

# On the Construct State, Uniqueness and Genitive Relations\*

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IATL 18, Bar Ilan 24-25/6/2002.

The literature on the construct state has traditionally assumed that the head of the construct state, and therefore the construct state as a whole, inherits its (in)definiteness value from the genitive DP; a phenomenon known as “(in)definiteness spread” – see Borer (1984, 1996), Ritter (1988, 1991), Siloni (1991, 1997), and Dobrovie-Sorin (2000), among others. This paper presents a semantic analysis of the construct state in Hebrew which departs from this view in that it claims that all construct states denote a unique individual independent of the nature of the genitive DP. The construct form of the noun (the head of the construct state) is given a lexical denotation of a functional noun (at type  $\langle e, e \rangle$ ). In the construct state, (the individual denoted by) the genitive DP serves as the argument to this function. The denotation of the construct state as a whole is a unique individual by virtue of being the output of a function, i.e. it does not depend on the nature of the argument of the function. New data is provided to support the functional nature of the construct form of the noun and to show that this function is determined in the lexicon. The implications of this analysis for the analysis of other properties of the construct state are also discussed.

## 1. Introduction: Relational vs. Functional Nouns in the Construct State

Relational nouns are those nouns whose lexical meaning does not encode characteristics of the entity itself, but rather a relation that the entity must bear to a second, distinct, entity. In his study of definiteness, Löbner (1985) posits a further distinction within the class of relational nouns. The first subclass, for which he maintains the label ‘relational’, is of nouns that express a one-to-many relation, e.g. *hand*, as a person normally has two hands. The second subclass, labeled ‘functional nouns’, is of nouns expressing a one-to-one relation, such as *head* (animals normally have just one head), but also the plural *hands*, as a person has only one plurality (or one set) of hands. The distinction between relational and functional nouns plays an interesting role in construct states expressing part-whole relation (or inalienable possession). In a context of a gymnast in the Olympics, compare the acceptability of a construct state headed by the functional nouns *roš* ‘head’ in (1a) and *yedey* ‘hands’ in (1b), with the odd construct state in (1c) which is headed by the relational noun *yad* ‘hand’.

- (1) a. [CS **roš** ha-mit’amel] nifga ba-nefila me-ha-kora  
head(m) the-gymnast(m) hurt(m) in-the-fall from-the-bar  
‘The gymnast’s head was hurt during the fall off the bar.’  
b. [CS **yedey** ha-mit’amel] nifge’u ba-nefila me-ha-kora  
hands(pl) the-gymnast hurt(pl) in-the-fall from-the-bar  
‘The gymnast’s hands was hurt during the fall off the bar.’  
c. ?# [CS **yad** ha-mit’amel] nifge’a ba-nefila me-ha-kora  
hand(f) the-gymnast hurt(f) in-the-fall from-the-bar  
‘The gymnast’s hand was hurt during the fall off the bar.’

Note, importantly, that we can turn *yad* ‘hand’ into a functional noun by changing the context

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\* For comments and helpful discussion of different stages of this work I wish to thank the audience at IATL 18, the participants of SURGE (the Rutgers semantics reading group), the audience at WCCFL XXI, and Ron Artstein, Chris Barker, Ivano Caponigro, Shai Cohen, Veneeta Dayal, Polly Jacobson, Per Anker Jensen, Heather Robinson and Gianluca Storto.

such that the gymnast has only one hand, e.g. in the context of the Paralympics, and (1c) will become acceptable.

This paradigm of construct states expressing the part-whole relation suggests that the head of the construct state must be a functional noun. It is known, however, that the construct state is not restricted to nouns that are functional in nature. Therefore, I propose that the morpho-phonological change into the construct form coerces all nouns into functional nouns. That is, the construct form of the noun differs from the free form not only in its morphology but also in its meaning.

The rest of the paper is organized as follows. The next section spells out the formal details of the functional analysis and presents new data to support it. This analysis has implications for the analysis of some central properties of the construct state, including the ban on the definite article and the position of adjectives. Section 3 presents the range of genitive relations in the construct state and discusses how they are encoded in the functional noun denotation. Based on new data, I argue that the complete meaning of the functions is determined in the lexicon.

## 2. The Construct Form as a Functional Noun

The construct form of the noun (the head noun of the construct state) is analyzed as a functional noun, i.e. it differs from the free form of the noun not only in its morpho-phonological form but also in its lexical denotation. Formally, while the free form of the noun denotes – as is standard in the literature – a set of individuals (type  $\langle e, t \rangle$ ), the construct form of the noun denotes a function from individuals into individuals (type  $\langle e, e \rangle$ ). This function takes the genitive phrase as its argument, and the construct state as a whole denotes the (unique) individual which is the output of the function for that input individual (cf. Jacobson 1993, Dobrovie-Sorin 2000, where a structurally evoked type-shifting rule shifts the head noun in genitive constructions into an  $\langle e, e \rangle$  function).

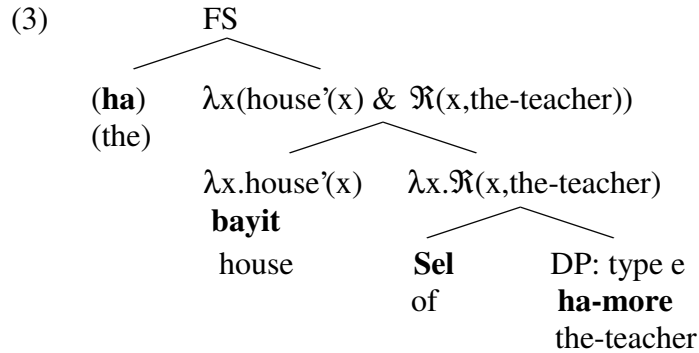
In the light of this proposal, consider the singular construct state in (2a) and the plural construct state in (2b).

- |        |                                |    |                        |                |
|--------|--------------------------------|----|------------------------|----------------|
| (2) a. | CS: type e                     | b. | <b>batey</b>           | <b>ha-more</b> |
|        |                                |    | houses                 | the-teacher    |
|        | N: type $\langle e, e \rangle$ |    | ‘The teacher’s houses’ |                |
|        | DP: type e                     |    |                        |                |
|        | <b>beyt</b>                    |    |                        |                |
|        | house                          |    |                        |                |
|        | <b>ha-more</b>                 |    |                        |                |
|        | the-teacher                    |    |                        |                |
|        | ‘The teacher’s house’          |    |                        |                |

In the singular construct state in (2a), *beyt* ‘house’ denotes a function from individuals into ‘house’ individuals and the genitive DP *ha-more* ‘the teacher’ denotes an individual. Since a function is by definition single valued, the composition of these elements yields the unique ‘house’ individual that the function assigns to the input ‘teacher’ individual. In order to deal with a plural head noun, we assume plural individuals in the sense of Link (1983). The plural *batey* ‘houses’ denotes a function of type  $\langle e, e \rangle$  in which the range of the function is restricted to plural (non-atomic) individuals. When the individual denoted by *ha-more* ‘the teacher’ is fed into this function, the output is the unique plural ‘houses’ individual, i.e. the maximal individual, that the function assigns to that input ‘teacher’ individual.

The functional analysis immediately accounts for why the definite article cannot mark the head noun. Specifically, the individual denotation of the construct state as a whole denotes is unsuitable for the definite article to apply (cf. Dobrovie-Sorin 2000 who uses the ban on the definite article to motivate a type-shifting of the head noun into an  $\langle e, e \rangle$  function).

In comparison, consider the free state in (3).



Unlike the argumental genitive DP in the construct state, I assume that the *šel* ‘of’ phrase in the free state is a modifier. In particular, it denotes the set of individuals that stand in some unspecified genitive relation  $\mathfrak{R}$  to (the individual denoted by) *ha-more* ‘the teacher’. This set is intersected with the set denoted by the head noun *bayit* ‘house’ to yield the set of ‘house’ individuals that are related to ‘the teacher’. Since at this point the free state denotes a set, the definite article may apply.

The rest of this section presents two kinds of evidence in support of the functional analysis. Section 2.1 discusses the status of the individual denoted by the construct state with respect to uniqueness, as it is expected to be unique by virtue of being the output of a function. Section 2.2 presents further evidence that the construct state as a whole denotes an individual (of type  $e$ ), and therefore serves as evidence that it is the output of an  $\langle e, e \rangle$  function.

## 2.1 Uniqueness

The paradigm we saw in section 1 suggested that a part-whole construct state was felicitous only if the head noun was a functional noun. Note, however, that even with the part-whole relation the requirement for a one-to-one mapping in the model is not absolute, and it could be satisfied by salience. Consider, for example, a context of a monk engaged in copying old scripts, in which only one hand of the monk is relevant for the copying. In this context, there is a one-to-one mapping between the monk and his hand, and the construct state in (4) is felicitous.

- (4) [CS **yad** ha-nazir]      nišbera ve-hu ne'elac      lišbot mi-melaxto  
 hand(f) the-monk(m) broke(f) and-he was-forced to-stop from-work-his  
 ‘The monk’s hand broke, and he was forced to stop working.’

When the relation expressed in the construct state is not part-whole, and world knowledge does not provide uniqueness (neither absolute nor of relevance), the construct state construction forces uniqueness. Consider (5-6) in a context of a strike in some library, where it is clear that the library has more than one employee. In the examples in (5) the head nouns are singular and the genitive DPs are definite. (5a) introduces an employee of the library using the construct state and (5b) does the same by means of a free state. Crucially, the continuation (5c) which introduces a second (distinct) employee of the library (by means of a free state) is possible

following the free state in (5b) but not the construct state in (5a).

- (5) a. [CS **oved** ha-sifriya] xasam et ha-knisa ha-rašit ...  
 employee the-library blocked Acc the-entrance the-main  
 ‘The library’s employee blocked the main entrance...’  
 b. [FS **oved** šel ha-sifriya] xasam et ha-knisa ha-rašit...  
 employee of the-library blocked Acc the-entrance the-main  
 ‘An employee of the library blocked the main entrance...’  
 c. ...ve-od **oved** **šel ha-sifriya** xasam et ha-axorit  
 and-more employee of the-library blocked Acc the-rear  
 ... and another employee of the library blocked the rear one.’

This contrast shows that the descriptive content of the construct state forces the individual introduced by the construct state in (5a) to be unique in the situation, independent of world knowledge. (6) illustrates the same for plural head nouns with indefinite genitive DPs (on the use of the numerical *axat* ‘one’ in these indefinites – see section 2.1.1).

- (6) a. [CS **ovdey** sifriya axat] patxu be-švita...  
 employees library(f) one(f) opened in-strike  
 ‘A library’s employees went on strike ...’  
 b. [FS **ovdim** šel sifriya axat] patxu be-švita...  
 employees of library(f) one(f) opened in-strike  
 ‘Employees of a library went on strike...’  
 c. .... aval **ovdim** **axerim** hif’ilu et ha-sifriya ka-ragil  
 but employees others operated Acc the-library as-usual  
 .... but other employees operated the library as usual.’

When the continuation (6c) is added to (6a), the ‘other employees’ must be from a different library, i.e. the construct state exhibits maximality in that it introduces all the employees of the one library. When the same continuation is added to (6b), the ‘other employees’ can be from the same library, i.e. no maximality effect is observed with the free state. In sum, the data presented in (5-6) shows that the descriptive content of the construct state renders the individual it denotes unique (for a singular head noun) or maximal (for a plural head noun) in the situation, as expected under our analysis that the denotation of the construct state is the output of an <e,e> function.

### 2.1.1 A Note on the Genitive DP: Bare Indefinite vs. Indefinites with ‘one’

In (6) we have used indefinites with the numerical *axat* ‘one’ as the genitive DP rather than bare singulars which are the unmarked indefinite in Hebrew. The reason for using the numerical ‘one’ is that in the construct state environment bare singulars do not denote an individual, but rather a kind, and the construct state as a whole denotes a sub-kind, not an individual. The numerical ‘one’ forces an individual reading for the genitive DP, so the construct state as a whole also denotes an individual. This is illustrated by the contrast in (7-8).

- (7) a. **anfey** oren  
 branches pine  
 ‘Pine branches’  
 b. **anfey** oren exad  
 branches pine one  
 ‘A pine’s branches’

- |  |  |
|--|--|
| (8) a. # <b>kalbat</b> šaxen<br>dog(f) neighbor(m) | b. <b>kalbat</b> šaxen exad<br>dog(f) neighbor(m) one(m)<br>'A neighbor's dog' |
|--|--|

(7a) denotes a kind of branches, while (7b) can be used to refer to the branches of a specific pine tree. In (8a), the sub-kind denotation is odd, since there is no sub-kind of dogs such that they are owned by (or bear any other relation to) neighbors. (8b), in contrast, may be used to refer to an individual dog that is owned by some neighbor. In (5-6), the numerical ‘one’ was used to force an individual denotation, since the goal of the paradigm was to demonstrate that the construct state renders the individual it denotes unique (or maximal) in the situation.

Note that the functional analysis presented here for individual denoting construct states can be extended to account for the sub-kind cases as well. In particular, if the bare singular denotes a kind individual at type *e*, it can be the argument of the  $\langle e, e \rangle$  function denoted by the head of the construct state. In this case, the function would map kind individuals onto kind individuals, such that the output of the function would be a sub-kind. The problem is that it has been argued by Dayal (2002) that bare singulars in Hebrew do not have a kind denotation in the sense of Carlson (1977), as they cannot appear with kind predicates such as *nadir* ‘rare’. Alternatively, we can adopt Krifka’s (1995) ‘concepts’ at type *e* which, unlike kinds, are not organized in a taxonomic hierarchy and need not be well established in background knowledge. If a bare singular in Hebrew can denote a concept, the  $\langle e, e \rangle$  function will map concepts onto concepts, where the output concept will be a sub-concept. Some support for this denotation comes from the fact that a bare singular in the genitive DP can be modified by a relative clause to create a concept ‘from scratch’, a characteristic Krifka associates with concepts but not with kinds. For example, *anfey oren še-gadal le’at* ‘branches of a pine that grew slowly’ could potentially be used if branches of a slow-growing pine share special characteristics and therefore constitute a sub-concept. Further research is required to determine whether bare singulars indeed have a concept denotation and to better understand the semantic implications of functions that relate concepts. Note, in conclusion, that this analysis of concept denoting construct states could shed light on why the construct state is often used in Hebrew for compounding.

### 2.1.2 Uniqueness vs. (In)definiteness Spread

In this section we go back to the uniqueness paradigm presented above and compare it to the traditional view of “(in)definiteness spread”. Based on two formal tests – Accusative marking by *et* and agreement of modifying adjectives (see the references below for details), the “(in)definiteness spread” view assumes that the head of the construct state is not specified with respect to (in)definiteness, so the (in)definiteness value of the genitive DP “spreads” to marks the head of the construct state, and therefore the construct state as a whole. This view has been formalized in syntactic terms using  $[\pm\text{definite}]$  features in Borer (1996), Ritter (1991), and Siloni (1997), among others. Abstracting from the details of the different analyses, they all assume that a  $[\pm\text{definite}]$  feature that originally marks the genitive DP passes on to the head noun and as a result marks the construct state as a whole as  $[\pm\text{definite}]$ . A semantic analysis of “(in)definiteness spread” is given by Dobrovie-Sorin (2000). Dobrovie-Sorin posits an (in)definiteness preserving  $\langle e, e \rangle$  function denotation for the sister of specDP, which causes the head noun to type-shift into an  $\langle e, e \rangle$  denotation. This function takes the genitive DP in specDP as its argument and preserves its (in)definiteness value in the denotation of the construct state as a whole: a definite individual

is mapped onto a definite individual and a variable (the denotation assumed for indefinites) is mapped onto a variable<sup>1</sup>.

All the analyses that follow the “(in)definiteness spread” view predict that (5a) will be equivalent to a simple definite DP while (6a) will be equivalent to a simple indefinite DP. Thus, they cannot account for the uniqueness paradigm in (5-6) where the construct state has been demonstrated to render the individual it denotes unique/maximal both with a definite and with an indefinite genitive DP: while definites are expected to exhibit uniqueness, indefinites never denote unique individuals (although they may denote specific ones). Therefore, the uniqueness paradigm presented here renders the “(in)definiteness spread” approach untenable.

A different approach to (in)definiteness in the construct state is presented by Siloni (2000). Siloni argues for a view where there is “definiteness spread” but no ‘indefiniteness spread’; for the indefinite construct states she assumes that they are indefinite by default or definite if the head noun is marked by a (non-prefixal) definite article. Since the construct state in (6a) is not marked by a (non-prefixal) definite article, Siloni would predict that it is indefinite by default. This prediction is identical to the one made by the “(in)definiteness spread” approach, and it therefore faces the same problem in accounting for the uniqueness paradigm.

Although I argue against the “(in)definiteness spread” approach, I do not propose here an alternative analysis of the two formal tests that have motivated this view – Accusative marking by *et* and agreement of modifying adjectives. It should, however, be noted that the analysis presented here is compatible with Danon’s (2001) analysis. Very briefly, Danon distinguishes syntactic and semantic definiteness, and proposes that the feature that the syntactic tests are sensitive to is a purely syntactic feature [def] which spreads from the genitive DP<sup>2</sup>. Since this analysis makes no prediction as to the meaning of these construct state, it is compatible with the semantic analysis presented here.

## 2.2 Evidence for type e denotation: Restrictive Modification

A second piece of evidence for the functional analysis comes from the behavior of purely restrictive adjectives. Recall, first, that the position of the adjective in the construct state is not canonical: it follows the genitive DP instead of immediately following the head noun, as in the free state (and other DPs). If the genitive phrase is an immediate argument of the head noun as proposed here, the adjective composes with (the denotation of) the construct state as a whole, i.e. with the (unique) individual which is the output of the  $\langle e, e \rangle$  function. Consequently, a purely restrictive adjective should not be possible in this position, as the construct state already denotes a single individual. As (9-10) show, this prediction is borne out.

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<sup>1</sup> Note that it is unclear what it means for a function to map variables, since variables are not entities in the model, but rather placeholders for individuals (and potentially other entities). Thus, the distinction between variables and individuals cannot be the basis for an (in)definiteness preserving function; such a function must be sensitive to some property distinguishing definite and indefinite individuals.

<sup>2</sup> Unfortunately, any “spread” analysis will make the wrong prediction in the following case.

- (i) a. raiti (\**et*) [yalda zo] ba-muzeon  
I-saw *et* girl this(f) in-the-museum  
'I saw this girl in the museum.'  
b. raiti ??(*et*) [horey [yalda zo]] ba-muzeon  
I-saw *et* parents girl this(f) in-the-museum  
'I saw this girl's parents in the museum.'

Since the object in (ia) disallows *et*, a “spread” mechanism will predict the construct state in (ib) to disallow *et* as well, contrary to the facts.

- (9) a. #delet ha-bayit **ha-axorit** b. ha-delet **ha-axorit** šel ha-bayit  
door(f) the-house(m) the-back(f) the-door the-back of the-house  
‘The house’s back door’ ‘The back door of the house’
- (10) a. #ragley ha-para **ha-kidmiyot** b. ha-raglayim **ha-kidmiyot** šel ha-para  
legs(pl) the-cow the-front(pl) the-legs the-front of the-cow  
‘The cow’s front legs’ ‘The front legs of the cow’

(9a) is deviant because *delet ha-bayit* (lit: ‘door the-house’) denotes the (unique) door the function assigns to the house, so there is not set to choose the back door from. An adjective like *aduma* ‘red’, which can be interpreted attributively, is possible in this position: it would be predicated of the individual denoted by the construct state. The plural *ragley ha-para* (lit: ‘legs the-cow’) in (10a) denotes the maximal ‘leg’ individual the function assigns to the cow, i.e. the sum of the cow’s legs. Being an individual, this output cannot be restricted by the adjective to denote just the front legs. Again, an attributive adjective, e.g. *xumot* ‘brown’, is possible. Finally, the same restrictive adjectives are possible modifiers for the head nouns in the free state (b) examples, as expected from the types proposed in (3).

These data indicate that an adjective that agrees in number and gender with the head noun modifies the construct state as a whole and not just the head noun, as usually assumed in the construct state literature. This finding sheds new light on the position of these adjectives, which do not follow the head noun but rather the genitive DP. In particular, the reason that the adjective follows the genitive DP, i.e. the construct state as a whole, is that modifies the whole construct state. Put differently, the position of the adjective is not non-canonical: the adjective follows the nominal it modifies which is the whole construct state. This account contrasts with previous ones, e.g. Ritter (1991), Siloni (1997), where the adjective was assumed to modify the head noun alone and its position was derived syntactically.

Before we go on to examine the genitive relations in the construct state, let us summarize the logical properties of the analysis. The construct form of the noun was analyzed as an  $\langle e, e \rangle$  function, and this analysis was supported by two kinds of evidence. First, the ban on restrictive modification showed that the construct state as a whole denotes an individual, i.e. the output of the  $\langle e, e \rangle$  function. In addition, this individual was demonstrated to be unique/maximal in the situation even in cases where uniqueness was not dictated by world knowledge. The latter also provided evidence against the view of “(in)definiteness spread”.

### 3. Genitive Relations in the Construct State

The previous section argued for an  $\langle e, e \rangle$  function denotation for the construct form of the noun, such that it maps individuals onto individuals in the set denoted by the free form of that noun. The next question to be addressed is what determines this mapping, i.e. which genitive relations can be expressed by the functions. Formally, if the  $\langle e, e \rangle$  function for any noun  $N$  is  $\lambda y. \iota x [N'(x) \ \& \ \mathfrak{R}(x, y)]$ , what are the possible  $\mathfrak{R}$  relations? and what are the restrictions on the domain of the function (the  $y$  variable)?

#### 3.1 The data

To answer these questions, let us first examine the range of genitive relation that are found in the construct state. First, the construct state can express lexical relations. In these cases the genitive

relation  $\mathfrak{R}$  comes from the head noun alone, such as with the inherent relation in (11a), kinship in (11b), and part-whole in (11c).

- (11) a. **ktovet** ha-universita      b. **horey** ha-psixolog      c. **kce** ha-šulxan  
 address the-university      parents the-psychologist      edge the-table  
 ‘The university’s address’      ‘The psychologist’s parents’      ‘The table’s edge’

Other genitive relations  $\mathfrak{R}$  that can be expressed in the construct state are possession (or ownership) in (12a), the agentive relation in (12b), and part-whole in (12c).

- (12) a. **kalbat** šaxen      exad      b. **simlat** ha-me’acev      c. **anfey**      ec      exad  
 dog      neighbor one      dress      the-designer      branches tree one  
 ‘A neighbor’s (female) dog’      ‘The designer’s dress’      ‘A tree’s branches’

Note that the part-whole relation here is not an inherent relation as in (11c): branches are branches even if they are not part of a tree (or a bush), while an edge does not have any independent existence (cf. Vikner & Jensen 2002).

But not all genitive relations are available with the construct state. In particular, although Hebrew allows for contextual (or pragmatic) genitive relation in the free state, the construct state cannot express such relations. Consider (13) in a context of a professional meeting about parenthood where each participant brings a pair of parents to elucidate their point. While we can refer to the parents who came with the psychologist using (13a), (13b) cannot be used in this context – it only has a lexical interpretation (as in 11b). Similarly, in a context involving a girl and a boy drawing a painting, we can use (14a) to refer to the sky in the girl’s painting, but the construct state counterpart in (14b) cannot express this meaning. Unlike (13b), (14b) lacks a lexical interpretation, and therefore it is infelicitous.

- (13) a. ha-**horim**      šel ha-psixolog      b. **horey**      ha-psixolog  
 the-parents of the-psychologist      parents the-psychologist  
 both: ‘The psychologist’s parents’ (roughly)
- (14) a. ha-**šamayim**      šel ha-yalda      b. **#šmey**      ha-yalda  
 the-sky      of the-girl      sky      the-girl  
 ‘The girl’s sky’

At this point, we can begin to answer to the question about the nature of  $\mathfrak{R}$ . We have seen in (11) that  $\mathfrak{R}$  can come from the lexical meaning of the noun itself, and in (13-14) that it cannot come from the context. An interesting question arises as to the source of  $\mathfrak{R}$  in (12), especially with respect to the agentive and possession relations. The literature is divided as to the source of these relations: Partee (1997) and Barker (1995) analyze agentive and possession as the unmarked cases of contextual relations because they are not associated with any particular lexical item, while Vikner & Jensen (2002) classify them as lexical relations, arguing that unlike real contextual relations these are available without a supporting context (see also Jensen & Vikner 2002). As I have argued before for possession (Heller, in press), the unavailability of pure contextual relations in the construct state supports Vikner & Jensen’s view that the agentive and



possession relations are lexical rather than (unmarked) contextual relations<sup>3</sup>. This is summarized in (15), which is based on Vikner & Jensen’s (2002) Table 1.

(15)

Construct State	Vikner & Jensen	Genitive Relations	Barker, Partee
✓ (11a,b,c)	LEXICAL	inherent relation	LEXICAL
✓ (12c)		part-whole	
✓ (12b)		agentive	PRAGMATIC
✓ (12a)		possession	
✗ (13-14)	PRAGMATIC	free	

### 3.2 The Analysis

This section reviews the analysis of the semantic content of function I presented in Heller (in press) which addresses the questions raised at the beginning of this section about the nature of  $\mathfrak{R}$  and the restrictions on the domain of the function (the functional denotation will be written as  $N\sim$ ). For relational nouns, the basic denotation of the noun is of type  $\langle e, \langle e, t \rangle \rangle$ , as in *kace* ‘edge’ in (16b). The corresponding construct form *kce* ‘edge’ in (16c) is an  $\langle e, e \rangle$  function which maps individuals onto individuals that stand in the ‘edge’ relation to them. Note that this function is defined only for individuals that satisfy the selectional restrictions on the outer argument of the relational noun, i.e. individuals that have an edge.

- (16) a. **kce** ha-šulxan  
 edge the-table  
 ‘The table’s edge’  
 b. Free form  $edge \quad \lambda y \lambda x. edge'(x, y)$   
 c. Construct form  $edge\sim \quad \lambda y. tx[edge'(x, y)]$

But many nouns are not relational – they merely denote a set of individuals. In order to relate them to other nouns and express the various genitive relations, Vikner & Jensen (2002) propose type-shifting rules that coerce sortal nouns (type  $\langle e, t \rangle$ ) into relational nouns (type  $\langle e, \langle e, t \rangle \rangle$ ). One source for the genitive relation  $\mathfrak{R}$  is the *qualia roles* in Pustejovsky’s (1993) enriched lexical entries for nouns. Pustejovsky proposes, for entirely different reasons, that the lexical entry of a noun not only lists its argument structure, as commonly assumed, but also its qualia structure. The qualia structure lists the essential attributes of the object, such as its relationship to other objects, its purpose and origin. The proposed qualia roles are given in (17).

- (17) *Qualia structure*  
 CONSTITUTIVE: the relation between an object and its parts.  
 FORMAL: that which distinguishes it from a larger domain.  
 TELIC: its purpose and function.  
 AGENTIVE: factors involved in its origin or ‘bringing it about’.

<sup>3</sup> The construct state is not the only construction that shows that possession patterns with lexical relations and not with contextual ones. Storto (2000a,b) presents data from the English double genitive (e.g. *some dogs of John*) which exhibits the same pattern.

I follow the spirit of Vikner & Jensen’s analysis and use qualia roles to restrict the domain of the function and the relation  $\mathfrak{R}$ . First, part-whole relations are derived using the CONSTITUTIVE qualia role, as illustrated by (18), repeated from (1a).

- (18) a. **roš** ha-mit’amel  
 head the-gymnast  
 ‘The gymnast’s head’  
 b. Free form *head* Argument structure  $\lambda x.\text{head}'(x)$   
 Qualia structure CONSTITUTIVE  $\lambda y\lambda x.\text{part-of}'(x,y;\text{body})$   
 c. Construct *head~*  $\lambda y.t_x[\text{body}'(y) \ \& \ \text{head}'(x) \ \& \ \text{part-of}(x,y)]$

The lexical entry of *head* in (18b) lists its sortal denotation as well as its CONSTITUTIVE qualia role. The construct form of the noun *head~* in (18c) denotes the  $\langle e,e \rangle$  function whose domain is the set of individuals that satisfy the restriction introduced by the CONSTITUTIVE role, i.e. they are a ‘body’, and the function maps each of those individuals onto the ‘head’ individual that stands in the *part-of* relation to it.

The agentive relation is derived in a similar fashion using the AGENTIVE qualia role. Consider (19), repeated from (12b).

- (19) a. **simlat** ha-me’acev  
 dress the-designer(m)  
 ‘The designer’s dress’  
 b. Free form *dress* Argument structure  $\lambda x.\text{dress}'(x)$   
 Qualia structure TELIC  $\lambda x\lambda y.\text{wear}'(y,x)$   
 AGENTIVE  $\lambda x\lambda y.\text{sew}'(y:\text{human},x)$   
 c. Construct *dress~*  $\lambda y.t_x[\text{human}'(y) \ \& \ \text{dress}'(x) \ \& \ \text{sew}'(y,x)]$

The lexical entry for *dress* lists two qualia roles: TELIC and AGENTIVE. The agentive relation is derived using the AGENTIVE role, such that the function denoted by *dress~* maps those individuals that can create a dress onto ‘dress’ individuals that were created by the input individual<sup>4</sup>. Note that while the  $\mathfrak{R}$  used here is the verb *sew*, there is clearly more to the creation of a dress than just sewing; the actual predicate in the lexicon can be abstract and need not correspond to an existing verb – see the representation of possession below.

The last genitive relation to be discussed is possession. Vikner & Jensen (2002) do not associate this relation with a specific lexical entry or qualia role. Instead, they claim that this relation can be freely established “between an animate being *X* and an item *Y* which *X* has at his or her disposal, being able to use or handle it”. For the genitive relation  $\mathfrak{R}$ , they use the abstract predicate *control*. (20), repeated from (12a), illustrates how possession is derived in the construct state.

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<sup>4</sup> The TELIC qualia role can also be used to derive an  $\langle e,e \rangle$  function for this head noun. Although this relation is available independent of the genitive DP, it becomes salient if we change the genitive DP to one that biases the telic reading over the agentive one.

- (i) **simlat** ha-dugmanit ha-jinjit  
 dress the-model(f) the-redhead(f)  
 ‘The redhead model’s dress’

- (20) a. **kalbat** šaxen exad  
 dog(f) neighbor(m) one(m)  
 ‘A neighbor’s (female) dog’  
 b. Free form *dog* Argument structure  $\lambda x.dog'(x)$   
 c. Construct *dog~*  $\lambda y.\iota x [animate'(y) \ \& \ dog'(x) \ \& \ control'(y,x)]$

The lexical entry for *dog* in (20b) lists a sortal noun with no qualia structure, but since this object can be controlled, the construct form *dog~* in (20c) denotes a function that maps human individuals that have the ability to control onto ‘dog’ individuals that are controlled by the input individual.

In the light of this analysis, let us comment on the fact that contextual relations are not found in the construct state. The lack of contextual relations follows naturally under the current analysis where the relations expressed by the  $\langle e,e \rangle$  function are all derived in the lexicon. Assuming that  $\mathfrak{R}$  cannot be left unspecified, we predict that the construct state could not express contextually supplied relations.

#### 4. Conclusions

In this paper I have argued that the construct form of nouns in Hebrew denotes a function from individuals into individuals (type  $\langle e,e \rangle$ ). Being the output of a function, the individual denoted by the construct state as a whole has been demonstrated to be unique/maximal in the situation. I have further shown that the construct state allows for lexical relations, but excludes contextual ones, and concluded that the functional denotation of the head noun is derived in the lexicon using lexical information, including enriched lexical entries for nouns that list their qualia structure – the essential attributes of the noun. This analysis accounts for the following central properties of the construct state:

- The **phonological change** in the noun corresponds to a difference in semantic denotation: the construct form of the noun denotes a functional noun at type  $\langle e,e \rangle$ .
- The **ban on the definite article** is accounted for in semantic terms (cf. Dobrovie-Sorin 2000): since the denotation of the construct state as a whole is the output of an  $\langle e,e \rangle$  function, i.e. an individual, the definite article cannot apply.
- The **position of an adjective** that agrees with the head noun in number and gender and occurs following the genitive DP was argued to be canonical: such an adjective modifies the construct state as a whole and not just the head noun. This entails that the functional head cannot be directly modified by an adjective. The **nested configuration of adjectives** immediately follows: since the adjective that agrees with the head noun modifies the construct state as a whole, it must follow the genitive DP with all its modifiers, including the adjectives.
- This analysis is not compatible with “**(in)definiteness spread**”: being the output of a function, the construct state as a whole denotes a unique/maximal individual, independent of the (in)definiteness value of the genitive DP.

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