

# Definiteness spreading in the Hebrew construct state\*

Gabi Danon

## Abstract

The Construct State (CS) in Modern Hebrew displays a phenomenon known as DEFINITENESS SPREADING (DS), often characterized as having the definiteness value of the CS determined by that of its embedded genitive phrase. This is shown to be an oversimplification: semantically, DS gives rise to no less than four different interpretation patterns in definite-marked CSs. We examine the implications of these semantic facts for a Minimalist analysis of DS in terms of the operation Agree. It is argued that the formulation of Agree given in Chomsky (2000, 2001) does not provide the tools needed to account for these facts. A further problem for a syntactic analysis based on Agree is posed by the structural configuration found with adjectival CS modifiers, where agreement takes place despite the lack of the c-command relation required by Agree. This paper argues that both problems can be solved by viewing the Agree operation as a feature *sharing* operation, as proposed independently by several authors. Using this approach, all four semantic patterns can be derived using an independently motivated hypothesis regarding the interpretation of features at the syntax-semantics interface.

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## 1 Introduction

One of the most intriguing properties of the Semitic genitive construction known as the Construct State (CS) is the spreading of the definiteness value of the embedded genitive DP to the entire CS. This is illustrated in the following example, where a definite embedded DP (*ha-studentim*) renders the entire CS in object position definite:

- (1)    ha-mištara ivtexa    et   hafganat        ha-studentim ha-gdola.  
      the-police secured OM demonstration the-students   the-big  
      ‘The police secured the big student demonstration.’

The fact that the CS in (1) is definite is evident not only from its interpretation, but also from its syntactic properties: First, the object marker *et*, which is used only with definite objects, is obligatory in (1). Second, Hebrew attributive adjectives must agree with the noun that they modify in gender, number *and definiteness*; in the example above, the adjective *ha-gdola*, which modifies the entire CS headed by *hafganat*, is obligatorily marked as definite.

Over the years, many different analyses have been proposed for the phenomenon of Definiteness Spreading (henceforth DS). Most of these analyses share the assumption that DS is an obligatory process involving both semantic and syntactic definiteness simultaneously, i.e., that definiteness marking on the embedded DP always renders the entire CS as definite, both semantically and morphosyntactically. Thus, examples like (1) above have often been implicitly assumed to be the only option allowed by the grammar. However, as noted by Danon (2001) and Engelhardt (2000), this is not without systematic exceptions; for instance, certain

## 1. Introduction

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classes of construct state nominals with definite embedded DPs give rise to indefinite readings, thus failing to show definiteness spreading at the semantic level. Such ‘definiteness splits’ pose a serious problem to most existing analyses of DS, which assume the definiteness of a CS to follow in a direct and deterministic manner from the definiteness value of its embedded nominal. In fact, the exact range of definiteness interpretations in a CS has never been fully described until now, let alone analyzed and explained from a theoretical point of view. Definiteness spreading, thus, presents an interesting puzzle for models of syntax and the syntax-semantics interface.

The first goal of this paper is thus to provide a full characterization of the range of possibilities for definiteness spreading, covering not only the prototypical cases involving full semantic and syntactic DS but also those in which the definiteness values of the two nominals seem to diverge.

Accounting for the fact that definiteness can ‘spread’ from the phrase where it is marked to other phrases poses a serious theoretical challenge, as it seems to require a mechanism for multiple interpretations of a single linguistic resource. After surveying the various analyses previously proposed for DS, I will argue for a novel analysis of the syntax of definiteness spreading, which is tied to a theory of the way in which grammatical features are handled by the syntax-semantics interface. The analysis is based on two recent proposals within the Minimalist framework, under which agreement should be viewed as feature *sharing*. The analysis to be proposed borrows various ideas from many of the previous analyses of DS, but the specific implementation in terms of feature sharing, which differs from the formal mechanisms previously assumed, will be shown to correctly account for the full range of semantic facts, while still being theoretically simple and compatible with

general assumptions regarding the nature of basic syntactic operations.

From a more general theoretical perspective, this paper aims to show that DS provides empirical evidence in favor of viewing natural language phenomena in which the value of a feature on one node is dependent on the value of the same feature on another node as feature *sharing*, which contrasts with the model of checking/valuation and deletion commonly assumed in the Minimalist literature. I will show that a feature-sharing approach, in addition to providing a better basis for an analysis of the semantic facts, can also correctly account for a certain structural problem, first noted in Danon (2007), regarding the configurational relation between nodes showing a dependency in definiteness. It will be shown that definiteness spreading may relate pairs of nodes that do not stand in a c-command relation, which according to standard formulations of the operation Agree is predicted to never be possible. The proposed feature sharing analysis, on the other hand, exploits the transitivity of the feature sharing operation to correctly derive the observed structures.

The organization of the paper is as follows: Section 2 provides some basic background on the construct state in Hebrew and surveys the data regarding the range of interpretations found with definite-marked CSs. Section 3 is an overview of the major approaches to explaining DS in previous work; I will argue that none of these approaches correctly predicts all aspects of the syntax and the semantics of DS. Section 4 discusses a structural problem that poses a serious challenge to any analysis of DS that views DS as agreement; this section also provides the theoretical background in which the proposed analysis will be formulated. Section 5 lays out the analysis of DS in terms of feature sharing.

## 2 The construct state and definiteness in Hebrew

### 2.1 Background: the construct state in Modern Hebrew

Let us start with an overview of some basic facts about the syntax of Hebrew noun phrases in general, and the syntax of the CS in particular. Most of these facts have been extensively discussed in the literature on Semitic DPs; see for instance Borer (1999), Ritter (1991) and Siloni (2001).

A construct state nominal (CSN) consists of a nominal head, which is phonologically reduced and must be immediately followed by an embedded nominal phrase;<sup>1</sup> I will refer to these as *the head* and *the genitive*, respectively:<sup>2</sup>

- (2)     tmunat \*(ha-nasi)  
         picture \*(the-president)  
         ‘the picture of the president’

The definite article can never be attached to the nominal head of a CSN, as shown in (3a); this distinguishes CSNs from so called ‘free nominals’, which use the prepositional marker *šel* in front of embedded genitives, as illustrated in (3b):<sup>3</sup>

- (3)    a.   \* ha-tmunat ha-nasi  
             the-picture the-president  
             ‘the picture of the-president’

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<sup>1</sup>The only possibility for using a noun in the reduced form with no genitive phrase is by attaching a pronominal clitic to it.

<sup>2</sup>In most of the literature on the syntax of CSNs, what I refer to as ‘the head’ is actually the head of NP, which is dominated by one or more functional projections, and hence it is not technically the head of the CSN as a whole. The term ‘head’ is used in what follows simply as a convenient way to refer to the overt lexical head.

<sup>3</sup>In colloquial Hebrew it is actually quite common to attach the article to the head of a CSN instead of to its embedded genitive. In this paper I focus only on what is often termed ‘standard’ Hebrew, where attaching the article to the head of a CS is ungrammatical.

## 2.1 Background: the construct state in Modern Hebrew

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- b.    ha-tmuna   šel ha-nasi  
      the-picture of the     president  
      ‘the picture of the president’

The only way of specifying the definiteness of a CSN is via definiteness spreading: the definiteness value of the CSN as a whole is determined by the definiteness value of the embedded genitive. Thus, a definite genitive in (2) renders the entire CSN definite.

Hebrew has only a definite article and lacks an indefinite article.<sup>4</sup> The definite article, *ha-*, is a prefix that attaches to the noun, rather than an independent word. Following Borer (1988, 1999), Danon (2001), Falk (2006), Siloni (1997), Wintner (2000) and others, I consider the article to be the morphological realization of a morphosyntactic definiteness feature, [+def], rather than an independent syntactic head. Among other advantages of this view, it makes it possible to analyze definiteness agreement between nouns and modifying adjectives, illustrated below in (4), as a simple instance of concord, which would be derived using the same mechanism that accounts for gender and number concord between nouns and adjectives.<sup>5</sup>

- (4)    ha-tmunot   ha-xadašot  
      the-pictures the-new  
      ‘the new pictures’

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<sup>4</sup>An unstressed postnominal numeral *exad* (‘one’) is sometimes used as a kind of optional indefinite article; its distribution, however, seems to correlate not only with indefiniteness but also with specificity.

<sup>5</sup>Sichel (2002), on the other hand, argues that *ha-* is an independent head inserted in D and not a bound morpheme, based on the fact that elements such as negation and modifiers may sometimes separate between *ha-* and an attributive adjective that agrees in definiteness with the modified noun. This, however, is only possible in colloquial Hebrew, which might suggest that the status of the definite article is undergoing diachronic change. In what follows I restrict the discussion to ‘standard’ Hebrew, in which the definite article is strictly a bound prefix.

Another important property of the Semitic CS is its cross-categorical nature. As noted by Borer (1999), Danon (2001), Hazout (2000), Siloni (2000, 2002), Wintner (2000) and others, one can find, in addition to constructs headed by a noun, constructs headed by adjectives, quantifiers, numerals, and participles. According to Botwinik-Rotem and Terzi (2006), Danon (2007) and Siloni (2000), even PPs in Hebrew should be analyzed as instances of the CS. These different kinds of CS are illustrated below:

- (5) a. gdoley \*(ha-mumxim)  
big.PL \*(the-experts)  
'the biggest experts'
- b. kol/alfey \*(ha-yeladim)  
all/thousands \*(the-children)  
'all the children/the thousands of children'
- c. lovšey \*(ha-xalifot)  
wearers the-suits  
'the suit wearers'
- d. lifney \*(ha-mesiba)  
before \*(the-party)  
'before the party'

The heads of the phrases in (5) can be characterized by the same phonological paradigm as the one that creates heads of CSNs.<sup>6</sup> Furthermore, the phrase-initial heads in these examples must be followed by an obligatory DP; alternatively, they may host a pronominal clitic, which is morphologically identical to the one used with heads of CSNs. Like in nominal CS, the definite article is not allowed on the head of these non-nominal constructs; just like in CSNs, these phrases are rendered

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<sup>6</sup>In some cases, such as in monosyllabic words, the phonological form of a head of a CS is identical to that of a non-CS head; therefore, phonology alone cannot always be used as a reliable indicator for deciding whether a given phrase is in the construct state.

## 2.2 The interpretation of a definite-marked CS

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definite only by means of the marking on their embedded DP.<sup>7</sup>

It should be noted, however, that the cross-categorial status of the CS applies only to its head; the phrase that follows the head, on the other hand, is always nominal. Thus, one does not find constructs with an embedded PP or CP:

- (6) a. \*tmunat im ha-praxim  
picture with the-flowers  
'the picture with the flowers'
- b. \*hakxašat še- ha-nasi poše'a  
denial that the-president criminal  
'the denial that the president is a criminal'

This fact could naturally be related to the fact that the Semitic CS involves genitive Case assignment to the embedded phrase, which is morphologically visible in Standard Arabic and abstract in Hebrew. We return to this point in §5.4.

## 2.2 The interpretation of a definite-marked CS

As mentioned above, many discussions of definiteness spreading in CSNs take it for granted that morphosyntactic definiteness, reflected in definiteness agreement with adjectives and in the use of the object marker *et*, and semantic definiteness, i.e. the interpretation of the nominal as definite or indefinite, stand in a one-to-one relation. Furthermore, the implicit assumption has often been that definiteness spreading in a CS is necessarily 'total', such that both levels of a definite-marked CS are always definite. Thus, examples such as (1) are often cited as characteristic of DS, where the definiteness of both the entire CSN and the embedded nominal is evident both syntactically and semantically.

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<sup>7</sup>The fact that examples (5a)–(5c) are definite is clear from their interpretation. PPs as in (5d) are argued in Danon (2007) to also carry an optional definiteness value, which is sometimes reflected in definiteness agreement between PPs and nouns that they modify.



However, as discussed in Danon (2001), syntactic and semantic definiteness do not always correlate with each other. Perhaps the clearest example involves demonstratives, which, in Hebrew, have the syntactic behavior of adjectives, and hence carry a definite article iff the noun does; when no article is present, a demonstrative gives rise to a noun phrase that is semantically definite and syntactically indefinite:

- (7)   sefer (\*ha-)xašuv       ze  
       book (\*the-)important this  
       ‘this important book’

More important for the discussion of CSNs is the observation made in Danon (2001) that there are constructs that are not necessarily interpreted as definite, even though their embedded DP is definite. Consider for instance the definite-marked CSN *tošav ha-štaxim* in the following example:

- (8)   etmol   ne’ecar la-xakira       tošav   ha-štaxim,   ve- ha-yom  
       yesterday arrested to-interrogation resident the-territories and today  
       ne’ecar   od       exad.  
       arrested another one  
       ‘A resident of the territories was arrested for interrogation yesterday, and  
       another one was arrested today.’

The CSN in this example is interpreted as *indefinite*, as shown by the fact that it is felicitous even though the second clause entails that there is no uniqueness presupposed.

There are two possible approaches for the analysis of such cases: according to Dobrovie-Sorin (2003), no DS applies in this case, such that the CSN in (8) is not [+def] despite having a [+def] embedded nominal; Dobrovie-Sorin claims that this follows from the CSN in (8) having a syntactic structure that differs from the structure of CSNs that show DS. Alternatively, Danon (2001) argues that the entire CSN carries a morphosyntactic [+def] feature despite being semantically indefinite. Ev-

## 2.2 The interpretation of a definite-marked CS

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idence for spreading of *morphosyntactic* definiteness in this kind of CSN comes from the fact that when the CSN in (8) is used in object position, it must be preceded by the object marker *et*.<sup>8</sup>

- (9)    ani makir \*(et) tošav    ha-štaxim.  
      I    know OM    resident the-territories  
      ‘I know the resident of the territories.’

However, unlike the CSN in (8), which could in principle be interpreted as either definite or indefinite (with the indefinite reading forced only by the non-uniqueness entailed by the second conjunct), the same CSN in (9) must be interpreted as definite, i.e. it presupposes a unique resident of the territories in the context. Danon (2002) argues that the loss of the indefinite reading occurs only after *et* (and not in oblique argument positions, for instance), which could be taken as evidence that the object marker itself has semantic content. Under this view, the syntactic definiteness feature of the CSN is not necessarily interpreted as semantic definiteness, unless external factors force this. This contrasts with the approach advocated by Dobrovie-Sorin (2003), who argues that there is no ‘split’ between syntactic and semantic definiteness, and that the interpretation of (9) follows from its having the kind of internal structure that leads to DS, unlike the CSN in (8).

The analysis developed in the rest of this paper further pursues the ideas pro-

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<sup>8</sup>For some reason, adjectival modification of a CSN like the one in (8) forces a definite reading of this DP. More specifically, an adjectival modifier for this CSN is ungrammatical unless marked as definite (*tošav ha-štaxim \*(ha-)gavo’ha*, lit. ‘resident the-territories \*(the-)tall’); and in the presence of a definite-marked adjective, only a definite reading of the entire CSN is possible. The fact that we get only a definite reading does not follow from the analysis developed in this paper; the fact that an indefinite adjective is ungrammatical, on the other hand, does not follow from the alternative approach advocated by Dobrovie-Sorin (2003). I leave it as an open question what causes this phenomenon.

posed in Danon (2001, 2002), and specifically the hypothesis that a [+def] feature is not necessarily interpreted on every nominal where it appears. Thus, I will argue that some occurrences of [+def] are reflexes of *syntactic* operations, where semantic interpretability of such features is an interface condition that relies on the semantics being able to ‘see’ the dependency between two (or more) nominals bearing [+def]. In what follows I will develop an analysis according to which the embedded DP and the CS as a whole share the same *syntactic* definiteness value, but are not necessarily interpreted as both definite or both indefinite.

Before considering the theoretical issues, it is important to note the range of empirical facts. Focusing on constructs with a definite-marked embedded nominal (henceforth, ‘[+def] CS’), we find no less than four interpretation options:

- [+def] interpreted both on the embedded DP and on the CS as a whole
- [+def] interpreted only on the embedded DP
- [+def] interpreted only on the CS as a whole
- [+def] not interpreted at all within the CS

These four possibilities are discussed in detail below.<sup>9</sup>

**[+def] interpreted both on the embedded DP and on the CS as a whole** Of the four interpretation possibilities for a [+def] CS, this is the one acknowledged by virtually all authors, and it has often been assumed to be the only possible interpretation. In prototypical ‘semantic DS’, the definiteness value is interpreted on

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<sup>9</sup>Since a CS can be recursively embedded inside another one, the discussion below predicts that the number of possible interpretation patterns should be exponentially dependent on the number of embeddings; thus, when one simple CS is embedded inside another, the discussion predicts 8 possible patterns. Judgments are quite subtle in these cases, but I believe that with careful selection of lexical items all patterns can indeed be observed.

## 2.2 The interpretation of a definite-marked CS

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both levels. For instance, example (10a) below could be paraphrased as (10b), with two definite DPs:

- (10) a. xulcat ha-yeled nirteva.  
shirt the-boy got-wet  
'The boy's shirt got wet.'
- b. ha-xulca šel ha-yeled nirteva.  
the-shirt of the-boy got-wet  
'The boy's shirt got wet.'

**[+def] interpreted only on the embedded DP** As noted by Danon (2001, 2002), Engelhardt (2000) and Fassi Fehri (1999), a CSN with a definite embedded DP is *not always* interpreted as definite. In examples (11a–b) below, the most natural reading is one in which no uniqueness is assumed for the CSN:<sup>10</sup>

- (11) a. dan hu yelid ha-ir.  
Dan is native the-city  
'Dan is a native of the city.'
- b. lifney švu'ayim ne'ecar saxkan ha-kvuca.  
before two weeks arrested player the-team  
'A player of the team was arrested two weeks ago.'

Thus, (11a) does not require the implausible presupposition that there is only one native of the city; and (11b) is compatible with a context in which none of the players of the team is salient from the previous context.<sup>11</sup> Lack of a uniqueness presupposition is thus an indication that the [+def] feature in these examples is not interpreted on the CSN as a whole. These are not isolated examples: CSNs headed by 'group

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<sup>10</sup>It is not totally clear whether the head of the CS in (11a), *yelid*, should be analyzed as a noun or as an adjective. This is irrelevant to the point being made, that there is no uniqueness associated with the CSN.

<sup>11</sup>Some speakers find it easier to get an indefinite reading in these cases when the embedded nominal is a proper name, such as *yelid Tel-Aviv* ('a native of Tel-Aviv') and *saxkan ha-po'el Tel-Aviv* ('a player of ha-po'el Tel-Aviv').

## 2.2 The interpretation of a definite-marked CS

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nouns', i.e., nouns that denote membership in a group or collective, such as *xaver* ('member') and *oved* ('employee'), systematically give rise to this kind of indefinite reading.

Further evidence for lack of semantic DS is given in Engelhardt (2000). Engelhardt shows that 'non-definite' event-denoting CSNs are allowed in environments that disallow definites, as illustrated in the following example (Engelhardt 2000, p. 71):

- (12) a. ruti mevala et zmana be-/\*ba- ktiva.  
ruti spends OM time.3SGFEM in-/\*in.def- writing  
'Ruti spends her time writing.'
- b. ruti mevala et zmana be- ktivat ha-sefer.  
ruti spends OM time.3SGFEM in- writing the-book  
'Ruti spends her time writing the book.'

Sentence (12a) establishes the fact that the complement of the preposition *be-* ('in') in sentences of this kind must be indefinite: the PP *ba-ktiva* ('in-the-writing') renders the sentence ungrammatical. Having established this fact, Engelhardt then shows that the [+def] CSN *ktivat ha-sefer* in (12b) is allowed in this environment, despite having a definite embedded DP. This shows that, at least in some respects, such CSNs are not definite.<sup>12</sup>

**[+def] interpreted only on the CS as a whole** As noted by Dobrovie-Sorin (2000), the embedded nominal in a definite-marked CS (i.e., the nominal carrying the definite article) is not always interpreted as definite. This is illustrated in the following examples:

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<sup>12</sup>Engelhardt argues that such CSNs are 'non-definite' as a result of lacking the DP layer, which is the locus of definiteness features. I will not adopt this analysis; instead, I will assume that CSNs like this are specified for a syntactic [+def] feature that is not interpreted on the CS level.

## 2.2 The interpretation of a definite-marked CS

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- (13) a. ha-mas ha-ze yifga be- roxšey ha-diroť.  
the-tax the-this hurt.FUT in buyers the-apartments  
'This tax will hurt the buyers of apartments.'
- b. asfan ha-atikot ha-ze hu poše'a.  
collector the-antiques the-this is criminal  
'This antique collector is a criminal.'

As the English translation should make clear, the embedded nominal in these examples is not interpreted as definite. Informally, these embedded nominals are non-referential and denote properties; hence, it might be argued that these are NPs rather than full DPs (Borer 1999, Dobrovie-Sorin 2003), an assumption that I will adopt. CSNs with such non-referential genitive phrases systematically give rise to a definite interpretation of the whole CSN and not of the NP on which the definite article appears.

CSNs with this interpretation pattern are extremely common. In many cases, the difference between this kind of interpretation and the 'double definiteness' reading is simply a pragmatic issue. Consider for instance the following pair of examples:

- (14) a. tmunat ha-nasi še- al ha-kir hudpesa be- hodu.  
picture the-president that on the-wall printed in- India  
'The president's picture on the wall was printed in India.'
- b. tmunat ha-yogi še- al ha-kir hudpesa be- hodu.  
picture the-yogi that on the-wall printed in- India  
'The yogi's picture/the picture of a yogi on the wall was printed in India.'

In (14a), the CSN in subject position is usually interpreted as involving double definiteness: both the picture and the president are understood as unique in the context. In the minimally contrasting (14b), on the other hand, the most natural interpretation is that the context contains only one picture of a yogi, but the yogi in

the picture is not necessarily unique or familiar. Put in this perspective, the apparent double definiteness in (14a) as opposed to (14b) might simply be the result of the fact that most contexts presuppose a unique president. More generally, double definiteness systematically surfaces where both nominals are referential and where contextual and lexical factors induce a presupposition of uniqueness; in contrast, the embedded nominal is not interpreted as definite when it is nonreferential.

**[+def] not interpreted at all within the CS** As noted in Winter (2005), definite articles in adjectival CS modifiers may be semantically vacuous:

- (15) a.    pagašti et ha-iš    švur    ha-ecba.  
               met.1SG OM the-man broken the-finger  
               ‘I met the man who has a broken finger.’
- b.    ani sone et ha-anašim xasrey ha-buša    ha-ele.  
               I    hate OM the-people lacking the-shame the-these  
               ‘I hate these shameless people.’

In these examples, the definite article in the adjectival CS is an agreement marker; adjectival CS modifiers must agree in definiteness with the modified noun just like simple adjectival modifiers, regardless of the interpretation of the nominal that they dominate. Thus, dropping the definite article from *ha-buša* (‘the-shame’) in (15b) would make the sentence ungrammatical, even though the sentence does not presuppose existence or uniqueness of the referent of this nominal. Furthermore, the entire adjectival CS is also not interpreted as definite; we may assume that definiteness marking on AP modifiers is always semantically vacuous.

In short, the assumption that both levels in a [+def] CS are interpreted as definite is simply false. It should, however, be emphasized that, despite the fact that the two levels of a CS may differ with respect to their semantic definiteness, there is still a dependency that could be stated as follows:

### 3. Previous analyses of definiteness spreading

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- (16) A bare CS (i.e., one with no overt determiner/quantifier) can be interpreted as definite only if its embedded nominal is formally definite.

In other words, definiteness of the embedded nominal is a necessary condition for definiteness of the entire CS. Thus, while DS is not as strict as previously assumed, there is nevertheless a systematic syntactic dependency that must be accounted for. Hence, one of the requirements from an analysis of DS is that it should be able to account for the entire range of interpretations shown above and for the nontrivial properties of the syntax-semantics interface involved in deriving these different patterns.

## 3 Previous analyses of definiteness spreading

### 3.1 Overview

The phenomenon of DS has attracted a great deal of attention, and over the years a large number of analyses has been proposed to account for it. Most of these analyses have attempted to link DS to other properties of the Semitic CS, such as its word-like properties, the ungrammaticality of attaching the definite article to the head of a construct, and the word order in CSNs. It is actually not a priori clear which of these properties are really related to DS; for instance, as shown by Falk (2006) and Sadler (2000), some sort of DS in nominals seems to occur in languages like Welsh, in which not all other properties of the Semitic CS are attested. In what follows, I will consider only the issue of DS without trying to relate it to other properties of the CS.

Previous analyses of DS can be classified into four classes according to the kind of formal mechanism that they employ:

1. Agreement (Fassi Fehri 1999, Longobardi 1996, Ritter 1991, Siloni 1997)



2. Incorporation and word formation (Benmamoun 2003, Borer 1999)
3. Reentrancy and constraint-based approaches (Falk 2006, Wintner 2000)
4. Semantic composition (Dobrovie-Sorin 2000, 2003, Heller 2002)

Below I discuss each of these approaches and argue that none of them provides a satisfactory explanation of both syntactic and semantic aspects of DS. In particular, I will show that no previous analysis successfully accounts for the full range of possible interpretations for the [+def] feature, as discussed in the previous section.

### 3.2 Agreement

Probably the most influential analysis of Hebrew CSNs within the Generative tradition is the one proposed by Ritter (1991). Ritter proposed that the head-initial order of CSNs, which in complex event nominals is NSO, is derived by head movement of the head of NP, which moves to the D position through an intermediate functional projection, NumP. Additionally, phrasal movement of the embedded genitive DP to the specifier of NumP yields the observed word order with respect to adjectival modifiers. Genitive case, in Ritter's analysis, is assigned by the phonetically empty D after N-raising provides it with phonetic content that makes it visible as a case assigner.

With respect to definiteness spreading in a CSN, Ritter argues that the phonetically null D head of a CSN is not inherently specified for a definiteness value. Hence, the head of NP enters into a spec-head agreement relation with the genitive DP in [spec,NP], which results in the N acquiring the definiteness value of its specifier. Subsequent head movement of N into the D position leads to the observed definiteness value for the entire CSN.

Many other authors have proposed various modification to Ritter's analysis, implementing Ritter's general idea in slightly different ways. Siloni (1997), for instance, argues that genitive case is assigned in a spec-head configuration within an intermediate agreement projection, where definiteness agreement (which leads to DS) takes place simultaneously with case assignment; subsequently, Agr+N moves to D in order to supply it with a definiteness value. Longobardi (1996) adopts Siloni's analysis of case assignment and definiteness agreement as taking place in AgrP, with subsequent movement of the Agr+N head to D triggered by the need to check a +article feature on D. According to Fassi Fehri (1999), who argues for a 'split DP' analysis consisting of two distinct D levels, the lower D head attracts the genitive DP to its specifier position in order to check its own unspecified definiteness feature, thus also deriving DS from spec-head agreement.<sup>13</sup> In his analysis, subsequent head movement to the higher D position, driven by the need to check a case feature, renders the entire DP [+def]. Cinque (2000), who argues against a head-movement analysis of CSNs and in favor of a derivation involving phrasal movement, suggests that DS "may follow from feature sharing" which, as in the analyses mentioned above, takes place under spec-head agreement simultaneously with genitive case assignment/checking.

One possible objection to the above agreement-based analyses of DS, pointed out by Dobrovie-Sorin (2000), is that agreement is normally not an operation that involves a feature that is realized once and interpreted twice, but a feature that is realized twice but interpreted once. In the agreement-based analyses of DS mentioned above, a DP bearing an interpretable definiteness feature is claimed to agree with a head bearing no definiteness value, which, as a result of this agreement, ac-

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<sup>13</sup>Fassi-Fehri analyzes the CS in Standard Arabic, which is essentially the same as in Hebrew.

quires its own interpretable definiteness feature. Thus, while the idea of reducing DS to the well-studied phenomenon of agreement is methodologically attractive, as it would allow for an analysis that requires no construction-specific mechanism, the formal properties of the ‘agreement’ involved in DS seem to be different from those of indisputable instances of agreement, where one of the two agreeing nodes bears an uninterpretable feature. On the other hand, as shown in §2.2, there is more than one option for interpreting the two definiteness features in a CS. The question is therefore whether the application of the notion ‘spec-head agreement’ in the analyses mentioned above is indeed a valid use of this formal device. To a large extent, this depends on theory-internal assumptions regarding the range of dependencies covered by the agreement mechanism. We return to this issue in §4.1.

### 3.3 Incorporation and word formation

The well-known fact that the CS displays many word-like properties plays a central role in the incorporation analysis proposed in Borer (1999). Her analysis challenges many of the central assumptions and hypotheses of the head-movement analyses discussed above; in what follows, I will focus only on the aspects of Borer’s analysis that have to do with DS, which is the driving force behind the derivation that she proposes.

Borer defends the view that definiteness in Hebrew is a feature base-generated on nouns, rather than a semantic property of independent heads belonging to the category D. Definiteness of a simple (non-CS) DP, Borer argues, is the result of N movement to D, leading to the  $\pm$ definite feature of N becoming a feature of N+D.

At the heart of Borer’s analysis lies the proposal that the head of a CSN, unlike a noun in the free state, is base generated with no  $\pm$ definite specification. This means that such a head cannot, by itself, determine the definiteness value of the

DP which serves as its extended projection. Borer stipulates that a DP *must* carry a  $\pm$ definite specification, and hence, if the nominal head of a CSN does not have its own base-generated  $\pm$ definite feature, the only way to construct a grammatical DP is by incorporating another noun, which does carry a  $\pm$ definite value. For such incorporation to be possible, Borer claims that the embedded genitive phrase must first move to the [spec,NumP] position governed by the top DP; following this, incorporation into D would be able to supply a definiteness value to the entire CSN. Therefore, Borer argues that both the word-like properties of a CSN and definiteness spreading are the result of incorporation of the head of the genitive phrase into the head of the CSN, driven by the need to supply a definiteness value to the CSN.

One drawback of Borer's analysis is the large number of debatable stipulations and assumptions on which it relies. First, the assumption that the embedded nominal raises to [spec,NumP] (which is needed in order to make incorporation structurally possible) is, as Borer herself acknowledges, a stipulation that does not seem to follow from anything else. Furthermore, the assumption that all DPs *must* carry a definiteness feature ('The Definiteness Criterion') is also stipulative. While Borer relates the presence of this feature to referentiality, this is not enough to rule out nominals with no  $\pm$ definite specification; there is no obvious reason why nominals lacking this feature could not be generated, perhaps being interpreted as indefinite using an operation of existential closure. The fact that non-referential CSNs in predicate positions display exactly the same syntactic properties as referential ones makes it doubtful that Borer's Definiteness Criterion can be independently motivated.

Finally, Borer's analysis relies on two distinct mechanisms of feature percola-

tion, one involving ‘upwards percolation’ and one involving ‘downwards percolation’:

**Secondary percolation:** percolation of a feature from a complement to a head within a morphological structure, which takes place in the absence of some feature specification for the head

**Feature sharing:** percolation of features from the head of an extended projection down to the lexical head

Borer claims that following phrasal movement and head incorporation, a sequence of such feature percolation operations takes place. This is essential in order to ensure that the definiteness feature from the head of the genitive phrase ends up associated also with the head of the CSN as a whole.

Although it might be the case that both kinds of feature percolation do exist as part of Universal Grammar, judging whether this analysis involves construction-specific operations or not depends on having a full theory of feature sharing and percolation operations across languages. A theory that relies only on independently motivated operations would have a clear advantage in this respect.

In what follows, I will adopt several key aspects of Borer’s approach, such as the view of definiteness as a grammatical feature base-generated on N; the hypothesis that heads of CSNs enter the derivation without a value for this feature; and the idea that feature sharing operations play a central role in the analysis of DS. Unlike Borer, I will not make use of any movement operations or morphological incorporation mechanisms; instead, I will argue in section 5 for an implementation of feature sharing that uses nothing but an independently motivated notion of agreement.

### 3.4 Reentrancy and constraint-based approaches

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Finally, we should briefly mention another analysis based on the idea that DS is related to the word-like properties of the CS. According to Benmamoun (2003), a Semitic CSN forms a single prosodic unit at PF; he further suggests that since a CSN is a prosodic unit, the features of one of the members of this unit depend on the other.<sup>14</sup> However, this proposal relies on the implicit stipulation that definiteness is the only feature that can be shared in the way in a CSN; specifically, Benmamoun provides no explanation for the fact that there is no spreading of number features between members of the CSN, such that a CSN like *tmunat ha-yeladim* (lit. ‘picture the-children’) is singular (‘the picture of (the) children’), despite having plurality marked on the embedded nominal. It should be noted that even though this problem is immediately evident in the case of Benmamoun’s analysis, it is not limited to this analysis: other analyses must also stipulate, in one way or another, that whatever mechanism is involved in DS does not apply to other features.

### 3.4 Reentrancy and constraint-based approaches

Another formal mechanism that has been used in some previous analyses of DS is reentrancy. Reentrancy is one of the most fundamental aspects of unification based formalisms such as HPSG; it can be described as the sharing of linguistic content between two or more nodes, where what is meant by ‘sharing’ is not mere equality of value, but rather being the exact same formal object.

Wintner (2000) develops an analysis of definiteness in the Hebrew noun phrase within the HPSG framework in which DS is seen as reentrancy. Wintner proposes that the lexical process that creates heads of CS involves, among other things, an

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<sup>14</sup>See also Siloni (2003), who develops a more elaborate PF-based analysis of the CS; while she argues that this is the reason for the ungrammaticality of attaching a definite article to the head of a CSN, she does not attempt to derive DS itself from the prosodic properties of the CSN.

### 3.4 Reentrancy and constraint-based approaches

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explicit statement that the definiteness value of the head of a CS is reentrant with that of the genitive DP. Thus, definiteness spreading in this approach is direct sharing of the exact same feature; this involves no syntactic operation beyond what is dictated by the lexical constraints imposed by heads of constructs.

One outcome of this analysis is that it provides a very simple account for the ungrammaticality of attaching the definite article to the head of a CS. In the lexicon, the head of a CS has no definiteness value of its own; furthermore, Wintner assumes that the definite article, being a morphological affix, is attached in the lexicon, subject to the constraint that the noun it attaches to must be indefinite (attaching the article can thus be seen as the morphological realization of a lexical operation that turns an indefinite noun into a definite one). Under these assumptions, the head of a CS simply lacks the indefiniteness specification that is necessary to allow it to serve as input to the operation of attaching the article.

Constraints on feature identity have also been used in analyses of DS within the LFG framework. Sadler (2000) discusses a construction in Welsh which bears a striking resemblance to the Semitic CS. Among other things, the Welsh genitive construction also displays definiteness spreading. Sadler's analysis of this phenomenon is a straightforward application of reentrancy: the definiteness value of the construction as a whole is stipulated to be the same as the definiteness value of the embedded nominal.<sup>15</sup>

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<sup>15</sup>Although there seems to be a tendency in the LFG literature not to view equality of atomic features as structure sharing of the kind found in constructions such as raising and long distance dependencies, formally there is no distinction between these two kinds of structure sharing. Thus, for instance, the feature equality proposed by Sadler (2000), given in (a) below, is based on the same formal notion of equality as the one used in raising constructions, as in (b):

(1) a.  $(\uparrow \text{DEF}) = (\downarrow \text{DEF})$

Falk (2006) proposes an LFG analysis of DS in Hebrew that derives DS as part of a more general conflation of the grammatical function of possessors with definiteness. Unlike Sadler’s analysis of DS in Welsh, Falk proposes that the definiteness value of the entire CS is the f-structure corresponding to the whole embedded genitive (which is often, but not always, the possessor), rather than its definiteness value alone. Falk argues that this approach avoids the conceptual problems posed by the “unheard of” mechanisms of feature sharing, copying, or percolation, and that it can account for the ‘non-definite’ CSNs discussed in Engelhardt (2000), as illustrated in example (12b) above.<sup>16</sup>

Falk’s analysis focuses on the syntactic aspects of CSNs, and hence the semantic issues are not directly addressed; while he makes the claim that a CSN is definite iff its f-structure contains a path of DEF attributes that terminates in the value ‘+’, it is clear that this is a claim about *syntactic* definiteness. Hence, this leaves the semantic issues open. Given that the LFG ‘glue logic’ is specifically meant to handle cases where a single element appears as the value of more than one feature but is nevertheless interpreted only once, it might be possible to extend Falk’s and Sadler’s analyses of DS with a theory that would allow the semantic component to interpret a shared DEF feature in more than one way. None of these works, however,

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b.  $(\uparrow \text{SUBJ}) = (\uparrow \text{XCOMP SUBJ})$

There is no difference between the two ‘=’ symbols in these equations. Thus, formally, the equation in (a) requires a single shared ‘+’ value for two DEF features. I am grateful to Yehuda Falk for his comments and clarifications regarding this issue.

<sup>16</sup>An alternative explanation for Engelhardt’s observation that some CSNs with an embedded definite can appear in environments that exclude definites, as in (12b), is that these environments exclude noun phrases that are *semantically* definite, and not those that are syntactically definite. Thus, the phrases that she refers to as ‘non-definites’ are syntactically definite (i.e., specified as [+def]), but semantically indefinite.



addresses this issue.

Overall, it is hard to tell to what extent the LFG and HPSG analyses mentioned above, which make use of direct structure sharing, could make the right semantic predictions. None of these analyses includes an explicit proposal for how the semantic component interprets a shared definiteness value. Clearly, augmenting these analyses with a simplistic mapping of syntactic definiteness values to semantic definiteness would not account for the full range of interpretations induced by a [+def] CS. In section 5, I will argue for a feature sharing analysis that bears some similarities to the reentrancy analyses discussed above; unlike these analyses, however, it contains a specific proposal for how the shared feature gives rise to the various interpretation patterns.

### 3.5 Semantic approaches

Dobrovie-Sorin (2000, 2003) argues that what appears to be ‘definiteness spreading’, not only in Semitic CSNs but also in other languages that have preposition-less genitive structures, is nothing more than a side effect of the semantic composition involved in the interpretation of CSNs.

Specifically, Dobrovie-Sorin proposes that the head of a CSN denotes a function from individuals to individuals. The exact content of this function can be either lexically specified, as in relational nouns like *mother*, or contextually determined. A function, by definition, involves a unique mapping for each individual. Hence, a function applied to the denotation of a definite DP, which itself must be unique in the given context, would give another unique individual. As a result of this, the uniqueness presupposition associated with definiteness seems to ‘spread’ to the complex nominal.

For instance, consider Dobrovie-Sorin’s analysis of the CSN *beyt ha-iš* (‘the

man's house', lit. 'house the-man'):

*beyt ha-iš*:  $f(x)$ , where  $f$  = house-of &  $x$  = [ the man ]

The apparent definiteness of this DP is a combination of two independent factors:

1. The embedded genitive, *ha-iš* ('the man'), is definite, and thus presupposes uniqueness.
2. The head of the CSN, *beyt* ('house'), denotes a function from individuals to individuals, and hence its application to each individual gives another unique individual.

Therefore, Dobrovie-Sorin argues that no *syntactic* mechanism is needed to account for the observed definiteness spreading.<sup>17</sup>

Another analysis along the same lines is proposed in Heller (2002). Like Dobrovie-Sorin, Heller claims that heads of CSNs denote functions from (singular or plural) individuals to individuals (i.e., functions of type  $\langle e, e \rangle$ ). The exact nature of the function, according to Heller, is lexically determined for each class of head noun.

One prediction of this analysis is that, in cases where no function (i.e., no one-to-one mapping) can be lexically determined, CSNs would be infelicitous. Heller supports this prediction by discussing examples like *yad ha-mit'amelet* (lit. 'hand the gymnast'), which cannot, in most natural contexts, be interpreted as 'the gymnast's hand', and which is only felicitous in a context where the gymnast has only

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<sup>17</sup>Dobrovie-Sorin explicitly claims that indefinite CSNs, unlike English indefinite possessives like *a man's house*, are not interpreted by this function-application mechanism, as they do not entail uniqueness. Instead, she proposes that indefinite CSNs are structurally different from definite ones, which leads to a different method of semantic composition, that does not involve the application of a type  $\langle e, e \rangle$  function.

one hand, or only one hand is contextually salient. This is unexpected under the standard view of DS, which would predict this CSN to be just as grammatical as the free state nominal *ha-yad šel ha-mit'amelet* ('the hand of the gymnast'), which is felicitous even in neutral contexts.

In fact, it should be noted that CSNs with head nouns whose basic semantic content is not that of a function often sound highly unnatural, regardless of context. Thus, the (b) examples in (17–18) below are judged by most speakers to be quite marginal, even in the presence of a restrictive modifier that would, in principle, make a definite acceptable; this contrasts with the (a) examples, which are headed by nouns that are easily interpreted as functions:<sup>18</sup>

- (17) a.    *sof ha-seret*  
           end the-movie  
           'the end of the movie'
- b. ?? *scenat ha-seret*    (*še- haxi ahavti*)  
           scene the-movie (that most liked.1SG)  
           'the scene of the movie (that I liked most)'
- (18) a.    *beyt ha-šaxen*  
           house the-neighbor  
           'the neighbor's house'
- b. ?? *kufsat ha-šaxen*    (*ha-aduma*)  
           box the-neighbor (the-red)  
           'the neighbors's (red) box'

Under Dobrovie-Sorin's and Heller's analyses, such facts are expected.

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<sup>18</sup>There is a delicate issue of characterizing judgments in these cases; CSNs are often regarded as belonging to a high register, and hence 'unnatural' does not necessarily relate to grammaticality. Furthermore, many poorly understood factors make the acceptability of CSNs often highly variable, such that even CSNs headed by closely related nouns and expressing the same semantic relations are not always equally acceptable. Still, I believe that to the extent that one can abstract away from these issues, the contrasts in (17)–(18) are real.

These two semantic analyses thus seem to provide a simple account for definiteness spreading without imposing any construction-specific syntactic mechanism. This, however, is also the source of the major shortcoming of this approach: since it is an entirely semantic analysis of DS, it provides no explanation for the undeniable syntactic manifestations of DS (Falk 2006). Hence, it leaves unexplained the fact that a direct object CSN with a definite embedded genitive must be preceded by the object marker *et*, just like simple definite objects; and the fact that adjectives modifying a CSN in which the embedded DP is definite must also be definite. As the distribution of *et* and the definiteness agreement with attributive adjectives are clearly syntactic phenomena (Danon 2001), it seems unlikely that a semantic analysis of DS could account for these facts without making semantic properties of noun phrases visible to the syntax; at least none of the existing semantic approaches offers any clue as to how these syntactic phenomena are to be derived.

An additional problem with the semantic approach to DS is that it provides an account for only one out of the four interpretation patterns discussed in section 2.2, namely, the ‘double definiteness’ pattern. According to Dobrovie-Sorin (2003), there is a structural difference between CSNs that are interpreted as definite and those that are not, and thus the latter are not subject to the rules of semantic composition that apply in double definiteness cases. The syntactic evidence for having multiple CS structures is rather weak, and I will not adopt this approach. Alternatively, it might be possible to extend the semantic approach to cover the cases where definiteness is interpreted only once by proposing additional rules for semantic composition that apply in these cases; for instance, it might be claimed that group nouns used as heads of CSNs denote mappings from individuals to *sets*, thus accounting for the systematic indefinite readings of [+def] CSNs headed by group

nouns. It is an open question to what extent the semantic analyses of DS can be extended along these lines.

A more serious problem for the semantic approach is that it is not clear how it could account for cases where DS is merely the reflex of agreement, as in adjectival CS modifiers such as (15). In this case, definiteness on the embedded DP is triggered ‘from above’ by the modified noun, and is a purely syntactic phenomenon which seems outside the scope of the semantic analyses of Dobrovie-Sorin and Heller. The only way to handle these facts under the semantic approach to DS is to assume that the definite article on the embedded nominal of an adjectival CS undergoes some sort of ‘PF lowering’ from the CS as a whole to the embedded nominal, along the lines proposed in Dobrovie-Sorin (2003). An analysis that can account for these facts without having to assume an additional mechanism of this sort would clearly have a methodological advantage over an analysis that does require an additional mechanism. I leave it open as to whether such an analysis is a viable option that can be supported by independent evidence, and if so, whether it can be applied to non-adjectival CS as well.

Still, these shortcomings of the semantic analysis of DS do not necessarily mean that it should be altogether rejected, if only some independent mechanism can be shown to account for the syntactic facts. It could, in fact, be true that ‘semantic DS’ and ‘syntactic DS’ are two distinct consequences of the operations that underlie the formation of the CS. Such a modular view of DS might actually have significant advantages over unitary approaches, given the existence of ‘splits’ between the two notions of DS. I will return to this issue in section 5.2.

### 3.6 Intermediate summary

The discussion above covers most of the approaches to DS proposed to date in the generative literature. Each of these approaches has its advantages and disadvantages:

- The agreement approach utilizes nothing but an independently established formal operation, and is thus a methodologically desirable approach. It fails to account for the semantic facts, which in the common case of ‘semantic DS’ seem to contradict the predictions of an agreement based analysis.
- The incorporation approach provides a mechanism specifically designed to account for feature spreading, but this account is extremely construction-specific and is based on a large number of debatable assumptions and stipulations.
- The reentrancy-based analyses proposed within the HPSG and LFG framework provide an extremely simple and straightforward account of DS that utilizes nothing but a well-established formal operation. It is not clear, however, to what extent these approaches can account for the semantic facts, given that they only provide a formal account of how the morphosyntactic definiteness feature spreads across a CSN.
- The semantic approaches provide a simple and elegant analysis of the prototypical instances of semantic DS that does not require any syntactic mechanism. These approaches, however, provide no way to account for syntactic aspects of DS, and it is also not clear how they would be extended to CSNs where no semantic DS occurs, as in adjectival CS.

#### 4. Towards a Minimalist analysis

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Clearly, some of these approaches seem to have complementary advantages and disadvantages, such that one approach succeeds exactly where the other fails, and vice versa.

Since each of these analyses is formulated within a different set of theoretical assumptions, an important question is to what extent the main insights of these approaches can be formulated within other frameworks. Specifically, I will focus on whether these approaches can be restated in the framework of recent versions of the Minimalist Program, and whether working within this framework would lead to any new insights into the mechanisms involved. In the next section, I will first show that, while agreement might seem like the natural formal device from a Minimalist point of view, Minimalist assumptions about the nature of agreement processes lead to the wrong semantic predictions, and also give rise to an additional problem that has not been noticed in previous work on DS. I will then discuss two recent proposals for modifying the Minimalist operation of Agree such that it would bear a strong similarity to the kind of reentrancy found in unification-based approaches. This will serve as the basis for the formal analysis of DS that will be proposed in section 5, which borrows central insights and ideas from each of the analyses discussed above.

## 4 Towards a Minimalist analysis

### 4.1 Agree and DS

As discussed in §3.2, previous agreement-based analyses of DS utilize the notion of spec-head agreement as a way to transfer the definiteness value of the embedded DP to a head that lacks a definiteness value. As a result, definiteness, while marked overtly only once, is interpreted on both agreeing nodes, unlike the situation in

typical agreement configurations. Nevertheless, this approach was still, technically, a valid one within the Principles & Parameters framework, due to the fact that this framework has never explicitly defined spec-head agreement as a relation involving one interpretable and one uninterpretable feature.

The formalization of agreement in the Minimalist Program is significantly more explicit and restricted in this respect. The operation Agree is defined in Chomsky (2000) as a relation involving two nodes, a PROBE and a GOAL:

**Probe:** a head that bears one or more uninterpretable features

**Goal:** the closest (active) node c-commanded by the probe which bears a matching interpretable feature<sup>19</sup>

In the framework of Chomsky (2000, 2001), interpretable features enter the derivation valued, while uninterpretable features enter the derivation unvalued. As a result of Agree, an uninterpretable feature of the probe is valued and deleted.

Before discussing the technicalities of an Agree-based analysis of DS, we should address a more basic issue: Given the properties of DS discussed in §2, analyzing DS as agreement seems to be somewhat counterintuitive. It is quite clear that DS has properties that set it apart from prototypical instances of agreement or concord, where morphosyntactic features are ‘copied’ from the node on which they are interpreted to another node where they act as purely formal markers, with no semantic contribution. As discussed above, this is obviously not the case in DS.

Within the Minimalist framework, however, there is only one syntactic operation for passing feature values from one node to another – Agree.<sup>20</sup> Unlike what this

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<sup>19</sup>More precisely, Chomsky views the feature itself as the goal.

<sup>20</sup>Similarly, unification-based grammar formalisms make use of a single operation, unification, for sharing feature values.



operation's name suggests, it is not, in fact, merely a formalization of the pretheoretic notion of agreement, as witnessed by the widespread use of Agree in analyses of dependencies involving no overt morphological agreement. Attempting to analyze DS using Agree is thus not an attempt to reduce DS to agreement, but an attempt to test to what extent DS can be modeled as a *syntactic* operation under Minimalist assumptions.

Turning now to the specific details of the formalization of Agree, the predictions of an Agree-based analysis of DS are very clear: If the head of a CS enters the derivation with an unvalued definiteness feature, and probes for the definiteness feature of the embedded DP (=the goal), the result would be that the definiteness feature on the head of the CS is valued and deleted; definiteness would then be interpreted only on the embedded DP. Therefore, out of the four interpretation patterns discussed in section 3, only the one found with CSNs headed by group nouns or event nouns is predicted to occur. Thus, the semantic facts do not follow from a reformulation of previous agreement-based analyses using the Agree operation of Chomsky (2000).<sup>21</sup>

The question, then, is what alternative analysis can be formulated under current Minimalist assumptions. Before trying to answer this question, another technical difficulty for a Minimalist analysis will be presented. Understanding the nature of

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<sup>21</sup> An additional problem in this analysis would be to account for the syntactic consequences of DS, such as the fact that definiteness agreement between the head of a CSN and APs that modify it involves the same definiteness value as that marked on the embedded nominal. Since the definiteness feature of the CSN head, in this analysis, is deleted as soon as it is valued, this feature should not be available to further syntactic operations. The only possible way to derive definiteness agreement of the head of a CSN with APs would be to assume that an adjective that modifies the head of a CSN probes for the definiteness feature of the *embedded* nominal. This is an interesting outcome that, as far as I can see, should not a-priori be ruled out.

this difficulty will provide us with the key to analyzing the phenomenon of DS.

## 4.2 CS modifiers and the c-command problem

Danon (2007) brings up a structural problem to the analysis of definiteness in the CS, which has to do with constructs that serve as modifiers. Consider the definiteness of the adjectival CS in the following example:

- (19)    dan makir et ha-yalda            arukat            ha-raglayim.  
           Dan knows OM the-girl(FEM,SG) long(FEM,SG) the-legs(PL)  
           ‘Dan knows the girl with long legs.’

The adjectival CS *arukat ha-raglayim* is a modifier of the definite-marked noun *ha-yalda*; like simple adjectives, it agrees with the noun in number, gender and definiteness (Borer 1999, Hazout 2000, Wintner 2000). Unlike simple adjectives, however, the agreement here seems to be ‘distributed’: while the adjectival head of the CS, *arukat*, overtly agrees with the modified noun in gender and number, definiteness agreement is overtly marked on the nominal phrase embedded within the CS, *ha-raglayim*. It is important to note that this is indeed definiteness concord with the modified noun, and not independent definiteness marking that is semantically motivated. Definiteness on *ha-raglayim* in (19) is obligatory, as shown by the ungrammaticality of the non-agreeing adjectival CS in (20a) below; this contrasts with (20b), where the modifier is not an adjectival CS but a relative clause, and indefiniteness of the noun *raglayim* (‘legs’) does not lead to ungrammaticality:

- (20)    a.    \* dan makir et ha-yalda arukat raglayim.  
               Dan knows OM the-girl long legs  
               ‘Dan knows the girl with long legs.’  
           b.    dan makir et ha-yalda še yeš la raglayim arukot.  
               Dan knows OM the-girl that exists her legs long  
               ‘Dan knows the girl who has long legs.’

- c. dan makir et ha-yalda švurat \*(ha-)regel.  
 Dan knows OM the-girl broken the-leg  
 ‘Dan knows the girl who has a broken leg.’

What the paraphrase in (20b) shows is that there is no direct semantic motivation for the definiteness marking on the modifier in (19); example (20c) further shows that obligatory definiteness agreement is observed even when the adjectival CS dominates a non-unique singular. Thus, as noted in Winter (2005), the second occurrence of the article in examples like (19) and (20c) does not seem to contribute anything to the interpretation. Using Minimalist terminology, this would be an instance of an uninterpretable definiteness feature.

The question is how exactly the agreement relation between the noun *ha-yalda* and the genitive phrase, which is embedded inside the adjectival CS, is established, and how the uninterpretable feature on the CS is valued. In the discussion below, I will make the following assumptions:

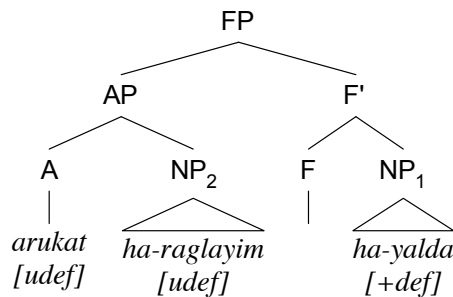
1. Both the head of the adjectival CS and its embedded genitive enter the derivation with unvalued definiteness features; the modified noun enters the derivation with a valued feature. Under standard Minimalist assumptions regarding feature interpretability and feature valuation, this is a direct consequence of the fact that definiteness in the modifier is uninterpretable.
2. Following Borer (1999), I will assume that the embedded nominal of an adjectival CS is an NP and not a DP.
3. The adjectival CS, like other adjectival modifiers, is first merged into a position that c-commands the NP that it modifies. For concreteness, I will assume that it is merged as a specifier of some functional projection dominating NP.

4. Subsequent movement leads to the observed N–AP word order. Whether this is head movement (Ritter 1991) or phrasal movement (Shlonsky 2004) is irrelevant at the moment.

With these assumptions, consider the following simplified representation for the stage in the derivation right after the adjectival CS is merged into the structure:<sup>22</sup>

<sup>23</sup>

(21)



Assuming that the formal operation behind concord is essentially the same as the operation involved in other kinds of agreement (Carstens 2001), the problem

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<sup>22</sup>The notation *[udef]* stands for an unvalued definiteness feature.

<sup>23</sup>This representation ignores many issues regarding the internal structure of adjectival constructs, such as whether they are derived by movement of the kind usually assumed to be involved in deriving nominal CS. Since we are interested in the valuation of the definiteness feature, these issues are irrelevant: no matter how the adjectival CS is derived, there can not be an agreement relation within the adjectival CS that values one of the unvalued definiteness features, because no node within this AP enters the derivation with a valued definiteness feature.

For the present discussion, what matters is simply the c-command relations between the following nodes: the modified NP, the adjective, and the embedded NP of the adjectival CS. I assume that any analysis of the adjectival CS should involve the same c-command relations between these elements as in the tree in (21). This simplified tree is therefore given only for expository purposes, and does not make any claims regarding the structure of the phrase beyond the basic domination and c-command relations to be discussed.

that this construction poses to a Minimalist analysis is the following: The head of the NP embedded inside the adjectival CS (*ha-raglayim* in this example, marked as NP<sub>2</sub>) enters the derivation with an unvalued definiteness feature. This feature must enter an agreement relation with a node that carries a valued definiteness feature. The only such node is the modified NP (*ha-yalda*, marked as NP<sub>1</sub>), which bears an interpretable [+def] feature. However, under any plausible analysis of the structure of the adjectival CS, NP<sub>2</sub> does not c-command NP<sub>1</sub>, because NP<sub>2</sub> is ‘buried’ inside the adjectival CS. Hence, the prediction is that NP<sub>2</sub> (or its head) would not be able to probe for the interpretable feature of NP<sub>1</sub>, and hence no Agree operation could apply. The derivation would therefore crash due to failure to value the unvalued feature on NP<sub>2</sub>.

If adjectival constructs involve DS, as seems to be the case, the adjectival head of the CS also enters the derivation with an unvalued definiteness feature. Assuming that an XP shares features of its head, the AP could probe for the [+def] feature of NP<sub>1</sub>, thus valuing its own unvalued feature. This, however, does not seem to help in the case of the unvalued feature of the more deeply embedded NP<sub>2</sub>.<sup>24</sup>

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<sup>24</sup>One apparent solution to this problem would be to adopt Borer’s (1999) analysis of the adjectival CS as being a single word, rather than a complex syntactic structure, derived by incorporating a bare N into the adjectival head. Empirically, Borer bases this analysis on the claim that the genitive nominal in an adjectival CS can never be syntactically complex, disallowing any kind of modification, as illustrated below:

- (1) a. mešubac xulca  
           plaid shirt  
           ‘plaid shirted’  
       b. \* mešubac xulca kxula  
           plaid shirt blue

Even though it is true that most adjectival constructs resist modification of the embedded nominal, it is not true that adjectival constructs *never* allow a syntactically complex genitive. In those cases

Intuitively, definiteness spreading from NP<sub>2</sub> to the AP should be the key to this ‘transfer’ of the definiteness value from NP<sub>1</sub>. However, the directionality of valuation predicted by the standard definition of Agree seems to be the opposite of what is needed for this line of reasoning to work: feature valuation via Agree is a bottom-up process, in which a node values its unvalued feature(s) by agreeing with a lower node that carries a valued feature. In (21), valuation should somehow proceed in a top-down manner, from AP to NP<sub>2</sub>, in what is sometimes informally referred to as ‘percolation’. The Minimalist framework, however, does not include such a percolation mechanism.

where complex adjectival constructs are possible, they are subject to obligatory definiteness agreement with the noun that they modify, just like simple adjectival constructs. This is illustrated in the following examples:

- (2) a.    ha-agala    amusat ha-xacir ha-tari  
              the-wagon loaded the-hay the-fresh  
              ‘the wagon loaded with fresh hay’
- b.    ha-iš      ktu’a      štey ha-yadayim  
              the-man amputated two the-arms  
              ‘the man whose two arms are amputated’

It thus seems problematic to assume that adjectival constructs are simply adjectives with an incorporated noun. I will therefore not pursue this approach. It should also be noted that the distribution of the definite article in (2a) provides evidence against assuming a simple PF-lowering rule which lowers a definite article associated with the whole AP down to its embedded nominal, along the lines proposed by Dobrovie-Sorin (2003) for CSNs in which the embedded nominal is a modifier; the definiteness concord observed between *ha-xacir* and *ha-tari* in this example shows that the embedded nominal carries a [+def] feature at the *syntactic* level, prior to PF.

Finally, it should also be noted that the conditions that make modification of the embedded nominal in an adjectival construct possible are not totally clear. The adjectives in (2), unlike those in (1), denote 2-place relations between the modified noun and the embedded nominal. I leave it as an open question how this semantic generalization is related to the possibility of modifying the embedded nominal.

Notice that the ‘percolation’ in this case is essentially DS done ‘backwards’: unlike DS in CSNs, which involves a feature of the embedded NP/DP spreading upwards, here the spreading is downwards. This implies that DS has no inherent directionality, but is simply the linking of two definiteness features to each other. What we need in order to implement this idea is some sort of ‘persistent linking’ between the feature of the embedded NP and the feature of the AP, such that valuation of the uninterpretable feature on the AP would value this feature on the embedded NP as well. This kind of FEATURE SHARING is discussed in the next section.

### 4.3 Feature sharing

Sharing of linguistic content has always played a central role in unification-based formalisms, such as LFG and HPSG. The formal mechanism of reentrancy mentioned in §3.4 allows for a single formal object – which may be a simple feature or a full feature matrix – to be the value of more than one attribute in an attribute-value matrix. This powerful mechanism is used to capture phenomena such as agreement, raising, and long-distance dependencies, all of which involve an element that plays two (or more) ‘roles’ within a linguistic representation.

Even though the use of unification and reentrancy has never been part of mainstream Principles & Parameters theory, recent work on feature valuation within the Minimalist Program has adopted some central insights of these formal devices. The theory of valuation proposed in Chomsky (2000, 2001) has sometimes been claimed to be formally equivalent to a certain kind of unification (Asudeh and Toivonen 2006). In the rest of this section I discuss two recent proposals for modifying Chomsky’s notion of agreement such that it will also have the reentrancy property, i.e., such that agreement would create two instances of the same formal object, rather than two distinct objects that simply match in value. This will form

the basis for the analysis of DS in §5.

#### 4.3.1 Frampton and Gutmann (2000, 2006)

In an attempt to account for certain empirical facts that do not follow from the model of Chomsky (2000, 2001), Frampton and Gutmann (2000, 2006) (henceforth FG) propose to formulate the Agree operation as an operation that creates a permanent ‘link’ between the two agreeing nodes, thus essentially forming a single formal object rather than two independent ones. From a derivational perspective, the main difference between this permanent linking model and the standard view of agreement is that the former allows what could be viewed as delayed valuation of features. Under this model, two nodes,  $n_1$  and  $n_2$ , both carrying matching *unvalued* features, may enter an agreement relation, which would have the effect of linking them to each other. Subsequent agreement between  $n_2$  and another node  $n_3$  that carries a matching valued feature would then value not only the feature on  $n_2$ , but also the one on  $n_1$ , which at this point in the derivation simply points at the same formal object as  $n_2$ . Empirically, this allows for a simple analysis of constructions where a feature on two (or more) nodes seems to be valued by agreeing with a single higher node. This is particularly important if  $n_3$ , the node carrying the valued feature, is separated from  $n_1$  by another node (such as  $n_2$ ) that would be expected to lead to intervention, blocking direct Agree between  $n_1$  and  $n_3$ . In cases like this, alternative analyses, such as assuming a simple operation of multiple Agree (Chomsky 2004, Hiraiwa 2001), could not account for the observed agreement.

For instance, FG discuss the following schematic Icelandic example, involving case and number agreement between the subject of the embedded clause and the participle:



(22) They believed civilians(3pl,acc) to have been injured(pl,acc).

The question is how the participle values its case feature. FG argue for the following sequence of agreement operations:

1. the participle agrees with the object DP
2. the embedded T agrees with the object DP
3. matrix *v* agrees with the DP, which has moved to [spec,TP]

What this sequence of Agree operations does is ‘link’ the  $\phi$ -features of matrix *v*, embedded T, the DP, and the participle: step 1 links the features of the DP and the participle; step 2 links the embedded T, thus creating a 3-element chain consisting of 3 instances of the  $\phi$ -feature cluster; and finally, step 3 sets matrix *v* as the head of the entire chain, which in turn determines the case of the whole chain to be accusative. This entails that the case feature of the DP would be the same as that of the participle, even though agreement between these two nodes takes place prior to Agree with matrix *v*.

Feature sharing, in this model, is not an additional operation that exists side by side with ‘regular’ Agree, but an alternative formulation of Agree. For simple cases, the feature sharing version of Agree simply produces the same results as the more familiar version. As FG show, replacing Chomsky’s Agree with a feature sharing operation allows for a considerable simplification of various aspects of the Minimalist framework.

#### 4.3.2 Pesetsky and Torrego (2007)

A similar view of agreement as feature sharing is proposed in Pesetsky and Torrego (2007). Like Frampton and Gutmann (2006), Pesetsky and Torrego (henceforth

PT) argue that agreement creates a single formal object, rather than simply transferring a value from one object to another one. Using the terminology proposed by PT, the operation Agree takes two OCCURRENCES of a feature and turns them into two INSTANCES of a single feature. As in FG's model, this allows 'indirect' feature valuation, whereby a feature value would seem to propagate down through a sequence of nodes.

An additional innovation in PT's analysis is the claim that feature valuation and feature interpretability are independent of each other. Unlike what is assumed in Chomsky (2000, 2001), PT propose that an occurrence of a feature may be unvalued but interpretable, or valued and uninterpretable (or, of course, both valued and interpretable, or neither). They illustrate these options in the case of finite clauses in which tense is marked on the lexical verb. In this case, they claim that the T head enters the derivation with an unvalued tense feature, while the verb carries a valued one; following Agree, which creates a single shared tense feature, it is the instance on T that is interpreted. The rationale behind this separation of valuation from interpretability is that the computational system only 'sees' whether a feature is valued or not, and Agree operates to ensure valuation of all features occurrences. Interpretability, on the other hand, is an interface condition. PT adopt the following from Brody (1997):

**Thesis of Radical Interpretability (Brody 1997):** Each feature must receive a semantic interpretation in some syntactic location.

Under this plausible hypothesis,<sup>25</sup> the interpretation of a feature with multiple in-

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<sup>25</sup>This hypothesis makes the prediction that Case features also receive an interpretation. PT argue that Case is simply a tense feature on DP, and hence it does not pose a counterexample to the Thesis of Radical Interpretability. See also Svenonius (2006).

stances is not necessarily on the node that initially carried the valued occurrence; it is up to the semantic component to determine how and where each feature is to be interpreted. PT thus argue that adopting the feature sharing approach to agreement, together with the Thesis of Radical Interpretability, allows us to eliminate certain stipulations regarding the relation between interpretability and valuation.

It should already be clear that PT's analysis has some formal properties that seem surprisingly relevant to the analysis of DS in the Hebrew CS. In the next section I develop an analysis of DS that builds upon PT's view of agreement, valuation and interpretability.

## **5 A feature sharing analysis of definiteness spreading**

### **5.1 Sharing, valuation and interpretability**

As discussed in detail in the preceding sections, attempting to analyze DS as the result of applying the operation Agree of Chomsky (2000, 2001) makes the wrong semantic predictions, as well as failing to account for definiteness agreement with adjectival CS modifiers. However, a Minimalist analysis cannot be based on alternative construction-specific mechanisms. In this section I show that PT's formulation of Agree, together with their claims regarding interpretability, provides an elegant way out of this apparent dead end, thus making possible a Minimalist analysis of DS.

Recall the following facts about Hebrew DS:

- The head of a CS carries no overt marking of definiteness.
- The embedded nominal can be overtly marked for definiteness.
- When the embedded nominal is marked as definite, the entire CS may be

interpreted as definite.

- In adjectival CS modifiers, [ $\pm$ def] is not interpreted at all within the CS, but only on the NP that it modifies.

Following Borer (1999) and Danon (2006), I assume that definiteness in Hebrew is a feature for which the noun itself is specified. More precisely, let us assume that nouns in the free form may enter the derivation with a valued [def] feature. In contrast, the lexical head of a CS must always enter the derivation with an unvalued definiteness feature. This distinction between free and bound nouns follows not only the morphological facts, but also the observation that the embedded DP could be one that is inherently specified for definiteness, such as a proper name, while the lexical head of a CS is morphologically unspecified for definiteness, and any definiteness value that it eventually comes to carry is “inherited”. Following the suggestion in Wintner (2000), this could be assumed to be a property of the lexical process that derives heads of CS from heads in their free form: the output of this lexical process is a head that must enter the derivation with an unvalued definiteness feature.

Furthermore, following Danon (2006), I will assume that D in Hebrew enters the derivation with an unvalued [def] feature; given that definiteness is a semantic property of full DPs, I assume that definiteness can only be interpreted at the DP level (and not at the NP level), following an Agree relation between D and another node that will value the D’s [def] feature.

With these assumptions, we begin with an analysis of a simple CSN, like the following:

- (23)    tmunat ha-nasi  
           picture the-president  
           ‘the president’s picture’

Of the two nouns in (23), the first, *tmunat*, enters the derivation with an unvalued definiteness feature, while the second, *ha-nasi*, like other heads of free (i.e., non-CS) nominals, carries a valued feature. Additionally, each DP is headed by an abstract D with unvalued [def]. The single valued [+def] on the lower N will thus have to value the [def] feature of three higher nodes.

As discussed above, a central innovation made by PT is the suggestion that feature valuation and feature interpretability do not necessarily coincide: an unvalued occurrence of a feature could eventually become an interpretable instance of a shared feature. This proposal has immediate consequences for the analysis of DS. Under this view, the fact that the definiteness feature on the head of a CS is initially unvalued says nothing about whether or not it will be interpreted. Similarly, the fact that the lexical head of the embedded nominal enters the derivation with a valued definiteness feature does not mean that this instance of the feature will be interpreted. The derivation must simply involve valuation of the unvalued feature of the head of the CS, which could simply be achieved by establishing an Agree relation between the unvalued occurrence of the definiteness feature on the head of the CS and the valued one on a lower XP.

More specifically, the derivation proceeds in a bottom-up manner involving a sequence of Agree operations, each involving a node carrying unvalued [def] and the highest node carrying [def] that it c-commands:

1. Agree between the embedded D and the embedded NP
2. Agree between the higher N and the embedded DP
3. Agree between the higher D and the higher NP

As Agree does not depend on any structural relation other than c-command, it is



by the syntax. Formally, after feature sharing takes place, one of the instances of the shared definiteness feature must be interpreted – but not necessarily the one that was initially valued. The fact that there is no simple syntactic generalization regarding the interpretability of this feature on each of the two levels of a CS, which was a central problem to previous accounts of DS, now receives a straightforward explanation.

Note, however, that within the analysis developed so far, flexibility of interpretation in a CSN is limited by one factor, namely, the assumption that [def] can only be interpreted on DP. There seems to be reason to think that not all embedded nominals in a CSN are DPs. Dobrovie-Sorin (2003), for instance, argues that some embedded nominals are bare NPs; in the case of definite-marked nominals, the cases that she discusses tend to overlap to a large degree with the nominals shown in §2.2 to give rise to definiteness being interpreted only on the entire CSN. No additional stipulation, then, is needed in order to derive these results: if certain kinds of embedded nominals in a CSN are non-referential modifiers that do not project DP, then the derivation of CSNs containing such nominals involves only one DP level. This is illustrated in (25) for the CSN *ugat ha-tapuxim* ('the apple cake'):

- (25)            *e*            *ugat*            *ha-tapuxim*  
                   [<sub>DP</sub> D.DEF<sub>i</sub> cake.DEF<sub>i</sub> [<sub>NP</sub> apples.DEF<sub>i</sub> ]]

Interpretability in CSNs like this is forced to take place at the level of the CSN as a whole. Similarly, adopting Borer's (1999) claim that the embedded nominal in an adjectival CS is an NP immediately rules out the possibility of having [+def] interpreted on the embedded nominal in this case.<sup>27</sup>

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<sup>27</sup>There is a clear similarity between this aspect of my analysis and Borer's (1999) claim regarding the interpretation of adjectival constructs: Borer takes the absence of a DP level to be the *direct* reason for the lack of definite reading on the embedded nominal in an adjectival CS.

In conclusion, the interpretation of the definiteness feature in CSNs provides strong support for PT's view of the independence of feature interpretability from feature valuation. As mentioned in §2.2, lexical semantics, as well as pragmatic factors, play a central role in determining the interpretability of the various instances of the definiteness feature in a CSN consisting of two DP levels. This is not information that is relevant or accessible to the computational system. These facts are therefore best analyzed by moving feature interpretability out of the computational system, as in PT's model.

One additional thing to note is that, under the analysis proposed above, having a [+def] feature marked on a head cannot be assumed to be a sufficient condition for overt realization of the definite article on that head, as not all heads that share a definiteness feature realize it overtly. It is also not the interpretability of such a feature that determines where it will be spelled out. Instead, it seems to be the case that only certain lexical classes of heads allow morphological realization of a [+def] feature. Specifically, a noun or an adjective in the free state will always be marked with *ha-* if it carries a [+def] feature; heads of a CS, on the other hand, never carry an article, which could either be part of what characterizes the lexical process that derives them from free heads, or a by-product of their phonological properties, as argued by Siloni (2003). Similarly, the head of a DP never realizes a definite article in Hebrew, and therefore there is no double definiteness marking when D and N share a definiteness feature.

## 5.2 Multiple interpretability?

One question opened by the analysis proposed above is whether a single feature can be interpreted twice, i.e., whether two instances of a single shared feature can both be interpretable. In many other cases of agreement, this question simply does



not come up; for instance, where agreement between nodes of different categories is involved, lexical considerations may rule out one of the agreeing nodes as the locus of semantic interpretation of the shared feature. This is not the case for definiteness in CSNs; in examples such as (24) above, both levels of the CSN are potential sites for interpretation of the [+def] feature.

According to PT, “nothing prevents the semantics from accessing the same information more than once”. In their analysis of raising constructions, this is used to account for the fact that the main clause and the embedded clause seem to share the same tense value.<sup>28</sup>

This approach would provide an immediate way to formulate the mainstream view of DS in Semitic as indeed leading to both levels of a [+def] CSN being interpreted as definite. There seems to be an overwhelming consensus in the literature that multiple interpretations of a [+def] feature are possible. If we adopt PT’s claim that the same feature can be interpreted more than once, nothing more needs to be added.

Other authors, however, have argued against the possibility of having the same feature interpreted more than once; Adger and Ramchand (2005), for instance, propose the principle *Interpret Once under Agree (IOA)*, which states that interpretable features in an Agree chain are interpreted only once. It might in fact be possible to follow this kind of approach, as suggested by the semantic analyses of DS discussed in §3.5: recall that according to Dobrovie-Sorin (2000) and Heller (2002), what looks like a definite reading of both levels of a CSN is actually the

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<sup>28</sup>In fact, the two clauses share more than just the value of a formal tense feature (i.e., past/present etc): the tense of the embedded clause in a raising construction is coreferential with that of the main clause, in a way which goes beyond what can be expressed using identity of simple features, unless the value of the tense feature is enriched to include some sort of referential index.

result of having the head of a CSN interpreted as a function of type  $\langle e, e \rangle$ . This entails that if the embedded DP is definite (and hence, denotes a unique individual), the entire CSN will also presuppose uniqueness of its referent. Combined with the analysis of DS proposed in this paper, this could be stated as the claim that in apparent examples of multiple interpretations of the shared definiteness feature, only the lower instance of this feature is in fact interpreted. For instance, in (26) below, the shared [+def] feature would be interpreted only on the embedded DP *ha-šaxen* ('the neighbor'); the *house-of* function applied to the unique individual denoted by this DP would denote a unique house:

- (26)    *beyt ha-šaxen*  
           house the-neighbor  
           'the neighbor's house'

As noted in §3.5, this kind of semantic approach is capable of accounting for only one out of four observed semantic patterns. If the conditions under which this semantic pattern is found can be shown to be predictable and systematic, the analysis proposed by Dobrovie-Sorin and Heller could be argued to apply just under these conditions.

If such an analysis can be shown to work, it would provide a rather restricted view of the syntax-semantics interface, such that every feature is interpreted exactly once, as argued on independent grounds in Adger and Ramchand (2005). This seems to fit in with the observation that in other constructions that involve some sort of 'duplication' or 'sharing' or linguistic resources, only one instance contributes to the compositional semantics. For instance, in raising constructions (as well as other kinds of movement), only a single occurrence of the moved phrase is interpreted, rather than both the overt copy and its traces being interpreted.<sup>29</sup>

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<sup>29</sup>As far as I can see, the only kind of construction where a 'single' entity is systematically inter-

It is beyond the scope of this paper to examine the semantic details of this approach. If indeed it can be shown that in all CSNs where both levels seem to be interpreted as definite, the correct semantics can be derived via the function-application approach suggested in the works cited above, the resulting picture of the syntax-semantics interface as it applies to grammatical features would be extremely simple and elegant; the semantic approach would then cover exactly those cases that are not covered by the hypothesis that a shared feature is interpreted exactly once. I leave this as an open question at the moment.

### 5.3 DS in adjectival CS revisited

Let us now consider what happens in adjectival CS modifiers, which agree in definiteness with the modified head, as in (27):

- (27)    ha-yalda arukat ha-raglayim  
           the-girl long    the-legs  
           ‘the long-legged girl’

The analysis to follow will rely on the assumptions below:

- The head of an adjectival CS, like the head of a nominal CS, is lexically specified to enter the derivation with an unvalued [def] feature.<sup>30</sup>
- The nominal head of the CS-internal NP, unlike other nouns in the free form, also enters the derivation with an unvalued [def].<sup>31</sup>

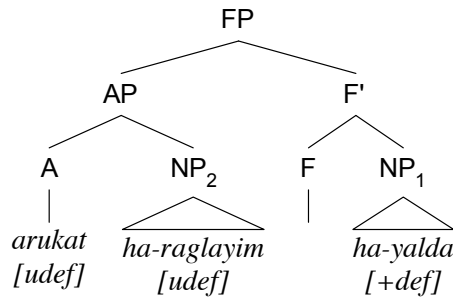
interpreted twice is control, where both the overt DP and the non-overt PRO are interpreted. Formally, control is not usually assumed to involve either movement or feature checking/sharing, and thus it is not surprising that this construction displays different properties than the ones discussed in this paper.

<sup>30</sup>In this respect, it does not differ from free attributive adjectives, which also agree in definiteness with the modified noun.

<sup>31</sup>What rules out a noun with unvalued [def] in other environments is the fact that nothing would

The tree for the relevant stage in the derivation of (27) was given in (21), repeated below as (28):

(28)



As I have argued in §4.2, the problem here is that, if only the modified NP (*ha-yalda*, NP<sub>1</sub>) carries a valued definiteness feature, and the embedded NP of the adjectival CS (NP<sub>2</sub>) carries an unvalued one, we do not have the c-command relation required for Agree to hold between the probe NP<sub>2</sub> (or its head) and the goal NP<sub>1</sub>. While the AP does c-command NP<sub>1</sub>, this could not, under standard views of Agree, lead to valuation of the definiteness feature on NP<sub>2</sub>, but only of the feature on the AP. Even if A and NP<sub>2</sub> were involved in a prior Agree operation, there is no ‘memory’ of this: standard Agree does not create a permanent link between two agreeing nodes.

Furthermore, it is questionable whether standard Agree could even hold between A (or AP) and NP<sub>2</sub>, as this would be a totally vacuous operation; since it involves two unvalued features, none of them could be valued as a result of this agreement.

This kind of problem is precisely what the proposals in FG and PT are meant to solve. Under these proposals, Agree establishes a permanent link between two instances of the definiteness feature. This allows ‘delayed’ valuation of one instance be able to value its [def] feature; being involved in an agreement relation is a necessary condition for a head to enter the derivation with an unvalued feature. Thus we do not need to stipulate that nouns with unvalued [def] are only allowed to appear inside adjectival CS.

by valuation of the other, achieved through a future Agree operation with an additional instance of the definiteness feature. Thus, the derivation of (27) would proceed as follows:

1. The head of the adjectival CS probes for the (unvalued) definiteness feature of NP<sub>2</sub>. The two unvalued occurrences of the [def] feature thus become two instances of a single shared feature. This crucially contrasts with an analysis based on standard Agree, which would require either the adjective or NP<sub>2</sub> to carry an interpretable definiteness feature for agreement between these two nodes to be possible.
2. Upon merging the entire adjectival CS into a functional projection that dominates NP<sub>1</sub>, an additional Agree operation takes place, between AP and NP<sub>1</sub>. Since the feature on NP<sub>1</sub> is valued, this results in the valuation of [def] on AP, which is shared by the embedded NP<sub>2</sub> as well.
3. The D head of the entire modified noun phrase (not shown in (28)) enters Agree with the [def] feature on NP<sub>1</sub>.

The result is a single valued definiteness feature with four instances. The computational system has thus valued all unvalued features.

As to the interpretability of the definiteness feature, the Thesis of Radical Interpretability simply requires it to be interpreted *somewhere*. The definiteness feature, in this case, can only be interpreted in one place – on the main DP, which is the only DP here. It cannot be interpreted on either the AP or NP<sub>2</sub>, thus matching the observed semantic facts.<sup>32</sup>

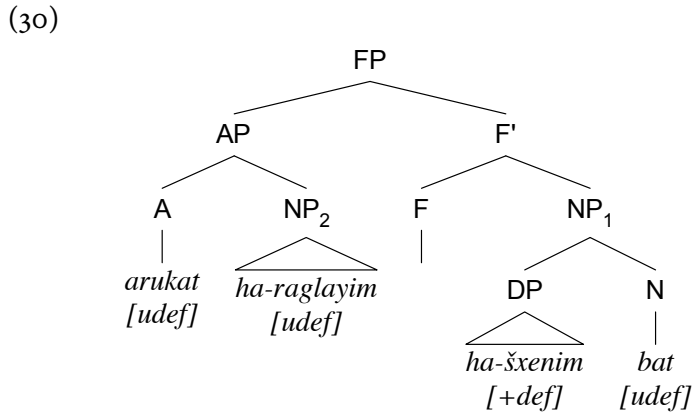
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<sup>32</sup>There are many questions regarding the interpretation of adjectival constructs that are not addressed here; see for instance Siloni (2002).

Notice, finally, that there is no reason why this kind of “definiteness chain” should be limited to 4 instances. The DP modified by the adjectival construct could, for instance, be itself part of a larger nominal CS, as in (29):

- (29)    bat        ha-šxenim    arukat ha-raglayim  
          daughter the-neighbors long    the-legs  
          ‘the long-legged daughter of the neighbors’

Consider the derivation of the nominal in (29). Following standard assumptions in the literature on CSNs, let us assume that the embedded genitive in a CSN is generated in [spec,NP]; upon merger of the adjectival CS we would have the following structure:



In this case, the derivation involves 6 occurrences of the definiteness feature; only 4 of these are shown in (30). The following agreement operations take place:

**D-NP agreement in the embedded DP:** The embedded D agrees with the valued [def] feature on the NP *ha-šxenim* (‘the neighbors’).

**DS in the nominal CS:** The unvalued definiteness feature on *bat* agrees with the embedded DP *ha-šxenim*.<sup>33</sup>

<sup>33</sup>For the current proposal, it does not matter whether this instance of Agree takes place upon Merge, or later, following movement of N and/or of the embedded DP.

**DS in the adjectival CS:** The unvalued definiteness feature on *arukat* agrees with the unvalued feature of NP<sub>2</sub> *ha-raglayim* ('the legs').

**Definiteness concord:** The unvalued feature on the AP agrees with the one on the NP.

**D-NP agreement in the main DP:** The main D (not shown in (30)) agrees with the valued [def] feature on the NP *ha-šxenim* ('the neighbors').

This derivation leads to a single definiteness feature shared by all 6 nodes.

The interpretation in this case is on the nominal CS as a whole, and optionally also on the embedded DP *ha-šxenim*. If both levels of the CSN are interpreted as definite, this could follow either from multiple interpretations of the shared [+def] feature, or from a single interpretation on the embedded DP *ha-šxenim* ('the neighbors') together with the compositional semantics of the CS, as discussed in §5.2.

In summary, the feature sharing view of Agree proposed by PT allows us to account for the grammaticality of adjectival CS modifiers, which pose both a semantic and a structural problem to the formulation of Agree in Chomsky (2000, 2001). The key to the semantic issue is that definiteness is interpreted on an agreeing head outside the adjectival CS. The key to the structural issue is that an instance of a feature can be valued indirectly, because feature sharing is a transitive relation.

## 5.4 DS and other properties of the construct state

The analysis presented so far has not attempted to derive DS from any other property of the Semitic CS; nor has it made any explicit predictions regarding where this kind of phenomenon is expected to occur. In this section I briefly address these issues.

In order for the proposed analysis of DS to be applicable, the lexical head of a CS must enter the derivation with an unvalued [def] feature. The fact that it cannot carry its own independent definiteness value seems like an unavoidable stipulation; many previous analyses also stipulate something along these lines, either explicitly or implicitly (Borer 1999, Wintner 2000). At the same time, this by itself is not a sufficient condition for DS or for forming a CS: adjectives, for instance, may reasonably be assumed to enter the derivation with unvalued [def] even in their free state (when used attributively).

What, then, allows DS to apply in the CS and not in other kinds of nominals? It is perhaps instructive to compare the CS to free genitives, which make use of the prepositional element *šel*. The theoretical question is why DS does not occur in (31b), as opposed to (31a):

- (31) a.    *tmunat ha-yeled*  
              picture the-boy  
              ‘the boy’s picture’
- b.    *tmuna šel ha-yeled*  
              picture of the-boy  
              ‘a picture of the boy’

One line of explanation that suggests itself is that this follows from some sort of locality constraint related to the presence or absence of extra structure surrounding the embedded nominal. Within the Minimalist framework, this could be derived from Case. It has often been suggested that CS formation involves, among other things, Case assignment to the embedded nominal. For concreteness, let us assume that the lexical process deriving heads of CS specifies its output as carrying a structural (genitive) Case feature.<sup>34</sup> Following Chomsky (2000), the embedded

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<sup>34</sup>I will abstract away from the possibility that Case in a CS is assigned by an abstract functional head rather than by the overt lexical head; I believe that the idea proposed here can be implemented



nominal is syntactically active as long as its Case feature has not been valued. This means that Agree could take place between the head of the CS and the embedded nominal, simultaneously sharing the definiteness and Case features. The crucial aspect of this analysis is that the embedded nominal in a CS does not get Case independently of the formation of the CS.<sup>35</sup>

Free genitives, on the other hand, seem to behave differently with respect to Case. The presence of *šel*, which bears many similarities to prepositions (and which could arguably be analyzed as a preposition itself), could be seen as evidence that Case in the free state is not directly related to the head of the embedding DP. Consider the possibility that it is *šel* itself which is the Case assigner in (31b).<sup>36</sup> If this is so, then the embedded nominal in examples like (31b) has its Case feature valued *before* it is merged into the larger nominal, which means that it is no longer active when the head of the larger phrase is available. Thus, no Agree relation is possible, and no DS can be derived in a free genitive.

If this analysis is along the right lines, we derive the fact that DS is found only in the CS from the fact that a CS involves ‘direct’ Case assignment. This, in turn, is supported by the observation made in §2 that the embedded phrase in a CS must

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with or without assuming such functional heads.

<sup>35</sup>If we also assume that the CS-head *must* have its own Case feature checked (or, in GB terms, that Case assignment is obligatory), we also get an immediate explanation for the obligatory presence of an embedded nominal, regardless of the need to value the definiteness feature. This is crucial for the analysis of adjectival constructs, where it might seem odd to claim that the adjectival head is lexically specified as having an obligatory [def] feature.

<sup>36</sup>Alternatively, *šel* in free genitives has sometimes been claimed to be the realization of *inherent* genitive assigned by the noun (see for instance Siloni 1997). There are advantages and disadvantages to this view as well as to the view of *šel* as a (structural) Case assigner; it is outside the scope of the present discussion to try to settle this issue.

be nominal. Thus, we may derive the ungrammaticality of constructions consisting of a CS-head followed by a non-nominal phrase, such as the following example:

- (32) \* *tmunat im ha-praxim*  
           picture with the-flowers  
           a/the picture of (something) with flowers

If the embedded nominal (*ha-praxim*) has its Case feature valued within the PP, it is no longer active once merged with the CS-head *tmunat*; as a result, *tmunat* cannot value its [def] feature by Agree.

I thus conclude that the one property of the CS that is necessarily related to DS is the locality implied by the absence of anything that would assign Case to the embedded nominal independently of what is involved in CS-formation. At a minimum, this predicts that no DS (or no other feature sharing) would ever occur between a pair of nodes separated by a PP layer, where the lower node is nominal.

## 5.5 Indefinites and uninterpretable definiteness

We conclude this section with a brief discussion of two remaining issues:

1. How is a DP with an uninterpretable definiteness feature interpreted?
2. What interpretation patterns are there for constructs in which the embedded DP is [-def]?

These two issues turn out to be related to each other. We have already noted that in a [+def] CS, it is not always the case that both levels are interpreted as definite; thus, the discussion above has implicitly answered the first question: a DP bearing uninterpretable [+def] is interpreted as indefinite. As to the second question, it seems that in a [-def] CS, both levels are always interpreted as indefinite; in other words, one does not find a [-def] CS in which either the embedded DP or the CS

as a whole is interpreted as definite, unless an additional determiner is used. While this might look unremarkable from a pre-theoretic point of view, we should show how this fits into the model of DS proposed in this paper.

Thus, we need to account for the fact that while definiteness is found only in the presence of overt marking (or lexical specification, as with proper names and pronouns), indefiniteness is the ‘elsewhere’ reading. One way to capture this generalization is to make use of the Blocking Principle proposed in Chierchia (1998):

(33) **Blocking Principle** (‘Type Shifting as Last Resort’) (Chierchia 1998):

For any type shifting operation  $\tau$  and any X:

$*\tau(X)$

if there is a determiner D such that for any set X in its domain,

$D(X) = \tau(X)$

This principle is meant to block the free application of type shifting operations in cases where this type shifting could be signaled by an overt determiner. If extended to definiteness features, this principle would predict that the semantic operation associated with definite articles would not be available in Hebrew unless an interpretable [+def] feature is present.

Indefiniteness differ from definiteness in not requiring any type shifting. If nouns have a basic interpretation at the type of sets/properties, this interpretation would still be available as the unmarked interpretation in a nominal whose [ $\pm$ def] feature is uninterpretable.

We thus derive the asymmetry between definite and indefinite readings in a CS. As claimed also in Dobrovie-Sorin (2000, 2003), there is no semantic ‘indefiniteness spreading’ in Hebrew. We can therefore maintain the hypothesis that syntactically, indefinite CS involves exactly the same Agree-based feature sharing as

definite CS; the fact that both levels of a [-def] CS seem to always be interpreted as indefinite is simply the result of not having a definiteness operator available as a free type shifting operator.

## 6 Conclusion

Definiteness spreading poses an interesting challenge to Minimalist analysis because of its unique mix of morphological, syntactic, and semantic issues. The fact that definiteness is not necessarily interpreted on the node where it is morphologically marked and the fact that the syntactic representation leaves a central aspect of the interpretation of the CS underspecified illustrate important properties of the syntax-semantics interface and the way in which it handles grammatical features.

The attempt to analyze DS within the theoretically restrictive and formally explicit mechanisms provided by the Minimalist framework has provided a test case in which two different models of agreement and feature valuation can be compared in terms of their empirical predictions. This article has shown that the feature sharing view of agreement, as developed in Pesetsky and Torrego (2007), allows for a simple and straightforward account of a range of facts that do not follow from the theory of agreement in Chomsky (2000, 2001). Using the feature sharing mechanism, various ideas and insights developed over the years under several theoretical frameworks can all be unified into a single analysis that makes use of no construction specific mechanisms.

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