

**LFG ARCHITECTURE, SEMANTIC
DEFINITENESS STRUCTURES AND
NONVERBAL SYNTACTIC
CONSTRUCTIONS**

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Abstract**

Nonverbal sentences have posed a challenge for modern linguistic theories. The proper analysis of definiteness/specificity helps account for certain nonverbal sentences. This paper is a preliminary study of a semantic definiteness structure in LFG theory which expresses three semantic definiteness relations found in natural language: Existential, Identity, and Characterizational. The three relations derive their features for definiteness/specificity from the discourse, similar to the feature systems of Heim (1982, 1983) and Enç (1991).

1 Introduction

Nonverbal sentences have posed a challenge to the theory of LFG. The proper analysis of definiteness/specificity helps account for certain nonverbal sentences. This paper is a preliminary study of a semantic definiteness structure in LFG theory which expresses three semantic definiteness relations found in natural language: Existential, Identity, and Characterizational. The three relations derive their features for definiteness/specificity from the discourse, similar to the feature systems of Heim (1982, 1983) and Enç (1991).

Addressing the problem of verbless sentences, Rosén initially examines alternative analyses of predicative complements proposed by Grimshaw (1982) and Andrews (1982), and then argues for a modification to F-structures using situation semantics (Fenstad et al, 1987) for structures which have no copula verb, such as topic-comment constructions (Vietnamese) and nominal sentences (Maori). Her main argument and proposal focuses on the latter construction from Maori shown in Example (1):

(1) Nominal sentences (Maori)

He taariana, te hoiho
INDEF stallion DEF-SG horse
'The horse is a stallion.' (Biggs 1969, p. 24).

According to Rosén's analysis, the first NP in this sentence is predicative and the second NP is the 'subject'. Semantically, the first NP predicates a property of the second NP, the property of being a stallion. Pointing out that the existing LFG F-structure analysis is incoherent, she analyses the relation of the two arguments SUBJ and OBJ through indexing without introducing a PRED by following the path between the F-structure

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and the two arguments in the ‘situation semantics schema’. As it stands, Rosén’s analysis provides a workable solution.

However, further study of nonverbal sentences shows relations within these languages which play a significant role in the syntax of the language. This paper extends Rosén’s analysis proposing that nonverbal predicates can be more adequately and completely explained if they are analyzed according to the relation between the semantic definiteness/specificity features of the sentence, the semantic meaning of the relation between these, and the function of the semantic definiteness/specificity structures of elements in the sentence with respect to the discourse.

I first briefly review elements of Heimian semantics and present data from one language, Sinhala, coded with features which show a system in one language with grammatical constraints based on relations of definiteness/specificity marking, followed by a preliminary formulation of the three semantic/definiteness structures resulting from the proposed relations. Section 3 formulates the structures of the three relations, borrowing heavily from Jackendoff’s approach for describing functional a(argument)-structures of Conceptual Semantics (1983, 1990). Section 4 presents a formal representation of a level of definiteness/specificity structures, contrasting the a-structure with the proposed definiteness structures and their connection to a simplified phrase structure. The paper concludes with discussion of future research.

2 Semantic Definiteness Relations in Verbless Syntactic Constructions

This section gives a brief outline of key features of File Change Semantics and Enç’s (1991) further developments for specificity. I then give examples of nonverbal sentences from Sinhala which have definiteness constraints. Thirdly, I formulate the three proposed semantic definiteness/specificity relations.

2.1 Semantic Definiteness/Specificity Relations

Building on Karttunen’s argument (1976) that not all sentences are referring expressions, Heim (1982, 1983) reformulated “the familiarity theory of definiteness”, in her theory File Change Semantics (FCS) so that links to the discourse were neutral to referents. FCS characterizes definiteness and indefiniteness using the metaphor of file cards, which contain the information presented by an utterance, constantly changing and being updated as new information is added to definites and new cards are being started for indefinites (Heim 1983, pp. 167-169), similar to Kamp’s (1981, 1993) “discourse representation structures”. In terms of indexing in Heim’s system, NPs are *variables*, where definite NPs have an index that refers to a previously introduced, or *familiar* NP, while the index for an indefinite NP presents a newly introduced, or *novel* NP into the discourse. Once an NP is entered into a discourse, it can become an antecedent for a referring expression (e.g. pronoun).

Enç (1991) develops Heim’s notion of definiteness to accommodate specificity. Definiteness involves a strong link, that of identity of reference to an already established discourse referent. Enç calls the antecedents of a definite NP a “strong antecedent” (cf. Milsark 1977). Certain nominals are

inherently definite: “names, definite descriptions, and pronouns are definite NPs” (Enç 1991, p. 9). In addition to the original definite reference index, there is a second specificity index, representing the variable that the discourse referent is to be chosen from. This means that “all NPs carry a pair of indices, the first of which represents the referent of the NP” (Enç 1991, p.7), while the second index represents the specificity relation. The specificity relation of the NP is constrained by its linkage indicated by the second index. If both indices are indefinite and not discourse-linked, the NP is indefinite and non-specific. But if the first index is indefinite while the second is linked to a definite NP, the NP is specific. If an NP is indefinite but nonetheless includes a discourse referent which is linked to a strong antecedent, it is specific. The antecedents of specific NPs are called “weak antecedents”, a modification of Milsark’s insight into the behavior of “weak determiners”.

The approach to coding definiteness and specificity in this paper adheres to File Change Semantics concepts of definiteness and specificity with minor modifications. I also code the definiteness/specificity *relation* obtaining *between NPs within* a sentence. The following examples from Sinhala demonstrate.

2.2.1 Existential Relation

The first is the Existential relation, coded lexically in Sinhala with a special verb to distinguish animate and inanimate Existence, as shown in Example (2).

(2 a) [–def/–spec]
lamxyek inxwa
 child-IND be.AN.PRE¹
 ‘There is a child.’

(2b) [–def/–spec]
unx tiyenəwa
 fever be.INAN.PRE
 ‘Fever exists.’ (Henadeerage 2002, p. 170).

Examples (2a) and (2b) each introduce an element into the discourse, so each respective NP is not discourse-linked and therefore the NP is indefinite and nonspecific, coded [–def/–spec]. If the only function of a sentence is to introduce an indefinite and nonspecific element into a discourse, then this can be said to have an Existential Semantic Definiteness Relation.

2.2.2 Characterizational Relation

The second Semantic Definiteness Relation is the Characterizational Relation, a label used by Kuno and Wongkhamthong (1981) to describe one

¹ Henadeerage interlinear gloss codes present tense as ‘PRE’.

type of copula in Thai. This relation also introduces an indefinite and nonspecific element into the discourse; however, unlike the Existential Semantic Definiteness Relation, in this relation the indefinite and nonspecific element assigns a property or characteristic to another NP in the sentence.

Example (3a), a verbless sentence (NVS), adds the characteristic of being a teacher to the first NP, Mr. Gunasiri, who has already been mentioned in the discourse, is coded NOM and is definite and specific [+def/+spec]. The second NP is morphologically coded indefinite, and not having been previously mentioned in the discourse, is indefinite and nonspecific [-def/-spec].

- (3a) [+def/+spec] [-def/-spec]
Gunasiri mahattāya ape iskoole guruwārek
 Gunasiri gentleman.NOM 1PL.GEN school.LOC teacher.IND
 ‘Mr. Gunasiri is a teacher of our school.’ (Henadeerage 2002, pp. 160-161).

The Characterizational Definiteness/Specificity Relation reflects an important constraint in the grammar of Sinhala. In this sentence type, the indefinite NP is always the predicator and must always follow its argument: the word order is fixed and is constrained by the indefinite predicator.

- (3b) [-def/-spec] [+def/+spec]
 **ape iskoole guruw ārek Gunasiri mahattāya*
 1PL.GEN school.LOC teacher.IND Gunasiri gentleman.NOM

In Example (3c) the child has the property of having a fever, a newly introduced NP, which is not discourse linked, and so is [-def/-spec].

- (3c) [+def/+spec] [-def/-spec]
lamāya-tə unə tiyenəwa
 child-DAT fever be.INAN.PRE
 ‘The child has a fever.’ (Henadeerage 2002, p. 170)

Henadeerage offers this sentence as an example of an existential verb. He is very clear that the copula goes with ‘fever’, an inanimate object, not with the animate NP ‘child’ in (3c) (p.c.). This sentence is not an Existential in our sense of the Existential Relation of Example (2b). Instead, it has a Characterizational Relation between the two NPs, with the first NP having the property of the second NP. Note that it follows the constraint of the predicator following the argument, ‘child’.

2.2.3 Identity Relation

The last Semantic Definiteness Relation proposed is the Identity Relation. In this sentence type in Sinhala, the two arguments are not morphologically coded for definiteness, rather each nominal is marked with NOM. In this relation, both NPs in the sentence are definite and specific. Note that in this sentence, both are discourse-linked to the same third definite specific NP,

following the definitions of Heim and Enç for a strong antecedent. Example (4a) illustrates this relation.

- (4a) [+def/+spec] [+def/+spec]
 Gunasiri mahattəya ape iskoole mul guruwəɾəya
 Gunasiri gentleman.NOM 1PL.GEN school.LOC head teacher.NOM
 ‘Mr. Gunasiri is the head teacher of our school.’ (Gair & Paolillo 1988, p. 40)

As shown in (4b), the word order is not fixed: the word order of the two NPs can be inverted; therefore, either can be the predicator.

- (4b) [+def/+spec] [+def/+spec]
 ape iskoole mul guruwəɾəya Gunasiri mahattəya
 1PL.GEN school.LOC head teacher.NOM Gunasiri gentleman. NOM

2.2.4 Action Nominals

Sinhala also has verbless ‘action nominals’ (AN) which are “not a nominalised form of a verb”, nor are they “derived from a verbal predicate in any way”, but they “describe activities, not states”, as was the case for the other nominal predicates shown above (Henadeerage 2002, p. 163). We might ask if these three types of Semantic Definiteness relations hold for these. Example (5) illustrates the use of definiteness in the progressive aspect.

- (5) a. *laməya paadəmə/waedə /hinaawə.*
 child.NOM lesson.DEF/work.DEF/smile.DEF
 ‘The child (is) studying.’
 ‘The child (is) working.’
 ‘The child (is) laughing/smiling.’
- b. *Andare enə kotə gowiyo kataawə.*
 Andare.NOM come.PRE.VADJ PTK farmer.PL.NOM talk.DEF
 ‘When Andare came the farmers (were) (really) talking.’ (Gair & Paolillo 1988, p. 62).
- c. *ayya-y taatta-yi barə kataawak.*
 elder.brother.NOM-CONJ father.NOM-CONJ serious talk.IND
 ‘Elder brother and father (are engaged in) a serious talk / (are seriously) talking.’

ANs have the meaning of continuous action, denoting repetition of the act, unlike other NVSs. Although they usually occur as definite nouns, sometimes indefinite ANs are possible, as in (5c). They may also be modified by an adjective, as with any other noun. In addition, as with other NVSs, time reference needs to be indicated by time adverbs in the context, or as in the adverbial clause starting with “when” in (5b) (Gair & Paolillo 1988, cited in Henadeerage). In fact, some ANs “only become acceptable with the context specified by means of adverbs” (Henadeerage 2002, pp. 163-164).

According to Gair and Paolillo, (cited in Henadeerage 2002, p. 163),

they differ from equational clauses syntactically in at least two ways:

- (1) There is no co-reference, identity or class inclusion relation between subject and predicate. Put simply, there is no 'is' relation.
- (2) The interpretation is 'do' rather than 'is', i.e., 'NP do the action of N'(Gair & Paolillo 1988, p. 63).

Thus, ANs can never have a Semantic Definiteness Relation of Identity, and since they refer to an existing element in the discourse, can never have an Existential Semantic Definiteness Relation either. As far as their definiteness/specificity relation in the Characterizational Relation, the predicate describes an activity being performed by the predicated element. However, although the activity is coded with a DEF marker, it does not refer, i.e., the action can be interpreted as continuous, short actions which flow together to give the meaning of the progressive aspect which is newly introduced, or [-def/-spec]: the predicator in these sentences is [-def/-spec], the same as the other Characterizational sentences above.

To summarise, Examples 2-5 contain two classificatory elements. The first classification uses the traditional categories of NP, [+/-Def], NOM, DAT, GEN, LOC, Adj, and one verb which is an existential copula coded for animacy [+/-ANIMATE BE]. The sentences in (2) have been termed Existential based on the verb; simple declaratives with one argument predicating a second argument in the sentence are found in the examples in (3); an equational construction based on the two "equal" nominals on each side of the copula are shown in the examples in (4); finally, (5) shows action nominals with key properties of nouns, adverbs, and adjectives.

The second classification has three distinct types of sentences whose features consist solely of [+/-Def] and [+/-Spec] and whose meanings can be divided semantically into three propositions formed by the relations between elements in the sentence and elements in the discourse: 1) Existential Relation, with one indefinite nonspecific argument; 2) Characterizational Relation, a verbless sentence, with two elements, one predicating an element which is definite and specific and the other whose element is assigning an indefinite nonspecific property to the first definite specific element; 3) Identity Semantic Definiteness/Specificity Relation in which both elements are definite and specific, referring to a third definite specific element in the Discourse.

Thus, we see that in Sinhala, verbless, as well as certain verbal sentences, can be grouped into three categories of meaning at the level of the sentence, according to their definiteness/specificity Relations to the discourse. The set of elements with properties of definiteness and specificity have three distinct relations, forming three distinguishable structures. These Semantic Definiteness/Specificity Relations and their Structures are summarized in Table 1.

Table 1. Semantic Definiteness/Specificity Structures²

Existential Structure – a structure which expresses a relation which is not linked to an existing element or discourse referent; therefore, it introduces at least one indefinite and non-specific element.

Characterizational Structure – a structure which expresses a relation which further describes or denotes a property or characteristic of an element or discourse referent; therefore, it characterizes a relation between one element and another indefinite and nonspecific element in the sentence.

Identity Structure – a structure which expresses a relation between two elements with an already existing element; therefore, it expresses a relation between a definite and specific element and another definite specific element to the same third definite specific element in the discourse.

As shown in the examples above, these relations can be used to describe the constraints on word order in the grammar of Sinhala at c-structure.

3 Semantic Definiteness/Specificity Functions and Structures

This section first gives a brief overview of Jackendoff's theory of Lexical Conceptual Structures (LCS), organized according to the three proposed semantic definiteness/specificity structures. As we review these structures, differences to the LCS will be proposed according to the semantic definiteness relations in the data from Sinhala in Section 2. A proposed classification for [THING] which is designed specifically for the def/spec of individuals is given, followed by a sketch of the three semantic definiteness/specificity relations and their functional structure.

In 1983 Jackendoff first sketched what he called lexical conceptual constituents, through the lexical decomposition of verbs and semantic meaning of prepositions subcategorized for verbs. This sketch was a combination of grammatical and conceptual structures, incorporating semantic roles and the conceptual "parts of speech", or [THINGS], later "conceptual constituents" (Jackendoff 1991, pp. 22-25). In order to capture the cognitive connection with grammar, he formulated lexical conceptual structures (LCS). These LCSs encode a verb's meaning through predicate 'decomposition'. These have been incorporated into LFG as a level of predicate argument structure, a-structure. For example, Butt (1996) incorporated LCS for an elaborated argument structure of light verbs and aspect in Urdu.

² I am using the term 'element' according to current usage in LFG syntactic analyses of discourse ('null elements')(Butt & King (2000).

However, predicate argument structure requires a verb to interpret the thematic roles of the argument and their function in a sentence. Simply revising LCSs by expanding their interaction with conceptual constituents to include the three semantic definiteness/specificity structures potentially confuses the semantic interpretation of the meaning of the definiteness/specificity relations. Instead of using [THING] as representations of the conceptual counterpart of “parts of speech”, each linguistic [THING] must be coded not only for definiteness or specificity, but also must maintain the meaning of the overall semantic definiteness/specificity relation of the respective sentence.

Moreover, when we sort elements and their characteristics at a semantic definiteness level, the characteristics of objects in a situation are closely intertwined with the context of the discourse situation. How do we sort objects, elements and properties according to definiteness and specificity? Fellbaum (2001) compared Aristotle’s notion of the classification of predicates (κατηγορία) (Aristotle ‘The Categories’ translated and analyzed in Kneale and Kneale 1962, p. 23) to modern day notions of predicates. Although it is not entirely clear what Aristotle means in a technical sense with this list of categories, Kneale argues that we can assume that this is the classification of ‘things’, “whether these terms occupy subject or predicate positions in sentences” (p. 29). My interest here is not with the specific details and controversies surrounding categorical usage, but rather with using Aristotle’s classification to exemplify one set of properties which can be used at a semantic definiteness level to distinguish different types of ‘THINGS’ coded for definiteness and specificity.

Aristotle’s list can be divided into the following ten classes of properties at a semantic definiteness level shown in Table 2. Aristotle’s list³ is on the left with Greek equivalents for the class provided by Kneale (1962). In the right column, I have provided additional information regarding the interpretation of the Greek meanings of the classes provided on the right⁴.

In the semantics of Existential Relations, an element may be human as in (2a) above, or properties may be associated with an element at the time they are first introduced into a discourse, as in Example (5b) above, for example. The general semantic meaning of the Existential proposition is a ‘state’ or stative, the eighth class. The Characterizational Relation in (3b) assigns the property of being a teacher, the first class on the list. All of the items on this list may be instantiated with the features of definiteness and specificity, independently of their categorical status of constituent at the level of argument structure.

³ I thank Steve Lack for assistance with creating the Greek diacritics in this list.

⁴ I wish to thank Robert Barnes discussion of this list and its meaning for Aristotle and the ancient Greek philosophers and Rex Mickan for providing the additional semantic information on the right, as well (p.c.).

1. Substance (οὐσία)	‘a man’, ‘property’, ‘wealth’
2. Quantity (ποσόν)	‘how much’, ‘how many’
3. Quality (ποιόν)	‘what’, ‘which’, ‘what kind of’
4. Relation (πρόζ τι)	‘to what’
5. Place (ποῦ)	‘where’
6. Time (ποτέ)	‘when’
7. Situation (κεῖσθαι)	‘event’
8. State (ἔχειν)	‘being’
9. Action (ποιεῖν)	‘doing’
10. Passion (πάσχειν)	‘undergoing’, ‘experiencing’

Table 2. Semantic Definiteness Classification of ‘THINGS’

3.1 Existential Semantic Definiteness Functional Structure

In the Existential Relation, as shown in Example (2), the argument is indefinite and nonspecific, acquiring its features [-def/-spec] from its relation to other elements in the discourse. Jackendoff’s decomposition of the copula BE in the sentence ‘A child exists’ proceeds as follows.

$$\text{State } [\text{THING } X_i], [\text{State } F [(X_i)]]$$

This ‘well-formedness rule’ says that in the State function F, with one argument, X_i , the Thing, X_i is a variable bound to the function F. This binding relationship prohibits an ‘action’ and any semantic relation other than ‘theme’. In this proposal, a theme can be defined as the semantic relation of a “participant..., being in a state or position” provided by Andrews (2007, p. 8).

Jackendoff’s functional (lexical) decomposition for this proposition is:

$$[\text{STATE}] \rightarrow [\text{State } \text{BE} ([\text{THING } X_i])]$$

The function is STATE with the verb BE. The [THING] is the argument and is bound to the verb BE. This transliterates from Jackendoff’s LCS to the data in Example (2a) as:

$$[\text{STATE}] \rightarrow [\text{State } \text{BE} ([\text{child}])]$$

where the Function is Stative BE and $\text{THING } X_i = \text{child}$. We know from the definition of ‘state’ and the semantic role of ‘theme’, that child (THING X_i) must be a ‘theme’, since ‘state’ can not have an agent or actor.

In order to add the semantic definiteness/specificity relation of Existence, we can specify directly what kind of feature of specificity is

mediated by the Existential State BE, by adding these features to the semantic description of the Existential function and its state relation of the [THING]=child. Three different meanings of a stative relation were given in Examples 2 - 5, and the Existential copula specifies the relation of existence meaning from the other two Semantic Definiteness relations in Sinhala.

$$[\text{State BE}_E (\begin{bmatrix} - \text{spec} \\ \text{child} \end{bmatrix})]$$

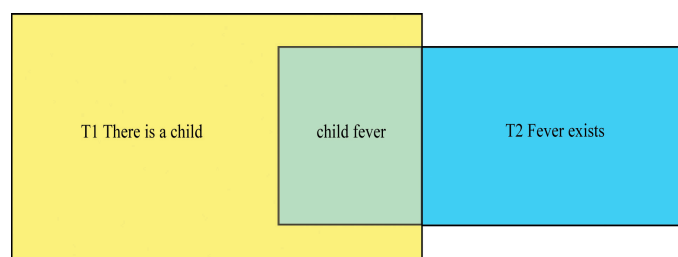
This equation tells us that the [THING] in the Existential BE function is nonspecific and combined with facts about definiteness and specificity as provided in the definitions of Semantic Definite Structures shown in Table 1, this represents the Existential Semantic definiteness/specificity Relation. Jackendoff proposes the Existential BE and the existence of the existential BE lexeme in language. However, his theory does not directly incorporate the means for identifying the Existential Relation in Conceptual Semantics. Moreover, the incorporation of specificity and/or definiteness is not a necessary (obligatory) feature of Jackendoff's LCS for Existential BE, i.e., BE_E.

Finally, this semantic definiteness equation is a function of Time, necessary for the conceptual relation of definiteness and specificity, but not for the lexical compositional structure of verbs without specificity marking. Returning to Examples (2a) and (2b), I introduce these as a sequence of sentences represented at (T1) and (T2), (T=Time).

There is a child.	T1
Fever exists.	T2

‘The child has a fever.’

Alternatively, these sentences can be represented as Venn Diagrams represented as sets, rather than the sequential listing, with the intersection of sets and accumulation of sets as the PowerSet = Discourse (Korpi 2004)⁵.



A set which includes a ‘child’ at T1, and a second set which includes the property, ‘fever’ intersects at T2 with ‘child fever’; the ordering in the discourse creates the meaning. In order to capture the information of not

⁵ I thank Andrew Yip for creating this Venn Diagram.

being previously mentioned which gives rise to the Existential Relation, ‘Time’ must be included as a variable in the function representing the specificity features [-spec] of the individuals in both sentences.

$$t_0 [\text{State BE}_E (\begin{bmatrix} - \text{spec} \\ \text{child} \end{bmatrix})], t_{>0} [\text{State BE}_E (\begin{bmatrix} - \text{spec} \\ \text{fever} \end{bmatrix})].$$

To summarize, in Sinhala the Existential Semantic Definiteness Relation has the ‘Existential BE’ copula, is stative, has a semantic role of theme = BE_E, has an argument which is [-spec], and is a function of the time of utterance.

3.2 Characterizational Semantic Definiteness Functional Structure

The Characterizational Semantic Definiteness Relation characterizes an individual. Thus, it differs from the Existential Relation whose sole function is to introduce an individual. We have seen three types of Characterizational Semantic Structures. The first is a straightforward function with one [+spec] individual being predicated by another [-spec] individual. The Semantic Definiteness/Specificity structure for Example (3a), ‘Mr. Gunasiri is a teacher’, is shown below.

Semantic Definiteness/Specificity Characterizational Function

$$t_{>0} [(\text{BE}_C) (\begin{bmatrix} + \text{spec} \\ \text{Mr. Gunasiri} \end{bmatrix} \begin{bmatrix} - \text{spec} \\ \text{teacher} \end{bmatrix})].$$

This equation says that this Characterizational Semantic Definiteness/Specificity function has two individuals, one [+spec] and one [-spec], which are arguments with the second predicating the first in the Characterizational relation. In addition the function includes the variable of time which must be greater than 0 when the first argument is [+spec]. Note that if this were the first sentence of a discourse, even though it is a proper noun, it would not be coded as [+spec] since the individual has not been previously mentioned. This accounts for certain “nominals” which “are inherently definite: ‘names, definite descriptions, and pronouns are definite NPs’ (Enç 1991, p. 9) nonetheless being coded [+def/-spec], if they have not been previously mentioned; the variable of T>0 in this function tells us that this inherently nominal definite is [+spec] because of its position in the discourse.

Action nominals are a second type of Characterizational semantic definiteness structure. This function has [+def] nominals predicating an individual. These nominals create an aspectual meaning for the predicating nominal, such as ‘lesson+DEF’ creating the progressive aspect, repetition of action meaning of studying (Example 5). Because these nominals are actually progressive aspectual structures, and not strictly nominals. I will not analyze them further here. However, it is worth noting that these nominal functions require a time reference or some other time adverb in the context, in addition to the ‘time’ variable of the function. The [+def/-spec] features

of the predicating nominal in this function are independent of the contextual requirements for meaning in the grammar.

A third type of Characterizational Semantic Definiteness/Specificity function is shown below. The function below gives the a-structure for Example (3c), ‘The child has a fever’.

A-structure

$$[(BE_C)(\begin{bmatrix} +spec \\ child \end{bmatrix})(BE_E(\begin{bmatrix} -spec \\ fever \end{bmatrix}))].$$

This equation tells us that the [THING] in the Existential BE function is nonspecific, although it is predicating ‘child’. Henadeerage describes the sentence “The child has a fever” as an Existential, non-animate copula of existence, with existential argument structure. This produces an inconsistency at the level of predicate argument structure if we call this anything but an existential verb. Lexically it must be an Existential verb. Below we test for its linking to the syntax, where it will be shown that this maps correctly to the syntax as an indefinite structure which must have the object postverbally with fixed word order.

3.3 Identity Semantic Definiteness Functional Structure

The third Semantic Definiteness/Specificity relation is the Identity Relation. As described earlier, the presence of two [+def/+spec] elements referring to a third, unique element, creates the semantic meaning of the Identity Relation. Example (4a) is the Identity Specificity Relation, with the two +def/+spec individuals identical to each other and to a third individual already in the discourse, a symmetric, reflexive relation. This can be written as:

$$[\lambda(BE)_I \text{gentleman}] \leftrightarrow [\lambda(BE)_I \text{Gunasiri}] \leftrightarrow [\lambda(BE)_I \text{head teacher of our school}]$$

The Specificity Identity Functional Structure for the sentence in Example (4a) is shown below:

$$T_0 [\text{gentleman}] \leftrightarrow T_0 [(BE_I)(\begin{bmatrix} +spec \\ Mr.Gunasiri \end{bmatrix})(\begin{bmatrix} +spec \\ head teacher \\ of our school \end{bmatrix})].$$

This semantic definiteness structure follows a preceding mention of either the gentleman, the head teacher, or Mr. Gunasiri. Hence, it has a three way correlation and must appear at Time 2, after an earlier utterance in the discourse.

To summarize, three core Semantic Definiteness Relations create an interface between the [THINGS] of the semantic definiteness/specificity structure and the discourse in Sinhala. Three forms of function-definiteness structure are postulated which have different meanings at the level of Conceptual Structure: Existence, Characterization, and Identity. These meanings are created through the relation created between individuals within

the sentence and between other individuals in the discourse. The individuals are represented as definiteness and specificity features and may be in a subset, set, proportional relation, or other modificational relation.

Although these relations are represented with three stative meanings, the relational form of the copula is similar to the verb BE, yet is independent of Lexical BE found in natural languages. Henadeerage argues very convincingly that these verbless sentences do not have a hidden copula; I have only included them in these sketches to cover their occurrence in those sentences in Sinhala where they are manifested. Semantic Definiteness/Specificity Existential Be is not the same as Lexical Be, as in the verbless sentences. Another point to notice is that the three structures have a semantic role which is most similar to ‘theme’ with three distinct manifestations. Those Characterizational sentences with action nominals can be characterized as predicating properties which are nonspecific within the relation, ‘changing its state or position’ (Andrews, p. 8) as the properties of the respective individual.

4 Structural Correspondences of the Semantic Definiteness Structures and C-structure

The preceding sections have formulated a set of relations composed of features derived from their position in the discourse and then organized in a set of relations at the level of the sentence. This is still insufficient to justify a level of semantic definiteness/specificity functions. An architectural assumption of the approach to the theory of LFG is of “...correspondence functions that map between the elements of one (usually more concrete) structure and those of another” (Kaplan, 1995, p. 15). Therefore, we need to establish an “element-wise correspondence” to further establish “a description of these formal properties”.

In order to establish this correspondence, I use the Characterizational Example (3c) with a dative subject and existential verb.

(3c) [+def/+spec][–def/–spec]
 laməya-tə unə tiyenəwa
 child-DAT fever be.INAN.PRE
 ‘The child has fever.’ (Henadeerage 2004, p. 170).

At the level of a-structure this sentence uses the existential verb to say that a ‘fever is at the child’. The problem then arises that we have an existential relation associated with the meaning of the verb and an indefinite nonspecific individual assigned to that verb. This is the description of a Semantic Existential Definiteness Relation. The semantic definiteness meaning of the sentence as a whole introduces a characteristic to an existing, i.e. definite specific element. Thus, the Existential Relation is embedded in the main structure, the *Characterizational* Semantic Definiteness Structure.

Figure 1 shows the mapping between the phrase structure and an argument functional structure with the Existential BE, and Figure 2 shows the mapping between the phrase structure and a Characterizational Semantic Definiteness Structure.

Figure 1. Phrase structure and functional Existential a-structure⁶

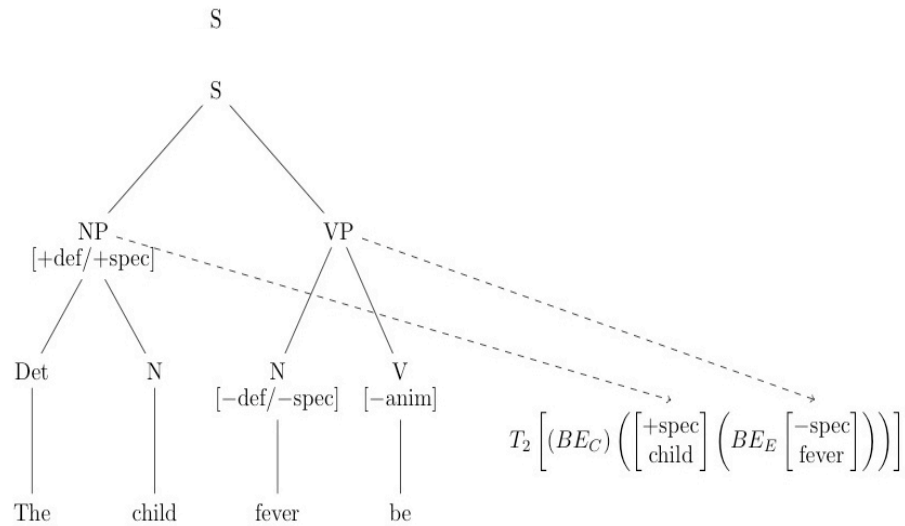
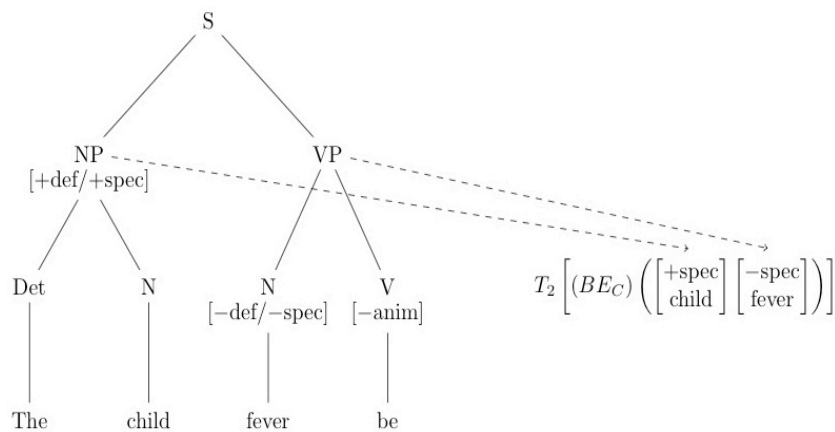


Figure 1 demonstrates that the Characterizational Semantic Definiteness has an embedded Existential relation at the level of a-structure in Sentence (3c). It is composed of two semantic definiteness structures, the Existential Semantic Definiteness/specificity relation and the Characterizational Semantic Definiteness/Specificity relation.

Figure 2 below shows that the Characterizational Semantic Definiteness structure projects the meaning of the sentence assigning a property to the first NP. This satisfies the syntactic constraints of word order in Sinhala with an indefinite and nonspecific element following the first argument which is definite and specific.

⁶ I thank Steve Lack for assistance with these two tree diagrams.

Figure 2. Phrase Structure and Characterizational Semantic Definiteness Structure



Thus, we have a mismatch in form and meaning between the arguments of the a-structure, with a verb which is exclusively existential in meaning with a nonspecific argument, and the Semantic Definiteness Structure which assigns the nonspecific property to one argument and definiteness/specificity to the other argument of the Characterizational Semantic Definiteness Structure.

We could simply instantiate the [THING] in the a-structure with the relevant specificity marking, i.e. [+spec] for 'child' and [-spec] for 'fever'. However, this requires a redefinition of the relation of the Semantic Definiteness Characterizational Relation. We can also argue that the word order in this sentence is fixed to match the constraint on word order in Sinhala of the Characterizational: the indefinite and nonspecific element must follow the definite and specific one. This meets the demands of Kaplan for an extension to the organization of linguistic information in LFG.

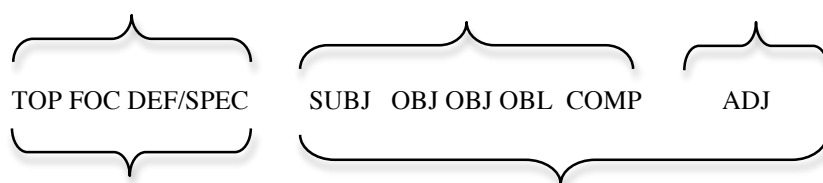
Moreover, these semantic definite relations are coded independently of topic as part of Information structure as shown in (6) below.

(6) *Topic Interpretation*

Gunapala nṁ guruwəɾəyek
 Gunapala.NOM TOP teacher.IND
 'As for Gunapala, he is a teacher.' or
 'Gunapala is a teacher' (but Siri is not).' (Kariyakarawana1998, p. 63)

How exactly does the topic of i-structure fit with these semantic definiteness relations and especially the element in these relations which is being predicated, e.g., the [+def/+spec] of the Characterizational Relation/Structure? Is this a ‘discourse subject’ or is it actually a topic as in (6), or both, or something else? The revised scheme is summarized in the diagram below (cf. Bresnan 2000, pp. 96-98; Henadeerage 2002, pp. 21-22).

Non-argument functions *Argument functions* *non-argument functions*



Discourse functions

Non-discourse functions

It is beyond the scope of this paper to work through the details of integrating a semantic definiteness/specificity structure with i-structure (Butt and King, 1996) and ellipsis of +Spec objects, as Butt and King (2000) did for Hindi and Urdu objects. Are they part of one main discourse function (D-function) which links to c-structure through f-structure and a-structure independently of semantic definiteness and specificity? Or, are the [+spec] objects of Turkish, Hindi and Urdu part of the proposed sentence level definiteness/specificity structure? How do topic and focus work in a system which integrates definiteness/specificity as a structure in its own right?

Related to the questions of the behavior of D-function structures are issues such as discourse subject, discourse topic and the processes of gr-subject (Manning 1994). I have not given a label to the [def/spec] in the above diagram pending further studies of some of these interactions.

5 Conclusion

Additional evidence for the usefulness of the three structures for tracking the development of a definiteness/specificity and referential system was shown in a study of second language acquisition, in a corpus of Japanese to English interlanguage. A clear pattern of development of definiteness/specificity structures, independent of morphological definiteness coding, was found. This study also found evidence suggesting that the Identity Structure, which requires a direct link to the discourse may be more difficult to acquire, and also, that the specific communicative task may constrain the occurrence of the three Semantic Definiteness structures in language. Moreover, this study incorporated definiteness/specificity structures directly into Jackendoff's LCS, as they were isomorphic to predicate argument structure (Fellbaum Korpi 2004). Further studies of the structures are needed in both first and second language acquisition, for their usefulness for a developing system of predicate argument structure and referentiality.

In conclusion, I have proposed that the LFG architecture be extended to

include a function composed of semantic definiteness/specificity structures which derive their features from the discourse. This structure can represent the verbless sentences of Sinhala in their entirety. Given this structure, verbless sentences can be coherently, completely, and consistently represented with respect to their features and relations. Thus, these verbless sentences pose no problem for the theory.

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