
built some houses  
c. \**ktuvim kama sfarim*.  
written some books

However, when looking at the Hebrew semantic analogues of Cinque's and Bennis' ergative adjectives, the facts are different. Some of these adjectives are completely grammatical in this context (10). Others are somewhat worse, with a certain degree of variation between speakers (11). Importantly, however, even the adjectives in (11) are better in the simple inversion context than other adjectives, which are unergative according to Cinque's tests, such as those in (9). This suggests that the adjectives in (10) and (11) are indeed ergative in Hebrew as well.

(10) a. *yedu'ot kama uvdot*.  
known some facts  
'Some facts are known.'  
b. *cfuyim kama šinuyim*.  
expected some changes  
'Some changes are expected.'



- (11) a. *?brurot kama uvdot.*  
 clear some facts  
 'Some facts are clear.'
- b. *??btuxim kama dvarim.*  
 certain some things  
 'Some things are certain.'

### 5.2.2 Possessive datives

Let us next look at the possessive dative test. As mentioned in section 2.3.6.3, In Hebrew, a dative argument can be interpreted as the possessor of an internal argument. Thus, such an argument can be interpreted as the possessor of the subject of an unaccusative (12a) or a passive (12b) verb, but not of an unergative one (12c) (Borer & Grodzinsky 1986).

- (12) a. *ha-kufsa nafla le-rina.*  
 the-box fell to-Rina  
 'Rina's box fell.'
- b. *ha-pgiša butla le-dan.*  
 the-meeting was+cancelled to-Dan  
 'Dan's meeting was cancelled.'
- c. *\*ha-xatul girger le-rina.*  
 the-cat purred to-Rina  
 Intended meaning: 'Rina's cat purred.'

Determining whether the test is applicable to adjectives depends on one's analysis of this structure. Borer & Grodzinsky (1986) assume that in order for a possessive interpretation to arise in the possessive dative construction, the dative phrase should c-command the possessed argument, or its trace. This generalization is completely structural, and nothing hinges on the lexical category of the predicate. Thus, if this analysis is adopted, no difference is predicted between verbs and adjectives.

In contrast, Landau (1999) argues that in the possessive dative construction in Hebrew, the dative phrase is raised to spec,VP. Landau assumes a little-*v*, in which Agent and Cause subjects are generated; for verbs with such subjects, therefore, spec,VP is empty and can serve as a possible landing site for the moved dative phrase. However, Landau proposes that subjects interpreted as

Experiencers and what he calls 'Perceivers' are generated in spec,VP, thus blocking movement of the dative argument to this position, making the possessive dative construction impossible, as in (13).

(13) \**dan hevin le-dina et ha-te'anut.*

Dan understood to-Dina acc. the-claims

Intended reading: 'Dan understood Dina's claims.'

Landau also notes that the possessive dative construction is unavailable with stative location verbs that lack an additional, agentive reading (e.g. *hexil* 'contain', but not *tafas* 'take up', which has an agentive reading in addition to its stative one). Again, this is so since by hypothesis, these stative verbs do not project a vP, and their subject is generated in spec,VP, thus blocking movement of the dative phrase to this position.

Note that Landau's analysis for verbal possessive dative constructions is incompatible with the framework adopted in this dissertation, which does not assume a little-*v* projection (see Introduction, section 1.2.1). Additionally, this analysis does not straightforwardly account for the ungrammaticality of sentences such as (14). In (14), a possessive dative construction is impossible, although the verb is passive. According to Landau's analysis, (14a) should be grammatical, since in the passive the external argument is not projected, and thus no argument occupies spec,VP.

(14) \**ha-te'anut huvnu le-dina.*

the-claims were+understood to-Dina

Intended reading: 'Dina's claims were understood.'

Landau needs to assume that in Hebrew, a phonetically null argument (*pro*) is generated in spec,VP in passive sentences (as in Borer 1998). However, this assumption would predict that (15), with a secondary predicate predicated of the implicit argument, would be grammatical, since the predicate will be licensed by the phonetically null subject in spec,VP. The sentence, however, is ungrammatical. In Meltzer-Asscher (to appear) I argue, based on this and other facts, that the implicit argument in Hebrew verbal passives is not syntactically realized.

(15) \**ha-sefer nixtav šikor / šikorim.*

the-book<sub>1</sub> was+written drunk(M.SG) drunk(M.PL)

Therefore, I do not adopt Landau's structural analysis for Hebrew possessive datives.

Note that the common property of the sentences in (13) and (14) is not structural, but rather semantic-thematic: both sentences contain an Experiencer argument: external in (13), implicit in (14). Cheng & Ritter (1987), Shibatani (1994) and others have also observed the fact that possessive datives are impossible with Experiencer subjects. These authors attributed this to the generalization that the possessor in possessive dative constructions must be an "affected" argument, but it is not affected in the case of Experiencer verbs. In (13), just as in (14), Dina is not affected by Dan's understanding her claims. Although (as Landau notes) the definition of "affectedness" is far from being precise, it does seem that the right account for the ungrammaticality of (13) and (14) should depend on their thematic characterization (namely, the existence of an Experiencer argument), rather than on their structural characterization, which is not uniform.

Let us now turn to the Hebrew possessive dative facts in the domain of adjectives. First, let us try to establish whether possessive dative constructions are possible in sentences with adjectives at all. Examples such as (16) show that they are.

- (16) a. *ha-kelev kašur le-dina la-mita.*  
 the-dog tied to-Dina to+the-bed  
 'The dog is tied to Dina's bed.'
- b. *ha-sefer yihiye munax le-dina ba-megera.*  
 the-book will+be placed to-Dina in+the-drawer  
 'The book will be placed in Dina's drawer.'
- c. *ha-tmuna mat'ima le-dina la-xeder.*  
 the-picture fitting to-Dina to+the-room  
 'The picture is fitting for Dina's room.'

Interestingly, however, not all adjectives behave the same. Some adjectives do not participate in this construction, as the examples in (17) show.

- (17) a. *\*aba ge'e le-dina ba-hesegim.*  
 father proud to-Dina in+the-achievements  
 Intended reading: 'Father is proud of Dina's achievements.'
- b. *\*dan mexusan le-dina bifney ha-ksamim.*  
 Dan immune to-Dina facing the-charms  
 Intended reading: 'Dan is immune to Dina's charms.'

c. ?*Dan metoraf le-dina al ha-xatul*

Dan crazy to-Dina on the-cat

'Dan is crazy about Dina's cat.'

The generalization capturing the facts of (16) and (17) seems to be that adjectives with an Experiencer subject do not participate in possessive dative constructions, whereas other adjectives do. The situation is thus similar to that in the verbal domain, where Experiencer subjects fail to license possessive dative constructions.

Having established that possessive dative constructions are in principle compatible with adjectives, let us now turn to determining the status of the subjects of adjectives. Looking first at 'regular' adjectives, i.e. adjectives not identified as ergative by Cinque or Bennis, we observe that they are impossible in possessive dative constructions (18).

(18) a. \**ha-xatul šamen le-dina.*

the-cat fat to-Dina

b. \**ha-šulxan šavur le-dina.*

the-table broken to-Dina

Turning next to the Hebrew analogues of Cinque's and Bennis' ergative adjectives, it can be seen that they behave like any other adjective, in not licensing a possessive dative interpretation (19).

(19) a. *ha-te'anut yedu'ot le-dina.*

the-claims known to-Dina

'The claims are known to Dina.'

Unavailable reading: 'Dina's claims are known.'

b. *ha-sibot brurot le-dina*

the-reasons clear to-Dina

'The reasons are clear to Dina.'

Unavailable reading: 'Dina's reasons are clear.'

c. \**ha-hesber savir le-dina.*

the-explanation reasonable to-Dina

Do the facts of (19) mean that *yadu'a* 'well-known', *barur* 'clear', *savir* 'reasonable' etc. are not ergative? Not necessarily. As shown above, having an internal argument is a necessary, but not a sufficient, condition for possessive interpretation in the possessive dative construction. An additional condition is that the predicate does not have an Experiencer argument (explicit or

implicit). As will become clear below, ergative adjectives denote judgments with regard to the truth value of propositions, and thus necessarily involve a (sometimes implicit) Experiencer – the person who knows the proposition, or finds it clear or reasonable, etc. The possessive dative interpretation in (19) is thus unavailable. Note that the adjectives in (18) (fat, broken) do not include such an Experiencer argument in their interpretation, and thus the reason for the ungrammaticality of (18) cannot be this – rather, the sentences are ungrammatical because the subject of the adjective is external.

### 5.2.3 Anaphor binding into the subject

Cinque (1990) provides the contrast in (20) as additional evidence that some adjectives are ergatives whereas others are not.

- (20) a. *Il proprio<sub>i</sub> destino non era noto a nessuno<sub>i</sub>.*  
           his own  destiny not was well-known to anybody  
           'No one<sub>i</sub>'s destiny is known to him<sub>i</sub>.'
- b. *\*I propri<sub>i</sub> amici non sono riconoscenti a nessuno<sub>i</sub>.*  
           his own  friends not are grateful to nobody

*noto* being ergative, its subject is generated as an internal argument, where it is bound by the quantified DP. In contrast, the subject of *riconoscenti* is external, and in no stage of derivation is it c-commanded by the quantified DP.

Let us now look at the parallel sentences in Hebrew. Consider (21) and (22):

- (21) a. *?ha-atid šelo<sub>i</sub> lo yadu'a / barur le-af exad<sub>i</sub>.*  
           the-future his not known / clear to-anyone  
           'His<sub>i</sub> future is not known / clear to anyone<sub>i</sub>.'
- b. *?ha-pitaron šelo<sub>i</sub> haxi savir be-einey kol exad<sub>i</sub>.*  
           the-solution his most reasonable in+eyes every one  
           'His solution<sub>i</sub> is the most reasonable in everyone<sub>i</sub>'s eyes.'
- (22) a. *\*ha-more šelo<sub>i</sub> lo nexmad le-af exad<sub>i</sub>.*  
           the-teacher his not nice to-anybody
- b. *\*ha-ben šelo<sub>i</sub> haxi ne'eman le-kol exad<sub>i</sub>.*  
           the-son his most loyal to-everyone

Although the sentences in (21) are marginal, they are somewhat better than those of (22). In fact, their status resembles that of the sentence in (23), with a verbal passive, in which the subject undoubtedly originates in complement position.

- (23) ??*ha-šir šelo<sub>i</sub> lo hušma le-af exad<sub>i</sub>.*  
the-song his not played to-anyone  
'His<sub>i</sub> song was not played to anyone<sub>i</sub>.'

It thus seems that binding facts support the conclusion that there are ergative adjectives in Hebrew, *yadu'a*, *barur* and *savir* among them.

The situation in English is similar. Though the sentences in (24), including the semantic analogues of Cinque's ergative adjectives, are not completely grammatical, their status is like that of (25) – which includes a verbal passive – rather than that of the completely impossible (26), which include other adjectives.

- (24) a. ?His<sub>i</sub> future is not known / clear to anyone<sub>i</sub>.  
b. ?His<sub>i</sub> solution is obvious to everyone<sub>i</sub>.  
(25) ?His<sub>i</sub> song was not played to anyone<sub>i</sub>.  
(26) a. \*His<sub>i</sub> teacher is not nice to anyone<sub>i</sub>.  
b. \*His<sub>i</sub> son is loyal to everyone<sub>i</sub>.

Again, this shows that *known*, *clear* and *obvious* are ergative in English.

#### 5.2.4 Extraction facts

The three internality tests above – simple inversion, possessive dative and binding - are appropriate for cases where the subject of the predicate is a DP. However, it is easily observable that the ergative adjectives identified by Cinque and Bennis can take CP subjects (in addition to DP ones). Cinque and Bennis suggest additional tests which can distinguish between ergative and unergative adjectives when these take clauses. One of Cinque's (1990) arguments in favor of the different mapping of the subject in the case of ergative and unergative adjectives is that while extraction is possible out of clauses appearing after ergative adjectives (27a), it is impossible out of clauses appearing after unergative ones (27b). Adopting Kayne's (1981b) and Huang's (1982) generalization that extraction is impossible out of adjuncts, these data lead to the conclusion that the clause is a complement of the ergative adjectives, while it is an adjunct in the case of unergative adjectives.

- (27) a. In che modo era prevedibile [t che se ne andasse t]  
 in which way was foreseeable that he would leave  
 b. \*In che modo sarebbe stato pericoloso che se ne fosse andato?  
 in which way would have been dangerous that he left

This situation is similar in Hebrew. The sentences in (28), in which extraction takes place out of a clause embedded under an ergative adjective, were systematically judged as better than those in (29), in which the adjective is unergative.

- (28) a. *ma savir še-dan kana le-dina?*  
 what probable that-Dan bought to-Dina  
 'What is it probable that Dan bought to Dina?'  
 b. *le'an barur še-omri nasa?*  
 where clear that-Omri went  
 'Where is it clear that Omri went?'  
 c. *eizo sidra yadu'a še-ohad ra'a?*  
 which show known that-Ohad saw  
 'Which show is it well-known that Ohad has seen?'  
 (29) a. \**ma macxik še-yuval katav le-yif'at?*  
 what funny that Yuval wrote to-Yif'at  
 b. \**ma mesukan še-yoav axal?*  
 what dangerous that-Yoav ate  
 c. ?*eizo katava tov še-noam kara?*  
 which article good that-Noam read

The situation in English, according to the speakers I have consulted, is reminiscent of that in Italian and Hebrew. Extraction out of subjects of ergative adjectives, though perhaps not perfect, is better than extraction out of subjects of unergative ones, as shown in (30).

- (30) a. ?How is it likely/clear that he behaved?  
 b. \*How would it be strange/dangerous that he would drive?

This leads to the conclusion that the clause is a complement in the case of ergative adjectives, while it is some kind of an adjunct in the unergative case.

### 5.2.5 As-clauses

Cinque notes that in Italian, *come* ('as') can only bind CP gaps found in the structural object position. The contrast in (31) thus reinforces the conclusion that *probabile* is ergative, whereas *sorprendente* is unergative. Similar facts hold in Dutch (Bennis 2000).

- (31) a. Come e probabile t, G. ce la fara.  
           As is probable, G. will make it.  
       b. \*Come e sorprendente t, G. ha vinto.  
           As is surprising, G. won.

Applying the test to Hebrew, it turns out that the same adjectives which allow post-adjectival subjects and can be bound by a quantified DP in object position are also allowed with *kmo* 'as' clauses (32), whereas other adjectives are impossible in this construction (33). This suggests that the adjectives in (32) are ergative, their subject originating in complement position.

- (32) a. *kmo še-haya barur, dan lo ba.*  
           as that-was clear Dan not came  
           'As was clear, Dan didn't come.'  
       b. *?kmo še-kvar nir'e batu'ax, dan yacli'ax.*  
           as that-already seems certain dan will+succeed  
           'As seems certain by now, Dan will succeed.'  
       c. *kmo še-yadu'a la-kol, dan nic'eax ba-misxak.*  
           as that-known to+the-all Dan won in+the-game  
           'As is known to everybody, Dan won the game.'
- (33) a. *\*kmo še-mafti'a, dan nice'ax.*  
           as that-surprising Dan won  
       b. *\*kmo še-nir'e mašma'uti, dan ne'elam.*  
           as that-seems significant Dan disappeared

The test is relevant to English as well (as shown by Stowell 1991). As shown in (34)-(35), the same adjectives identified by this test as ergative in Italian, Dutch and Hebrew are equally identified as ergative in English, according to it.

- (34) a. As seems certain by now, Dan will succeed.  
       b. As is known to everybody, Dan won the game.  
       c. As was predictable, Dan didn't show up.
- (35) a. \*As was surprising, Dan won.



- b. \*As seems significant, Dan disappeared.
- c. \*As is dangerous, Dan rode his bike to work.

### 5.2.6 The force of the clausal argument

Bennis (2000) notes an additional difference between ergative and unergative adjectives. Essentially, the observation is that ergative adjectives allow a certain degree of variability in the force of their clausal argument, namely, it can be a declarative clause but also, at least under certain conditions (e.g. when the sentence is negated), an interrogative (36). Bennis notes that this behavior is typical of complement clauses. In contrast, unergative adjectives invariably select declarative clauses (37).

(36) *Het is onzeker / onduidelijk dat / of / wanneer Jan weggaat.*

it is unsure unclear that if when John leaves

'It is unsure / unclear that / if / when John leaves.'

(37) *Het is onaardig / ongevaarlijk dat / \*of / \*wanneer Jan weggaat.*

it is unkind not dangerous that if when John leaves

The same phenomenon can be observed in Hebrew ((38)-(39)), and in English ((40)-(41)), again suggesting that the split between ergative and unergative adjectives exists in these languages too, and that the class of ergative adjectives is semantically parallel in all the languages discussed.

(38) a. *yadu'a / barur / batuax / muvan še-hi tagid štuyot*

known clear certain understood that-she will+say nonsense

'It is well-known / obvious / certain / clear that she'll speak nonsense.'

a. *yadu'a / barur ma hi tagid.*

known clear what she will+say

'It is well-known / obvious what she'll say.'

b. *lo batuax ma hi tagid*

not certain not certain what she will+say

'It is not certain what she'll say.'

c. *lo muvan ex hi tedaber.*

not understood how she will+say

'It is not clear how she'll speak.'

(39) *\*(lo) mafti'a / tov / mesukan matay ha-matos yinxat.*

- (not) surprising good dangerous when the-plane will+land
- (40) a. It is obvious /certain / clear that she will say hello.  
 b. It is obvious / certain / clear what she will say.  
 c. It is not obvious / certain / clear whether she will say hello.
- (41) \*It is (not) good / annoying / dangerous what she will say.

### 5.2.7 Dative objects

Bennis (2000) mentions an additional fact that distinguishes ergative adjectives from unergative ones in Dutch. Some ergative adjectives (though by no means all of them) license dative objects (42a). In contrast, in the general case, unergative adjectives do not license such complements (42b) (except a subclass of adjectives denoting mental properties, e.g. *gehoorzaam* 'obedient').

- (42) a. *dat deze opmerking (mij) duidelijk / bekend is*  
 that this remark me clear well-known is  
 'that this remark is clear / well-known to me.'
- b. *dat deze opmerking (\*mij) moeilijk / interessant is*  
 that this remark me difficult interesting is  
 'that this remark is difficult / interesting (\*to me)

The same can be observed in Hebrew, as shown in (43).

- (43) a. *ha-te'ana ha-zo yedu'a / brura / muvenet li.*  
 the-claim the-this known clear understood to+me  
 'This claim is known / clear / understood to me.'
- b. *\*ha-he'ara ha-zo mafti'a / me'anyenet li.*  
 the-remark the-this surprising interesting to+me

There seem to exist some adjectives which license dative objects, yet fail other diagnostics for ergativity, as shown in (44).

- (44) a. *ha-makum ha-ze šamur lo.*  
 the-place the-this reserved for+him  
 'This seat is reserved for him.'
- b. *xašuv lo še-ha-ši'ur yatxil ba-zman.*  
 important to/for+him that-the-class begins on-time  
 'It is important for him that the class begins on time.'

However, these cases are different from the ones in the text in that *le-* here is oblique, rather than dative, can be glossed as 'for', rather than 'to'. In these cases *le-* can be replaced by *bi-švil / avur* 'for' (45). Such a replacement is impossible with ergative adjectives (46):

(45) a. *ha-makum ha-ze šamur avuro / bi-švilo.*

the-place the-this reserved for+him

'This place is reserved for him.'

b. *xāšuv avuro / bi-švilo še-ha-ši'ur yatxil ba-zman.*

important for+him that-the-class begins on-time

'It is important for him that the class begins on time.'

(46) \**ha-te'ana ha-zo yedu'a / brura / muvenet avuro / bi-švilo.*

the-claim the-this known clear understood for+him

Since, as can be understood from the Hebrew examples, this test crucially relies on the dative/oblique difference, it cannot be applied to English, however. This is so since in English, *to* and *for* are to a large extent interchangeable. As seen in (47)-(48), both appear with ergative as well as unergative adjectives.

(47) a. It is clear to/for me that she didn't mean it.

b. It is obvious to/for me that this was a mistake.

(48) a. It is interesting to/for me that she said that.

b. It is important to/for me that you said that.

To conclude this section, I have shown that the split suggested by Cinque between ergative and unergative adjectives exists in Hebrew and English as well. The adjectives I diagnosed as ergative in Hebrew are: *yadu'a* 'known', *barur* 'clear, obvious', *batuax* 'certain' and *savir* 'probable, reasonable', which are analogues of Cinque's Italian ergative adjectives, and also *muvenet* 'understood', which is not included in Cinque's list. In English, the adjectives identified as ergative are *certain, clear, well-known, obvious, probable, implicit* and *understood*.

As noted above, the ergative adjectives in Hebrew (and some of the English ones as well) bear prototypical passive morphology, a fact that undermines Cinque's morphology-based explanation for the difference in mapping between these adjectives and adjectival passives. The following section presents an attempt to delineate the class of ergative adjectives based on their semantic, rather than morphological, properties.

### 5.3 Defining the class of ergative adjectives

#### 5.3.1 First attempt: clause-selecting adjectives are ergative

One fundamental fact about ergative adjectives that seems to be neglected in both Cinque (1990) and Bennis (2000, 2004) is that all of them can take clausal arguments. It is therefore tempting to claim, that what differentiates ergative from other adjectives is that their subject is clausal, and for some reason, a predicate must map a clausal argument as a complement, rather than a subject (perhaps since clausal subjects cannot exist, as suggested in Koster 1978).

However, this cannot be the whole picture, since in all the languages discussed above, adjectives which are not ergative according to any diagnostics nonetheless take clausal arguments. For example, the Italian adjectives *pericoloso* 'dangerous' or *sorprendente* 'surprising' take clausal arguments (49). However, the sentences in (50) show that *pericoloso* and *sorprendente* are not ergative, since they fail the *ne*-cliticization and the *come*-clause tests.

- (49) a. *Sarebbe stato pericoloso che se ne fosse andato.*  
would+have been dangerous that he left  
'It would have been dangerous that he left.'
- b. *Era sorprendente che nessuno dei residenti avesse udito dei rumori.*  
was surprising that none of+the residents have heard the rumors  
'It was surprising that none of the residents have heard the rumors.'
- (50) a. *\*Ne sono pericolosi molti (di viaggi).*  
Of-them are dangerous many of journeys
- b. *\*Come è sorprendente, Gianni ha vinto.*  
as is surprising Gianni won

The same facts can be observed in Hebrew. *tov* 'good' and *me'acben* 'annoying', for example, take clausal arguments (51), yet fail the *kmo*-clause test (52), which shows that they are unergative.

- (51) a. *(ze) tov še-dan ba la-azor.*  
it good that-Dan comes to-help  
'It's good that Dan is coming to help.'
- b. *(ze) me'acben še-dan me'axer.*  
it annoying that-Dan late  
'It's annoying that Dan is late.'

- (52) a. *\*kmo še-tov, dan ba la-azor.*  
 as that-good Dan comes to-help
- b. *\*kmo še-me'acben, dan me'axer*  
 as that-annoying Dan late

The examples above show, that there are predicates which have clausal arguments, yet do not map them internally. Importantly, the surface order in (49) and (51) in which the clause follows the adjective does not entail that the clause is a complement. The pattern in (49)-(52) simply adds to a growing amount of evidence (Hazout 1994, Zaring 1994 and others) showing that, cross-linguistically, so-called "extraposition" structures form a non-uniform class, in that the post-predicate clause is a complement in some cases, and an adjunct correlated with the subject position in others (see 5.5 below for additional discussion).

The data above thus show that the difference between ergative adjectives and other adjectives cannot be that the former take clausal subjects while the latter do not.

### 5.3.2 Second attempt: proposition-selecting adjectives are ergative

As was shown in section 5.3.1, both ergative adjectives and other adjectives can be predicated of clauses. However, as it turns out, many authors have argued that clauses do not uniformly denote a single type of abstract entities. Thus, predicates which syntactically select clauses can in fact be semantically divided to predicates which select different types of complements. For example, Rothstein (1999) as well as Taranto (2002) state that complement clauses may denote either events or propositions; Parsons (1993) argues that some *that*-clauses refer to facts, others to propositions. Asher (1993, 2000) and Hegarty (2003) argue that there are four types of abstract entities denoted by clauses: events, situations, facts and propositions; Peterson (1997) argues that clauses can denote events, propositions and facts; and Rochette (1988) and Léger (2006, 2010) claim that clauses selected by different predicates may refer to actions, events or propositions.

What is common to all these studies, as well as Achard (1998), Iatridou (1990) and Mair (1990) is that they distinguish a defined subset of predicates (verbs or adjectives) that semantically select propositions. I propose that this semantic characterization is relevant to the issue at hand. **Specifically, I propose that ergative adjectives, in contrast to all other adjectives, denote properties of propositions.**

In 5.3.2.1-5.3.2.3 I present three arguments that ergative adjectives are propositional. In 5.3.3, I discuss unergative adjectives, showing that they are non-propositional.

### 5.3.2.1 Basic semantics of ergative adjectives

As just mentioned, Léger (2006) distinguishes between event-selecting and proposition-selecting predicates. Following Rochette (1988), she notes the semantic intuition that non-propositional adjectives (e.g. *funny*) express subjective judgments regarding an event, or the reaction it evokes in its surroundings, whereas propositional adjectives express judgments having to do with the truth value of a proposition or its epistemological status, namely the probability that a certain proposition is true or false (e.g. *probable*), or the perceptibility of a proposition's truth value (e.g. *clear*). Based on this semantic characterization, Léger lists the adjectives in (53) as propositional:<sup>81</sup>

- (53) a. *vrai, exact, juste, vraisemblable, incontestable, indéniable, certain, sûr*  
           true correct fair likely indisputable undeniable certain sure  
           *assure, probable, plausible, possible, improbable, impossible,*  
           certain probable plausible possible improbable, impossible  
           *invraisemblable, douteux, erroné, faux, clair, évident*  
           unlikely doubtful erroneous false clear evident

A brief look at the list in (53) is sufficient in order to notice that it is extremely similar to the lists of ergative adjectives in Italian, Dutch, Hebrew or English, as discussed in 5.1 and 5.2 above.

### 5.3.2.2 Ergative adjectives and finiteness

An interesting feature of ergative adjectives (at least those discussed in 5.1 and 5.2 in Hebrew and English) is that they cannot take non-finite complements, only finite ones.<sup>82</sup> This is exemplified in (54)-(55):<sup>83</sup>

<sup>81</sup> French *possible* and its Hebrew and English counterparts *ešari* and *possible* present an interesting ambiguity between this epistemic reading and a deontic reading, involving estimation of someone's capabilities. For a detailed discussion of this ambiguity, including tests distinguishing the two readings, see Léger (2006).

<sup>82</sup> I would like to thank Tal Siloni for pointing out to me this difference between propositional and non-propositional adjectives.

<sup>83</sup> Unlike the ergative adjectives discussed here, raising adjectives (which are also ergative, as noted in the introduction), and which likewise select propositions, do appear with infinitival clauses (*It is likely to rain*).

- (54) a. *\*(ze) yadu'a / barur / batuax / muvan / amiti le-nagen al psanter.*  
 it known clear certain understood true to-play on piano
- b. *(ze) yadu'a / barur / batuax / muvan / amiti še-dan menagen al psanter.*  
 it known clear certain understood true that-Dan plays on piano  
 'It is known / clear / certain / understood / true that Dan plays the piano.'
- (55) a. \*It is certain / clear / well-known / understood / probable / true to play the piano.
- b. It is certain / clear / well-known / understood / probable / true that Dan plays the piano.

If ergative adjectives select propositions, there is a natural explanation for these facts. The general idea here is that propositional projections are larger than projections of events, and include more functional structure. As explained in Léger (2006), propositional complements are like independent sentences (which, likewise, denote propositions), in that they contain information about tense, aspect, the participants of the event, etc. The truth value of propositional complement phrases can be determined independently of that of the main clause. Projections of events, in contrast, are somewhat impoverished, lacking information regarding one or more of the above (this idea is present also in Rothstein 1999).<sup>84</sup> Propositional adjectives thus select only finite complements (as noted with regard to French in Achard 1998, Mair 1990 and Léger 2006). Assuming that ergative adjectives are propositional, the ungrammaticality of (54a)-(55a) is predicted. As explained above, propositions must include all the relevant information regarding the event they contain, and should be able to stand as independent clauses. But, the subordinated clauses in (54a)-(55a) are "defective" in that they lack tense specifications, and cannot appear independently. Léger (2006) further notes that the subject of the infinitive has no controller (since

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<sup>84</sup> Specifically, Léger (2006), following Rochette (1988) assumes that propositions are denoted by CPs (either finite indicatives or non-finite), and events are denoted by IPs (which, according to them, can be either infinitives or finite subjunctives). Two obvious problems arising from this analysis are the following:

- (i) Generally, finite clauses are assumed to be CPs, never IPs.
- (ii) According to the author's semantic criteria, raising predicates such as 'seem' and 'likely' are propositional, since they express evaluations with regard to a proposition's truth value. Thus, they should be analyzed as selecting CPs. However, most accounts for the unique syntactic behavior of raising predicates crucially rely on the assumption that their complement is IP, rather than CP.

the main clause is impersonal) and thus has no reference. Thus, this clause is not independent, and cannot denote a proposition, as required by the adjectives in the sentences.

As noted by Tal Siloni (p.c.), facts from interrogative complementation options reinforce the difference between propositional and non-propositional adjectives found above. In Hebrew, propositional adjectives can take both tensed and non-tensed interrogative clausal complements (56), although the latter are somewhat degraded for some speakers.

- (56) a. *yadu'a / barur / muvan ma dan yagid.*  
known clear understood what Dan will+say  
'It is well-known / clear / understood what Dan will say.'
- b. *(lo) yadu'a / barur / muvan ma le-hagid.*  
not known clear understood what to-say  
'It is (not) well-known / clear / understood what one should say.'

In English, propositional adjectives can take tensed interrogative clausal complements, not non-tensed ones (57)-(58).<sup>85</sup>

(57) It is certain / clear / well-known / understood what Dan will say.

(58) ??It is well-known / understood what to say.

These facts can be explained as follows. Tensed interrogative clauses denote propositions, as can be deduced from the fact that they may appear as independent sentences. Thus, they are selected by propositional adjectives. The situation with non-finite interrogatives is different. In Hebrew, such clauses can stand independently, as main clauses, as exemplified in (59). This is impossible in English (60).

- (59) a. *ma le'exol?*  
what to+eat  
'What should I eat?'
- b. *im mi le-daber?*  
with whom to-talk

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<sup>85</sup> An exception is (i), which many English speakers judge as acceptable.

(i) It is clear what to do.

In Hebrew as well, the construction is better with *barur* 'clear' than with the other adjectives. It is possible that the distinction between epistemic and deontic propositional adjectives, discussed in Léger (2006), is relevant here. I leave this issue for future research.



'With whom should I talk?'

- (60) a. \*What to eat?  
b. \*Whom to talk with?

Without providing an explanation for this difference between the languages, the data suggest that in Hebrew, non-finite questions can denote propositions, and thus can function as root clauses. In contrast, English non-finite questions are of a different epistemological type, and thus unfit to appear independently. This immediately explains the contrast between (56b) and (58) above. Though the relevant adjectives in both languages are propositional, non-finite questions are propositional in Hebrew, and therefore can be selected by these adjectives, whereas in English the same type of clauses denotes events, and cannot complement propositional predicates.

To conclude, adjectives denoting properties of propositions differ syntactically from other adjectives, in that they can take as complements only clauses which can also appear as main clauses. Given that the ability of a structure to appear independently is a diagnostics for its denoting a proposition, this fact strongly reinforces the hypothesis that indeed, ergative adjectives are propositional.

### 5.3.2.3 Ergative adjectives and nominal subjects

Ergative and unergative adjectives behave differently also with regard to nominal arguments. It is well-known that there is a small, limited class of proposition-denoting nouns, e.g. *claim*, *rumor*, *conclusion*, etc. These nouns denote objects that have propositional content, and are characterized by their ability to take clausal complements (*the claim that John loves Mary*). Consider now the sentences in (61)-(64). It can be observed, that ergative adjectives can select as their subjects propositional DPs (61), but not complex or simple event nominals (62)-(63), nor concrete nouns (64).

- (61) a. The claim / theory / pledge was clear / obvious / implicit / known.  
b. *ha-te'ana / šmu'a / bakaša hayta brura / yedu'a / muvenet.*  
the-claim rumor pledge was clear known understood  
'The claim / rumor / pledge was clear / known / understood.'
- (62) a. #The examination of the students was clear / obvious / implicit / known.  
b. #*bxinat ha-talmitidm hayta brura / yedu'a / muvenet.*  
examination the-students was clear / known / understood

- (63) a. #The trip / the party / the exam is obvious / certain / implicit.  
 b. #*ha-tiyul / ha-mesiba / bxinat ha-studentim hayta brura / yedu'a / muvenet.*  
 the-trip the-party the-exam the+students was clear known understood
- (64) a. #The prisoner / the house / the sound is obvious / certain / implicit.  
 b. #*ha-asir / ha-bayit haya barur / batuax.*  
 the-prisoner the house was clear certain

This provides further evidence that ergative adjectives select propositions.

### 5.3.3 Unergative adjectives are non-propositional

Let me now briefly elaborate on why unergative adjectives, e.g. *good, dangerous, funny, interesting, surprising* etc., are not propositional.

As mentioned in 5.3.2.1, intuitively, these adjectives express subjective judgments regarding an event (Rochette 1988, Léger 2006), rather than judgments having to do with the truth value of a proposition, namely the probability that a certain proposition is true or false, or the perceptibility of a proposition's truth value.

Further, we have seen in 5.3.2.2 that propositional adjectives can never take infinitival complements. In contrast, unergative adjectives can take such complements:

- (65) *(ze) tov / mesukan / macxik / me'anyen le-nagen al psanter.*

it good dangerous funny interesting to-play on piano

'It is good / dangerous / funny / interesting to play the piano.'

- (66) It is good / dangerous / funny / interesting to play the piano.

The fact that the adjectives in (65)-(66) take as complements "defective" clausal projections, which cannot function as main clauses, strongly suggest that they do not select propositions.

Note that unergative adjectives *can* take as complements also tensed clauses, as in (67)-(68):

- (67) *(ze) tov / mesukan / macxik / me'anyen še-dan menagen al psanter.*

it good dangerous funny interesting that-Dan plays on piano

'It is good / dangerous / funny / interesting that Dan plays the piano.'

- (68) It is good / dangerous / funny / interesting that Dan plays the piano.'

This means that tensed clauses (when embedded) can denote events or facts, not only propositions. Note, importantly, that in French there is an observable difference between the

finite clauses that complement propositional and non-propositional adjectives. While the former are indicative (69) the latter are subjunctive (70).

(69) a. Il est evident / sûr que le serveur a fait une erreur.

it is evident certain that the servant has made a mistake

'It is evident / certain that the servant has made a mistake.'

b. \*Il est evident / sûr que le serveur fasse une erreur.

it is evident certain that the servant made(SUBJ) a mistake

(70) a. \*Il est souhaitable / important que Jean finit ce travail avant demain.

it is desirable important that Jean finishes this work before tomorrow

b. Il est souhaitable / important que Jean finisse ce travail avant demain.

it is desirable important that Jean finish(SUBJ) this work before tomorrow

'It is desirable / important that Jean finish this work before tomorrow.'

This is explained in Achard (1988) and Léger (2006) along the same line of reasoning introduced in 5.3.2.2 above. An indicative clause is independent and autonomous. In contrast, a subjunctive clause, whose temporal and aspectual morphology is more defective, is not as autonomous, and cannot express a proposition. Indeed, subjunctive clauses cannot appear as matrix clauses.<sup>86</sup>

The phenomenon exemplified in (69)-(70) cannot be observed in Hebrew, where there is no distinction between indicative and subjunctive. In English the distinction exists, though it is not fully productive, and the indicative can always be used instead of the subjunctive. It is interesting to note nonetheless, that those adjectives allowing the subjunctive (e.g. *imperative, important, necessary, desirable, essential, critical, vital, crucial*) are all non-propositional.

Looking now at embedded questions, it was shown in 5.3.2.2 that propositional adjectives can take interrogative complements (in Hebrew both tensed and non-tensed, and in English, only tensed). Unergative adjectives, on the other hand, can never be complemented by interrogatives.

(71) a. \*(ze) tov / mesukan / macxik ma dan menagen.

it good dangerous funny what Dan plays

a. \*(ze) tov / mesukan / macxik ma le-nagen.

it good dangerous funny what to-play

(72) a. \*It is dangerous / good / funny / annoying what Dan will say.

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<sup>86</sup> Susan Rothstein (p.c.) notes that French subjunctives can appear in matrix jussive clauses (e.g. 'Qu'il vienne vite!'). How such clauses are best analyzed remains an open issue at this point.

b. \*It is dangerous / good / funny / annoying what to say.

This is explained if interrogatives denote propositions, and unergative adjectives are non-propositional.

Finally, following the discussion in 5.3.2.3 above, note that unergative adjectives can take as subjects non-propositional DPs, namely event nominals (73)-(74) and concrete nouns (75).

(73) a. The trip / the party was annoying / good / dangerous.

b. *ha-tiyul haya me'acben / tov / mesukan.*

the-trip was annoying good dangerous

'The trip was annoying / good / dangerous.'

(74) a. The destruction of the city was frightening / dangerous.

b. *harisat ha-ir hayta mafxida / mesukenet.*

destruction the-city was frightening dangerous

'The destruction of the city was frightening / dangerous.'

(75) a. The teacher / the film is good / annoying.

b. *ha-more / ha-seret tov / me'acben.*

the-teacher the-movie good annoying

Consider, in addition, sentences in which non-propositional adjectives have propositional DP subjects. In some cases, the result is completely impossible, as in (76).

(76) #The proposition is dangerous / good / frightening.

In other cases, the sentences are felicitous, but they are interpreted differently than the corresponding sentences with propositional adjectives. Consider for example (77). In (77b), with a propositional adjective, it is the proposition itself that is obvious. In contrast, what is dangerous in (77a) is not the content of the claim; a proposition cannot be dangerous *per se*. What one means in uttering (77a) is that people may use this claim in ways that have dangerous results.<sup>87</sup>

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<sup>87</sup> Tali Siloni (p.c.) notes that *annoying* seems to behave like *obvious* here: when we say 'The claim that some people are better than others is annoying', it is the proposition itself which is annoying. However, Asher (1993) and Peterson (1997) argue that propositions lack causal efficacy, and never enter causal relations. Asher (1993) discusses examples such as (i). He argues that what causes the mental state of the speaker in the sentence is not the abstract proposition denoted by the *that*-clause ('I would have gone to the party), but rather the *event, state or fact* of his thinking about this proposition.

(i) The thought that I would have to go to the party made me sick.

- (77) a. The claim that some people are better than others is dangerous.  
 b. The claim that some people are better than others is obvious.

What type of argument do unergative adjectives select? As discussed above, Léger (2006) argues that they select events, rather than propositions. As noted, this explains the various facts presented in the last two sections. However, a possible objection to this generalization is raised by the entailment pattern in (78), showing that unergative adjectives are factive, namely, they presuppose the truth of their clausal argument.

(78) *lo tov / mafti'a / macxik še-dan nasa me-ayalon. → dan nasa me-ayalon.*  
 not good surprising funny that-Dan drove from-Ayalon Dan drove from-Ayalon

'It's not good / surprising / funny that Dan drove via Ayalon → Dan drove via Ayalon.

Parsons (1993), Peterson (1997) and others suggest that factive predicates select facts. This would mean that unergative adjectives select facts, rather than events. Since facts are often assumed to be true propositions, unergative adjectives would be analyzed as selecting (a certain type of) propositions, not unlike ergative adjectives.

However, in view of the various selectional differences between ergative and unergative adjectives noted in this and the previous section, it seems reasonable to maintain a difference between the types of entities the two adjectives select. I therefore propose to assume that, if unergative adjectives select facts, these are not simple propositions (such as those selected by ergative adjectives), but rather nominalized propositions, which are of the type of individuals. The idea that factive clausal complements involve a nominal structure embedding a proposition was first suggested in Kiparsky & Kiparsky's (1970) seminal paper about factivity.

Thus, whether unergative adjectives are taken to select events or nominalized propositions, unergative and ergative adjectives are analyzed as selecting different types of arguments.

To conclude, in the last two sections I have presented syntactic and semantic evidence that ergative adjectives are propositional, and unergative adjectives are non-propositional. The next

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Note that the subject of *annoying* in *The claim that some people are better than others is annoying* is a Subject Matter argument ([-m]), which can be interpreted as causing some mental state. Thus, if propositions truly lack causal efficacy, the interpretation of the sentence must be that the cause for annoyance is the fact or the state of people claiming this claim, rather than the proposition itself.

step would be to understand **why** it is the case that propositional adjectives are ergative. I will suggest the following: the specification that an adjective selects a proposition is encoded on the relevant role assigned to the proposition, i.e. Theme. However, while the Theme role is generally "externalized" during the derivation of the adjective, when it is further specified as assigned to a proposition this  $\theta$ -role cannot be externalized, due to the nature of the externalization process.

#### 5.4 $\theta$ -roles specified as assigned to propositions cannot be externalized

In Reinhart's (2002) framework, the role assigned to the proposition by propositional adjectives in the examples above, as well as by propositional verbs, as in (79), is represented as [-c-m] – a participant not causing change, whose mental state is irrelevant to the eventuality denoted by the predicate, namely, a Theme.

- (79) a. John believed the answer / that Mary ate the cake.  
b. John thought that Mary ate the cake.

Importantly, however, not all predicates with a Theme  $\setminus$ -role select a proposition.

- (80) John ate [the cake] / \*[that the cake is too sweet].

A propositional predicate, thus, has a Theme role, and in addition, it has as part of its lexical information a semantic selectional restriction, specifying that this role needs to be assigned to a noun or a clause denoting a proposition (much like e.g. the Theme  $\setminus$ -role of *drink* is further specified to be assigned to a noun denoting a liquid substance). Namely, the variable introduced by the adjective is propositional. I will mark a Theme that has to be assigned to a proposition as 'Theme»Proposition'.

According to Reinhart's mapping procedure, [-] roles (namely roles composed only of negatively valued features) of transitive verbs are uniformly mapped internally, as complements. This means that the Theme role, represented as [-c-m], is an internal role. The Subject Matter role is argued by Reinhart (2002) to correspond to the feature cluster [-m]. Given Reinhart's mapping procedure, this role is thus invariably mapped internally too. This is visible in examples such as (81a), where the clause receiving this role surfaces internally, but even when the argument bearing the Subject Matter role appears in subject position, it can be shown that it was base generated as a complement. For example, as was pointed out in Rizzi & Belletti (1988), in sentences such as (81b), the argument appearing in subject position (the Subject Matter

argument) can be bound by the quantified Experiencer, object argument. This indicates that the subject originates in complement position.

(81) a. It frightened John [*that the prisoner escaped*].

b. His doctor<sub>i</sub> worried every patient<sub>i</sub>.

So, in the verbal domain, the Theme and Subject Matter  $\theta$ -roles are mapped internally. However, my claim is that only propositional adjectives are ergative, namely that in the adjectival domain, only a Theme marked to be assigned to a proposition is mapped internally, while all other roles (including other Themes and Subject Matter) are externalized.

The situation, therefore, is as follows:

(82)

$\theta$ -role	Example	Semantic nature of the argument	Mapping in verbs	Mapping in adjectives
Theme	√BUILD	Individual (type e)	Internal	Truly external
Subject Matter	√FRIGHTEN	Individual (type e), nominalized proposition (type e) or event (type ev)	Internal	Truly external
Theme(>>Proposition)	√KNOW	Proposition (type p)	Internal	<b>Internal</b>

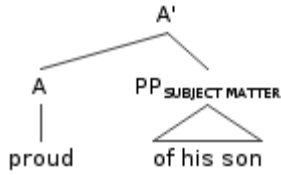
What is the reason for the split in the mapping of the  $\theta$ -roles in the adjectival domain?

I suggested in chapter 2, section 2.3, that adjective formation involves "externalization" of one of the root's  $\theta$ -roles. Externalization is achieved by lexical marking applied to one of the roles, which thereby becomes unavailable for syntactic assignment. After the AP is constructed, when the structure is passed to LF,  $\lambda$ -abstraction over the marked role occurs. This abstraction involves the introduction of a  $\lambda$ -operator, which binds the variable contained in the relevant  $\theta$ -role. This is exemplified in (83), repeated from (40) (chapter 2, section 2.3.2).

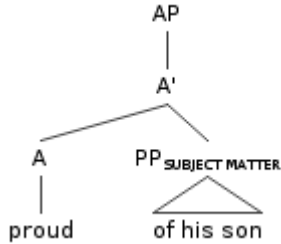
(83) Derivation of the AP *proud of his son*

a. Lexical array: proud(EXPERIENCER  $\rightarrow$   $\lambda$ -ABS, SUBJECT MATTER, s), his son

b. Projection of the object:



- c. Projection of the subject: inapplicable, no  $\theta$ -role available for assignment
- d. Projection of the AP level:



- e. Interpretation of the AP at LF:  $\lambda x \lambda s. \text{Proud}(s) \ \& \ \text{Experiencer}(s, x) \ \& \ \text{Subject Matter}(s, \text{his son})$

Consider, in contrast, the derivation of an ergative, propositional adjective, e.g. *yadu'a* 'well-known'. The root from which the adjective is derived, *know*, has a Theme role assigned to a propositional variable, as represented in (84)

(84) *yada* EXPERIENCER, THEME»PROPOSITION, e

Adjective formation involves marking for  $\lambda$ -abstraction. In this case, on a par with e.g. the derivation of adjectival passives, the derivation of the adjective should, **in principle**, include marking of the Theme role for  $\lambda$ -abstraction (as well as marking of the Experiencer role for saturation). Following marking, the lexical representation of the adjective would be the one given in (85).

(85) *yadu'a* EXPERIENCER<sub>→SAT</sub>, THEME»PROPOSITION<sub>→λ-ABS</sub>, s

If such marking was indeed possible, no arguments would be projected inside the AP (since both are marked for semantic manipulations) and at the AP level, the semantic representation in (86) would result:

(86)  $\lambda s \lambda x. \square y. \text{KNOW}(s) \ \& \ \text{Theme}(s, x) \ \& \ \text{Experiencer}(s, y)$

Crucially however, I propose that this representation cannot arise as a result of lexical marking. **I suggest that the  $\lambda$ -operator involved in adjective formation can abstract only over variables**



**of the type of individuals or events, not of propositions.**<sup>88</sup> This amounts to saying that adjectives are functions from individuals (interpreted in the broad sense to include events) to truth values, not functions from propositions to truth values. Thus, if *x* is of the type of propositions, it cannot be abstracted over by the lambda-operator, and externalization does not occur. The lexical marking in (85):  $\text{THEME} \gg \text{PROPOSITION} \rightarrow \lambda\text{-ABS}$ , is impossible, since propositions cannot be abstracted over during adjective formation. In contrast,  $\text{THEME} \rightarrow \lambda\text{-ABS}$ ,  $\text{SUBJECT-MATTER} \rightarrow \lambda\text{-ABS}$  and so forth are coherent expressions, since individual and event variables can be abstracted over.

Thus, the step of marking for  $\lambda$ -abstraction fails with propositional adjectives. However, this does not result, by hypothesis, by a failure of adjective formation in this case. Rather, the adjective is formed from the root despite the failure, and the Theme role, not being marked for externalization, is assigned, as it is canonically, to object position, just like it would be assigned in the verbal domain. Note that it does not matter whether the role is assigned to a clause or to a propositional DP; the marking for  $\lambda$ -abstraction is lexical, prior to the adjective's merger with its arguments. And this marking can never apply to role that needs to be assigned to a proposition, regardless of its syntactic realization.<sup>89</sup>

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<sup>88</sup> I do not claim that abstraction over propositions is impossible in general. As observed by Alex Grosu (p.c.), this cannot be the case, in view of examples like (ia), in which abstraction over a proposition takes place, on a par with the abstraction over an individual demonstrated in (ib):

- (i) a. What Bill saw was the king's palace.
- b. What is well-known (to everyone) is that  $2 + 2 = 4$ .

My claim is merely that the lambda-abstraction involved in adjective formation is restricted to applying to individual or event variables.

<sup>89</sup> Some propositional adjectives, in different languages, have undergone semantic drifts and can be predicated of entities other than propositions. One prominent example is *well-known* and its Italian and Hebrew counterparts *noto* and *yadu'a* respectively, which can denote properties of individuals (e.g. *a well-known actress*), with a meaning close to 'famous, familiar'.

Interestingly, According to Cinque (1990), the subject of *noto* is mapped internally, regardless of its semantic type. This is exemplified in (i), as well as in (1a) in the text. *Poesie* 'poems' is not a propositional DP, yet it is mapped internally, as evidenced by the possibility of *ne* extraction. The same is true in Hebrew. As exemplified in (ii), simple inversion is possible with *yadu'a*, even with a non-propositional DP (though the sentences are perhaps not completely acceptable for all speakers, they are undoubtedly better than sentences with unergative adjectives, as in (iii)).

The discussion above leads to the following conclusion regarding the formation of adjectives. As explained in chapter 2, section 2.3, it is a defining property of adjective formation that it includes marking for lambda-abstraction. This marking mechanism operates whenever it can. However, if an obstacle for the marking arises, i.e. the type of argument required by the  $\theta$ -role is at odds with the type of variable that can be abstracted over by the  $\lambda$ -operator, adjective formation proceeds without marking, resulting in an adjective lacking an external argument – an ergative adjective.<sup>90</sup>

## 5.5 Remaining issues

### 5.5.1 Extraction facts in Hebrew

A certain set of facts in Hebrew remains problematic in view of the analysis presented above. Hebrew has two structures with post-predicative clauses, one with the pronoun *ze* as a subject, and one with a null subject, as shown in Hazout (1994). Without going into the details of his analysis, Hazout argues that when the subject is *ze* ('it') (87a), it receives the external  $\theta$ -role of the predicate, the clause being an adjunct. On the other hand, when the subject is phonetically null

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- (i) *Ne sono note solo alcune (delle sue poesie).*  
of-them are well-known only some of his poems  
'Only some (of his poems) are well-known.'
- (ii) *yedu'im kama gormim la-maxala ha-zo.*  
known some causes for+the-illness the-this  
'There are some well-known causes for this illness.'
- (iii) *\*xašuvim kama sarim ba-memšala.*  
important some ministers in+the-government

Assuming, as is natural, that *noto* and *yadu'a* in their drifted meaning assign the Theme role without further specification as to the propositional nature of the argument, the fact that no externalization of the role applied here requires an explanation, which I do not have at the moment.

Note also that *sconosciuto* 'unknown' behaves differently than *noto* 'known', in that it has an unergative syntax (see (5b)). The reason for this adjective has only the meaning 'unfamiliar, anonymous', pertaining to individuals, and not the meaning 'not known' pertaining to propositions.

<sup>90</sup> Alex Grosu (p.c.) suggests an alternative way of deriving the syntactic behavior of ergative adjectives from their semantic characterization as propositional. Propositional adjectives are modal operators introducing a set of possible worlds. Their semantics involves a relation between the truth values of their clausal complement in these possible worlds, and their truth in the 'actual' world, the world of the matrix clause. Thus, to be evaluated, the clause needs to be in the scope of (namely, c-commanded by) both the modal operator (the adjective) and the world-index of the matrix clause. Hence, it has to be merged in complement, rather than subject, position.

(87b), it is a non- $\theta$ -marked expletive, and the clause is a complement, receiving the predicate's  $\theta$ -role.

(87) a. *ze tov lilmod sinit.*

It good to+learn Chinese

'It is good to learn Chinese.'

b. *tov lilmod sinit.*

good to+learn Chinese

'It is good to learn Chinese.'

Note that in (87), the same adjective, *tov*, appears in both sentences. To explain this, Hazout suggests that many predicates in Hebrew have the lexical property of being able to assign the same  $\theta$ -role either externally or internally.

I would like to comment here that it is not clear that this analysis is compatible with a view of  $\theta$ -roles and argument mapping such as the one in Reinhart (2002). According to Reinhart's view (as well as many others), the syntactic realization of a  $\theta$ -role is determined by the nature of the role (its feature composition), what other roles the predicate has, and the derivational history of the predicate. It is unclear why in (87) the same adjective, which has the same  $\theta$ -roles in both cases, would project the role internally in one case and externally in the other. Considering specifically the analysis I have suggested in this chapter, it cannot accommodate an account such as Hazout's, since it is committed to the idea that the semantic nature of the  $\theta$ -role (propositional vs. other) determines its mapping.

In addition, if we adopt Hazout's analysis, and assuming my characterization of a class of ergative adjectives in Hebrew, we would expect ergative adjectives, which supposedly have an exclusively internal  $\theta$ -role, to always appear without *ze*, since this element cannot be  $\theta$ -marked by them. In contrast, unergative adjectives, which according to my analysis have an external  $\theta$ -role, would be predicted to always occur with *ze*, receiving this role (and with an adjunct clause). Both these predictions are not borne out. Both ergative and unergative adjectives can appear both with and without *ze* (88) (although for some speakers the version of (88) with *ze* and the version of (89) without *ze* is slightly degraded):

(88) (*ze*) *muvaṅ / barur še-dan yiša kaxa.*

*ze* understood obvious that-Dan will+drive like this

'It's understood / obvious that Dan will drive like this.'

- (89) a. *(ze) tov / mesukan še-dan yisa kaxa.*  
*ze good dangerous that-Dan will+drive like this*  
 'It's good / dangerous that Dan will drive like this.'

Hazout's analysis thus has both theoretical and empirical drawbacks. However, it has the major advantage of explaining certain extraction facts in Hebrew. Hazout's analysis predicts that when *ze* appears, it receives the predicate's  $\theta$ -role, and the clause functions as an adjunct, hence a barrier for extraction. This prediction is borne out, with all types of adjectives – unergative (90a) as well as ergative (90b).

- (90) a. *\*ma ze tov / mafti'a še-dan yilmad?*  
*what it good surprising that-Dan will+study*  
 b. *\*ma ze savir / barur še-dan yilmad?*  
*how it probable obvious that-Dan will+study*

According to my analysis, *savir* and *barur* are ergative; the clause is thus a complement, and extraction should be possible. The ungrammaticality of (90b) thus requires explanation, which I do not have at the moment.

A possible direction is to analyze *ze*, when it appears with ergative adjectives, as originating in object position, receiving the adjective's internal  $\theta$ -role, than raising to subject position (see Zaring's analysis for French in 5.5.2). The clause is generated in this case as an adjunct, linked to the pronoun in object position. This suggestion requires further research, which I do not undertake here.<sup>91</sup>

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<sup>91</sup> Hazout also cites the sentences in (i) as reinforcement for his analysis. In (ia), with a null subject, extraction out of the embedded clause is possible. This suggests that the post-predicative clause is a complement. In contrast, extraction out of the embedded clause in (ib), with the subject pronoun *ze*, is impossible. This suggests that the clause in this case is an adjunct.

- (i) a. *s. ma tov [ lilmod t]?*  
*what good to+learn*  
 'What is it good to learn?'  
 b. *\*ma ze tov [lilmod t]?*  
*what it good to+learn*

According to my analysis, since *tov* is unergative, both sentences in (i) should be ungrammatical. And in fact, as shown in section 5.2.4 above, when the embedded clause is finite, extraction out of the clause is illicit with *tov* 'good', even when no subject pronoun appears in the sentence ((ii), repeated from (29c) above)

### 5.5.2 Subject pronoun selection in French

In a comprehensive study of verbs in French, Zaring (1994) shows that sentences exhibiting the linear order *NP V Clause* may have two different structures (reminiscent of the two structures in Hebrew). When the NP in subject position is *il*, the post-verbal clause is in argument position, and extraction out of it is possible. When the NP in subject position is *cela*, extraction out of the post-verbal clause is impossible. This suggests that *cela* is a referential pronoun (much like *ze* in Hebrew under Hazout's analysis) which receives the verb's  $\setminus$ -role, the clause being an adjunct. Zaring notes a correspondence between the different "extraposition" structures and different classes of verbs, and accounts for it, as follows:

(a) Impersonal passive verbs (*est décidé* 'is decided'), raising verbs (*semble* 'seems'), impersonal verbs (*faut* 'is necessary'), *dative psych* verbs (*plait* 'pleases') and pseudo-psych verbs (*arrive* 'happens') all have an internal  $\setminus$ -role which can be assigned to a clause. These verbs can appear either with *il* or with *cela*. Zaring suggests that with *il*, the role is assigned to the clause in complement position; with *cela*, the role is assigned to *cela* which is mapped in object position and subsequently moves to subject position (unlike in Hazout's analysis, where *ze* is base-generated in subject position). The clause is generated as a VP-adjunct co-indexed with *cela*.

(b) On the other hand, certain transitive verbs, such as *prouver* 'prove' can appear only with *cela*. Zaring suggests that these verbs assign an **external**  $\setminus$ -role to a clause. In extraposition structures, *cela* receives the external  $\setminus$ -role, and the clause co-indexed with it appears as an IP-adjunct.

However, this analysis of verbs in French does not extend seamlessly to adjectives, and in particular, does not capture the difference between ergative and unergative adjectives.

If there is in French a split between ergative and unergative adjectives, like in Italian, German, English and Hebrew, and if this split is semantically motivated like in these languages, then adjectives like *dangereux* 'dangerous', *bon* 'good' and others are expected to be unergative, just like in the other languages, and map their subject externally. We would therefore expect these

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(ii) *?eizo katava tov še-noam kara?*

which article good that-Noam read

It is well-known that nonfinite clauses are more transparent than finite clauses to extraction (see e.g. Chomsky 1986b). It is thus possible that extraction in (ia) is possible due to the nonfinite nature of the clause, despite its status as an adjunct.

adjectives to appear only with *cela*, a referential pronoun which can receive their external  $\theta$ -role. However, these adjectives appear also with *il*, as shown in (91).

(91) *il est dangereux que cet homme soit libre.*

it is dangerous that this man is free

It is unclear which element receives the external  $\theta$ -role of *dangereux* in such cases. A possible solution would be claiming that *il* can function as a referential pronoun here. This was suggested for English by Napoli (1988), who shows that referential *it* occurs in extraposition structures. Again, further research is needed to solve this problem.

## 5.6 Conclusion

This chapter discussed ergative adjectives – the class of adjectives mapping their subject internally, first discussed in Cinque (1990). It was shown that such a class of adjectives exists in Hebrew and English as well, and is composed of the semantic analogues of the relevant adjectives in Italian and Dutch. Further, it was argued that the class can be characterized semantically, as adjectives selecting propositional arguments, or expressing properties of propositions. It was suggested that the peculiarity of ergative adjectives, namely the fact that they map their subject internally, unlike all other adjectives, stems from the semantic property of their argument. Assuming, as was argued in chapter 2, section 2.3.2, that adjective formation involves marking for lambda-abstraction, which "externalizes" one of the root's  $\theta$ -roles, it can be straightforwardly explained why propositional adjectives are ergative. By hypothesis, the variable abstracted over by the lambda-operator in the semantic component can be only of the type of individuals or events, and not of the type of propositions. Hence, roles assigned to propositions cannot be marked for lambda-abstraction, and as a consequence, are not "externalized" in the process of adjective formation, but rather assigned internally.

This analysis of ergative adjectives strongly supports the hypothesis that adjective formation, as a rule, includes marking of a role for abstraction, as this assumption, given the additional stipulation that the lambda-operator in this case is selective with regard to the type of variables it can abstract over, accounts for the syntactic difference between ergative and unergative adjectives.

## **6 Adjective formation: An overview**

In chapter 2, it was shown that the subjects of adjectives are not realized inside the adjectival projection. I have thus argued that adjective formation must involve lexical marking of one of the root's  $\theta$ -role for  $\lambda$ -abstraction. Chapter 5 presented evidence that this generalization is too strong; since roles assigned to propositions cannot be marked for abstraction, when a root has a such a role, it can form an adjective without it being externalized.

In chapters 3 and 4, two case-studies of adjective formation were discussed: adjectival passive formation and adjectival present participle formation. These chapters exemplified the workings of the externalization mechanism. Interestingly, in the cases described in these chapters, externalization was always accompanied by an additional, valence-changing operation on the root's  $\theta$ -grid.

This chapter offers a general overview of the different available options for adjective formation, both options discussed in this work and additional options. In 6.1, I discuss which one of a given root's  $\theta$ -roles can in principle be marked for abstraction. In 6.2, I present the various valence-changing operations accompanying externalization in the different cases.

## **6.1 Which roles can be marked for $\lambda$ -abstraction?**

Taking into consideration the case-studies presented in chapters 3 and 4, it becomes apparent that when adjective formation takes place, marking for abstraction can apply either to an external or to an internal  $\theta$ -role, namely, either to roles that, in the verbal domain, are mapped to subject position or to those that are mapped to object position. Let us examine each case.

### **6.1.1 External roles marked for abstraction**

In chapter 4, section 4.4.3 it was shown that the formation of certain adjectival present participles (e.g. *revealing*) involves marking of an external role for abstraction. In this case, the external argument of the basic entry (REVEAL) remains external, or, more accurately, gets mapped as a 'truly' external argument.

Marking of an external role occurs also in other cases of adjective formation, not discussed in the present study. For example, it seems to be operative in the formation of adjectives suffixed with *-ive* (e.g. *supportive*), as well as in the formation of adjectives non-related to verbs (e.g. *proud*). In



all of these cases, the external role of the base (e.g. SUPPORT, PROUD) is marked to undergo  $\lambda$ -abstraction and ends up as a 'truly' external argument.

### 6.1.2 Internal roles marked for abstraction

As exemplified in chapters 3 and 4, marking of an internal role for abstraction occurs in the formation of adjectival passives and decausatives (e.g. *written*, *frozen*, see 3.5.4 and 3.5.5 in chapter 3), as well as in certain cases of adjectival present participle formation (e.g. *interesting*, see 4.4.3 above). In these cases, one of the base entry's (WRITE, FREEZE, INTEREST) internal roles becomes a 'truly' externally assigned role.

Marking of an internal  $\theta$ -role is reasonably also operative in the formation of *-able* adjectives (e.g. *manageable*). Here, too, the internal  $\theta$ -role of the base ends up assigned to the adjective's subject.

#### 6.1.2.1 Only internal roles realized by DPs can be externalized

What type of internal roles can be "externalized", or marked for  $\lambda$ -abstraction? Levin & Rappaport (1986) have addressed this question in their analysis of adjectival passive formation, which includes a lexical externalization operation. The generalization they reached, which seems empirically correct, is that only direct arguments of the verb (as explained in 1.1.3, this is the base for the derivation of the adjective, according to the authors), namely those not introduced by prepositions, may be externalized. This generalization accounts for the contrast in (1): externalization of the Theme of *read*, a direct argument realized by a DP (*read the book*), is possible (1a), while externalization of the Goal of *read*, realized by a PP (*read to the student*) is impossible (1b).

- (1) a. The book remained unread.  
b. \*The student remained unread.

The authors account for this generalization stating that an indirect argument cannot be  $\theta$ -identified in the absence of its  $\theta$ -role assigner (the preposition); since PPs cannot serve as adjectival subjects, the indirect argument can never be identified, and the resulting structure (e.g. (1b)) will be ungrammatical.

Note however a certain terminological confusion in Levin & Rappaport's analysis. The authors argue for a lexical derivation of adjectival passives, and a lexical externalization operation. Clearly, then, what is being externalized is not an argument (i.e. this is not a case of A-

movement, as in verbal passives), but rather a  $\theta$ -role. Therefore, when Levin & Rappaport write, for example, "externalization of an indirect argument can never result in a well-defined structure" (p. 650), the sentence should be read as: "externalization of a role which would be assigned to an indirect argument can never etc..".

In the framework of the Reinhart's (2002) Theta System, it is in fact possible to know, in many cases, which  $\theta$ -role will be assigned to a direct argument, and which will not. This is so since in this theory, the availability of an accusative Case feature for a given verb is determined based on its thematic properties. Reinhart (2002) suggests the following generalization:

(2) A verb with a [+] cluster and a fully specified [/-c] cluster has an accusative Case feature. [+] clusters are clusters in which all features are valued positively (i.e. [+c], [+m], [+c+m]). Fully specified [/-c] clusters are fully specified roles containing the valued feature [-c], i.e. [-c-m] and [-c+m]. According to the generalization, verbs with one of these fully specified internal roles have an accusative feature that needs to be checked. Thus, they will necessarily have a DP object checking this feature, and this DP will also receive the fully specified role. In contrast, verbs with other internal roles (e.g. Goal [-c] or Subject Matter [-m]) do not have an accusative feature, and thus their object must be realized as a PP (Botwinik 2010). We can thus predict which roles are assigned to DP objects, and which ones to PP objects, and accordingly, which roles are possible candidates for externalization. Let us examine the different cases.

**Fully specified [/-c] internal roles.** As mentioned above, when a verb has a Theme ([-c-m]) or an Experiencer ([-c+m]) internal  $\theta$ -role, it is endowed with an accusative feature. Thus, these roles are always assigned to DPs. According to Levin & Rappaport's generalization, therefore, they are licit targets for externalization. And indeed, we can observe that Themes and Experiencers are externalized, for example in the derivation of adjectival passives; in *written* the Theme role is externalized, and in *bored* – the Experiencer role.

**Underspecified roles.** The underspecified roles [-c] (Goal) and [-m] (Subject Matter) present a somewhat more complicated picture. These roles do not endow the verb with an accusative Case feature. However, as [-] clusters of transitive verbs (clusters all of whose values are negative), these roles are uniformly mapped internally according to the mapping procedures of Reinhart (2002). This situation gives rise to different scenarios:

**The Goal [-c] role.** This internal role can be assigned to internal arguments which are either dative PPs (3a), or, in certain languages, dative DPs (3b,c) (see Botwinik 2010 for arguments that *disturb* assigns a [-c] role, and that *the children* is a dative DP).

- (3) a. He drove [to the city].  
b. He taught [the children] English.  
c. He disturbed [the children].

When the role is assigned to a PP, externalization is predicted to be impossible. When it is assigned to a DP – it is predicted to be possible. These predictions are indeed borne out, as can be seen in (4):

- (4) a. \*The city remained undriven.  
b. The children remained untaught.  
c. The children remained undisturbed.

**Subject Matter [-m]).** Object-Experiencer verbs (e.g. *worry*) present an interesting alternation, discussed in detail in Reinhart (2002) (see also chapter 4, section 4.3.2.2 above). Abstracting away from many details, according to Reinhart, the basic  $\theta$ -grid of these verbs includes three roles: Cause, Experiencer, and Subject Matter. The Cause role can be reduced, resulting in a dyadic verb, as in (5). In this case, the Experiencer role is mapped externally, and the Subject Matter role is mapped internally. Note that although the basic experiencer verb has an accusative feature (it has both a [+] cluster and a fully specified [/-c] cluster), this feature is reduced when the Cause role is reduced (see Reinhart 2002, Reinhart & Siloni 2005 for the observation that valence-changing operations are often accompanied by accusative Case reduction). Thus, the subject matter role must be realized as a PP.

- (5) John is worried [about his health].

Since the role is realized as a PP, it is not predicted to be able to undergo externalization. This is indeed borne out, as seen in (6).

- (6) \*John's health is unworried.

However, object-Experiencer verbs also have a realization in which their external [+c] role, though not eliminated, is not syntactically realized. Since the role is not realized, nominative Case is available, and the Subject Matter role can be realized as a complement DP and move to

subject position to check this Case (7a). The argument bearing the role appears in subject position, but it is an internal argument, as can be deduced from the binding pattern in (7b).<sup>92</sup>

- (7) a. John's health worries him.  
b. [His health]<sub>i</sub> worries [every patient]<sub>j</sub> t<sub>i</sub>.

Since the Subject Matter role is a direct object in cases such as (7), it is a licit target for externalization. And in fact, it is externalized in the formation of adjectival present participles of object-Experiencer verbs (e.g. *mad'ig* 'worrisome', see chapter 4, section 4.4.3).

We have thus seen that only internal  $\theta$ -roles assigned to DPs can be externalized. Furthermore, the Theta System's criterion for the existence of an accusative feature, and the mapping procedure, enable us to predict in many cases which  $\theta$ -roles will be realized by DPs (and thus will be available for externalization), and which as PPs.

#### 6.1.2.2 Only roles which can appear as sole arguments can be externalized

As explained above, Levin & Rappaport (1986) claim that only direct arguments can be externalized. But, the authors further argue that this condition is not sufficient. Even direct arguments cannot always be externalized. For example, both *teach* and *sell* have two possible direct arguments each, since they exhibit the dative alternation (8). However, the goal argument of *teach* can be externalized in adjectival passive formation (9a), whereas that of *sell* cannot (9b).

- (8) a. He taught the children English.  
b. He taught English to the children.  
c. He sold the costumer the car  
d. He sold the car to the customer.
- (9) a. The children remained untaught.  
b. \*The customer remained unsold.

This is correlated with the fact that, as seen in (10a), the Theme argument of *teach* is optional, whereas the Theme argument of *sell* is obligatory (10b).

- (10) a. He taught the children.

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<sup>92</sup> Notice that although in English *worry* appears both in (5) and in (7), it is in fact a different verb in the two cases – the verb in (5) underwent elimination of the external  $\theta$ -role, and that in (7) did not. In other languages, the two verbs have different forms (e.g. in Hebrew *da'ag* is the reduced verb, and *hid'ig* – the verb with the full  $\theta$ -grid).

b. \*He sold the customer.

Thus, according to Levin & Rappaport, (9a) is grammatical since the unrealized  $\theta$ -role, the Theme, is optional. In contrast, since the Theme of *sell* is obligatory, it should be realized in the adjectival sentence, just like in a verbal one. But since adjectives cannot check Case (*\*The customer remained unsold the car*), and since, as noted by the authors, *of*-insertion is not a productive rule in the construction of adjectival phrases (*\*The customer remained unsold of the car*), the  $\theta$ -role cannot be realized.<sup>93</sup> This results in a violation of the  $\theta$ -criterion, hence the ungrammaticality of (9b).

The conclusion of Levin & Rappaport (1986), then, is that only direct arguments of a verb can be externalized in adjectival passive formation (since PPs cannot occupy the subject position), and this only under the condition that the verb has no additional direct argument (as this would lead to a violation of the  $\theta$ -criterion). I adopt Levin & Rappaport's characterization of the type of arguments which can be externalized, and further suggest that this characterization is true not only for adjectival passives, but for externalization in the formation of any type of adjective. Note, that the Theme»Proposition role cannot be externalized either, but this is due to the properties of the  $\lambda$ -abstraction mechanism, as discussed in chapter 5.

To conclude this discussion, let us summarize the types of internal roles which can be lexically marked for abstraction in adjective formation, in a table (11).

(11)

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<sup>93</sup> See 6.2.2 below for a discussion of *of*-insertion.

Type of role    Example of basic entry        Resulting adjective

Theme:

V  $\theta$ [+c+m]  $\theta$ [-c-m]

WRITE

written

Experiencer:

V  $\theta$ [+c]  $\theta$ [-c+m] ( $\theta$ [-m])

BORE

bored

Goal, when realized as a Dative DP:

V  $\theta$ [+c+m]  $\theta$ [-c] ( $\theta$ [-c-m])

TEACH

taught

Subject matter, when the external role is not realized, and nominative is available:

V ( $\theta$ [+c])  $\theta$ [-c+m]  $\theta$ [-m]

EXCITE

exciting

## 6.2 Valence-changing operations accompanying adjective formation

We have seen in the previous section that adjective formation includes marking of one  $\theta$ -role, external or internal, for  $\lambda$ -abstraction. Note, however, that if the basic entry is dyadic, something more must happen. Indeed, in the adjective formation operations presented in chapters 3 and 4, lexical marking was always accompanied by a valence-changing operation, affecting the basic entry's thematic grid. Why is that?

If the transitive basic entry's external role was marked for abstraction, we are still left with the internal  $\theta$ -role. If this is a role assigned in the verbal domain to a direct argument, some manipulation of this role is required, since an adjective, unlike a verb, cannot check its complement's accusative Case.

If the transitive basic entry's internal role was marked for abstraction, we are still left with the base's original external  $\theta$ -role. This role cannot be realized either, since there is no available Case for it: the argument receiving the externalized role, generated in spec,PredP, will be the one closest to spec,TP, thus the one raising to receive nominative Case.

It is therefore necessary to "take care" of the internal  $\theta$ -role when the external one is marked for abstraction, and vice versa. How is that accomplished? Let us look at each case separately.

### **6.2.1 Manipulating an external $\theta$ -role**

How can one "get rid", so to speak, of an external  $\theta$ -role? We can answer this question by looking at the verbal domain. There, we can observe that there are three ways to "eliminate" an external  $\theta$ -role: it can be saturated (namely, existentially bound in the semantics) as in passive verbs; it can be reduced, or eliminated, altogether, as in the formation of unaccusative verbs according to Reinhart (2002), Levin & Rappaport (1995) and others; or, if this is licensed, it can remain unassigned, as is possible with object-Experiencer verbs (see discussion of (7) above). We have already seen in the previous chapters that the three possibilities are put to use in adjective formation:

- (i) Saturation of the external  $\theta$ -role is involved in the formation of 'true' adjectival passives, as explained in chapter 3.
- (ii) Reduction of the external  $\theta$ -role takes place in the formation of adjectival decausatives, as discussed in chapter 3.
- (iii) Non-realization of the external  $\theta$ -role occurs in the formation of adjectival present participles of object-Experiencer verbs, as was shown in chapter 4, section 4.4.3.

We can thus conclude that there is a significant parallelism between the adjectival domain and the verbal domain with regard to the possibilities of non-realization of an external argument.

### **6.2.2 Manipulating an internal $\theta$ -role**

Again, bearing in mind what we know of the verbal domain, and in this case, of the nominal domain as well, we can observe that there are two ways to avoid a direct object. Either lexically saturate the internal  $\theta$ -role (as in verbal null object constructions, e.g. *John ate*, which is interpreted as *John ate something*, see Rizzi 1986b), or realize it as a PP with a semantically vacuous preposition checking Case (i.e. *of*), rather than a DP (cf. the productive rule of *of*-insertion in event nominals). I propose that both these options are exploited in adjective formation, and the choice between them depends on the thematic role assigned to the direct object.

(i) If the internal role is a role assigned in the verbal system to an *accusative marked* direct object (i.e. a Theme or an Experiencer), the role undergoes saturation, namely, is marked for undergoing existential closure in the semantics. This is what happens in the formation of adjectival present participles from transitive roots, see discussion in chapter 4, section 4.4.3.

(ii) If the internal role is a role assigned in the verbal system to a *dative marked* direct object (i.e. Subject Matter or Goal), the role remains intact, but *of*-insertion occurs in order to enable Case-checking. Let us demonstrate this point.

In the nominal domain, *of*-insertion is a productive rule. In essence, when a verb has an accusative Case feature (12a), a nominal derived from it can take the same type of complements, but these will appear in an *of*-phrase, as in (12b).

- (12) a. The army destroyed the city.  
b. The destruction of the city.

It has therefore been suggested by Chomsky (1981) that *of* is a dummy preposition, assigning (or checking) accusative Case.

In the same discussion of the categorial component and Case theory, Chomsky (1981) extends this proposal to the adjectival domain, suggesting that the Case deficiency of adjectives, just like that of nouns, is overcome by the surface application of '*of*-insertion', as in (13).

- (13) proud John     $\rightarrow$     proud of John

This analysis, which groups adjectives with nouns with respect to *of*-insertion, became the common view in the years to come. "proud" and "envious" are often quoted as adjectives with *of*-complements,



However, if we look closely at the data, we find that 'of-insertion' in the adjectival domain is quite limited, definitely much more so than in the nominal domain. Whereas some adjectives do indeed license 'of-insertion' (14), many other adjectives do not allow it (15).

(14) supportive of, protective of, indicative of, suggestive of, dominative of, proud of, envious of

(15) a. \*productive of, \*corrective of, \*creative of, \*descriptive of...  
 b. All adjectival present participles of object-Experiencer verbs: \*interesting of, \*frightening of, \*surprising of...

How can we make sense of the facts of (14) and (15)? What sets apart the two types of adjectives? I would like to draw attention to the following fact: the adjectives in (14) all correspond to verbs which, in Hebrew, take PP complements (16).<sup>94</sup> On the other hand, the adjectives in (15) correspond to verbs taking DP complements in Hebrew (17):

(16) *tomex be-, megen al, more al, meramez al, šolet al*  
 supports in protects on indicates on suggests on dominates on  
*hitga'a be-, kine be-*  
 prided himself in envied in

(17) a. *meyacer et, metaken et, yocer et, meta'er et*  
 produces ACC corrects ACC creates ACC describes ACC  
 b. *me'anyen et, mafxid et, mafti'a et*  
 interests ACC frightens ACC surprises ACC

Botwinik (2010) shows, that what distinguishes verbs taking obligatory PP complements, such as those in (16), from those taking DP complements, is that the former have an underspecified internal  $\theta$ -role, namely, a role with one feature unspecified ([-c] or [-m]). Such verbs have a somewhat broader range of interpretation than verbs whose internal role is fully specified. Since the role is unspecified, the verb is not endowed with an accusative Case feature (see 6.1.2.1 above), and a preposition must check the complement's Case feature.

Botwinik claims, that the English counterparts of the verbs in (16) are analogous to those in Hebrew in their thematic structure, namely, they too have an underspecified internal role. Why does the difference between verbs with an underspecified internal  $\theta$ -role and a fully specified one

<sup>94</sup> A possible exception, noted by Susan Rothstein (p.c.) is *characteristic of*, which corresponds to the Hebrew verb *me'afyen* ('characterizes'), taking a DP.

not show up in English? Namely, why do the English correlates of the verbs in (16) take a direct object, despite their underspecified role? Botwinik argues that the complement of the verbs in (16) is a *dative*, rather than an *accusative* DP. These are morphologically indistinct in English, but have different  $\theta$ -features.

The generalization then seems to be, that *of*-insertion in the adjectival domain is possible only when the base's internal  $\theta$ -role is underspecified. Let us show, for example, that *proud* and *envious* have a [-m] internal role, rather than [-c-m]. We can do that using one of Botwinik's tests (due to Marelj 2004). The difference between the two roles is that the [-m] role has a possible interpretation as [+c-m], namely, it can be interpreted as causing the eventuality denoted by the predicate. A [-c-m] argument never has this interpretation. Consider now (18).

- (18) a. John is proud of his son.  
 b. John is envious of Dan.

(18a) has an interpretation in which John's son caused his father's state, namely, John's son made him proud. Likewise, if John is envious of Dan, it is possible that Dan caused him to be envious. So, when roots with underspecified internal roles undergo adjective formation, the role remains intact, and is realized syntactically as an *of*-phrase. In contrast, fully specified internal roles must be saturated in the course of adjective formation: *of*-insertion cannot be applied in these cases.<sup>95</sup>

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<sup>95</sup> In some cases, a Theme argument seems to be realized in an '*of*-phrase'. In a web search I found several examples such as those in (i).

- (i) a. His speech was revealing of the potential for change.  
 b. He is understanding of human nature.

However, I believe that '*of*' here is not a "dummy" preposition checking Case. Rather, it introduces an adjunct doubling the saturated argument, much like the '*by*' in passives (see Landau 2009 for a comparable analysis of '*of*-phrases' in evaluative adjectives, where he states that *of* in English spells out both the dummy and the 'ablative' prepositions in the language). For one, the '*of*-phrase' in these cases resists A'-movement (iia), unlike true arguments (iib).

- (ii) a. \*the potential for change of which his speech was revealing.  
 b. the walls of which he witnessed the destruction.

Further, the examples in (i) would be translated to Hebrew using adjunct-introducing prepositions (iii), rather than small, semantically vacuous prepositions checking Case.

- (iii) *hu haya mevin be-yaxas le-teva ha-adam.*  
 he was understanding in-regard to-nature the-man  
 'He was understanding with regard to human nature.'

This seems to mean that while in the nominal domain *of* is a reflex of accusative Case, in the adjectival domain it is a reflex of dative, or some other oblique case. At the moment, I have no account for this generalization.

To conclude, we have seen that, when the external  $\theta$ -role of the base is marked for abstraction during adjective formation, the internal  $\theta$ -role may either be saturated, or realized as an *of*-phrase, depending on its nature. When the internal  $\theta$ -role of the base is marked, the external role may be saturated, reduced, or left unrealized. The table in (19) summarizes the different options for adjectival formation out of a basic entry.

(19)

External $\theta$ -role	Internal $\theta$ -role	Example: Basic entry	Example: Resulting adjective
externalized	saturated	REVEAL	The shirt is <i>revealing</i>
externalized	<i>Of</i> -insertion	SUPPORT	The team is <i>supportive</i>
saturated	externalized	WRITE	The letter is <i>written</i>
reduced	externalized	FREEZE	The lake is <i>frozen</i>
unrealized	externalized	EXCITE	The job is <i>exciting</i>

### 6.3 A note on 'non-derived' adjectives

As explained in the introduction, section 1.2.1, as a consequence of my goals and methodology, the present study dealt mainly with participle, and the generalizations and mechanisms introduced in it are most naturally applicable to verb-derived adjectives. However, I would like to offer here a brief discussion of 'non-derived' adjectives, and possible directions for their analysis.

The adjectives I refer to in this section are simple, morphologically non-derived adjectives, such as those in (20) in Hebrew and English.

- (20) a. *lavan, xam, kacar*  
           white hot short  
       b. white, hot, short

In English, these adjectives are not affixed forms, related to verbs or nouns. In Hebrew, the morphological makeup of these forms is debated. According to the traditional, root-based

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Further research is required in order to understand the exact nature of the *of*-phrase in these cases.

approach to Hebrew morphology, these forms are the result of inserting the consonantal root into an adjectival vocalic template. If, on the other hand, one adopts a word-based approach to Hebrew morphology (e.g. Bat-El 1994), these words are analyzed as atomic forms. In any case, both in Hebrew and in English, these forms cannot be analyzed as morphologically derived from verbs.

Note, however, that even if these forms are indeed not morphologically derived from verbs, they can still be the result of some process of word-formation. First, it is possible that in the case of these adjectives, morphological derivation does not go hand in hand with lexical-semantic operations forming words. That is, a lexical-semantic operation occurs which gives rise to an adjective, but this process is not accompanied by morphological derivation; the morphological form of the adjective is frozen. Another possibility is that a morphological operation does accompany the formation of the adjective, but that the input for this derivation is a category-less item, rather than a verb (in Hebrew, this category-less item can be viewed either as the traditional consonantal Semitic root, or as a different type of abstract representation of the basic predicate, on a par with the roots used throughout this work, e.g. BUILD or PROUD).

We thus have two options: the adjectives in (20) are either basic entries, non-derived both morphologically and semantically, or they are semantically derived (in which case either their morphological form is frozen or it is derived from a root). The question is arising whether such adjectives can be subsumed under the sort of analyses proposed in this study for e.g. participles, in which adjective formation includes a semantic-thematic operation on a root carrying a thematic grid, or whether they represent a qualitatively different case, in which no process of word-formation applies at all.

Let me first present a possible outline for an analysis along each of the two lines above, and then briefly discuss some of the considerations which can help in determining which direction should be pursued.

(i) Morphologically simple adjectives are semantically non-derived. If simple adjectives are semantically, as well as morphologically, non-derived, we can assume that their representation is something along the lines of that in (20). Note that the lexical representation here is a lambda-formula. In section 2.3.1 I have presented arguments that lambda-expressions should not appear in the lexicon in the case of predicates taking multiple arguments, since the merging order of the different arguments is determined based on syntactic, non-lexical factors. However, this objection

is irrelevant in the case of one-place predicates: in this case the representations of the lexical information as an unordered thematic role list or as a lambda-expression are equivalent.

(21) Hot:  $\lambda s.\lambda x.HOT(x,s)$

As in the analysis of derived adjectives presented above, the argument  $x$  cannot be merged within the AP; it cannot be incorporated into the semantic representation, since merge with a lexical head is contingent upon  $\theta$ -assignment, which is impossible here – the adjective has no  $\theta$ -roles to assign. Only once Pred is merged, the external argument can be merged, in spec,PredP, and the function denoted by the AP is applied to the subject, to create the interpretation of the clause.

Note that if this analysis is adopted, the subject of the adjective is not interpreted as standing in any specific thematic relation to the event, not carrying any  $\theta$ -role familiar from the verbal domain. It is interpreted as an argument bearing some non-specified relation to the predicate. As mentioned in 1.1.1 in the introduction, several authors have suggested that adjectives indeed receive a semantic role which is unique to the adjectival domain, e.g. Pesetsky's (1982) 'attribute' role.

(ii) Morphologically simple adjectives are semantically derived. If simple adjectives are taken to be semantically derived, then their formation should include lexical marking of a  $\theta$ -role for abstraction, and perhaps additional thematic manipulations (e.g. saturation or reduction of a role), as in the other cases of adjective formation, described in 6.2 above.

Taking into consideration the semantic interpretation of such adjectives, I noted in chapter 3, section 3.4.2.2 the possibility of analyzing adjectives such as *short* as 'adjectival decausatives', namely, to assign them the lexical representation in (22).

(22) Short:  $SHORT(CAUSE_{\rightarrow}REDUC,THEME_{\rightarrow}\lambda-ABS)$

This representation states that the adjective is derived from a root whose thematic grid includes an external argument, the cause of the shortening event, which is reduced during adjective formation. The resulting adjective, *short*, has only one thematic role, Theme, and this role is not syntactically assigned but rather abstracted over to create a  $\lambda$ -expression.

How can we decide between options (i) and (ii) above? One consideration which seems to favor option (ii) is the morphological inconsistency of the relevant class of adjectives. There is a vast amount of variability between languages with regard to which adjective is morphologically simple and which derived. Even when looking only at English and Hebrew, we can observe, for example, that the English adjectives in (23a) are morphologically simple, whereas their Hebrew

counterparts in (23b) are participial in form. Opposite examples can also be found, as shown in (24).

(23) a. popular, sick, nice, ugly  
      b. *mekubal, xole, xamud, mexo'ar*

(24) a. tired  
      b. *ayef*

Given that participial forms are assigned an analysis which involves manipulation of a thematic grid, it is only natural to attribute the same analysis to the semantically identical adjectives, though the latter do not display the same morphology.

Note, however, that the analysis in (ii) entails that the subject of these adjectives is interpreted as carrying one of the familiar verbal  $\theta$ -roles – Theme, Experiencer, etc. Whether this is indeed the case is an empirical question, to which I do not have a definite answer at this point. Note that given Reinhart's (2002) Theta System,  $\theta$ -roles designate very specific relations between events (or states) and participants. For example, a Theme argument is an argument which does not cause change and whose mental state is not involved in the eventuality denoted by the predicate. This seems to indeed be a correct description of the relation between the subject and the adjective in a sentence such as *the coffee is hot*, as well as many others. But whether this is the situation for all morphologically-simple adjectives remains to be seen.

Note, crucially, that it is not necessarily the case that all simple adjectives are treated in the same way. It is possible, for example, that a cross-linguistic survey will show that there is a certain class of adjectives which display derived morphology in some languages and simple morphology in others (e.g. *ugly*), whereas other adjectives never display derived morphology (color-names may be adjectives of this type). In such a case, it may be reasonable to attribute a semantic derivation to the former class, while giving a simple basic representation as in (21) to the latter.

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