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THE PROSODIC STRUCTURE OF CONSTRUCT STATE NOMINALS IN MODERN HEBREW

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Abstract

The prosodic structure of Construct State nominals in Modern Hebrew

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The construct state (CS) provides a rich opportunity to explore the syntax-prosody interface in Modern Hebrew because it is morphologically uniform but syntactically, semantically, and prosodically diverse. Research on the syntax-prosody interface in Hebrew has been fairly limited, while the construct state has been frequently studied in the expression of genitive relations, the syntactic structuring of DPs, compounding, and beyond (Berman 1988, 2020, Borer 1996, 1998, Siloni 1996, 1997, and others). However, previous studies of CS prosody have conventionally assumed that all construct states map to single prosodic words (Siloni 2001, Faust 2014). Looking specifically at CS nominals, I argue that they are prosodically heterogenous in ways that reflect their underlying syntactic structure and provide insight into interactions between syntax and prosody. I also consider the prosodic status of CS nominals in contrast with free state (FS) nominals, which are analytic genitive constructions where nouns unambiguously map to separate prosodic words. The analysis presented here relies on Borer's (2012) tripartite division of CS nominals into compounds, M-constructs, and R-constructs. Borer argues that CS nominals are not syntactically uniform based on various syntactic and semantic diagnostics. I identify three types of prosodic structures for CS nominals that parallel Borer's typology: minimal prosodic words [ft ft …]$_{\omega}$

(Ito & Mester 2009), coordinative prosodic words [ω ω]$_{\omega}$ (Ito & Mester 2013), and phi-phrases (ω ω ...)$_{\phi}$. These structures are motivated using phonological diagnostics including stress assignment, resyllabification, and antepretonic /e/-deletion (Bolozky & Schwarzwald 1990). I also propose that the mapping from syntax to prosodic structure in CS nominals can be captured with Match Theory (Selkirk 2011), as long as constraints requiring syntax-to-prosody matching are ranked highly to show a more direct effect of syntax on prosody. By examining the predictions of Match Theory, I further consider how prosody may inform syntactic analyses of the construct state and free state. I conclude that a more fine-grained view of CS prosody provides a better understanding of the construct state and syntax-prosody interactions.

1 Introduction

The construct state in Modern Hebrew provides an interesting opportunity to explore issues at the syntax-prosody interface because it shows a combination of unique syntactic and phonological properties. Work on this interface in MH is limited, and the few analyses that tackle the prosody of this construction argue that construct state nominals constitute a single prosodic word due to the "weak" phonological status of the head, or its "reduced" phonological form (Siloni 2001, Faust 2014). The prosodic status of construct state nominals contrasts with that of the semantically parallel free state nominals, in which all nouns unambiguously project independent prosodic words. Using phonological diagnostics relating to resyllabification, stress assignment and the synchronically active phonological process of /e/-deletion, I will show that the prosodic structure of construct state nominals is heterogeneous in a way that is directly associated with their syntactic structure. I identify at least three types of possible prosodic structures: minimal words (ω), coordinative words, and phi-phrases (ϕ).[1]

These divisions align to an extent with Borer's (2012) tripartite division of construct states into compounds, M-constructs, and R-constructs. Traditionally, construct states have been categorized as either compositional or non-

[1] A minimal word is defined as a prosodic word that can be dominated by another prosodic word, but does not dominate any other prosodic words. This contrasts with a maximal word, which cannot be dominated by a prosodic word but can dominate one. In the discussion here I will also be referring to non-minimal words, which simply refers to a prosodic word that is not minimal but not necessarily maximal. A non-minimal word can be dominated by another prosodic word, and must dominate another prosodic word (Itô and Mester 2013, Bennett 2018). Coordinative words are recursive prosodic word structures which consist of multiple independent prosodic words. These contrast with adjunctive words, which consist of a sub-word element such as a clitic that adjoins to a prosodic word (Itô and Mester 2019).

compositional. In Borer's terms, M-constructs and R-constructs are compositional-type construct state nominals, while compounds are non-compositional. I claim that compositionality broadly corresponds to the projection of separate prosodic words by the head and non-head (hereafter referred to as the "dependent")[2] in the construct state. In compositional cases, the head and dependent do project separate prosodic words, while in non-compositional cases the head and dependent project a single minimal prosodic word together. Furthermore, within the class of compositional construct state nominals, including both M-constructs and R-constructs, I argue that construct state nominals map to either a word, creating a recursive coordinative word structure, or a phi-phrase. Which prosodic constituent the construct state nominal corresponds to is dependent on the amount of functional material in the extended projection of the dependent. If the dependent is an unmodified, bare noun, then the head and dependent may form a coordinative word, potentially via a post-syntactic amalgamation process as described by Harizanov and Gribanova (2018). If the dependent is modified or a DP, amalgamation is not possible, and the construct state nominal must project a phi. Borer draws a distinction between M-constructs and R-constructs based on the amount of functional material in the dependent, but the prosodic distinctions are actually between M-constructs on the one hand, and R-constructs and M-constructs with a modified dependent on the other. An example of each type of nominal discussed is shown in (1), adapted from Borer (2012).[3]

[2]In terms of possession, the head is the "possessed", and the dependent is the "possessor".

[3]Gloss notations:

DEF - definite	M - Masculine	F - Feminine	DOM - direct object marker
SG - Singular	PL - Plural	CS - Construct state	POSS - possessive

(1) (a) Compound

beit *sefer*
house.CS book
'School'

(b) M-construct (with bare dependent)

beit *zxuxit*
house.CS glass
'A glass house'

(c) M-construct (with modified dependent)

beit *zxuxit* *venetsianit*
house.CS glass Venetian
'A house of Venetian glass'

(d) R-construct

beit *ha-mora*
house.CS DEF-teacher
'The teacher's house'

(e) Free state

ha-bajit *shel* *ha-mora*
DEF-house of DEF-teacher
'The teacher's house'

I also argue that the head of a free state nominal may project a phi-phrase. Crucially, although the dependent of a construct state nominal may project a phi-phrase, the head cannot, thus prosodically differentiating construct state nominals from free state nominals. These claims regarding the mapping from syntax to prosody are summarized in table 1.[4]

[4]The prosodic structures shown here are not exhaustive. Depending on the amount of modification in nominals that allow modification, more elaborated structures may be required.

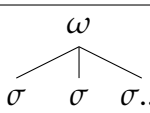
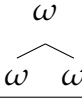
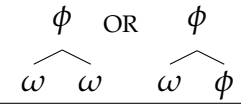
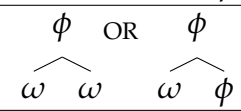
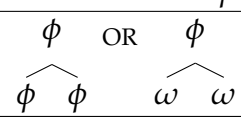
Nominal Type	Compositional?	Modified dependent?	Prosodic structure
Compound	No	No	
M-construct	Yes	No	
M-construct	Yes	Yes	
R-construct	Yes	Yes	
Free state	Yes	Yes	

Table 1: Summary of nominal types and prosodic structures

The mapping of possible syntactic structures of the construct state and the free state to the prosodic structures identified above will also be considered within the framework of Match Theory (Selkirk 2009, 2011). The prosodic differences between free state nominals and construct state nominals, and within different types of construct state nominals are shown to be related to syntactic structure, and informed by constraints on the syntax-prosody interface. This also shows that the prosodic structure of a given construct state nominal is not derived from some inherent phonological weakness of the head, contra to previous work. The analysis presented here reveals that the mapping from syntax to prosody in Hebrew may be more direct than previously considered.

The structure of the paper is as follows. In section 2, I will describe the relevant surface syntactic and morphological properties of the construct state.

Then, I will discuss general phonological properties of Hebrew nouns, identifying several diagnostics for prosodic wordhood. This will be followed by a discussion of the morphophonological properties of the construct state itself, and whether these properties can be used as diagnostics of prosodic wordhood. In section 3, I will present arguments in favor of drawing the prosodic distinctions summarized in table 1. In section 4, I will consider different syntactic analyses of construct state nominals in the framework of Match Theory, and weigh whether any of the analyses are able to predict the prosodic differences proposed. Let us now review the syntactic and phonological properties of Hebrew nominals.

2 Syntactic and phonological background

The construct state commonly expresses genitive relations in semitic languages. Like genitive constructions more generally, the construct state can also express hyponymic or associative relationships, and is a well-known compounding device in Modern Hebrew (Anderson 1985, Borer 1988, 1996, 1998, Berman 2020, Ravid and Shlesinger 1995, Doron and Meir 2013, and others). In Hebrew, it also contrasts with two analytic genitive constructions, the free state and the double genitive. The construct state and the free state are common in both spoken and written Hebrew, while the double genitive is considered more high register or stylistic. For this reason the double genitive will not be an object of interest here. An example of all three types of genitives are given in (2).

(2) (a) Construct state

beit *ha-mora*
house.CS DEF-teacher
'The teacher's house'

(b) Free state

ha-bajit *shel* *ha-mora*
DEF-house of DEF-teacher
'The teacher's house'

(c) Double genitive

beit-a *shel* *ha-mora*
house-POSS.F.SG of DEF-teacher
'The teacher's house'

Free state (FS) nominals and construct state (CS) nominals differ in their morphology, phonology, and syntax. Although speakers show a preference

for either the free state or the construct state under different semantic circumstances, they are in general semantically interchangeable (Ravid and Shlesinger 1995).[5] Note that the free state expresses the possessive relation via the linker or preposition *shel*,[6] roughly translated as "of". In the construct state *shel* may not appear.

Possession can also be expressed with a pronominal clitic, as appears on the head of the double genitive *beita* (2c). This form can also be used in isolation to mean "her house". In this case a bound form of the noun stem appears that sometimes overlaps with the form of the head in the construct state. Because the head in a construct state nominal is sometimes a bound morpheme and sometimes undergoes optional vowel deletion, it is typically described as "phonologically reduced". Due to this perceived phonological "weakness" in the head, many view construct state nominals as single phonological words that only bear a single primary stress (Berman 1978, Borer 1988, 1999, 2012, Siloni 2001, Shlonsky 2004, Faust 2014, and others). I show in section 3 that regardless of these alternations in the head, construct state nominals are actually prosodically heterogenous in ways that can be associated with their underlying syntactic properties.

However, it is important to note that CS nominals are generally more word-like than FS nominals when considering differences between them in morphology, syntax, and phonology, even if they are not all single phonolog-

[5]For example, when the possessor/dependent is a proper noun the free state is always preferred over the construct state.

[6]The exact status of *shel* will not be determined here. For our purposes, it is important to note that *shel* is a functional element, and therefore does not have the status of a prosodic word (Selkirk 1996).

ical words. In addition to the absence of the linker *shel* in the construct state, the definite article *ha-* is restricted in where it may appear. The definite article cannot normatively appear on the head, but definiteness features spread to the head from the dependent. In the free state, each noun has separate definiteness features and supports its own definite article. This difference can be observed between (2a) and (2b), and contributes to the impression that FS nominals are more phrase-like, while CS nominals are more word-like. The morphosyntactic properties of the construct state and relevant differences from the free state are further detailed in section 2.1.1.

2.1 Syntactic properties of nominals

2.1.1 Comparing the construct state, free state, and noun-adjective phrases

Here I will review some of the syntactic properties of nominals in Hebrew by comparing the construct state to the free state and noun-adjective phrases. It is helpful to compare these constructions because they reveal morphosyntactic and surface phonological differences relevant to the analysis of the construct state, while allowing us to understand the behavior of nouns more broadly in Hebrew. Since a defining feature of the construct state is that it is meant to exhibit word-like properties, it is specifically useful to compare it to the free state, which is a genitive construction that does not exhibit word-like properties. It is also useful to compare the construct state to noun-adjective phrases, because both construct state nominals and noun-adjective phrases contain two linearly adjacent lexical heads, which in the case of noun-adjective phrases do not typically exhibit word-like properties. The facts pre-

sented here are well-known and well-described in previous literature.

The most immediately noticeable difference between the head of a CS nominal and that of an FS nominal or noun-adjective phrase, is that the CS head may have allomorphy in the stem or in the suffixes attached to the stem. Consider the examples in (3) and (4).

(3) (a) Construct state

beit *ha-mora*
house.M.SG.CS DEF-teacher.F.SG
'The teacher's house'

(b) Free state

ha-bajit *shel* *ha-mora*
DEF-house.M.SG of DEF-teacher.F.SG
'The teacher's house'

(c) Noun-adjective

ha-bajit *ha-gadol*
DEF-house.M.SG DEF-big.M.SG
'The big house'

(4) (a) Construct state

xadar *oxel*
room.M.SG.CS food.M.SG
'A dining room'

(b) Free state

xeder *shel* *ha-mora*
room.M.SG of DEF-teacher.F.SG
'A room of the teacher'

(c) Noun-adjective

xeder *gadol*
room.M.SG big.M.SG
'A big room'

(d) Noun-adjective

xadar-im *gdol-im*
room.M.PL big.M.PL
'A big room'

In the CS nominal in (3a), the form of "house" is a reduced one syllable word *beit*, while in noun phrases (3b-c), it appears as two syllables identical to its isolation form *bajit*. In the CS nominal in (4a), the form of "room" is the vowel-lowered, unreduced *xadar*, while in noun phrases (4b-c), it appears as identical to its isolation form *xeder*. These examples show the way allomorphy can occur in the stems of CS nominal heads. Additionally in (3), we can observe the placement behavior of the definite article. Hebrew noun phrases show concord in definiteness, gender, and number, with the definite article appearing as a prefix *ha-* on both the head noun and all its modifiers (3c). These features surface morphologically. There is no indefinite article in Hebrew, so if a noun is indefinite the head and its modifiers will simply lack the definite prefix (4c-d). In the construct state, the definite article may not attach to the head, but its presence on the dependent indicates that the entire CS nominal is definite (3a). This probably involves some form of feature spreading (Danon 2007) or percolation (Borer 1999), the exact mechanism of which will not be relevant here. In (4a) we can see that the absence of the definite article on the dependent renders the entire CS nominal indefinite. Note again that this is not the case in the free state, where the definiteness of the head and possessor are independent of each other, as seen in (4b).

It is also important to observe that the head of a CS nominal can be identical to the isolation form of a noun, which is the form that appears in noun-

adjective phrases and the free state. An example of this is given in the CS nominal in (5a), which can be contrasted with (5b). Examples (5b) and (5c) also further demonstrate concord in Hebrew noun phrases.

(5) (a) Construct state

tsalaxat *per-ot*
plate.F.SG.CS fruit-F.PL
'A fruit plate'

(b) Noun-adjective

tsalaxat *gdol-a*
plate.F.SG big-F.SG
'A big plate'

(c) Noun-adjective

ha-tsalax-ot *ha-gdol-ot* *ha-elu*
DEF-plate-F.PL DEF-big-F.PL DEF-these.F.PL
'These big plates'

Allomorphy in CS also occurs in the suffixes that attach to the head noun, specifically the feminine singular and masculine plural suffixes. Feminine nouns in Hebrew are often accompanied by the feminine singular suffix *-a*, which appears as *-at* in the construct state. This is shown in the contrast between the construct state in (6a) and free state (6b).

(6) (a) Construct state

xults-at *ha-mora*
house-F.SG.CS DEF-teacher.F.SG
'The teacher's shirt'

(b) Free state

ha-xults-a *shel* *ha-mora*
DEF-shirt-F.SG of DEF-teacher.F.SG
'The teacher's shirt'

Previous studies analyzing the construct state as a single prosodic word claim that the form of the feminine singular suffix *-a* appears outside of CS due to a phonological process of word-final /t/ deletion. In an analysis of the construct state as a single prosodic word, /t/ is allowed to surface in the CS head because the feminine suffix is not in the final position of a phonological word. This does not necessarily explain the allomorphy in the masculine plural suffix however, as shown in (7).

(7) (a) Construct state

sakin-ei *tabax*
knife-M.PL.CS chef.M.SG
'Chef's knives'

(b) Free state

ha-sakin-im *shel* *ha-tabax*
DEF-knife-M.PL of DEF-chef.M.SG
'The chef's knives'

In the construct state in (7a) the allomorph of the masculine plural suffix *-ei* appears, while in the free state in (7b) the masculine plural suffix appears as its regular form *-im*.

Beyond allomorphy, there are further differences between CS and FS nominals that deserve attention. First, CS restricts the placement of adjectives and other modifiers in ways that FS does not. In the construct state, the head and dependent must be linearly and syntactically adjacent, with no modifiers intervening between the two.[7] In the free state all modifiers appear next to the

[7]This is somewhat of an oversimplification, since numerals and quantifiers modifying the dependent may intervene. However, this is because numerals and quantifiers are prenominal modifiers – when they appear with the dependent, the head and the phrase containing the dependent are still linearly and syntactically adjacent. No post-nominal modifiers may intervene between the head and dependent.

noun they modify, as is generally the case in Hebrew. Compare the examples in (8).

(8) (a) Construct state

xultsat *ha-jalda* *ha-jafa*
shirt.CS DEF-girl DEF-pretty
'The girl's pretty shirt' (or 'The pretty girl's shirt')

(b) Free state

ha-xultsa *ha-jafa* *shel* *ha-jalda*
DEF-shirt DEF-pretty of DEF-girl
'The girl's pretty shirt'

In (8a), the adjective *hajafa* can only follow the dependent *hajalda*, although it modifies the head *xultsat*. In (8b) we see that the adjective *hajafa* immediately follows the head *haxultsa*. Since a post-nominal modifier of the head must follow the dependent in the construct state, note that the attachment of the modifier may also be ambiguous when the dependent and the head are the same gender and number. For example, (8a) may also be understood as "the pretty girl's shirt", with *hajafa* modifying *hajalda*. To express this in the free state, the adjective *hajafa* would follow *hajalda* as well.

Building on this, when both the head and dependent are modified in the construct state, the modifiers must be strictly ordered. The example in (9) demonstrates the only possible order for modifiers of the head and dependent in the construct state.

(9) (a) Construct state

xultsat *ha-jalda* *ha-xaxama* *ha-jafa*
shirt.CS DEF-girl DEF-smart DEF-pretty
'The smart girl's pretty shirt'

(b) Free state

ha-xultsa *ha-jafa* *shel* *ha-jalda* *ha-xaxama*
DEF-shirt DEF-pretty of DEF-girl DEF-smart
'The smart girl's pretty shirt'

In (9a), it would not be possible to express "the smart girl's pretty shirt" by changing the order of the modifiers to **hajafa haxaxama*. The only possible order appears in (9a). In the free state in (9b), observe that each adjective appears following the noun it modifies.

The strict ordering of modifiers is also observed when the construct state is nested. Another interesting property of construct states is that they may be (theoretically infinitely) nested, in which case the modifiers of each head must also be nested.[8] Example (10) demonstrates this.

(10) *[[sharvul* *[[xultsat* *[ha-jalda* *ha-xaxama]]* *ha-jafa]]* *ha-arox]*
sleeve.CS shirt.CS DEF-girl DEF-smart DEF-pretty DEF-long
'The long sleeve of the smart girl's pretty shirt'

In addition to word order restrictions on modification, the ordering of arguments is more strict in the construct state than in the free state. For example, when a construct state headed by a noun that is not deverbal has both an agent and theme argument,[9] only the theme can surface as the CS dependent, while the agent must be expressed analytically using FS. The resulting argument order is noun-theme-agent. In the free state, on the other hand, both noun-theme-agent and noun-agent-theme orders are possible (Borer 1999,

[8]Note however that more than two modifiers in such a situation quickly becomes too cumbersome.

[9]Construct states can also be headed by deverbal nouns, or process nominals, but these will not be discussed here since they probably have a different underlying syntax than other CS nominals. See Borer (1999), Siloni (1997), Shlonsky (2004).

Sichel 2003, Shlonsky 2004, Siloni 1996, 1997). The examples in (11) demonstrate this contrast.

(11) (a) Construct state

tmunat *ha-xamanijot* *shel* *ha-oman*
picture.CS DEF-sunflowers of DEF-artist
'The artist's picture of the sunflowers'

(b) Construct state

**tmunat* *ha-oman* *shel* *ha-xamanijot*
picture.CS DEF-artist of DEF-sunflowers
Intended: 'The artist's picture of sunflowers'

(c) Free state

ha-tmuna *shel* *ha-xamanijot* *shel* *ha-oman*
DEF-picture of DEF-sunflowers of DEF-artist
'The artist's picture of sunflowers'

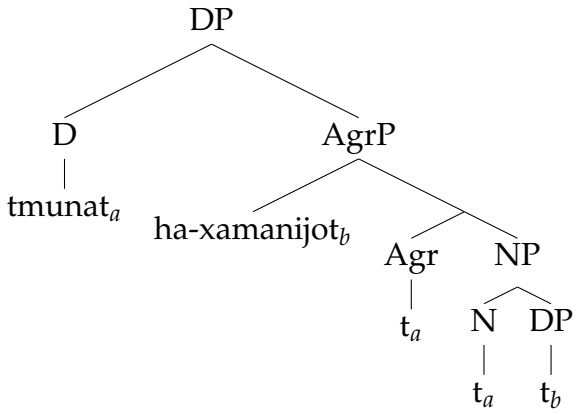
(d) Free state

ha-tmuna *shel* *ha-oman* *shel* *ha-xamanijot*
DEF-picture of DEF-artist of DEF-sunflowers
'The artist's picture of sunflowers'

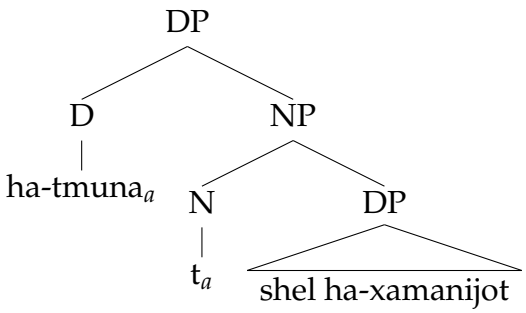
Analyses of the construct state in Hebrew attempt to account for the properties of CS outlined in this section. Building on previous analyses (Fehri 1989; Ritter 1987, 1988) that derive CS nominals using head-to-head movement, Siloni (1996, 1997) provides a conventional analysis that argues for D as the position to which the CS head raises. This follows from the distribution of the definite article *ha-* and the ordering of adjectives and arguments as described. Siloni also derives the free state via head movement of the head noun to D, drawing the difference between CS and FS from the presence of an Agr phrase in CS that is absent from FS. The dependent in CS raises to the specifier of the

Agr head, where it is assigned structural genitive case by the Agr head. In FS, genitive case is assigned inherently by the linker *shel*, so there is no need for the projection of the Agr head. The resulting structures of the free state and construct state under this analysis are given in (12) for the phrase "the picture of the sunflowers". [10]

(12) (a) Construct state



(b) Free state



This analysis conveys a more integrated impression of the construct state in comparison to the free state, since CS requires the establishment of a structural agreement relationship with the dependent, while in FS the dependent is assigned genitive case independently of the syntactic structure. Genitive case is therefore directly tied to the syntactic properties of the CS structure, while in FS it is secondary to the structure. This is compatible with the intuition that FS is

[10]Note that in (12a) the dependent is merged as a complement of N since it is a theme, but it could also be merged as a specifier of N if it were an agentive possessor.

less integrated than CS and more phrase-like, while CS is more integrated and more word-like. In section 4, I examine different possible syntactic analyses in light of the proposed prosodic structures for CS. Although this examination does not necessarily support Siloni's (1996,1997) analysis, it does support one that preserves the character of CS as being more word-like and FS as being more phrase-like.

2.1.2 Borer's (2012) typology

Borer (2012) expands on previous analyses with the introduction of a tripartite syntactic division among construct state nominals, This division is specific to construct states headed by nouns, although construct states may actually also be headed by adjectives, numerals, quantifiers, and prepositions (Borer 2012, Doron and Meir 2013). Although construct states are uniform morphologically, Borer's analysis highlights their syntactic heterogeneity, which I will show corresponds to prosodic heterogeneity. The three types of CS nominals identified by Borer are R(eferential)-constructs, M(odificational)-constructs, and compounds. R-constructs have a referential dependent, hence the "referential" label, while M-constructs and compounds do not. The dependent of an R-construct is referential in the sense that it can be referenced by a pronoun and may be accompanied by a determiner or adjective that entails reference (such as "some"). Dependents of M-constructs have a modificational property interpretation, hence the "modificational" label, and can modified in a restricted way. Compounds are essentially lexicalized CS nominals, behaving as though the head and dependent are a single syntactic unit. An example of each type of

CS nominal, adapted from Borer (2012), is given in (13).

(13) (a) Compound

beit *ha-sefer*
house.CS DEF-book
'The school' (literally 'House of book')

(b) M-construct

beit *ha-ets*
house.CS DEF-wood
'The wooden house'

(c) R-construct

beit *ha-mora*
house.CS DEF-teacher
'The teacher's house'

R-constructs and M-constructs may be grouped together as compositional CS nominals, indicating that their meaning can be transparently discerned from the individual meanings of the head and dependent. Compounds on the other hand are non-compositional, meaning that their meanings cannot be transparently discerned, as in (13a).[11] Alternatively, M-constructs and compounds can be grouped together as non-referential CS nominals, exhibiting more word-like properties than R-constructs.

Borer argues for this tripartite distinction using a variety of syntactic diagnostics. First, Borer identifies several ways in which R-constructs and M-constructs diverge from compounds. The dependent of M-constructs and

[11] Although I adopt Borer's analysis, some of the CS nominals presented as compounds in this study are actually compositional. These seem to have become compounds via a process of lexicalizaiton. They show evidence of lexicalization such as allowing pluralization of the entire CS to appear morphologically on the dependent, allowing the definite article to attach to the CS head, and exhibiting stress retraction.

R-constructs can be coordinated and the head can be referred to with a pronoun, which is impossible in compounds. Both R-constructs and M-constructs also allow nested heads, as exemplified in (10). Finally, R-constructs and M-constructs differ from compounds in allowing modification of the dependent. R-constructs fully allow modification of the dependent, while M-constructs only allow modification of the dependent with a PP or property-denoting adjective. Compounds, on the other hand, do not allow any modification of the dependent.

Meanwhile, M-constructs and compounds also share properties to the exclusion of R-constructs. The dependent in both M-constructs and compounds cannot be modified by a definite adjective, cannot be pluralized (unless the plural is interpreted as a property), cannot be quantified, cannot be referenced by a pronoun, and does not allow determiners or adjectives that entail reference. Compounds and M-constructs additionally share the property of optionally repositioning the definite article *ha-* to the head, which as described above is normatively banned. An example of the repositioning of the definite article is given in (14).

(14) (a) Compound

ha-beit *sefer*
DEF-house.CS book
'The school'

(b) M-construct

ha-beit *ets*
DEF-house.CS wood
'The wooden house'

Finally, compounds differ from both R-constructs and M-constructs in

that a compound may itself function as the head of a CS nominal, shown in (15).

(15) *[joshev rosh]* *moatsa*
[sitter.CS head].CS council
'The council chairman'

The fronting of *ha-* is a well-known property of compounds, and along with the ability of compounds to act as heads of CS nominals can be interpreted as evidence of syntactic or prosodic wordhood. In compounds specifically (but not necessarily M-constructs), failing to front the definite article actually gives an impression of formality or a higher register.

To account for the differences among CS nominals outlined above, Borer attributes the properties of compounds to the syntactic incorporation of two nominal heads, while deriving M-constructs and R-constructs via head movement of the head of the construct to the head of a higher functional projection. M-constructs and R-constructs can then be differentiated by the amount of functional material present in the extended projection of the dependent – R-construct dependents are full DPs, while M-constructs are either classifier phrases or simply noun phrases. Borer claims that the unifying property across all construct states is in fact a prosodic structure requirement that the head and dependent form a phonological word, which is the result of phonological liason. A simplified version of the syntactic structures proposed by Borer is given in (16).

(16) (a) Compound: $[_{NP}[N_1+N_2]]$
(b) M-construct: $[_{FP}N_1...[_{NP/CLP}N_2]]$
(c) R-construct: $[_{FP}N_1...[_{DP}N_2]]$

As discussed, previous analyses of the construct state generally attempt to account for the complementary distribution of the head and the definite article, the inability of modifiers to intervene between the head and dependent, and the strict ordering of modifiers and multiple arguments, while allowing for the opposite in the free state. Some of these analyses also specifically put forward an account of the word-like properties of the construct state (Borer 1988, 1999, 2012, Siloni 2001). However, from a phonological perspective, not much has actually been said about the prosodic structure of construct state nominals, and to my knowledge there has been no serious examination of phonological diagnostics for prosodic wordhood in the construct state. In the following section, I identify potential phonological diagnostics for prosodic wordhood in Hebrew, and discuss the basis of previous claims that the construct state is a single prosodic word. I argue that previous claims generally do not use appropriate diagnostics in the context of a phonological analysis, and that they do not constitute phonological evidence for wordhood in the construct state.

2.2 Phonological properties of nominals

There has been a general consensus in previous literature that construct state nominals are single prosodic words, while free state nominals and noun-adjective phrases are made up of separate, independent prosodic words. This is based on the notion that the head of the construct state is phonologically "reduced". Reduction has been associated with an absence of stress on the head altogether or an absence of primary stress, vowel deletion, and general "phonological modification", which refers to the allomorphic changes present in con-

struct state heads. I will show that these diagnostics as previously applied are not informative of the prosodic structure of construct state nominals. To understand how to interpret these claims, we should first review the phonology of Hebrew nominals in general.

2.2.1 General noun phonology

Primary stress in Hebrew nouns involves a combination of lexical stress and regular, default stress (Bat-el 1989, 1993, Graf and Ussishkin 2003, Shaked 2009). Lexical stress is associated with a particular noun or affix, and can be specified to occur on any syllable of the word. Default primary stress is assigned to the right-most syllable of the word.[12] Secondary stress is then assigned by default to every other syllable to the left or right of the primary stressed syllable within a prosodic word (Bolozky 1997, 2015, Bolozky and Schwarzwald 1990). The presence of secondary stress for all speakers is debated, but for speakers who claim to perceive it, it is fairly regular, and allows for violations of LAPSE but never of CLASH. The constraint LAPSE penalizes two adjacent unstressed syllables, while CLASH penalizes two adjacent stressed syllables (Bat-el 1989, Bolozky 2015, Bolozky and Schwarzwald 1990). Most bisyllabic nouns have final stress, while trisyllabic nouns have final primary stress, and initial secondary stress. There are not many nouns larger than three syllables outside of loanwords, presumably due to prosodic size restrictions. Some examples are given in (17). Footing is not provided because the foot structure

[12]The full landscape of stress assignment is somewhat more complex than this, with mobile and immobile stress (Bat-el 1993). The crucial distinction here is only between lexical and default stress.

of Hebrew is both debated (see Bat-el 1993, Graf 2000, Ussishkin 2000, Graf and Ussishkin 2003, Becker 2003) and not crucial for any claims made here.

(17) (a) Default stress

shul.xán	'Table'
sì.fri.já	'Library'
sfa.rím	'Books'
òf.no.ím	'Motorcycles'

(b) Lexical stress

sé.fer	'Book'
of.nó.a	'Motorcycle'
tí.ras	'Corn'
jé.da	'Knowledge'

Note that a word may have lexical stress which is overridden by default stress when a suffix is added. This is not always the case, however. Some lexical stress is retained across paradigms unless a suffix with its own lexical stress requirements is appended to the word (Bat-el 1993). For example, a suffix may require that primary stress appear on the syllable preceding the suffix (18b). The examples in (18) provide a summary of different possible combinations of lexical and default stress on nouns in Hebrew.

(18) (a) Default stress on stem; default stress with suffix

ka.dúr	*kà.du.rím*
'Ball'	'Balls' (pl, *-im*)

(b) Default stress on stem; lexical stress with suffix (pre-suffix stress)

ar.náv	*ar.né.vet*	(vs *àr.nav.ím*; 'Rabbits' (pl, *-im*))
'Rabbit' (m)	'Rabbit' (f, *-et*)	

(c) Lexical stress on stem; default stress with suffix

jé.led	*jè.la.dím*
'Child'	'Children' (pl, *-im*)

(d) Lexical stress on stem; default stress with suffix (stem ”wins”)

tí.ras	*tí.ra.sìm*
‘Corn’	‘Corns’ (pl, *-im*)

(e) Lexical stress on stem; lexical stress with suffix (suffix ”wins”)

trák.tor	*tràk.to.ríst*	(vs *trák.to.rìm*; ‘Tractors’ (pl, *-im*))
‘Tractor’	‘Tractor driver’ (*-ist*)	

The realization of stress in Hebrew is achieved by lengthening the vowel in the stressed syllable and the appearance of a high tone (Becker 2003), although pitch is a less reliable indicator of stress than duration (Silber-Varod and Amir 2022). Note that Hebrew has no phonemic vowel length distinctions or tone distinctions, though stress itself can be contrastive (compare *bó.ker* “morning” to *bo.kér* “cowboy”).

Noun stems are also subject to certain vowel deletion processes. Some of these processes are no longer phonologically motivated, and can perhaps be better described as allomorphic alternations (Bolozky 1997). Of interest is antepretonic /a/-deletion, which applies to some lexically-specified forms with an /a/ two syllables before a stressed syllable. The environment required for antepretonic /a/-deletion also occurs in Segolate plural formation, which involves an additional vowel alternation.[13] Some examples of antepretonic /a/-deletion, in general and in Segolates, are given in (19). The environment for deletion arises when a suffix is added to the noun.

[13]Segolate nouns are lexically marked as participating in the particular plural formation process shown in (19b), analogous to a main pattern in Broken Plural formation in Arabic. Although singular Segolate nouns generally share a similar phonological shape, namely the pattern CéCeC in the singular, whether or not a noun behaves as a Segolate is considered to be lexically-specified. In any case, this process is not synchronically phonological.

(19) (a) Antepretonic /a/-deletion

SG	**PL**	
da.vár	*dva.rím*	'Thing'
ga.mál	*gma.lím*	'Camel'
pa.kíd	*pki.dím*	'Clerk (m)'
pki.dá	*pki.dót*	'Clerk (f; from *pa.kíd*)'

(b) Segolate alternation

SG	**PL**	
ké.lev	*kla.vím*	'Dog'
mé.lex	*mla.xím*	'King'
bó.ker	*bka.rím*	'Morning'

Bolozky (1997) explains that /a/-deletion historically applied to unstressed non-high vowels in open syllables that had not undergone any lengthening or tensing process. This actually occurred regardless of the distance of the vowel from primary stress, but in Modern Hebrew the relevant environment is distance from primary stress due to the disappearance of the other lengthening and tensing rules. This process is not considered phonologically active because there are similar singular nouns that do not exhibit vowel deletion when a suffix is added. For example the masculine singular *ga.mád* "dwarf", which is comparable to the singular *ga.mál* "camel" in phonological form, becomes *ga.ma.dá* in the feminine singular and *ga.ma.dím* in the masculine plural. Additionally, the singular *sa.kín* "knife", which is comparable to *pa.kíd* "clerk", becomes *sa.ki.ním* in the plural. There is no phonological motivation for these differences.

Additionally, the process of Segolate noun pluralization is based on abstract underlying forms. The plural *kla.vím* "dogs" is the result of the combination of underlying */kalb/* with the masculine plural suffix *-im*. This underlying form of the stem surfaces in the feminine singular form *kal.bá*. An /a/-insertion process then applies to the underlying form */kalbim/* resulting in the intermediate form */kalabim/*. This form undergoes antepretonic /a/-deletion, and is also subject to a stop spirantization process that changes /b/ to /v/, resulting in the surface form *kla.vím*. Bolozky suggests that none of these changes are the result of active phonological processes.

Antepretonic /a/-deletion is provided here as a contrast to two phonologically active vowel deletion processes, antepretonic /e/-deletion and post-tonic final /e/-deletion (Bolozky and Schwarzwald 1990). Following Bolozky (1997), we can assume that phonologically inactive vowel deletion, as in antepretonic /a/-deletion, is an instance of allomorphy that is triggered by the addition of certain morphemes or features. The relevance of allomorphy to the prosodic analysis of the construct state will be revisited in section 2.2.2.

Two phonologically active vowel deletion processes that are relevant to the prosodic analysis of the construct state are antepretonic /e/-deletion, and post-tonic final /e/-deletion.[14] Both of these deletion processes are conditioned by LAPSE, which penalizes numerous consecutive syllables without primary stress.[15] Note as well that both of these processes are optional, and tend to apply more often in "casual" or fast speech. Antepretonic /e/-deletion may

[14]Antepretonic /e/-deletion only affects "derived" /e/s, whose historical source is probably epenthesis due to an unsyllabifiable onset cluster (Bolozky and Schwarzwald 1990).

[15]Note that according to Bolozky and Schwarzwald (1990), a violation of CLASH, which penalizes two adjacent syllables with primary stress, would block deletion.

apply in the presence of a preceding vowel-final clitic, pronoun, or numeral, while post-tonic final /e/-deletion may apply in the presence of a following vowel-initial clitic or pronoun. Post-tonic final /e/-deletion is somewhat restricted by the frequency of the noun stems, but applies regularly in verbs with the present tense feminine singular suffix *-et*. These processes are exemplified in (20) and (21).

(20) Antepretonic /e/-deletion

(a) */ha + je.la.dím/* 'The children'
ha.jè.la.dím ~ hàj.la.dím

(b) */ba + me.si.bá/* 'At the party'
ba.mè.si.bá ~ bàm.si.bá

(c) */shlosha ne.xa.dím/* 'Three grandchildren'
shlo.shá nè.xa.dím ~ shlo.shán.xa.dím

(21) Post-tonic final /e/-deletion

(a) */sé.ret ʔe.xád/* 'A (one) movie'
sé.ret e.xád ~ sér.te.xàd

(b) */ha + jé.led ha.zè/* 'This kid'
ha.jé.led a.zè ~ ha.jél.da.zè

(c) */hi me.da.bér.et ʔi.tò/* 'She is talking to him'
ìm.da.bé.ret i.tò ~ ìm.da.bér.ti.tò

Observe in (21) that what is described as a vowel-initial clitic is actually preceded by a glottal stop or fricative underlyingly. Initial glottals may be omitted in Modern Hebrew, and more often than not the relevant word is produced with an initial vowel (Dekel 2014). For the purposes of phonological processes, any word with an initial glottal can be considered vowel-initial.

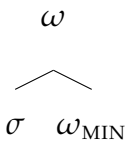
Since vowel deletion in (20-21) generally only applies when the preceding or following element is functional in nature (a pronoun or clitic), I propose that the domain for /e/-deletion and any related resyllabification is a non-minimal prosodic word, following Bolozky and Schwarzwald's (1990) claim that clitics form prosodic words with adjacent elements. This means that /e/-deletion can only be triggered when an appropriate preceding or following clitic forms a recursive prosodic word with the noun. As clitics, functional elements do not project their own prosodic words, and then also may be assigned secondary stress relative to the word domain of the noun (see *hàj.la.dím*, *ha.jél.da.zè*, and *sér.te.xàd*).[16]

I propose that since deletion and resyllabification are optional, the structures involved are affixal clitic type structures, as defined by Selkirk (1996) and Itô and Mester (2009). This contrasts with the incorporation of vowel-initial suffixes into a word, which trigger obligatory resyllabification and a shift in stress (if stress isn't lexically specified). A stem with the addition of a vowel-initial suffix thereby projects a minimal prosodic word. Note that a minimal word cannot dominate another prosodic word, but can be dominated by one (Itô and Mester 2013). Clitics that trigger optional deletion and resyllabification are instead adjoined to a prosodic word, creating a recursive, adjunctive word. The two structures are given below in (22a) and (22b).[17]

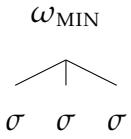
[16]Some function words may possibly project their own prosodic words and maintain primary stress, such as numbers. These issues are outside the scope of this paper.

[17]Note that the foot structure within a minimal word is not relevant to the discussion here, so it is just represented as a syllable-based structure.

(22) (a) */ha + je̲ladím/* *ha.jè̲.la.dím ~ hàj.la.dím* 'The children'



(b) */jéled + im/* *jè.la.dím* 'Children'



The contrast in (22) shows that the addition of a suffix creates a new lexical item that projects a minimal prosodic word, while the presence of a proclitic or enclitic does not. Note that the contrast between the forms in (21) and (22b) also establishes that primary stress is assigned within minimal prosodic words, which correspond to lexical words.

It is also not likely that the clitics in (21) are free clitics, combining with the noun to form a phi-phrase, since they may be assigned secondary stress relative to the primary stress of the word to which they are cliticized. Secondary stress assignment is reported to occur at the word level in Modern Hebrew, rather than the phrase level. Additionally, both vowel deletion processes appear to be marginal at best when they occur across word boundaries, indicating that phi-phrases are not the domains of these processes. This is demonstrated in (23), with examples adapted from Bolozky and Schwarzwald (1990).

(23) (a) Marginal antepretonic /e/-deletion

/hem raʔu je̲ladim ba + rexov/ 'They saw children in the street'

èm.ra.ú je̲.la.dím bar.xóv~ ʔèm.ra.új.la.dím bar.xóv

(b) Marginal post-tonic final /e/-deletion

/hi m<u>e</u>dabere<u>t</u> ʔislandit/ 'She speaks Icelandic'

ìm.da.bé.r<u>e</u>t is.lán.dit ~ ʔìm.da.bér.tis.lán.dit

According to Shaked (2009), phi-phrases in Modern Hebrew generally obey binarity constraints, but in short phrases composed of three words (or three minor accentual phrases) there is optionality in whether BINMIN or BINMAX can be violated. BINMIN requires phi-phrases to be composed of at least two words, while BINMAX requires that phi-phrases do not exceed two words. This means that phrases consisting of three words may either surface as one phi-phrase or two. Since the pronoun *hem* "they" does not project it's own prosodic word in (23a), we can observe that (23a) is only composed of three words, which would at maximum organize into two phi-phrases (either *(rau jeladim) (barexov)* or *(rau) (jeladim barexov)*. Since antepretonic /e/-deletion does not seem possible in these cases and is not triggered by the incorporation of vowel-initial suffixes into a word, we can conclude that it only applies within a non-minimal prosodic word. Meaning, antepretonic /e/-deletion cannot apply across maximal word boundaries within a phi-phrase or within minimal words. If it were possible in any prosodic structure, we would not expect deletion in (23a) to be marginal, but rather merely optional.

In (23b), there are only two prosodic words since the pronoun *hi* "she" also does not project its own word. Antepretonic /e/-deletion applies within the recursive word formed by the pronoun and the verb, but post-tonic /e/-deletion does not apply within the phi-phrase formed by this recursive word and the object of the verb. We can therefore conclude that both types of /e/-

deletion can only occur within non-minimal prosodic words.

Since /e/-deletion is phonologically active and relativized to a particular prosodic structure, we can use it to assist in the determination of the prosodic structure of construct state nominals, alongside the characteristics of stress assignment in nouns. On the other hand, antepretonic /a/-deletion is not a phonologically active process, and cannot be used as a diagnostic of prosodic structure. Based on the observed properties of antepretonic /e/-deletion and post-tonic /e/-deletion, we can assume that they apply in non-minimal words, whereas obligatory processes of resyllabification, vowel deletion, and allomorphy must apply within minimal words. Primary stress assignment must be assigned within a minimal word as well. Now I will consider the specific phonological properties of the construct state that have previously been associated with prosodic wordhood.

2.2.2 Construct state (morpho-)phonology

Primary stress in construct state nominals appears on the dependent, while it has been claimed that either no stress or only secondary stress appears on the head. Alternatively, in the free state both nouns have primary stress, and in noun-adjective phrases both the noun and adjective bear primary stress. Example (24) demonstrates these previously proposed differences with stems that exhibit default stress.[18] Word boundaries are notated with brackets, while phi-phrase boundaries are notated with parentheses.

[18] Although several descriptions of construct state nominals claim that there is no stress present on the head whatsoever, this idea will not be considered here. It is quite obvious that there is some level of prominence on the heads of compositional CS nominals.

(24) (a) [σ σ ω]

ti.pàt *xa.láv*
drop.CS milk
'A drop of milk'

(b) (ω [σ ω])

ti.pá *shel* *xa.láv*
drop of milk
'A drop of milk'

(c) (ω ω)

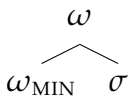
ti.pá *kta.ná*
drop small
'A small drop'

Note again that the feminine singular suffix *-a* surfaces as *-at* when it is attached to the head of a CS nominal. As stated in section 2.1.1, this alternation interpreted as evidence of phonological wordhood in the construct state (Shlonsky 2004, Faust 2014). Historically, the disappearance of *-t* in isolation forms has been attributed to word-final deletion, since *-at* is also found in stems with possessive suffixes, such as *ti.pa.tó* "his drop". Words with possessive suffixes are minimal words, since any relevant vowel deletion, allomorphy, and resyllabification processes are obligatory. Because *-at* surfaces in both these words and construct states, we are meant to assume that there is no phonological word boundary following the noun that heads the construct state. However, I argue that there is insufficient evidence to state that /t/-deletion is a phonologically active rule, given that it is not generalizable across the language and does not account for allomorphy in the male plural suffix. Note as well that the feminine singular suffix always surfaces as *-at* in the construct state, regardless of type (as defined by Borer (2012)) or prosodic structure. The CS head and dependent cannot form a minimal word in all cases, as I will show in section 3. The presence of *-at* furthermore does not rely on any properties of a following or preceding segment.

I also argue that it is not possible to state that /t/-deletion only applies when /t/ appears at a maximal word boundary, because then we would expect *-at* to surface when a noun stem combines with a clitic, and this is not the case. Consider example (25).

(25) (a) */ti.pá* + *ʔa.xát/* 'A (one) drop'
ti.pá a.xát ∼ *ti.pá.xat*

(b) Structure of *ti.pá.xat*



Example (25) shows that when *tipa* combines with the clitic form *-xat* of the numeral "one" to mean "a drop",[19] an adjunctive prosodic word is formed. In this case, the feminine singular suffix appears at a non-maximal word boundary, but still surfaces as *-a* rather than *-at*. If *-at* surfaced in the construct state only in the absence of a maximal word boundary, we would expect it to appear in (25b).

Furthermore, note that the feminine singular suffix *-et* as well as the feminine plural suffix *-ot* both have a final /t/ that does surface word-finally. It's not clear why word-final /t/-deletion should only apply to the feminine singular suffix, and therefore I believe it is difficult to motivate this alternation phonologically, at least synchronically. The alternation between *-at* and *-a* is then not due to a phonologically active rule, since it is specific only to the feminine singular suffix when this suffix appears in the context of genitive case.

A /t/-deletion rule also does not account for the alternation between *-ei* and *-im* in the masculine plural suffix, which in a way is the opposite of the

[19] See Borer (2005) for more information on the indefinite use of *-xat* and *-xad* in place of *ʔaxat* and *ʔaxad* (which she generalizes as *-xit*).

alternation in the feminine singular – the final consonant is dropped "word-internally" instead of word-finally. Although there could be a separate phonological process which accounts for the male plural suffix, there is again no synchronic reason to believe either alternation is phonological, and a phonological explanation would miss the generalization that both of these alternations appear in genitive contexts where there is no particle (i.e. *shel*) to express a genitive feature. I therefore propose that these alternations are cases of morphosyntactically-conditioned allomorphy that is triggered by a genitive feature associated with the noun stem, and cannot inform an analysis of the prosodic structure of the construct state.

Several additional examples of allomorphic alternations in the construct state are given in (26)-(29) that are often used as evidence that the construct state requires a phonological reduction of the head, resulting in a [σ ω] type prosodic structure.[20]

(26) *sé.fer* 'Book', *sfa.rím* 'Books'

(a) *sé.fer* *je.la.dím*
book.M.SG.CS children
'A children's book'

(b) *sif.réi* *je.la.dím*
book.M.PL.CS children
'Childrens' books'

[20] Although previous studies claim that the head of CS can only bear secondary stress or no stress, I notate the prominence on the heads of the construct state nominals in (26)-(29) as primary stress. In section 3 I show that prominence on the heads of compositional CS nominals must be primary stress.

(27) *pa.kíd* 'Clerk', *pki.dím* 'Clerks'

(a) *pa.kíd~pkíd* *mas*
clerk.M.SG.CS tax
'A tax clerk'

(b) *pki.déi* *más*
clerk.M.PL.CS tax
'Tax clerks'

(28) *ni.tsa.xón* 'Victory', *nits.xo.nót* 'Victories'

(a) *ni.tsa.xon~nits.xón* *ha-niv.xé.ret*
victory.F.SG.CS DEF-team
'The team's victory'

(b) *nits.xo.nót* *ha-niv.xé.ret*
victory.F.PL.CS DEF-team
'The team's victories'

(29) *bá.jit* 'House', *ba.tím* 'Houses'

(a) *béit* *ha-mo.rá*
house.M.SG.CS DEF-teacher
'The teacher's house'

(b) *ba.téi* *ha-mo.rá*
house.M.PL.CS DEF-teacher
'The teacher's houses'

There are four different patterns of interest in the examples above: no change in the singular (26a), optional vowel deletion in the singular (27a, 28a), an irregular vowel quality alternation in the singular or plural (26b, 29a-b), and obligatory vowel deletion in the plural (26b, 27b, 28b). As previously discussed, the masculine plural suffix *-im* is obligatorily realized as the diphthong *-ei* on heads of construct state nominals (26b, 27b, 29b). Alongside the change in vowel quality observed in (26b) and (29a), the deletion of the first or second

vowel on the construct state head is meant to represent phonological "reduction" as described earlier. The change in (29a) is acknowledged to be of a more irregular type, seemingly specific to the word "house" itself. In this case we see diphthongization – *béit* is monosyllabic, often even appearing as *bét*, while *bá.jit* is bisyllabic. Note that none of these vowel changes are thought to be the result of active phonological processes (Bolozky 1997, Faust 2014); although more recently Faust and Torres-Tamarit (2024) provide a compelling synchronic phonological analysis of /a/-syncope in CS for cases like (27) and (28). The historical sources of the vowel deletion in (27)-(28) were discussed in section 2.2.1. Below I argue that the alternations observed in (26)-(29) are additional instances of allomorphy triggered by morphosyntactic features.

An important observation about allomorphy in the stems of construct state heads is that the allomorph is often the same as the one that accompanies possessive pronominal suffixes. This is sometimes, but not always, identical to the allomorph of the stem that appears in plural forms as well. Berman (1978) argues that the identity between the stem alternations in the construct state and forms with possessive suffixes is evidence for the phonological wordhood of CS nominals. The dependent of the construct state is proposed to have the same effect on the head as the addition of an suffix would. A corresponding form with a possessive pronominal suffix is given in (30)-(33) for each noun in (26-29). These forms are interpreted in previous literature as constituting prosodic words.

(30) *sé.fer* 'Book', *sfa.rím* 'Books'

(a) *sif.ró* (compare to: *sé.fer je.la.dím* 'A children's book')
'His book'

(b) *sfa.ráv*
'His books'

(31) *pa.kíd* 'Clerk', *pki.dím* 'Clerk'

(a) *pki.dó* (compare to: *pa.kíd~pkíd más* 'A tax clerk')
'His clerk'

(b) *pki.dáv*
'His clerks'

(32) *ni.tsa.xón* 'Victory', *nits.xo.nót* 'Victories'

(a) *nits.xo.nó* (compare to: *ni.tsa.xón~nits.xón ha.niv.xé.ret* 'The team's victory')
'His victory'

(b) *nits.xo.no.táv*
'His victories'

(33) *bá.jit* 'House', *ba.tím* 'Houses'

(a) *bei.tó* (compare to: *béit ha.mó.ra* 'The teacher's house')
'His house'

(b) *ba.táv*
'His houses'

Although a full analysis of these paradigms is interesting in its own right, here the focus will only be on whether these alternations can inform a prosodic analysis of the construct state. The trigger for allomorphy according to Berman's argument would have to be prosodic, and the prosodic structure that acts as the trigger would have to match the prosodic structure resulting from the combination of a noun stem with a suffix (either the plural suffix or the possessive pronominal suffix, neither of which undergo allomorphy perfectly aligned with CS allomorphy). For the sake of arguing for prosodically conditioned allomorphy in CS, let's assume momentarily that the allomorphy trigger is the lack of a prosodic word projection by the stem. This would be a

shared environment for both CS heads and stems combined with suffixes if the CS dependent has the same prosodic effect on a CS head that a suffix has on a noun stem. We see below that this proposal does not hold.

First, it is not just any affix that results in the stem alternations observed in (30)-(33), but specifically a possessive suffix. The plural suffix *-im* often requires a different form of the stem than that which appears with a possessive pronominal suffix (compare *sfa.rím* "books" to *sif.ró* "his book"). Both possessive pronominal suffixes and the plural suffix are contained within the minimal prosodic word projected by the noun, since the resulting form requires obligatory stem changes and obligatory resyllabification when applicable. Therefore it cannot simply be the case that being incorporated into a minimal prosodic word (or lacking a prosodic word projection) triggers allomorphy – there must also be reference to some morphosyntactic features. If there were no reference to morphosyntactic features and allomorphy were purely triggered by prosodic reorganization, we would expect to see the same type of allomorphy in both plural forms and forms with possessive pronominal suffixes, but we do not (again compare *sfa.rím* "books" to *sif.ró* "his book"). We would also expect to see this allomorphy in the CS head, but we do not (compare the form of "book" in CS, *sé.fer*, to the plural and possessive pronominal suffix forms).

The dependent of the construct state therefore cannot prosodically trigger allomorphy in the same way as a suffix, because there is not always corresponding allomorphy in the singular form of a CS head. Many masculine nouns in the construct state appear in the same form as their counterparts in isolation, but when they appear before a possessive pronominal suffix they ex-

hibit allomorphy. As we see in (26a), a singular form in the construct state may exhibit no allomorphy whatsoever. This is unexpected if the trigger for allomorphy in the construct state and forms with possessive pronominal suffixes is the presence of an identical prosodic structure – we would expect allomorphy to be triggered for a particular stem whenever that stem appears in the conditioning environment. Stated another way, if the construct state *sé.fer je.la.dím* "a children's book" and the possessive pronominal form *sif.ró* "his book" had an identical prosodic structure that triggered allomorphy, we expect allomorphy to be triggered in both cases. In contrast, when *sé.fer* "book" combines with a suffix and then appears in the construct state (26b), allomorphy is obligatorily triggered within a minimal word as expected, creating the form *sif.réi je.la.dím*.[21]

Consider as well that the vowel deletion type allomorphy seen in (27) and (28) is optional in the construct state, while as discussed, allomorphy and vowel deletion are obligatory within minimal prosodic words. Allomorphy in forms with possessive or plural suffixes is always obligatory, as seen in (31) and (32). Therefore, even if the trigger for this type of allomorphy were prosodic in both construct states and nouns with possessive pronominal suffixes, the prosodic structure that triggers allomorphy would have to be different in both cases. In one case allomorphy is obligatory (as in minimal prosodic words), and in the other it is optional (as in non-minimal prosodic words).

[21]We might think that allomorphy in the case of singular *sefer* could be blocked due to the dependent in CS beginning with a consonant. This type of allomorphy is typically not blocked by following consonants – compare *sé.fer* "book" to *sìf.rei.xém* "Your all's (m) book (sg)", where allomorphy is required to apply despite homophony with the plural *sìf.rei.xém* "Your all's (m) books (pl)." Allomorphy also does not apply to singular *sefer* when the dependent begins with a vowel, as in *sé.fer à.vo.dá* "a work book."

In CS heads, allomorphy is only obligatory when the head combines with a plural suffix or in irregular cases such as *beit* "house". However, the obligatory allomorphy in the plural forms of CS heads is due to its combination with the plural suffix, not the presence of the CS dependent. In these cases, allomorphy is obligatory much like allomorphy with the regular plural suffix is obligatory. If allomorphy were triggered by the presence of the CS dependent, we would expect it to occur in singular forms as well as plural forms. Furthermore, in cases such as (27)-(29), the form of the stem in the plural CS head is the same as in the regular plural form, indicating that this form of the stem may be morphosyntactically related to a number feature.

Nonetheless, we might still be tempted to analyze the construct state head as a sub-word element (such as a foot or syllable) that adjoins to the prosodic word projected by the dependent, in the same way that clitics may adjoin to a word to form adjunctive words, as described in section 2.2.1. Within a non-minimal word vowel deletion is optional, so by extension allomorphy would be optional as well. I provide additional evidence in section 3 that this type of analysis is not compatible with the phonological properties of CS nominals, and that CS nominals must have varied prosodic structures. If allomorphy were diagnostic of prosody, we might expect it to occur in a way that is dependent on prosodic structure. However, the allomorphy observed above occurs regardless of prosodic structure (based on other diagnostics), so it cannot be diagnostic of prosody. Note that allomorphy in the construct state is also never

variable based on the differences outlined in table 1.[22]

In addition, Berman (2020) notes that some instances of allomorphy in the construct state appear to be disappearing in spoken Hebrew, due to being "no longer phonetically transparent". In other words, since these allomorphy processes are not phonologically active in the construct state, CS heads are subject to paradigm leveling. This is not the case for stem-suffix combinations, where allomorphy continues to be obligatory. The examples below are those given by Berman.

(34) (a) *ma.kór* 'Source'

ma.kór má.jim 'A water source'

(previously: *mə.kór má.jim*; also: *mə.ko.rót* 'Sources')

(b) *xé.der* 'Room'

xé.der ó.xel 'A dining room'

(previously: *xa.dár ó.xel*; also: *xà.da.rím* 'Rooms')

(c) *ni.sa.jón* 'Experience'

ni.sa.jón ha.a.vár 'Experience of the past'

(previously: *nis.jón ha.a.vár*; also: *nìs.jo.nót* 'Experiences')

(d) *sha.ja.rá* 'Convoy'

sha.ja.rát dgí.pim 'A jeep convoy'

(previously: *sha.jé.ret dgí.pim*)

In (34) we see that not only is vowel-deletion type allomorphy optional

[22] An exception may be compounds, which may have obligatory allomorphy in cases where compositional CS nominals do not. Importantly, the allomorphy would vary in optionality, not in form. However, compounds are argued to be single lexical items that project minimal words, so this is not surprising.

in the construct state, vowel-alternation type allomorphy is becoming optional as well. This indicates the absence of a phonological or prosodic environment that would require a "reduced" form of the CS head, and trigger allomorphy.

It is clear that the phonological behavior of a stem heading a CS nominal, although unusual, is different from the behavior of a stem in combination with a suffix. We can therefore conclude that allomorphy in the heads of CS nominals is not phonologically or prosodically triggered, but is instead the result of the presence of morphosyntactic features, including perhaps genitive case and number. The feminine singular suffix *-a* and the masculine plural suffix *-im* also appear to exhibit morphosyntactically triggered allomorphy in the construct state.

In an analysis of the prosody of the construct state, we should therefore only consider phonologically active processes such as stress assignment and vowel deletion as indicative of prosodic structure. I have argued that phonologically inactive vowel deletion and allomorphy processes are not reliable prosodic diagnostics. Although the various types of allomorphy observable on the heads of CS nominals are informative of morphosyntax, they do not appear to inform prosody. In section 3, I use phonological diagnostics to identify the prosodic structures available to different types of CS nominals.

3 Prosodic structure of construct state nominals

Using differences in resyllabification and stress assignment, I argue that both the head and dependent of compositional CS nominals project independent prosodic words, but members of a compound do not. Instead, members of a compound project a single prosodic word together, specifically a minimal prosodic word. Compounds are merged into the syntax as a single lexical terminal node,[23] and therefore satisfy the constraint MATCH(X0, ω), which requires that all lexical terminal nodes map onto a prosodic word. Compositional construct states on the other hand are merged as separate lexical terminal nodes, and therefore must both satisfy MATCH(X0, ω) separately, projecting separate prosodic words. This contrast aligns with a variety of syntactic diagnostics that indicate compounds are treated as words (Borer 1988, 2012), as discussed in section 2.1.2.

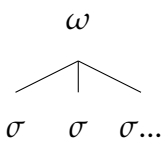
Furthermore, I show that compositional CS nominals project either a coordinative word or a phi-phrase, depending on whether the dependent is a bare noun or has additional material in its extended projection. When the dependent is a bare noun, the head and dependent undergo a post-syntactic amalgamation operation that results in a coordinative word. If the dependent is modified or a DP, amalgamation is blocked and the CS nominal is mapped to a phi-phrase. Evidence for these distinctions comes from both introspective judgments on prosodic phrasing, as well as the availability of antepretonic /e/-deletion only in CS nominals that project coordinative words.

I assume that non-nested CS nominals can map to one of the structures

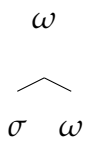
[23] In a DM world, we can probably define this as root + root adjunction/incorporation.

in (35). The discussion in this section will determine which structures are compatible with different types of CS nominals.

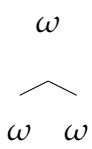
(35) (a) Minimal word



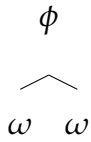
(b) Adjunctive word



(c) Coordinative word



(d) Phi-phrase [24]



Diagnostics for phrasing in free state nominals will not be discussed here in detail, because I am not aware of any outside of introspective phrasing judgments. However, I suggest that FS heads can map to phi-phrases, while CS heads cannot, based on the results of a production study conducted by Shaked (2009). Shaked examined the phrasing of both FS nominals and CS nominals modified by long and short relative clauses in sentential contexts. They found that when nominals were modified by short RCs, speakers frequently produced prosodic breaks after the head in FS, but rarely after the head in CS. Note that modification with short RCs is more likely to reveal the effects of

[24] Recall that another possible structure of phi-phrases for CS nominals is

syntax-prosody alignment constraints, since too little phonological material is added to help satisfy phonological well-formedness constraints. The short RCs Shaked used only added a single prosodic word to the phrase. As will be discussed in section 3.2, a prosodic break indicates the edge of a phi-phrase, so we can interpret Shaked's findings as evidence that heads in FS nominals can map to phi-phrases, or have a phi-phrase boundary at their right edge. In contrast, heads in CS nominals cannot map to a phi-phrase, since Shaked effectively shows that they may not be followed by a prosodic break. This difference in mapping is driven by a difference in the syntactic structure of FS and CS nominals. We will see that the mapping of FS heads to phis is also supported by the discussion of Match Theory in section 4, where I argue that the free state is likely derived by phrasal movement. Both Sichel (2003) and Shlonsky (2004) derive the free state via phrasal movement, which are the only syntactic analyses considered in section 4 that are also compatible with the proposed prosodic structures of CS nominals.

In the following sections I discuss phonological evidence for the prosodic structures of different types of CS nominals, beginning with a comparison of compositional and non-compositional CS nominals (compounds).

3.1 Compositional and non-comopositional CS nominals

The projection of separate prosodic words by the heads and dependents of compositional CS nominals can be determined by examining their phonological behavior against that of minimal and non-minimal prosodic words. Recall that according to Borer (2012), compositional CS nominals include R-

constructs and M-constructs. These are found to map to coordinative words or phi-phrases consisting of at least two prosodic words, while compounds are analyzed as minimal prosodic words. First, note that resyllabification in compositional CS nominals is optional, but effectively obligatory in certain compounds. As discussed in section 2.2.1, resyllabification is obligatory within minimal words, but not across word boundaries or within non-minimal words. Second, stress assignment in compositional CS nominals reflects primary stress in both the head and dependent, since these are both prosodic words and primary stress is assigned within a minimal prosodic word (see section 2.2.1). Since the prominence on compositional CS heads is able to participate in CLASH violations, it must correspond to primary stress, rather than secondary stress as stipulated in previous literature. In compounds, on the other hand, there is only a single primary stress, and secondary stress is assigned via default secondary stress rules.

Consider first that resyllabification in minimal prosodic words is obligatory, such as those projected by stem-suffix combinations (see section 2.2.1). The addition of a vowel-initial suffix forces a stem-final consonant to resyllabify as the onset of the following vowel (36a), but the same is not true of a final consonant of the dependent in compositional CS nominals (36b). Resyllabification in these cases can be somewhat unnatural, and is unambiguously optional. Consider the contrast in (36).

(36) (a) */mim.rax + im/*

mìm.ra.xím *(*mim.rax.im)*
spread.M.PL
'Spreads (noun)'

(b) */mim.rax ʔe.go.zim/*

mim.rax *e.go.zim* ∼ *mim.ra.xe.go.zim*
spread.CS nuts
'Nut Spread'

Interestingly, resyllabification may be more natural in cases where the definite article appears with the dependent, as in *béit ha.mo.rá* ∼ *béi.ta.mo.rá*, "The teacher's house". However, under no circumstances is resyllabification obligatory in that case, while it is always obligatory when a suffix attaches to the noun stem. The consonant with the potential to be resyllabified in (36), the *x* in *mim.rax*, is at the edge of a morphological word stem in both (36a) and (36b) so optionality here does not appear to be attributable to some morphological alignment requirement. There is therefore likely an additional prosodic boundary present in CS nominals that is missing from stem-suffix combinations. If CS nominals and stem-suffix combinations projected the same prosodic structure, we would expect them to exhibit similar phonological behaviors, such as obligatory resyllabification.

Moreover, in certain compounds resyllabification is effectively obligatory, indicating that these types of CS nominals do behave similarly to stem-suffix combinations. Consider the contrast between the compounds and compositional CS nominals in (37) and (38).

(37) (a) Compound */ben ʔadam/*

*bè.n a.dám (?/*bén. a.dám)*
son.CS adam
'Person'

(b) Compositional CS nominal */ben ha-mora/*

bén. a.mo.rá ~ bé.na.mo.rá
son.CS DEF.teacher
'The teacher's son'

(38) (a) Compound */jom huledet/*[25]

*jò.m u.lé.det (?/*jóm. hu.lé.det)*
day.CS birth
'Birthday'

(b) Compositional CS nominal */jom ha-ʔats.ma.ut/*

jóm. a.ats.ma.út ~ jó.ma.ats.ma.út
day.CS independence
'Independence day'

A lack of resyllabification in (37a) and (38a) is not ungrammatical per se, but it does register as unnatural and unnecessarily formal. This is not the case for the compositional CS nominals in (37b) and (38b). Although this behavior does not apply to all compounds, it is a relatively common phenomenon. Since compounds exhibit similar resyllabification behavior to stem-suffix combinations, which are minimal prosodic words, but compositional CS nominals do not, we can conclude that compounds project minimal prosodic words while compositional CS nominals project at least a non-minimal word. Compositional CS nominals could then project either an adjunctive word, coordinative

[25]Note that colloquially, speakers have even changed the spelling of this compound to reflect the consonant deletion and resyllabifcation.

word, or phi-phrase, but I will show below that they must correspond to either coordinative word or phi-phrases.

To eliminate an adjunctive word as a possible prosodic structure for compositional CS nominals, we must establish whether the head in these cases has the status of a clitic or an independent prosodic word. The position of stress shows that the head must project a prosodic word, since the stress on the head must be primary stress. Recall from section 2.2.1 that in Hebrew stress may either be lexically specified or applied by default to the final syllable of a minimal prosodic word. Secondary stress is then assigned to every other syllable to the left and right of the primary stress. We can see examples of default stress in (39a-b), an example of lexical stress in (39c), and secondary stress in (39b).

(39) (a) *gar.gér* 'Grain'

(b) *gàr.ge.rím* 'Grains'

(c) *tí.ras* 'Corn'

In compositional CS nominals, the head is assigned stress as though it projects its own prosodic word. Meaning, stress is assigned to the position where it would appear if the head were produced in any non-construct state context. Consider the construct state in (40) that consists of a head with default stress and a dependent with initial lexical stress.

(40) *gar.gér tí.ras (*gàr.ger tí.ras or *gar.gèr tí.ras)*
grain.CS corn
'A grain of corn'

Since *gar.gér* is assigned default stress, if it did not project its own prosodic word in the construct state we would expect it to be assigned secondary stress

relative to the primary stress of the dependent, *tí.ras*. This would be reflected by the minimal word prosodic structure in (35a) or the adjunctive word structure in (35b). In (40) we see that it is in fact ungrammatical to pronounce *gar.gér* with default secondary stress or with secondary stress occupying the position of default primary stress. As explained in section 2.2.1, secondary stress never violates CLASH in Hebrew, so the pronunciation **gar.gèr tí.ras* is not possible. This means that if the stress on the head in (40) were secondary stress, it would have to retract to the initial syllable of *gar.gér*. Again this is simply not the case, and as shown results in unnaturalness or ungrammaticality.[26] If the prosodic structure of compositional CS nominals was such that no stress or secondary stress appeared on the head, the ungrammaticality associated with shifting prominence in *gar.gér* is unexpected. The evidence here contradicts previous analyses that claim stress on the head is absent, or is secondary stress.

Note as well that there is nothing about the form *gar.gér* that blocks the assignment of secondary stress to the first syllable, as evident from (39b). In (39b), *gar.gér* combines with the plural suffix *-im*, which together project a minimal prosodic word *gàr.ge.rím*. In *gàr.ge.rím*, default secondary stress is assigned to the initial syllable, as expected. Additionally, when the head *gar.gér* combines with a suffix inside a CS nominal, it projects a prosodic word that aligns with the boundaries of the stem-suffix complex. In this case secondary stress is assigned to the initial syllable of *gar.gér*, shown in (41).

[26]Graf and Ussishkin (2003) make a similar observation regarding stress clash in construct state nominals, in a footnote.

(41) *gàr.ge.réi* *tí.ras* *(*gàr.ge.rèi tí.ras)*
grain.M.PL.CS corn
'Grains of corn'

Again, the prominence on the final syllable of the head cannot be secondary stress, since this would create a stress CLASH, which is not permitted for secondary stress in Hebrew. The head and dependent in compositional CS nominals must therefore both project prosodic words.

Furthermore, consider that compounds do behave like minimal prosodic words in terms of stress assignment, indicating that they correspond to the prosodic structure in (35a). The pairs in (42)-(44) show the contrast in stress assignment behavior between compositional CS nominals and compounds. The examples of compounds are adapted from Faust (2014).

(42) *o.réx* 'Editor'

(a) *ò.rex* *dín* *(*o.réx dín)*
editor.CS judgement
'Lawyer'

(b) *o.réx* *sé.fer* *(*ò.rex sé.fer)*
editor.CS book
'Book editor'

(43) *ma.tsáv* 'State/condition'

(a) *mà.tsav* *rú.ax* *(*ma.tsáv rú.ax)*
state.CS soul
'Mood'

(b) *ma.tsáv* *ká.as* *(*mà.tsav ká.as)*
state.CS anger
'State of anger'

(44) *ke.év* 'Pain'

(a) *kè.ev rósh (*ke.év rósh)*
pain.CS head
'Headache'

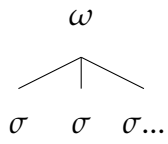
(b) *ke.év bé.rex (*kè.ev bé.rex)*
pain.CS knee
'Knee pain'

In examples (42a), (43a), and (44a), which are compounds, stress retraction is not only possible, it is essentially obligatory. It is extremely unnatural to pronounce these compounds with default primary stress on the second syllable of the CS head. Conversely, in the compositional CS examples in (42b), (43b), and (44b), pronouncing the head with secondary stress is extremely unnatural. It is basically obligatory to preserve the default primary stress assignment on the head. Note that these pairs all contain comparable stress environments to (40), where the head is assigned default stress and the dependent either has lexical initial stress or is monosyllabic. Again, the presence of secondary stress on the second syllable of the head would violate CLASH. Therefore, when secondary stress does appear, it must appear on the initial syllable of the CS head to avoid a CLASH violation. This also shows that there are two different prosodic behaviors exhibited by CS heads, depending on the type of CS nominal. In the case of compositional CS nominals the head must project a prosodic word, but not in a compound.

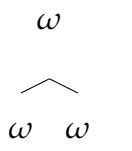
Compositional CS nominals therefore can only project the prosodic structure in (35c) or (35d), or that of a coordinative word or phi-phrase. These are the only structures in which both the head and dependent of the CS nominal are independent prosodic words, but either structure is possible based on the

stress analysis above. Note that the maintenance of stress assignment in compositional CS nominals as described is also familiar from the behavior of coordinative compounds in other languages, such as Japanese and Kaqchikel (Ito and Mester 2013, Bennett 2018). We will have to look further in order to determine whether compositional CS nominals must map to only one of these two structures, or whether they can map to either. Compounds on the other hand, must project minimal prosodic words, as in (35a). The relevant structures from (35) are reiterated in (45).

(45) (a) Compound



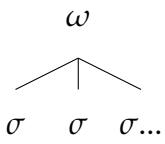
(b) Compositional CS nominal



OR

Importantly, although the stress behavior of compounds could also be accounted for if the head behaved like a clitic and formed an adjunctive word with the dependent (35b), there are other reasons to analyze compounds as minimal prosodic words (35a). These two alternatives are reiterated in (41).

(46) (a) Minimal word



(b) Adjunctive word

Compounds exhibit additional properties that indicate they are single lexical words, and therefore project a minimal prosodic word. Recall that obligatory resyllabification in compounds is more aligned with obligatory resyllabification in minimal prosodic words. Additionally, as described in section 2.1.2 (see example (14)), compounds allow the definite article *ha-* to attach before the head and display other syntactic properties associated with single words. Compounds may also exhibit alternative pluralization if they are strongly lexicalized (Berman 2020). For example, the plural of *ò.rex dín* "lawyer" may be realized colloquially as *ò.rex dí.nim* rather than the normative *or.xéi dín* "lawyers". This shows that compounds are treated as a unit morphosyntactically as well as prosodically. Compounds may therefore satisfy MATCH(X0, ω) as a whole, while their individual components are unable to do so. This confluence of factors points to compounds exhibiting a minimal word prosodic structure (46a), rather than an adjunctive word structure (46b).

We have thus far established that compositional CS nominals must contain at least two prosodic words, leaving open two mapping possibilities – either coordinative words or phi-phrases. Compounds on the other hand project only a single minimal word. In section 3.2 below, I show that whether compositional CS nominals project coordinative words or phi-phrases depends on their syntactic structure.

3.2 Contrasts within compositional CS nominals

I show that some compositional CS nominals map to a coordinative prosodic word, while others map to a phi-phrase. Evidence for the possible mapping of CS nominals to phi-phrases comes from introspective judgements about disambiguating prosody. Furthermore, I argue that whether a construct state nominal maps to a coordinative word or phi depends on its status as an M-construct with a bare dependent, or alternatively as an M-construct with a modified dependent or R-construct. M-constructs may form coordinative words as the result of a post-syntactic operation such as amalgamation (Harizanov and Gribanova 2018), but only if the dependent is bare or unmodified. This operation involves the post-syntactic lowering of the head of the construct onto the dependent, resulting in a head-adjunction structure which is visible to the phonology and Syntax-Prosody mapping constraints. The constraint MATCH(X0, ω) is fulfilled by matching both members of the head adjunction structure to prosodic words, as well as the adjoined head itself, since they may all be considered lexical terminal nodes. This is supported by the availability of antepretonic /e/-deletion in M-constructs with a bare dependent, but not in M-constructs with a modified dependent. I also present a contrast between construct states headed by a preposition and compositional CS nominals in the availability of post-tonic /e/-deletion, further supporting that M-constructs with bare dependents may map to coordinative prosodic words.

Although I have proposed several diagnostics in section 2.2.1 for minimal and non-minimal prosodic words in Hebrew, I am not aware of any similar diagnostics available for phi-phrases. Hebrew allows the application of several

processes between words, but they do not necessarily present themselves as being sensitive to phi-phrase structure. For example, Dekel (2014) identifies nasal assimilation, obstruent voicing assimilation, degemination, and affricate formation as quite freely possible between words, but it is not clear whether these processes can apply across phi-phrase boundaries. Outside of this there are also a handful of resources on the acoustic correlates of phrasing in Hebrew, which I summarize here from Shaked (2009). Shaked notes that work on prosody and the syntax-prosody interface in Hebrew is relatively scarce, and presents a summary of previous findings that is mostly based on work by Laufer (1987, 1996). At the intermediate phrase level, or phi-phrase level, Laufer identifies three cues that are associated with right-edge boundaries. They are listed in (47) below.

(47)
1. **Pitch reset**. There is a pitch reset after each ϕ-boundary. This is the most reliable cue to the edge of a ϕ-phrase. Two cues participate in pitch reset. First, there is a change in pitch from the last stressed syllable to the boundary. Then, after the boundary, pitch height resets.
2. **Vowel lengthening**. Final syllables of ϕ-phrases are lengthened (specifically vowels), with an increase in speech rate at the beginning of the following ϕ-phrase.
3. **Pause**. A physical pause may also occur between ϕ-phrases, but this is optional and not a particularly reliable cue to ϕ-phrase boundaries.

Other studies (Amir et al 2004, Silber-Varod 2005) identified by Shaked

find that lengthening is a very reliable cue in diagnosing phi-phrase edges. The two main cues for phi-phrase boundaries are then pitch reset and pre-boundary vowel lengthening. This is encouraging for continued experimental work on phi-phrasing in Hebrew.

Furthermore, Shaked finds effects of two constraints on prosodic organization in Hebrew: ALIGN$_R$(XP) and BINARY(MAP). Shaked uses the definition of these constraints given in Selkirk (2000), collapsing BINMIN, and BINMAX into BINARY(MAP). These are defined in (48).

(48) ALIGN$_R$(XP): *The right edge of any XP in syntactic structure must be aligned with the right edge of a MaP (ϕ-phrase) in prosodic structure.*

BINARY(MAP): *A major phrase (ϕ-phrase) must consist of just two minor/accentual phrases.*

Based on the results of a series of production and implicit prosody processing experiments, Shaked shows that the effects of these constraints are seen in the attachment height behavior of relative clauses. From the perspective of production, Shaked observed that in the free state breaks occurred frequently before high attaching short RCs but not low attaching short RCs. This is evidence that ALIGN$_R$(XP) is ranked above BINARY(MAP). An example of an ambiguously attaching RC that Shaked used in their experiment is given in (49). The interpretation was forced via a production context.

(49) *ha-ohadim heeritsu et ha-meamen shel ha-mitagref she-parash*
DEF-fans admired DOM DEF-coach of DEF-boxer who-retired
'The fans admired the coach of the boxer who retired'

In the sentence in (49), the short RC *she-parash* may either attach low and modify "boxer", or attach high and modify "coach". Breaks did not occur frequently before low attaching RCs, where according to Shaked's syntax there is no XP right-edge. Since breaks did occur frequently before high attaching RCs, where there is an XP right-edge, Shaked concludes that $\text{ALIGN}_{\text{R}}(\text{XP})$ is ranked high in Hebrew. Otherwise, we would expect to see the same prosodic organization regardless of attachment height, due to the pressure of prosodic well-formedness constraints such as BINARY(MAP). This is what Shaked observed in the case of long RCs, which consisted of three words instead of one. Here, more breaks were inserted before the three-word RC regardless of attachment height, since longer phrases can more easily accommodate prosodic well-formedness constraints. Thus in the case of low attachment with a long RC, where $\text{ALIGN}_{\text{R}}(\text{XP})$ does not force a prosodic break, we see the influence of phonological binarity constraints, or BINARY(MAP). Shaked argues that due to the variability in break placement in long low-attaching RCs either before the ultimate or penultimate word, we cannot argue that BINMIN is ranked higher than BINMAX or vice versa. But there does seem to be a pressure to maintain binarity based on these findings. Laufer also identifies these conflicting pressures in Hebrew, claiming that there appears to be a tendency to place prosodic boundaries at syntactic edges, but also to limit the length of prosodic phrases. These findings are promising for an attempt to analyze the prosodic structure of Hebrew using Match Theory. Without further evidence for phrasing, we can extrapolate from the high-ranking of $\text{ALIGN}_{\text{R}}(\text{XP})$ that some form of MATCH(XP, ϕ) is observed in Hebrew.

Parallel to the cases of RC attachment ambiguity discussed by Shaked, the attachment of post-nominal modifiers in compositional CS nominals may also be disambiguated by prosodic breaks. Recall from section 2.1.1 that the attachment of a modifier in a CS nominal is ambiguous when the dependent and the head are the same gender and number. An example is given in (50).

(50) *xul.tsát ha.jal.dá ha.ja.fá*
shirt.CS DEF.girl DEF.pretty
'The pretty girl's shirt' or 'The girl's pretty shirt'

It is possible however to introduce a prosodic break either before or after *ha.jal.dá* to indicate whether the dependent or the head is being modified.[27]. The primary cue being assessed by the author to determine the position of a prosodic break is a pause. Consider the phrasings of (50) shown in (51).

(51) (a) (*xul.tsát ha.jal.dá*) *ha.ja.fá*
'The girl's pretty shirt'

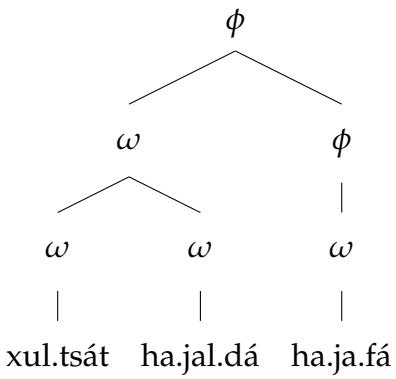
(b) *xul.tsát* (*ha.jal.dá ha.ja.fá*)
'The pretty girl's shirt'

In (51a), where the adjective modifies the head, a break follows the dependent and the head and dependent phrase together to the exclusion of the adjective. In (51b), where the adjective modifies the dependent, a break precedes the dependent and the dependent and adjective phrase together to the exclusion of the head. The crucial case here is (51b), since a prosodic constituent containing the dependent and adjective can only be a phi-phrase. In

[27]Note that the presence of a break is not obligatory, but a break does strongly lend itself to a particular interpretation. I am not making a claim about how these examples are typically prosodified by Hebrew speakers.

(51a) we could theoretically be observing the CS head and dependent forming a single prosodic word and the adjective phrase mapping to a phi-phrase, since it is syntactically a separate XP. Thus the structure could consist of a coordinative word that includes the head and dependent, which then adjoins to a phi projected by the AP, as shown in (52).[28]

(52) 'The girl's pretty shirt'

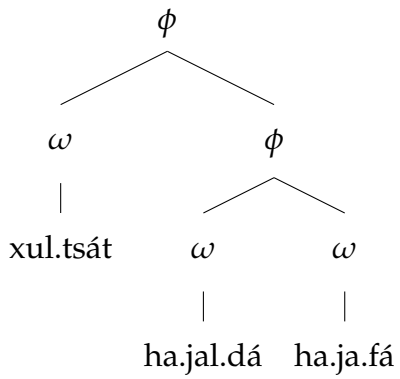


In (51b) however, there is no reason to assume that the dependent and the adjective would be able to form a coordinative word, since the dependent doesn't exhibit any special morphology or phonology, and neither does the adjective. The ability to form a coordinative word distinguishes a CS head followed by its dependent from a noun followed by an adjective. Additionally, there is no reason for the CS head to map to a phi-phrase on its own as this would fly in the face of existing syntactic analysis of the construct state, none of which assume the head can be an XP. We can safely assume then that a prosodic break indicates that the dependent and its modifying adjective map to a phi-phrase. The resulting prosodic structure is shown in (53) for the interpretation

[28]The adjective could also map to a ω here, but this is not critical to the argument that some CS nominals map to phis. Even if the CS head and dependent only mapped to a single ω, there is not any reason to believe the adjective ω would also be incorporated into that prosodic word. The CS nominal, which is a DP that includes the adjective, must therefore map to a phi-phrase in this type of case.

"The pretty girl's shirt".

(53) 'The pretty girl's shirt'



Due to the principle of LAYERDNESS, which states that no constituent lower on the prosodic hierarchy may dominate a constituent higher on the prosodic hierarchy, the construct state nominal in (51b) must map to a phi. It cannot be a prosodic word, simply because a prosodic word cannot dominate a phi, and the dependent and its modifier must map to their own phi-phrase. We therefore have evidence that some CS nominals must map to phi-phrases.

Additionally, when two modificationally ambiguous adjectives are present a prosodic break after the first adjective can indicate that the second adjective is modifying the head of the construct state nominal, but the first is modifying the dependent. These phrasing possibilities are shown in (54).

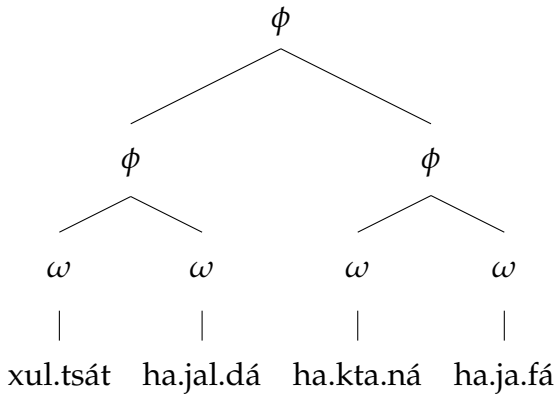
(54) (a) (*xul.tsát ha.jal.dá ha.kta.ná*) *ha.ja.fá*
'The small girl's pretty shirt'

(b) *xul.tsát* (*ha.jal.dá ha.kta.ná ha.ja.fá*)
'The small pretty girl's shirt'

The internal structure of the phis identified in (54) will be revisited in the discussion of Match Theory's predictions in section 4. The crucial take-

away here is that the prosody of a modified CS nominal can be distinguished from a CS nominal with a modified dependent. If Shaked's findings are correct in that alignment between syntax and prosody is highly ranked in Hebrew, we can assume that these prosodic structures are made possible by a match between syntax and prosody. In terms of satisfying phonological constraints that have been identified for Hebrew, specifically binarity requirements, these structures don't do a very good job. For the construct state nominals in (51), which consist of three words, we expect the prosodic phrasing to satisfy Shaked's BINARY(MAP) constraint. The well-formed mappings in this case actually do correspond to the outputs observed in (51), due to the odd number of words, but if the mappings are only a product of phonological constraints it is surprising that they should correspond to different modifier attachments. Furthermore in (54), where there is an even number of words, we expect BINARY(MAP) to produce a balanced structure, as in (55).

(55)



This is actually a possible phrasing of (54), but the interpretation then shifts to both of the modifiers attaching to the CS head. Notably, when the gender and number features of the head and dependent are no longer matched and

the ambiguity of modification is removed, the phrasing in (55) is not possible. Only the phrasing in (54a) is possible. This is demonstrated in (56).

(56) (a) (*xul.tsát ha.jé.led ha.ka.tán*) *ha.ja.fá*
'The small boy's pretty shirt'

(b) ?/**xul.tsát* (*ha.jé.led ha.ka.tán ha.ja.fá*)
Intended: 'The small boy's pretty shirt'

(c) ?/*(*xul.tsát ha.jé.led*) (*ha.ka.tán ha.ja.fá*)
Intended: 'The small boy's pretty shirt'

The phrasing in (56c) seems particularly bad. To summarize, the constituent structure here appears to impact surface level phrasing, indicating the influence of MATCH type constraints. Examining the phrasing of nested construct state nominals would be an interesting avenue for further exploration relating to this issue, since they can consist of nested DPs, which as XPs are expected to map to phi-phrases.

Now that we have established that some compositional CS nominals map to phi-phrases, we can consider under which circumstances they must map to coordinative prosodic words. This can be observed in M-constructs, which show a contrast in prosodic structure depending on the amount of functional material in the dependent's extended projection. As Borer (2012) identifies, the amount of functional material in the dependent's extended projection differentiates R-constructs from M-constructs. However, a modified dependent of an M-construct must also have additional functional material in its extended projection in relation to an unmodified dependent of an M-construct. Owing

to this lack of functional material, an unmodified dependent of an M-construct and its head are in a syntactically local relationship, allowing the head to lower and adjoin to the dependent in a process such as amalgamation (Harizanov and Gribanova 2018). The resulting amalgamated head projects a coordinative word structure, as in (35c). Amalgamation is blocked in other types of compositional CS nominals due to the presence of additional functional material in the dependent's extended projection. This additional material interferes with the adjacency of the dependent and the head, preventing amalgamation and requiring the CS nominal to map to a phi-phrase, as in (35d).[29] It could also be the case that the additional material in the dependent projects a phase, which would block amalgamation given that it is not possible across phase boundaries.[30] Since phases are the domains of spell-out, where syntactic constituents are assigned their phonological forms, it makes sense that prosodic word formation operations would be unable to take place across them.

By extension R-constructs would have to map to phi-phrases as well, since their dependents are DPs. The additional functional material in the extended projection of the dependent would also block amalgamation in R-constructs. Note that the CS nominals identified in (50)-(55) as mapping to a phi behave in a way compatible with this proposal, since *xul.tsát ha.jal.dá* is an R-construct.

The phonological evidence that supports the proposed distinction be-

[29]Harizanov and Gribanova conceive of this type of locality condition as capturing what is traditionally described as the Head Movement Constraint (HMC). They argue that genuinely syntactic head movement is not actually subject to the HMC, but post-syntactic movements of the type being considered here are.

[30]In a move compatible with this analysis, Sichel (2002) analyzes adjectives as requiring the projection of an additional DP within the structure of the DP projected by the noun. This would mean that modification may introduce a lower, additional DP boundary. DPs are established phases, so amalgamation could not take place when an adjective or modifier is present.

tween M-constructs with bare dependents and other compositional CS nominals comes from the applicability of antepretonic /e/-deletion. Recall from section 2.2.1 that antepretonic /e/-deletion takes place in non-minimal words. Therefore, if antepretonic /e/-deletion is permitted in M-constructs, but not in R-constructs, we can analyze M-constructs as constituting non-minimal, specifically coordinative words, while R-constructs do not. Unfortunately, it is quite difficult to generate R-constructs that provide the appropriate phonological conditions for antepretonic /e/-deletion. The construct head must be vowel final, while the dependent must be indefinite and have primary stress at least two syllables away from the primary stress of the head. If the dependent were not indefinite, the definite article would act as the trigger for antepretonic /e/-deletion rather than the construct state head itself. This would inform us that the combination of the definite article and the dependent is a prosodic word, but nothing of the relationship between the head and the dependent. Antepretonic /e/-deletion also does not apply if a stress CLASH violation would be generated, so deletion requires that primary stress on the dependent be either on the second or third syllable, depending on where primary stress is on the head. Note that since /e/s subject to deletion are derived, they are not stressed in any case.

Fortunately, modified M-constructs can be used as a proxy for R-constructs here. If the elaborated structure of the dependent in a modified M-construct blocks antepretonic /e/-deletion, we can assume that the elaborated structure of the dependent in an R-construct would also block antepretonic /e/-deletion. It is in fact that case that M-constructs with modified dependents block antepre-

tonic /e/-deletion, but M-constructs with unmodified dependents allow it. Example (57) reiterates the environment needed for antepretonic /e/-deletion in the context of CS nominals.

(57) (a) Deletion allowed: with definite article

ha.j<u>e</u>.la.dím ~ haj.la.dím

'The children'

(b) Deletion allowed: vowel-final M-construct with bare dependent

mo.fá j<u>e</u>.la.dím ~ mo.fáj.la.dím

'A children's show (show put on by children)'

(c) Deletion blocked: consonant-final M-construct with bare dependent

*kvu.tsát j<u>e</u>.la.dím (*kvu.tsátj.la.dím)*

'A group of children'

(d) Deletion blocked: non-/e/ vowel

*mo.fá r<u>i</u>.ku.dím (*mo.fár.ku.dím)*

'A dance show'

(e) Deletion blocked: non-/e/ vowel

*mo.fá x<u>a</u>.tu.lím (*mo.fáx.tu.lím)*

'A cat show (performing cats)'

In (57a), we see an example of antepretonic /e/-deletion repeated from section 2.2.1, where it occurs when the definite article *ha-* attaches to the head of noun with a derived /e/ two syllables before the stressed syllable. Optionality is shown here because as described in section 2.2.1, antepretonic /e/-deletion is an optional process. Example (57b) demonstrates the application of antepre-

tonic /e/-deletion in an M-construct with a unmodified, bare dependent. Examples (57c-e) show that antepretonic /e/-deletion is blocked when the conditioning environment is unfulfilled. Antepretonic /e/-deletion can only apply to derived /e/s, and is blocked if a consonant cluster would be created by its application. These are included is to show that the contrast we see in (58) below is in fact antepretonic /e/-deletion, and not some other phenomenon perhaps specific to CS nominals.

Now consider the examples in (58), which illustrate that M-constructs with bare dependents allow antepretonic /e/-deletion but M-constructs with modified dependents do not.

(58) (a) M-construct with bare dependent

mo.fá j<u>e</u>.la.dím ~ mo.fáj.la.dím

'A children's show (show put on by children)'

(b) M-construct with bare dependent, modified head

mo.fá j<u>e</u>.la.dím a.róx ~ mo.fáj.la.dím a.róx

'A long children's show'

(c) M-construct with modified dependent

mo.fá j<u>e</u>.la.dím mux.sha.rím (/?mo.fáj.la.dím mux.sha.rím)*

'A talented children's show (put on by talented children)'

In an M-construct with a bare dependent (58a), antepretonic /e/-deletion may apply. When the head is modified, as in (58b), antepretonic /e/-deletion is permitted as well, since there is no additional material in the extended projection of the dependent to block amalgamation. The M-construct forms a coordinative word in (58b) to the exclusion of the modifying adjective. However,

when the dependent is modified in (58c), antepretonic /e/-deletion is not possible. There is a strong sense of unnaturalness in applying antepretonic /e/-deletion in an M-construct with a modified dependent, which I argue is due to the fact that antepretonic /e/-deletion is an indicator of amalgamation, and requires that the head and dependent form a recursive prosodic word of the coordinative word type. Modifiers that appear alongside a coordinative prosodic seem to be interpreted as modifying the head, not the dependent, so when the modifier is unambiguously meant to modify the dependent unnaturalness arises. If the same M-construct with a modified dependent is produced without antepretonic /e/-deletion, there is no indication of amalgamation, and the result is perfectly acceptable and natural. M-constructs with bare dependents therefore map to coordinative words (35c), while M-constructs with modified dependents and R-constructs cannot. M-constructs with modified dependents and R-constructs must then map to phi-phrases (35d). The prosody of these different types of CS nominals is directly tied to their syntactic structures.

Two additional examples of this phenomenon are included below in examples (59) and (60).

(59) (a) M-construct with bare dependent

mit.lé m<u>e</u>.no.rót ~ mit.lém.no.rót

'Lighting fixture'

(b) M-construct with bare dependent, modified head

mit.lé m<u>e</u>.no.rót xa.zák ~ mit.lém.no.rót xa.zák

'A sturdy lighting fixture'

(c) M-construct with modified dependent

mit.lé m<u>e</u>.no.rót kve.dót (/?mit.lém.no.rót kve.dót)*

'A heavy lighting fixture (fixture to hold heavy lights)'

(60) (a) M-construct with bare dependent

miv.né l<u>e</u>.ve.ním ~ miv.nél.ve.ním

'A brick building'

(b) M-construct with bare dependent, modified head

miv.né l<u>e</u>.ve.ním ga.vó.a ~ miv.nél.ve.ním ga.vó.a

'A tall brick building'

(c) M-construct with modified dependent

miv.né l<u>e</u>.ve.ním a.du.mót (/?miv.nél.ve.ním a.du.mót)*

'A red brick building (building made of red bricks)'[31]

The same effects are observed in these cases. Applying antepretonic /e/-deletion to an M-construct with a modified dependent is unnatural, while it is acceptable to produce that same M-construct without /e/-deletion. As expected, antepretonic /e/-deletion is allowed in M-constructs with bare dependents.

Further evidence for contrasts in prosodic structure among construct states comes from the behavior of post-tonic /e/-deletion in construct states headed by a preposition. These types of construct states readily allow post-tonic /e/-deletion in the CS head, while compositional CS nominals do not.

[31]Note that in Hebrew there is no ambiguity regarding whether "red" is modifying "bricks" or "building". It can only be interpreted as modifying "bricks" due to number and gender agreement.

Consider the contrasts in (61) using the word *dé.rex*, which acts as both a noun meaning "path", and a preposition meaning "through". Here we see different environments where post-tonic /e/-deletion is allowed (61a-b), and environments where it is blocked (61c-d).

(61) (a) Noun with following clitic

ba-dé.r<u>e</u>x ha-zòt ~ *ba.dér.xa.zòt*
on.DEF-path DEF-this
'On this path'

(b) Prepositional CS head

dé.r<u>e</u>x hà-xa.lón ~ *der.xà.xa.lón*
path.CS DEF-window
'Through the window'

(c) Deletion blocked: noun with following adjective[32]

*dé.r<u>e</u>x ʔa.ru.ká (*dér.xa.ru.ká)*
path long
'A long path'

(d) Deletion blocked: nominal CS head

*dé.r<u>e</u>x hà-sha.lóm (*dér.xa.sha.lóm)*
path.CS DEF-peace
'The path of peace'

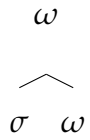
In (61a), when the noun *dé.rex* is followed by a clitic, post-tonic /e/-deletion is allowed as expected (see section 2.2.1). In this case the clitic forms a recursive, non-minimal prosodic word with the noun in the form of an adjunctive word. In (61b) the same behavior is shown by the construct state with the prepositional head *dé.rex*. We can interpret this as evidence that construct

[32]The frequency of collocation affects the availability of post-tonic /e/-deletion as well. Some combinations of a noun with a following content word may be more hospitable to deletion than others.

states headed by prepositions form recursive, non-minimal prosodic words as well. Following this, we see that post-tonic /e/-deletion is blocked with the noun form of *dé.rex* when it is either followed by an adjective (61c) or acts as the head of a compositional CS nominal (61d). As expected, post-tonic /e/-deletion applies within recursive, non-minimal prosodic words, but not across maximal word boundaries.

Since post-tonic /e/-deletion occurs in recursive, non-minimal prosodic words, there are two possible structures that (61b) can map to: either an adjunctive word (35b), or a coordinative word (35c). These structures are reiterated in (62).

(62) (a) Adjunctive word



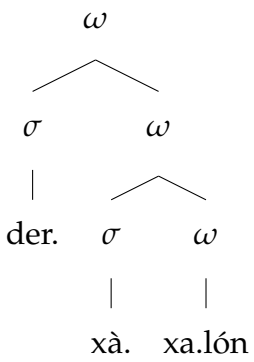
(b) Coordinative word

Since in (61b), *dé.rex* is being used a preposition meaning "through", which is a function word, MATCH(X0, ω) would not require that it map to a prosodic word. The head in this type of CS may then lack a prosodic word status and behave like a clitic,[33] free to adjoin to the prosodic word projected by *hà.xa.lón*. This results in a recursive non-minimal word structure of the adjunctive word type. Since in section 2.2.1 the definite article was proposed to

[33]I am considering the /e/-deletion in *de.rex* to be post-tonic /e/-deletion, although Bolozky and Schwarzwald (1990) do not discuss cases where post-tonic /e/-deletion occurs in a clitic. It otherwise appears to fit the criteria.

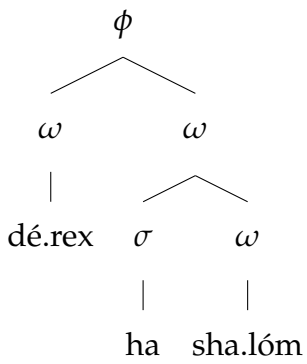
prosodically adjoin to the word projected by the noun stem as well, there are actually two layers of non-minimal word projections in *der.xà.xa.lón*. The prosodic structure is shown in (63).

(63)



This analysis of construct states headed by prepositions is compatible with the conclusions above regarding amalgamation. The dependents of these constructs are DPs, so the additional material in the extended projection of the dependent is expected to block amalgamation, preventing the formation of a head-adjunction structure and thereby also a coordinative prosodic word. However, since prepositions are function words, they may lack their own prosodic word projection. This allows prepositional CS heads to phonologically adjoin to the prosodic word projected by the dependent, making post-tonic /e/-deletion possible. The lack of /e/-deletion in the compositional CS nominal in (61d) therefore also requires that it map to a phi-phrase. If the head and dependent formed a non-minimal word together, we would expect post-tonic /e/-deletion to be permitted. The structure of (61d) would consist of two prosodic words in a phi-phrase, shown in (64).

(64)



Note that the CS nominal *dé.rex ha.sha.lóm* is an M-construct with a DP dependent, so we actually wouldn't expect amalgamation to apply here either, nor would we expect this form to allow post-tonic /e/-deletion. This example provides a more phonologically direct comparison to the CS headed by a preposition *dé.rex ha.xa.lón*, however. If we consider an M-construct with a bare dependent it appears that post-tonic /e/-deletion is allowed.

(65) *sé.ret* *ei.má* ∼ *sér.tei.má*
film.CS horror
'A horror film'

In (65), post-tonic /e/-deletion is allowed to apply as expected within a non-minimal prosodic word, specifically a coordinative word. The behavior of post-tonic and antepretonic /e/-deletion in construct states shows that outside of compounds, which are minimal words, construct states can project adjunctive words, coordinative words, or phi-phrases. Now that we have established the different types of prosodic structures that correspond to different types of CS nominals, we can consider whether existing syntactic proposals are compatible with these structures given the predictions of syntax-prosody mapping constraints.

4 Syntactic proposals and alignment with prosody

Examining the predictions of Match Theory allows us to weigh the viability of different syntactic analyses of the construct state, the viability of the prosodic structures proposed here for CS nominals, and gain insight into how directly syntax may affect prosody. I consider four different syntactic analyses of the construct state: Siloni (1996, 1997), Borer (1999), Sichel (2003), and Shlonsky (2004). Siloni and Borer are rejected since their predictions are incompatible with the identified prosodic properties of the construct state, in particular regarding its contrasts with the free state and noun-adjective phrases. Sichel and Shlonsky generate the same prosodic structures for unmodified cases of the free state and the construct state, but make different predictions for phrasing with modifiers. I will first briefly review Borer and Siloni's analyses as well the predictions they make given Match Theory, showing that these analyses are not compatible with the proposed prosody of the construct state and free state. Following this, I will discuss Sichel and Shlonsky's analyses and determine which makes the more appropriate predictions for the construct state and free state. Ultimately neither analysis can be rejected, since Sichel makes the correct predictions for the free state but not for the construct state, while Shlonsky makes the correct predictions for the construct state but not for the free state.

Before detailing the predictions of each syntactic analysis, a few theoretical preliminaries need to be specified. There are three theories of syntax-prosody mapping that could be considered here: Alignment, Lexical Match, and Non-lexical Match. Alignment constraints have been proposed for Hebrew by Shaked (2009) at the phrase level, and by Siloni (2001) at the word

level for construct states specifically. Both observe that Hebrew requires right-edge alignment between a syntactic and prosodic constituent. Shaked motivates this claim via production and processing experiments, while Siloni uses right-edge word alignment to account for the prosodic incorporation of the CS head into the prosodic word projected by the dependent. Since it was established in section 3 that prosodic incorporation is not a property of all construct states, Siloni's (2001) proposal will not be considered further here, as it will not account for the different CS prosodic structures. Shaked's constraint for capturing right-edge alignment, taken from Selkirk (2000), is given in (66).

(66) ALIGN$_R$(XP): *The right edge of any XP in syntactic structure must be aligned with the right edge of a MaP (Major Phrase – a ϕ-phrase) in prosodic structure.*

Although Hebrew phrasing has not previously been analyzed using the tools of Match Theory, I will attempt to sketch out preliminary predictions here while comparing two possible formulations of MATCH constraints. The first, which I call Lexical Match, requires that all maximal XPs with lexical heads map onto phi-phrases. The relevant constraint is given in (67).

(67) MATCH(LEXP, ϕ): *Map all lexical maximal projections onto a phi-phrase ϕ.*

Lexical Match constraints contrast with what I will refer to as Non-lexical Match constraints, which require the mapping of all maximal projections onto phi-phrases. A constraint defining Non-lexical Match is given in (68).

(68) MATCH(XP, ϕ): *Map all maximal projections onto a phi-phrase ϕ.*

These are syntax-to-prosody mapping constraints, which contrast with prosody-to-syntax mapping constraints. Prosody-to-syntax mapping constraints require that prosodic constituents are matched to a syntactic constituent of the relevant type. Considering the effects of prosody-to-syntax mapping constraints on the prosodic output of Hebrew is an important avenue for future research, but will not be addressed here.

Note that Hebrew requires the definition of an additional Match constraint: MATCH(X0, ω), which requires that all lexical terminal nodes in the syntax be matched to prosodic words. This is crucially a Lexical Match constraint, since it is clear from the discussion in section 2.2.1 that functional morphemes generally don't map to prosodic words in Hebrew.[34] This constraint is given in (69).

(69) MATCH(X0, ω): *Map all lexical terminal nodes onto a prosodic word ω.*

It is worth comparing the two instantiations of Match Theory in order to further our understanding of the extent to which syntactic structure is visible to the phonological grammar. Understanding the types of constituents available to the phonological grammar is crucial to the understanding of how phonology and syntax interact with and affect each other. Furthermore, the question of whether the phonology cares about syntactic constituents as a whole, or only their edges, could be answered by comparing Match Theory with Alignment theory. Unfortunately however, Alignment theory cannot be discussed here in depth, because there are no diagnostics or predictions for left-edge alignment in Hebrew to my knowledge. Given this, there is no way to differentiate

[34]In particular, none of the functional morphemes discussed in this section map to prosodic words.

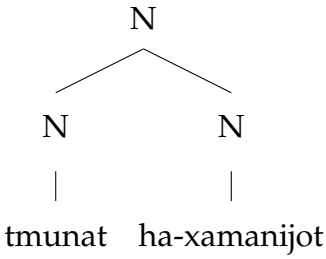
candidates that only satisfy alignment constraints from those that could satisfy both match and alignment constraints. With more information about phi-phrase organization in Hebrew a comparison between Alignment and Match Theory would be an interesting avenue for future research.

The syntactic analyses considered here take two main approaches to deriving the construct state. The first approach type includes Sichel, Siloni (1996, 1997), and Borer (1999). Sichel and Siloni both derive the construct state via head movement of the head of the construct state to D, while Borer adopts a head incorporation approach. Borer (2012) however later specifies that only non-compositonal construct states (compounds) involve head incorporation, while the remainder involve head movement of the head of the construct state to a higher functional projection, but not necessarily to D. These three analyses will be differentiated based on their derivations of the free state. The second approach type includes Shlonsky (2004), who specifically argues against head movement of nouns in Hebrew across the board. He instead derives the construct state by phrasal movement of the entire NP, which contains both the head noun and the dependent as its complement. Shaked (2009) identifies an additional proposal from Dobrovie-Sorin (2000, 2002) that argues for an absence of head movement in the construct state. Dobrovie-Sorin argues that word order in the construct state is achieved by the base-generation of the dependent in the specifier of D, which is right-peripheral. Dobrovie-Sorin's analysis will not be considered in further detail here. I show that the predictions for syntax-prosody mapping made by Siloni and Borer (1999) are not compatible with the prosody discussed for simple cases of the construct state and free state, which

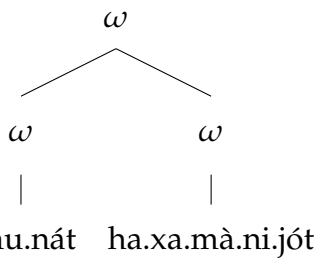
contain only the head and the dependent without modifiers. Although Sichel and Shlonsky approach the derivation of the construct state and the free state differently, their analyses make the same mapping predictions for simple cases, which are compatible with the prosodic structures I have proposed.

In the first approach group, we can immediately eliminate Borer's (1999) proposal of head incorporation as the syntactic source of all construct state nominals. Head incorporation would require head adjunction between the head noun of the construct and the dependent noun. Regardless of the details of this proposal, if construct state nominals were all formed by head incorporation, Match Theory predicts that they would all map to prosodic words, due to the requirements of MATCH(X0, ω). The syntactic structure of an incorporated head and the predicted prosodic mapping are shown in (70) for the construct state nominal *tmu.nat ha.xa.ma.ni.jot* "The picture of the sunflowers".

(70) (a)



(b)



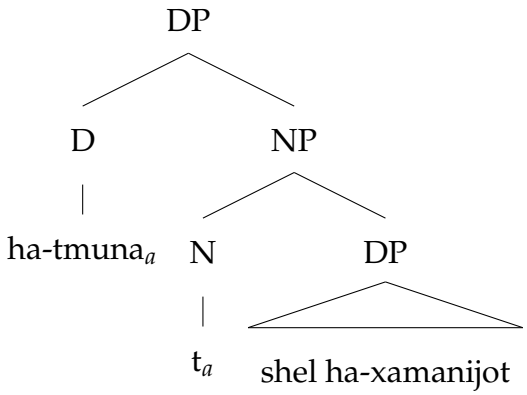
Note that although the definite article appears on the dependent, it is not necessarily a DP under this analysis. Borer argues that definiteness is a fea-

ture in Hebrew with which a noun is merged into the syntax, eliminating the need for a noun to move to D or near D in order to combine with the definite article. Since the complex head and it's components in (70a) are all terminal nodes in the syntax, they must all map to prosodic words to avoid violations of MATCH(X0, ω). This would result in a coordinative word. As discussed in section 3.2, not all CS nominals map to coordinative words, so this is analysis is incompatible with the phonological evidence for their varied prosody. My proposal that only M-constructs map to coordinative words does not encounter this issue, because the incorporation operation is only available to those CS nominals whose dependents lack extended functional material. The syntactic derivation of M-constructs is otherwise the same as for R-constructs (see Borer 2012), but results in a local relationship between the head and dependent that would allow incorporation to occur if the dependent has the appropriate structure. In addition to this, Borer's (1999) derivation of free state nominals requires post-posing when there are multiple arguments of the noun, further demonstrating that this analysis is not compatible with the prosodic structures proposed here.

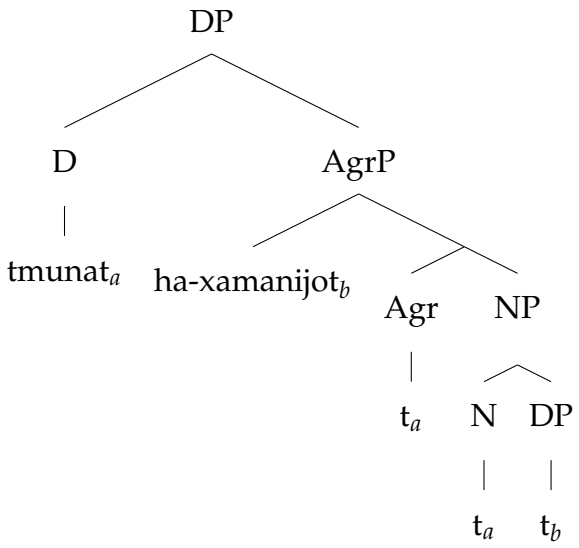
Considering the analyses of Sichel and Siloni (1996, 1997), we can also eliminate Siloni's proposal. Siloni's derivation of the construct state is the same as Sichel's, but Siloni's derivation of the free state isn't compatible with its proposed prosody. Siloni derives both the construct state and the free state via head movement of the head noun to D. The difference between the two arises from the presence of an Agr phrase in the construct state that is absent from the free state. The dependent in the construct state raises to the specifier of the

Agr head, where it is assigned genitive case by the Agr head. In the free state, genitive case is assigned by the preposition *shel*, so there is no need for the projection of the Agr head. The resulting structures of the free state and construct state are given in (71) for "The picture of the sunflowers".

(71) (a) Free state



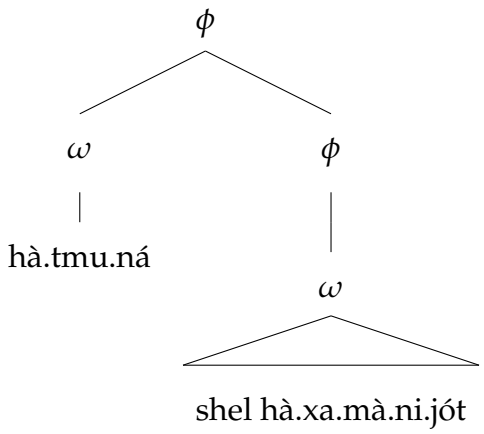
(b) Construct state



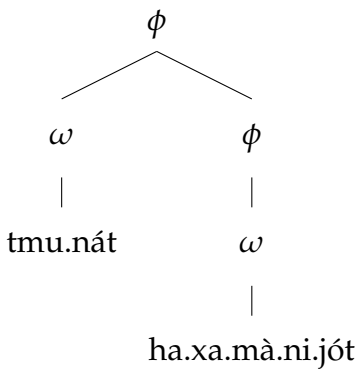
In this example, the dependent is merged as a complement of N but it could also be merged as a specifier of N if it were an agentive possessor. The same derivation would apply. In terms of Match Theory, both Lexical Match and Non-lexical Match make the same predictions for these structures. Note

that I make several additional assumptions when generating prosodic structures for each syntactic analysis. First, only heads and phrases containing phonologically overt material can violate or fulfill Match constraints. There is additionally no vacuous recursion, meaning that a single word dominated by a phi-phrase with no sisters, which is also dominated by a phi-phrase, becomes simply a word dominated by a single phi-phrase. Finally, I assume that functional morphemes, such as *shel*, are prosodically adjoined to the prosodic word to their right, given the behavior of functional morphemes discussed in section 2.2.1. Whether or not *shel* forms a phi or prosodic word with the word to its right does not greatly impact the predictions here in terms of identifying the most appropriate analysis of the construct state and free state. The prosodic structures that would satisfy both Lexical and Non-lexical Match for Siloni's derivations of the free state and construct state are given in (72).

(72) (a) Free state



(b) Construct state



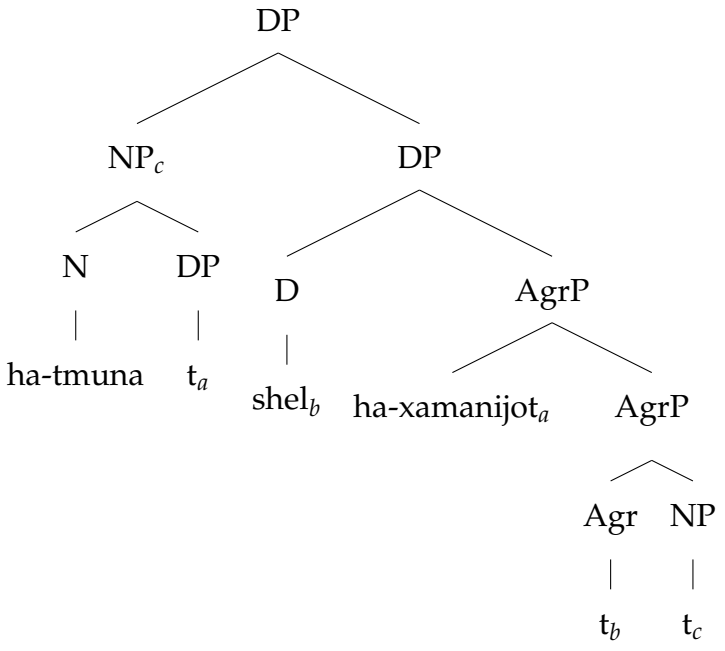
In (72) we see that the prosodic structures of simple free state and CS nominals are predicted to be identical under Siloni's analysis. As discussed in section 3, one of the key prosodic differences between the free state and construct state should be that the head of a free state nominal should be able to map to a phi, while the head of a construct state nominal should not. [35] The syntactic analysis provided by Siloni can therefore be eliminated as well, since it makes incorrect predictions for the prosody of simple cases of the construct state and free state, namely that they are prosodically identical. Note that it is possible that the phi-phrases containing the dependents are not actually projected, and that the structures in (72) consist of two prosodic words dominated by a single phi. The outcome would depend on the interaction of Match constraints with prosodic well-formedness constraints, and is left for future research.

This leaves us with the analysis of Sichel in terms of head movement approaches to the construct state. Sichel's analysis of CS nominals is essentially the same as Siloni's, capturing their properties via head movement of the head noun to D. The crucial difference between Sichel and Siloni's analysis is that

[35] This does not mean that the head of a free state nominal has to *always* map to a phi. But the availability of a mapping to phi for a single word should be predicted from the syntactic structure of the free state, since there are no phonological constraints that would require mapping to phi sentence-medially from a single word, as occurred in Shaked's production study.

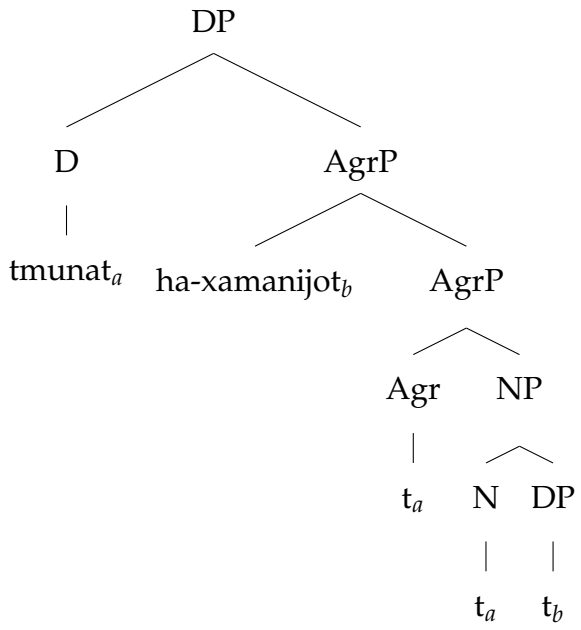
Sichel derives the properties of free state nominals via phrasal movement of the NP that contains the head noun. This ensures that a different prosodic structure will fulfill Match constraints for the free state and the construct state. The dependent of the free state is merged as a DP complement or specifier of the head noun, depending on its thematic role, but then moves to the specifier of a higher Agr projection that is headed by *shel* where it receives genitive case.[36] The NP, which contains the head noun along with a trace of the dependent DP, then undergoes phrasal movement to the specifier of D, in addition to the movement of *shel* to D. The resulting structures are shown in (73).

(73) (a) Free state



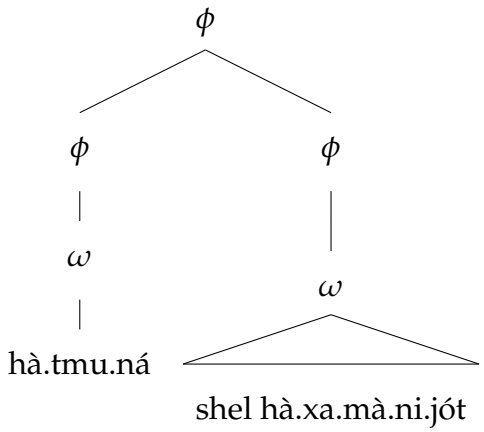
[36]This also differs from Siloni (1996, 1997), who argues that *shel* assigns inherent genitive case to the dependent and that the free state does not contain an Agr projection.

(b) Construct state

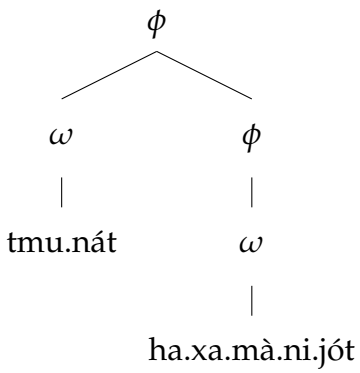


For the simple cases given here, both Lexical Match and Non-lexical Match make the same predictions. The prosodic structures that would satisfy Match constraints for Sichel's derivation of the free state and construct state appear in (74).

(74) (a) Free state



(b) Construct state



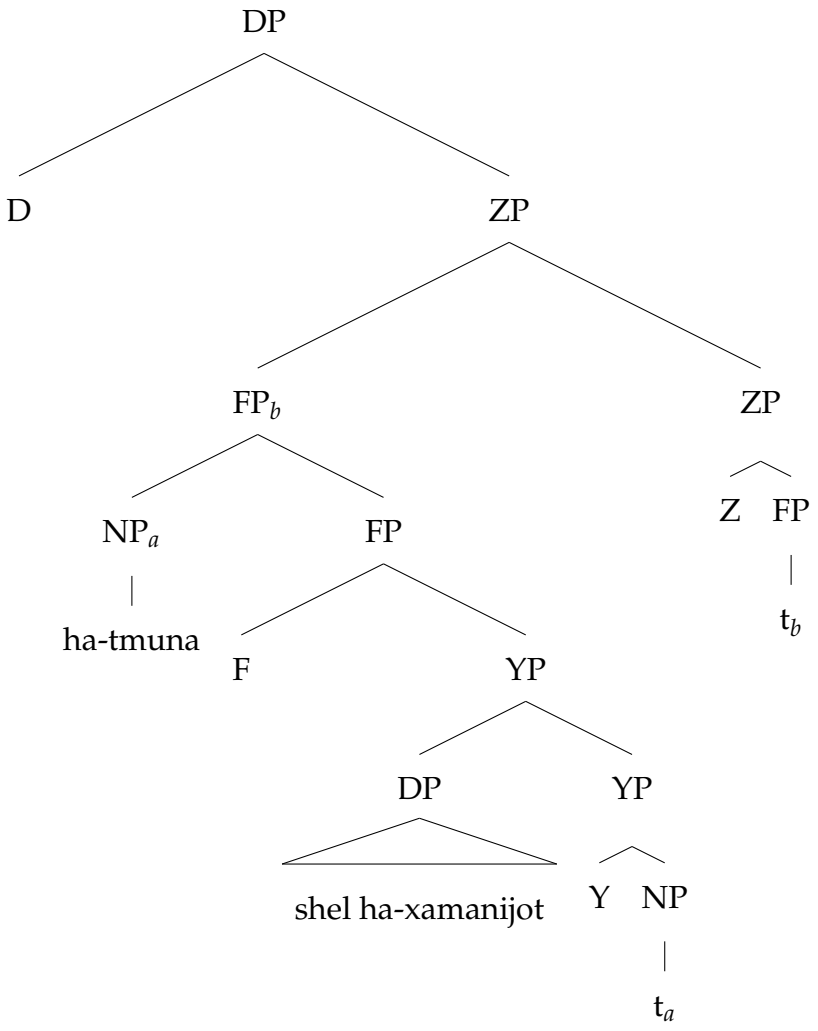
Crucially, the structures in (74) differentiate the heads of free state and construct state nominals prosodically. Furthermore, the construct state as a whole is mapped onto a phi-phrase, as supported by the phonological evidence discussed in section 3.2. In simple cases without modification, Sichel's analysis converges with the prosodic structures proposed in this study. We will see shortly that factoring modification into the equation causes problems for Sichel's analysis given the resulting prosodic mapping, but this does not mean we should eliminate Sichel's analysis from consideration. I will now contrast Sichel's proposal with Shlonsky's, which makes the same predictions for simple cases using different mechanisms.

Shlonsky argues that nouns cannot participate in head movement in Hebrew. All noun-initial word orders in the DP are derived by a combination of phrasal movement and pied-piping. The NP raises successive cyclically from specifier to specifier, pied-piping all the material to its right. According to Shlonsky the final landing site of this complex is some functional projection lower than D, due to word ordering with quantification and numerals. To correctly derive the word order facts in the construct state, Shlonsky must assume that single arguments of the noun are always merged as complements of N,

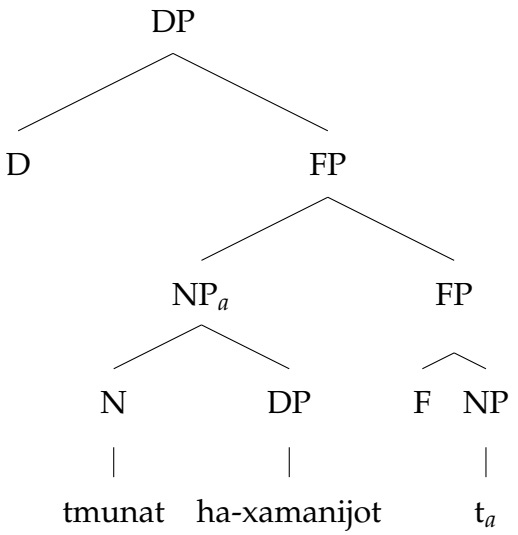
regardless of their thematic role. It is unclear whether this is a desirable assumption. When there are two arguments of the noun in the construct state, an agent and a theme, the agent merges as a specifier of N and the theme as a complement. This allows Shlonsky to account for the word order in construct states with single arguments, since the dependent and the head must always raise together, and for word order with two arguments, since the dependent in these cases must be the theme (see section 2.1.1), which is merged as a complement and raises together with the head. Shlonsky does not discuss the derivation of the free state, but based on the analysis of the construct state I conclude that dependents in the free state are merged as specifiers of functional projections above NP, possibly motivated by the presence of the preposition *shel*. Otherwise, there would be no way to account for the variable order of multiple arguments of the noun in the free state.[37] The resulting structures are given in (75).

[37]This also means that the NP can move past filled specifiers, to the next available specifier.

(75) (a) Free state

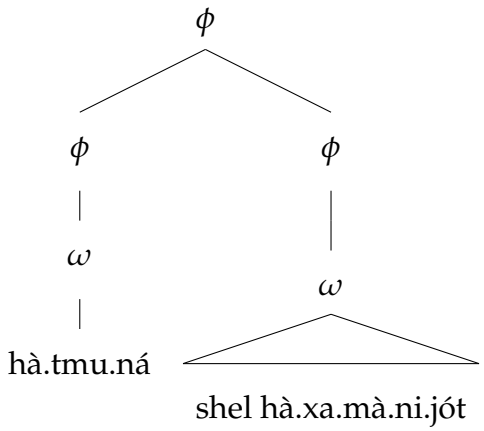


(b) Construct state

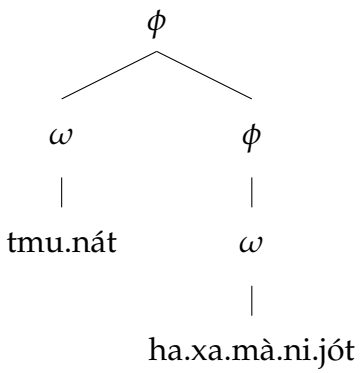


Here as well, Lexical Match and Non-lexical Match make the same predictions. The structures that best satisfy Match constraints for Shlonsky's analysis are identical to Sichel's for cases where the construct state and free state only consist of the head and a single dependent. These structures are repeated in (76).

(76) (a) Free state



(b) Construct state



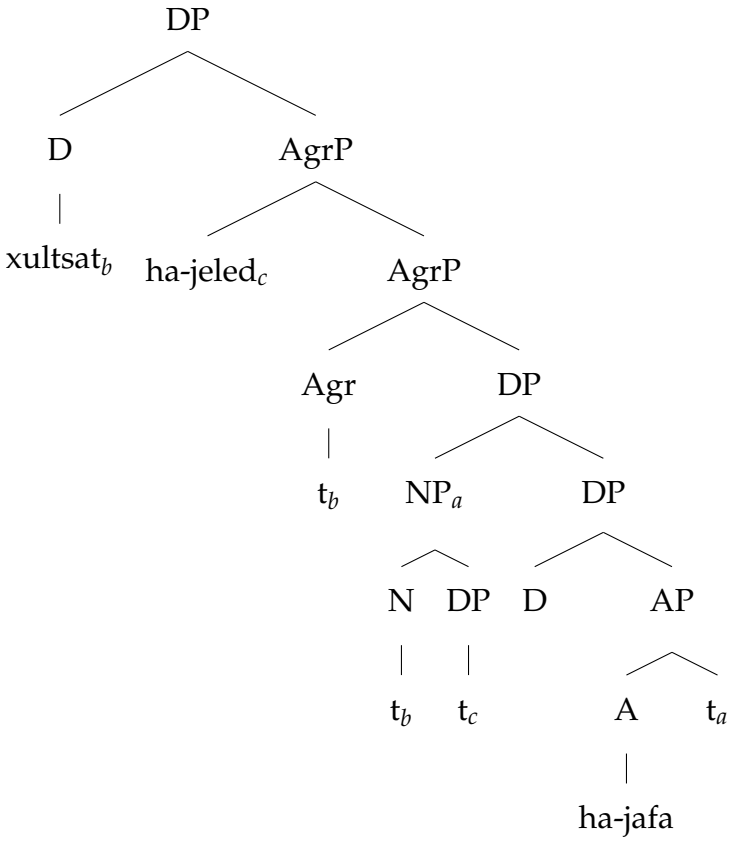
Given that Siloni and Borer's analyses were rejected on the basis that they are incompatible with phonological differences between the free state and the construct state, as well as the prosodic properties of the construct state itself, we have perhaps discovered an optimal analysis of the free state through the prosodic predictions of Sichel and Shlonsky's analyses. Although they use different mechanics and propose different types of movement for the construct state, the structure of the free state is derived in both via phrasal movement. This may be interpreted as evidence for a phrasal movement analysis of the free state, since independent syntactic and prosodic evidence conspire to favor such an analysis.

In order to advance our understanding of both the optimal analysis of the free state and construct state, as well as the required formulation of Match Theory for Hebrew, I now consider where the predictions of Sichel and Shlonsky pull apart. This can be seen in nominals with modification of the head noun, as well as nominals with modification of both the head and dependent. In terms of the different formulations of Match Theory, we will find that Lexical Match generates more flat structures, while Non-lexical Match generates more recursive and binary structures. Non-lexical Match appears to be prefer-

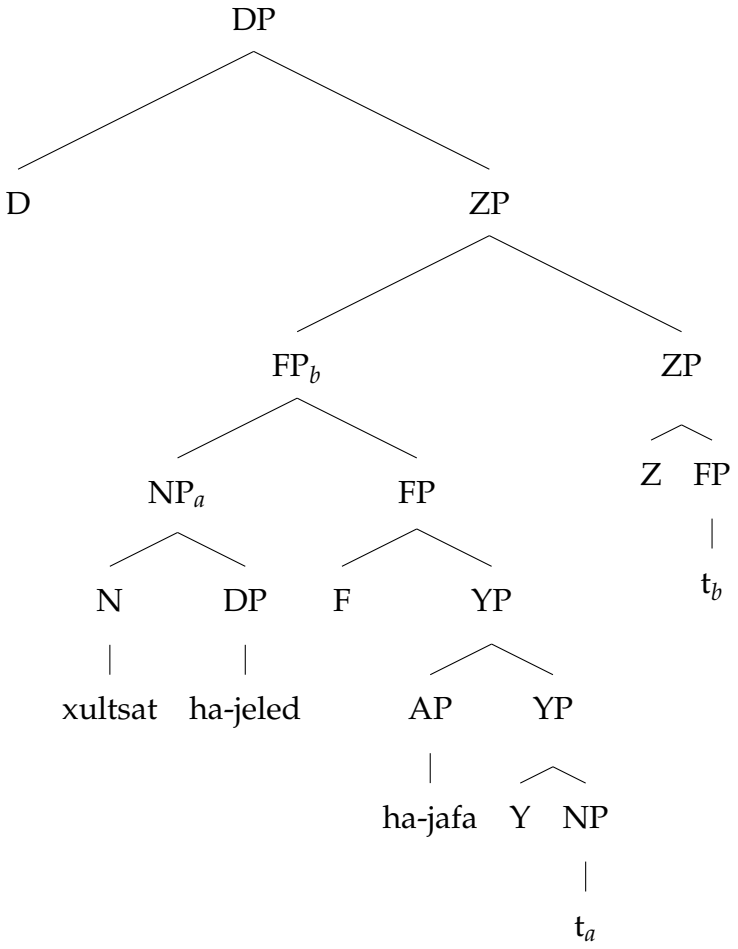
able to Lexical Match, but further evidence is needed to confirm this. For the construct state, Shlonsky's analysis makes viable predictions for phrasing with adjectives, but Sichel's does not. On the other hand, for the free state, Sichel's analysis makes viable predictions for phrasing with adjectives, but Shlonsky's does not.

First, consider the predictions of both analyses for CS nominals containing an adjective that is modifying the head, as in example (56) *xul.tsát ha.jé.led hà.ja.fá* "The boy's pretty shirt". Note that Shlonsky assumes that adjectives are merged as specifiers of functional projections above NP, while Sichel assumes that adjectives are merged into the syntax as heads, which project an additional DP within the DP of the nominal. To account for word order with adjectives, Sichel proposes that the NP moves into the specifier of the D associated with the adjective. With multiple adjectives, the NP moves successive cyclically through the specifier of each D, pied-piping the material to it's right. In the construct state, once the highest adjective's specifier of D is reached, the head is extracted to the D in the extended projection of the NP, while the dependent moves to the specifier of Agr-P. In the free state, the highest adjective's DP is pied-piped with the NP to the specifier of the D in the extended projection of the NP. This is how phrasal movement allows modifiers to intervene between the head and the dependent in the free state. The syntactic structures resulting from Sichel and Shlonsky's analyses of a construct state with modification are given in (77).

(77) (a) Construct state (Sichel)

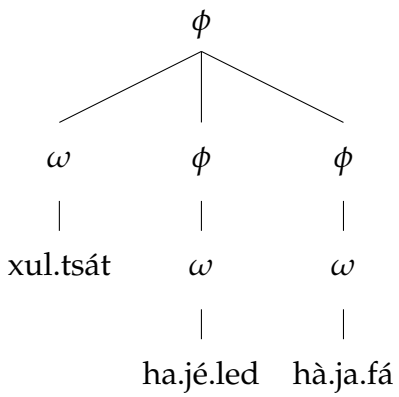


(b) Construct state (Shlonsky)



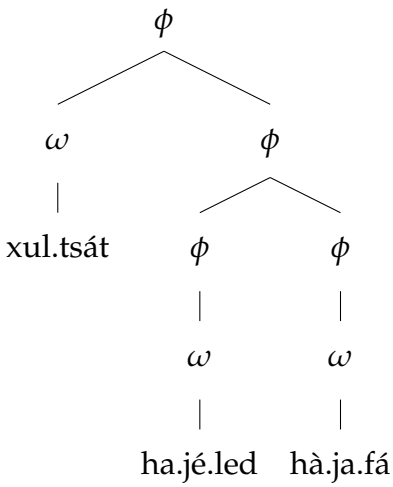
Although the derivations in (77) are fairly different, they result in identical prosodic structures from the perspective of Lexical Match, since Lexical Match only cares about lexical maximal projections and both analyses have the same lexical phrases. The structures generated by Lexical Match are given in (78).

(78) Lexical Match (Sichel, Shlonsky)

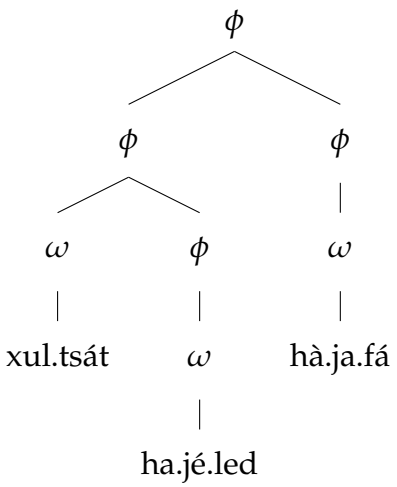


Given the phrasing of CS nominals discussed in example (51) in section 3.2, in particular where the head is modified and the head and dependent must phrase together, it appears that Lexical Match does not satisfy our expectations for the prosodic structure. Looking at the predictions of the Non-lexical Match, we see that Shlonsky's analysis makes the correct predictions, but Sichel's does not. The relevant prosodic structures are given in (79).

(79) (a) Non-lexical Match (Sichel)



(b) Non-lexical Match (Shlonsky)

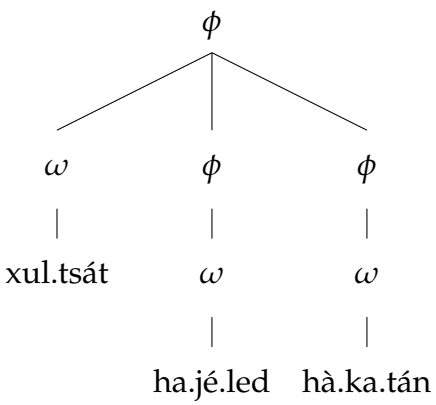


Here Shlonsky's analysis predicts that the head and dependent will phrase together, as expected. This is due to the fact that there is no movement out of the NP in Shlonsky's analysis of the construct state. Sichel's analysis predicts that the dependent and the adjective will phrase together to the exclusion of the head, which as we observed in section 3.2 should not be the case when the adjective is modifying the head. The crucial syntactic difference between Sichel and Shlonsky's proposals is that Sichel's involves the evacuation of the NP by both the head and dependent to a head and specifier position, respectively, so the head and dependent are never within the same XP to the exclusion of the adjective. This is not the case in Shlonsky's analysis, where both the head and dependent remain inside the NP, which is an XP that excludes the adjective.

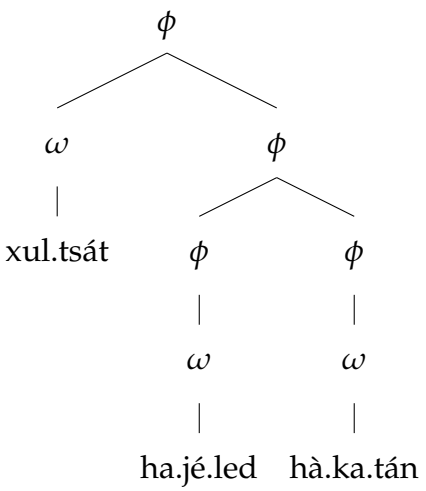
When the dependent is modified however, as in *xul.tsát ha.jé.led hà.ka.tán* "The small boy's shirt", Sichel and Shlonsky's analyses make the same predictions. It is not necessary to examine the syntactic derivations for the modification of the dependent, because in both analyses the resulting structures are straightforward. The modifying adjective will appear in an adjective phrase

which is within the DP of the dependent, while the dependent noun will appear in a noun phrase which has moved to the specifier of a higher functional projection within the dependent's DP. The noun and adjective are in two separate lexical XPs that are under the same functional XP in both Sichel and Shlonsky's analyses. The resulting prosodic structures are shown in (80) for both Lexical and Non-lexical Match.

(80) (a) Lexical Match (Sichel, Shlonsky)



(b) Non-lexical Match (Sichel, Shlonsky)

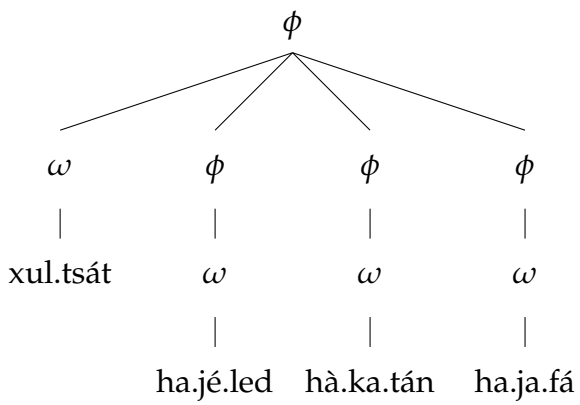


Again, Lexical Match differs from the phrasing identified for these types of structures in section 3.2. Non-lexical Match on the other hand generates the expected structures, where the dependent and adjective form a phi-phrase to

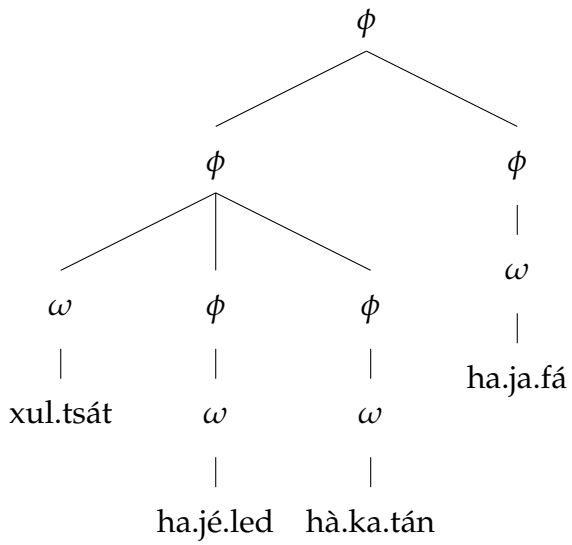
the exclusion of the head.

Sichel and Shlonsky's analyses once again diverge when we consider cases with two modifiers, one which modifies the head and the other the dependent. In this case, they diverge from the perspective of both Lexical Match and Non-lexical Match. The results of Lexical Match for *xul.tsát ha.jé.led hà.ka.tán ha.ja.fá* "The small boy's pretty shirt" is given in (81).

(81) (a) Lexical Match (Sichel)



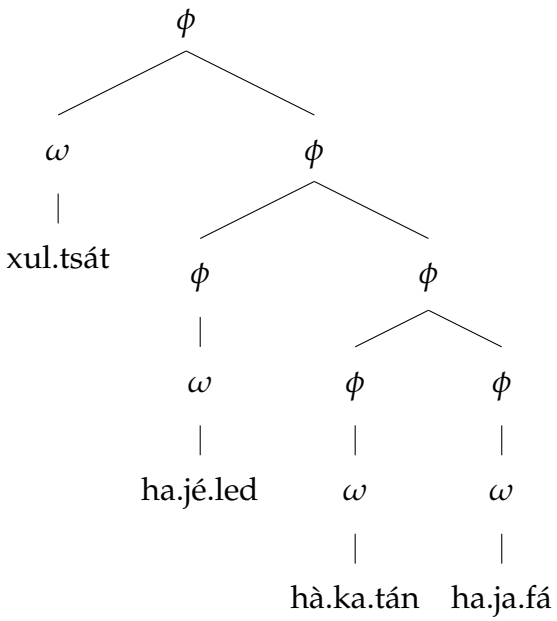
(b) Lexical Match (Shlonsky)



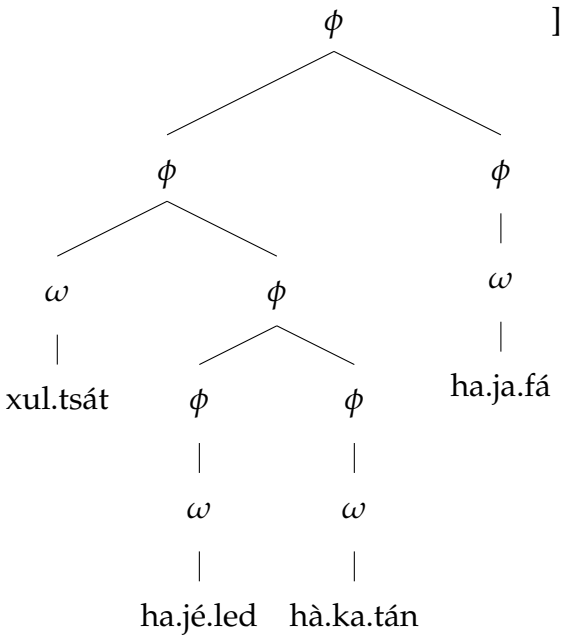
Note that the prosodic structure generated by Lexical Match under Sichel's analysis is a flat structure, but under Shlonsky's analysis the construct state

head, dependent, and the adjective modifying the dependent phrase together to the exclusion of the adjective modifying the head. This is again due to the fact that in Shlonsky's analysis, the head and dependent remain inside the NP, while in Sichel's, both must evacuate the NP. The phrasing generated by Lexical Match for Shlonsky's proposal is compatible with the possible phrasing identified in section 3.2. However, note that Non-lexical Match generates a similar prosodic structure for Shlonsky's proposal which would also be compatible with the analysis in section 3.2. This is shown in (82), along with the prosodic structure predicted by Non-lexical Match for Sichel's analysis.

(82) (a) Non-lexical Match (Sichel)



(b) Non-lexical Match (Shlonsky)

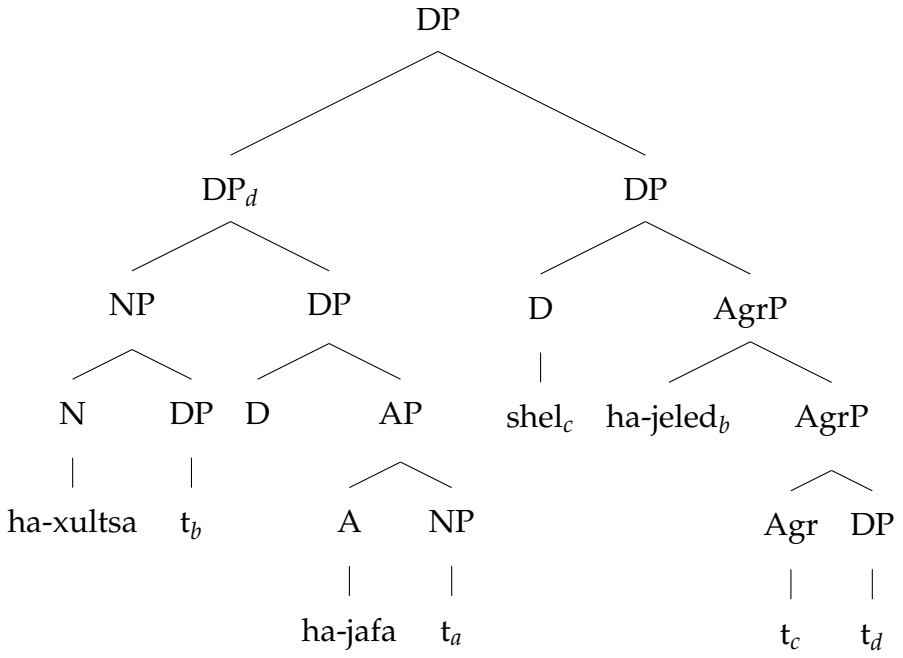


In (82) we see Shlonsky's analysis once more predicts that the construct state head, dependent, and the adjective modifying the dependent should phrase together to the exclusion of the adjective modifying the head. Additionally, the dependent and the adjective modifying it phrase together to the exclusion of the head. Whether this structure or that generated by Lexical Match aligns with the actual phrasing of these types of CS nominals is an empirical question that requires further investigation. Note that the prosodic structures generated by Sichel's analysis are incompatible with the analysis in section 3.2. Sichel's analysis therefore does not make quite the right predictions for prosodic phrasing in CS nominals, but Shlonsky's does.

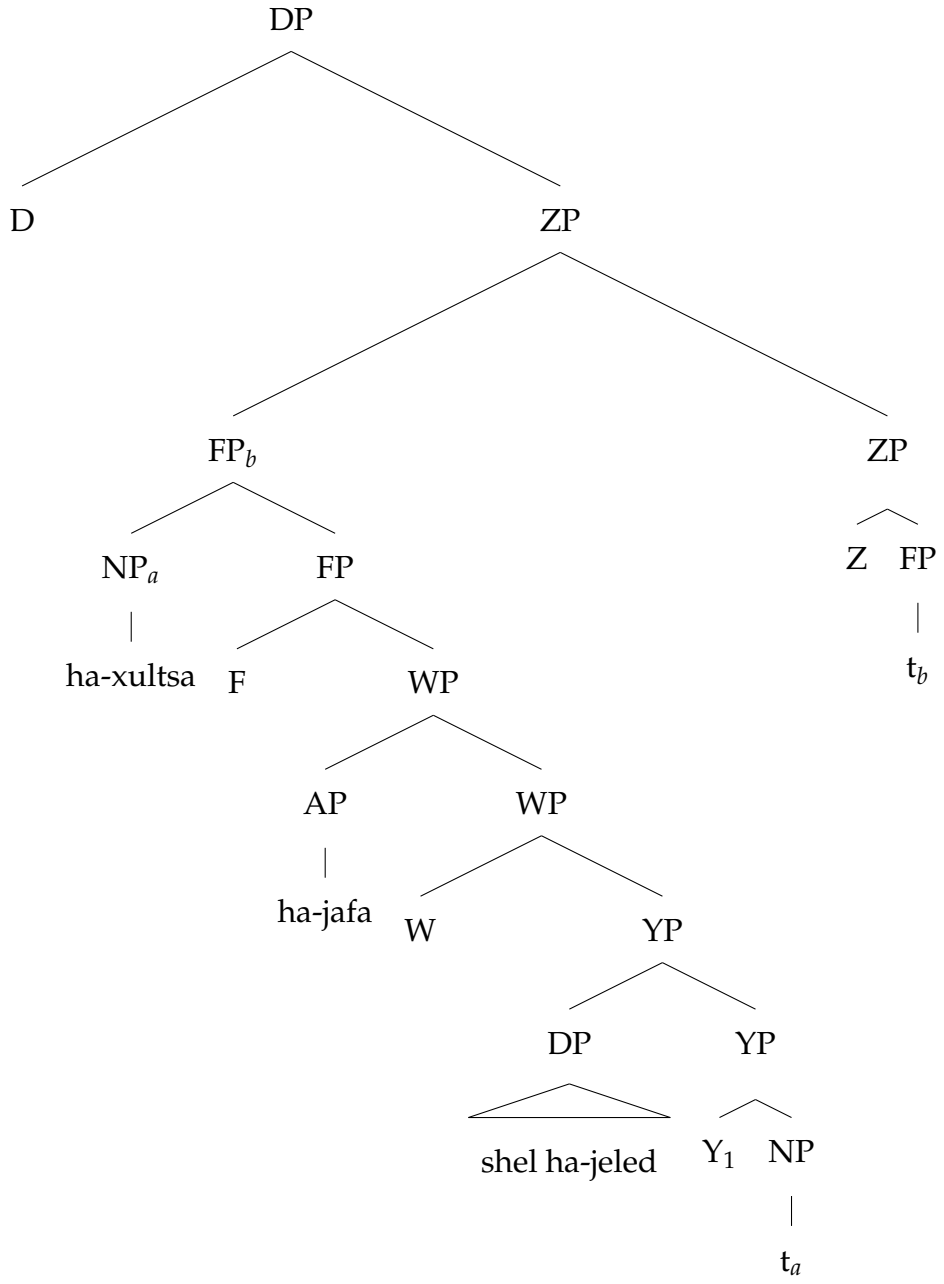
However, in free state nominals with modification we see the opposite result – Sichel's analysis does make correct predictions for prosodic phrasing, but Shlonsky's does not. The syntactic structures for a free state nominal with

modification of the head noun, *hà.xul.tsá ha.ja.fá shel ha.jé.led* "The boy's pretty shirt", are given in (83).

(83) (a) Free state (Sichel)

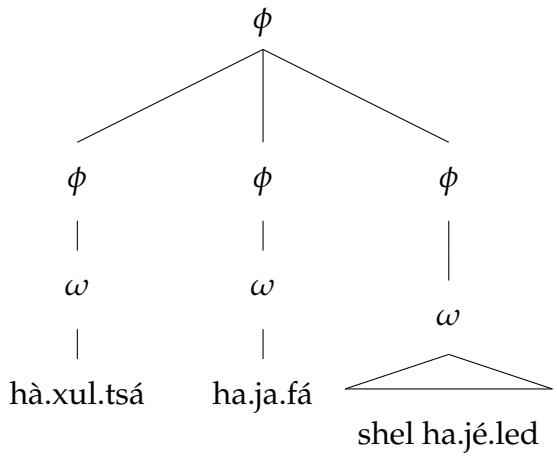


(b) Free state (Shlonsky)



For the free state nominal above with modification of the head, Lexical Match generates the same phrasing for both analyses, resulting in a flat structure. This is shown in (84).

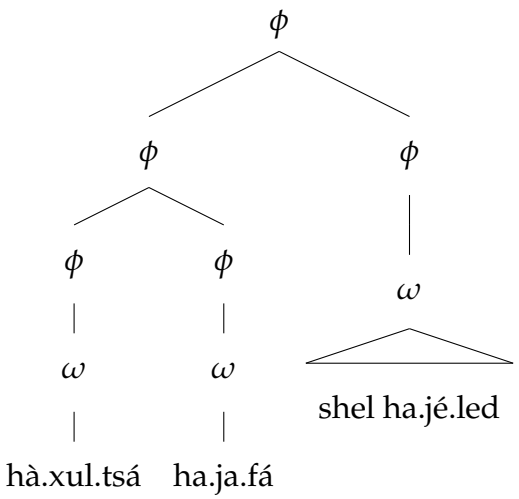
(84) (a) Lexical Match (Sichel, Shlonsky)



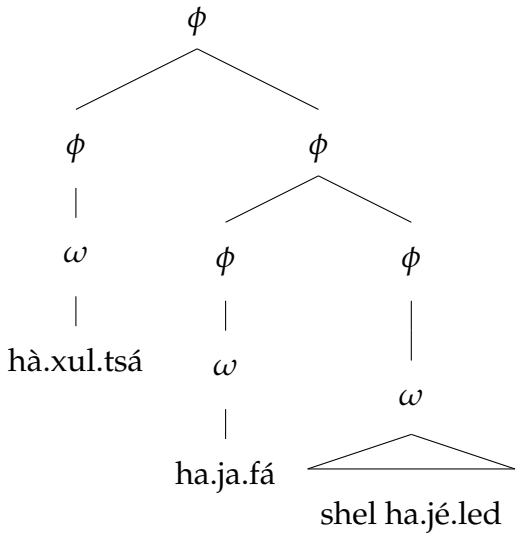
An appropriate analysis for prosodic phrasing in free state nominals with modifying adjectives has not yet been defined. Shaked's (2009) studies cannot be used to directly generate predictions for these cases, since Shaked only investigated RC modifiers, which do not occur in the same positions as adjectives. Shaked also notes that RCs may be subject to additional phrasing requirements of their own. Whether Lexical Match makes the correct predictions here is therefore left for future research.

The structures generated by Non-lexical Match are shown in (85). Sichel's analysis predicts that the head should phrase with its modifier, while Shlonsky's analysis predicts that the head's modifier should phrase with the dependent.

(85) (a) Non-lexical Match (Sichel)



(b) Non-lexical Match (Shlonsky)

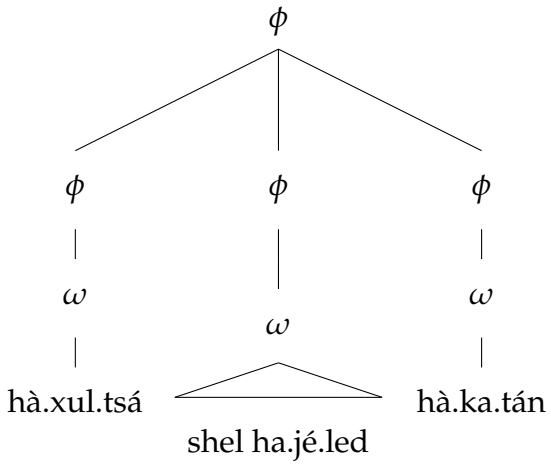


Based on my own native speaker judgments, I believe that the modifier of the head should phrase with the head, and not with the dependent, although I am not currently aware of diagnostics to support this. Therefore, in this case Sichel's analysis seems to make the correct prediction, while Shlonsky's analysis does not.

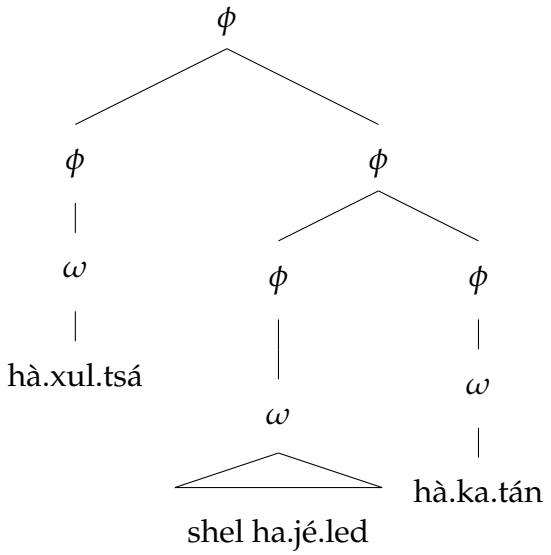
As occurred for the construct state, Lexical Match and Non-lexical Match generate the same prosodic structures for both Sichel and Shlonsky's analyses

of a free state nominal with modification of only the dependent. The prosodic structures are given in (86) for *hà.xul.tsá shel ha.jé.led hà.ka.tán* "The small boy's shirt".

(86) (a) Lexical Match (Sichel, Shlonsky)



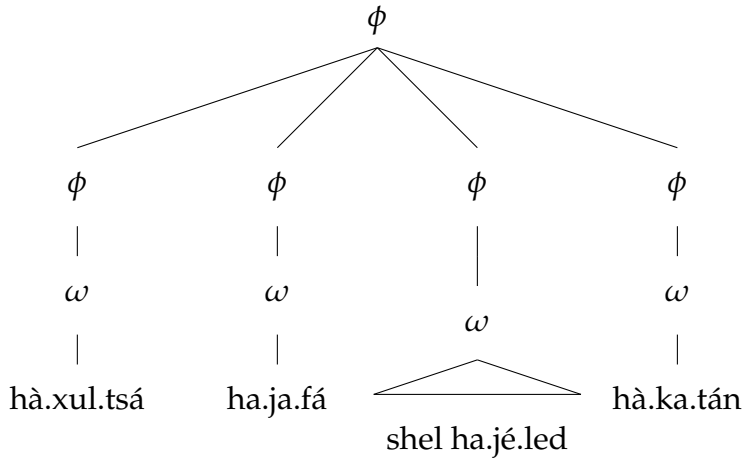
(b) Non-lexical Match (Sichel, Shlonsky)



Again, whether Lexical Match or Non-lexical Match provides a better account of the prosody here is an empirical question left for future research, but my own intuitions align with the phrasing generated by Non-lexical Match.

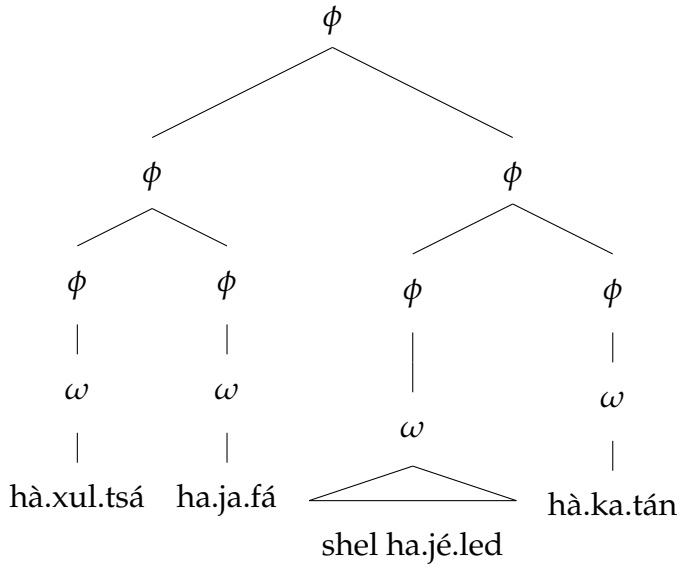
Finally, in cases where there is a modifier on both the head and dependent in the free state, Sichel's analysis once more makes better predictions than Shlonsky's. In the case of Lexical Match there is no difference between the two analyses, and a flat structure is generated, as shown in (87) for *hà.xul.tsá ha.ja.fá shel ha.jé.led hà.ka.tán* "The small boy's pretty shirt".

(87) (a) Lexical Match (Sichel, Shlonsky)

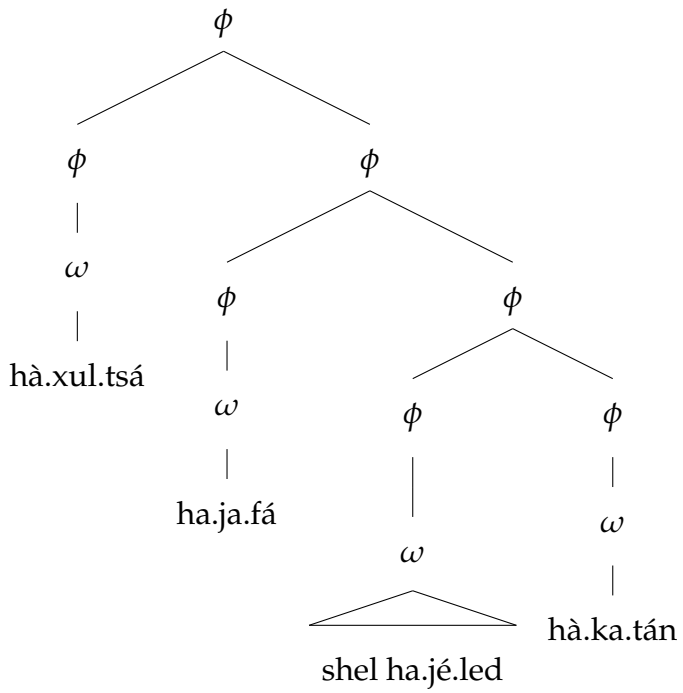


For Non-lexical Match however, Sichel's analysis makes the more appropriate predictions while Shlonsky's does not. In this case each modifier should phrase with the respective noun it is modifying, as would be the case under Sichel's analysis. Shlonsky's analysis predicts that the modifier of the head should phrase with the dependent and its modifier to the exclusion of the head itself. This is not likely to be the preferred phrasing. The prosodic structures generated by Non-lexical Match for both Sichel and Shlonsky's analyses are shown in (88).

(88) (a) Non-lexical Match (Sichel)



(b) Non-lexical Match (Shlonsky)



In comparing both Lexical Match and Non-lexical Match for Sichel and Shlonsky's analyses, we see that neither analysis fully accounts for the ob-

served prosody of the free state and the construct state (although empirical confirmation is still needed to determine the prosodic structure of the free state with modifiers). Sichel's analysis makes the correct predictions for the free state but not for the construct state, while Shlonsky's analysis makes the correct predictions for the construct state, but not for the free state. Additionally, at the phrase level Non-lexical Match is likely a better account of the data, since it predicts more recursive structure than Lexcial Match. This contrasts with the requirement at the word level for the relevant Match constraints to be Lexical, since function words do not appear to project prosodic words in Hebrew.

Furthermore, Sichel and Shlonsky's analyses were determined to be the most viable of existing analyses in terms of alignment with prosodic structure. More consideration should be given to the similarities and differences between the proposals, which could perhaps reveal an analysis that would more fully align with prosody. The discussion here provides a good basis for future research, which should examine both Shlonsky and Sichel's analyses in further detail, as well as additional types of construct state and free state nominals, such as those with both agent and theme arguments.

Given that multiple syntactic analyses were found to be compatible with the prosodic structures proposed for CS and FS nominals, it seems likely that the analysis here is on the right track. Furthermore, the comparison between the analyses revealed that the free state is most likely derived by phrasal movement, in contrast with the construct state, which is most likely derived by head movement. These derivations were most compatible with the prosodic analysis. It seems that in Hebrew there is also a more direct mapping from syntax

to prosody, based on the conclusions here and in past studies. However, it is possible that the proposed prosodic structures are more influenced by prosodic well-formedness constraints, and therefore not fully informative of the underlying syntactic structure. This would also be an important avenue for future research.

5 Conclusions

The construct state has been shown to be prosodically heterogenous, rather than characterized by prosodic wordhood as stipulated in previous literature. I have identified a prosodic contrast between compositional and non-compositional CS nominals, as well as a contrast between compositional CS nominals with bare dependents and those with modified or referential dependents. I have also shown that there is a contrast between the free state and construct state in terms of prosodic structure. Non-compositional CS nominals constitute minimal words, while compositional CS nominals may constitute coordinative words or phi-phrases, depending on whether the head and dependent have undergone amalgamation. Amalgamation is only available to compositional CS nominals whose dependents are non-referential, bare nouns, since it requires that the head and dependent are in a syntactically local relationship. The main prosodic difference between the construct state and free state was found to be that heads in FS nominals can project phi-phrases, while those in CS nominals are unable to. This is because the head of an FS nominal is an XP, but the head of a CS nominal is merely an X, or word. In support of these divisions I have supplied evidence from introspective judgments, stress assignment behavior, antepretonic and post-tonic /e/-deletion, and resyllabification. The prosodic structures I have established alongside a simplified version of their corresponding underlying syntactic structures are summarized in table 2.

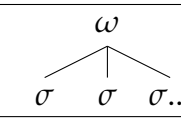
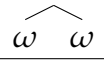
Nominal Type	Syntactic structure	Prosodic structure
Compound	$[_{NP}[N_1+N_2]]$	
M-construct	$[_{FP}N_1...[_{NP/CLP}N_2]]$	
M-construct	$[_{FP}N_1...[_{YP}N_2\ [_{SPEC}A\ [...]]]]$	
R-construct	$[_{FP}N_1...[_{DP}N_2]]$	
Free state	$[_{FP}DP_1...[_{FP}DP_2]]$	

Table 2: Summary of syntactic and prosodic structures

I have also examined the predictions Match Theory makes for mapping different syntactic analyses of the construct state and free state to prosodic structure, alongside different formulations of Match Theory. Non-lexical Match constraints were found to be preferable to Lexical Match constraints on the phrase level, although empirical investigation is needed to confirm phrasings. At the word level, Match constraints must be Lexical, since function words generally do not project their own prosodic words in Hebrew. The Match Theory analysis resulted in an observation that the free state should be derived by phrasal movement, based on the proposals of Shlonsky (2004) and Sichel (2003), whose analyses are the most viable in terms of syntax-prosody mapping. However, further investigation is required, since Sichel's proposal accounts for phrasing in the free state, but not in the construct state, and Shlon-

sky's proposal only accounts for phrasing in the construct state. In general, Hebrew seems to show a more direct mapping from syntax to prosody.

One burning question the reader may have is why, until now, the construct state has only been discussed as a single prosodic word, without prominence on the head. It is possible that the construct state has undergone some historical change, where it used to be but is no longer uniformly representative of a single prosodic word. Additionally, it is possible that the lack of prominence observed on the head of a CS nominal is actually an observation of the absence of a phi-phrase, since CS heads cannot map to phi-phrases at all. Recall from section 2.2.1 and section 3.2 that the realization of stress and the realization of phi-phrase boundaries are actually fairly similar: stress is realized with an increase in duration and a high tone in the stressed syllable, while phi-phrase boundaries are cued mostly by lengthening at the right edge and tonal changes. Since Hebrew is right-headed at the level of all prosodic constituents, the result is the presence of similar cues that indicate the right edge of prosodic words, phi-phrases, and iota-phrases. A difference in prominence between the left (head) and right (dependent) elements of a construct state nominal, where the right element has higher prominence, may then actually be indicative of the right edge of a phi-phrase rather than the absence of any prominence on the left element.

However, there is still much work to be done, and several different avenues immediately present themselves for further research. First, a comparison of the interactions between the different formulations of Match Theory, the syntactic proposals under consideration, and prosodic well-formedness con-

straints could be conducted in OT Workplace (Prince, Tesar, and Merchant 2017), using SPOT (Bellik, Bellik, and Kalivoda 2019). SPOT is a software tool able to create and automatically evaluate in terms of violations every possible prosodic structure corresponding to a specific syntactic structure. This software can also generate a factorial typology, allowing us to see what types of grammars could exist given a particular syntax and constraint set. This would be informative for the continued exploration of prosodic mappings of construct state nominals in Hebrew, and also for comparison with possibilities in other languages with construct state nominals, such as Arabic.

It would also be interesting to explore what the implications of sentential prosodic phrasing are on the prosodic structure of construct state nominals. For example, it may be possible that phonological well-formedness constraints at the phrasal level are able to block the process of amalgamation discussed for M-constructs. This would be an interesting outcome given that amalgamation occurs within phases.

Furthermore, it may be informative to explore the prosody of CS nominals and FS nominals with deverbal noun heads, since deverbal nouns are argued to have a more articulated syntactic structure. The extent to which syntax-prosody mapping constraints are sensitive to these levels of structure is another interesting avenue for future research. There is also always the potential for experimental work, both in production and in the processing of implicit prosody, in order to confirm the validity of the proposed prosodic structures.

To summarize, the conclusions reached here about the prosody of construct nominals provide solid groundwork for continuing to explore the prosodic

structure of the construct state in general, as well as the syntax-prosody interface in Hebrew. Due to its specific phonological, morphological, syntactic, and semantic properties, the construct state has provided valuable insight into the syntax-prosody interface in Modern Hebrew.

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