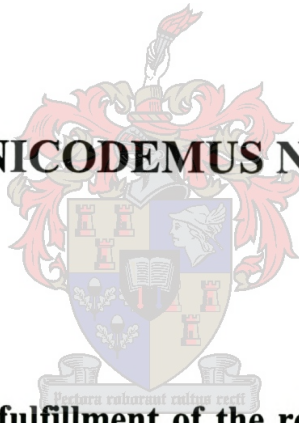# THE POLYSEMY OF SELECTED MOTION VERBS IN SESOTHO

BY

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Assignment presented in partial fulfillment of the requirements for the degree of Master of ARTS at the University of Stellebosch.

STUDY LEADER: PROF M.W. VISSER

DECEMBER 2003

DECLARATION

I, the undersigned, hereby declare that the work contained in this assignment is my own original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

ABSTRACT

The subject of this study is the polysemy of the motion verbs in Sesotho. Motion verbs can be classified as verbs of process or transition. This study examines the semantic and the syntactic properties of motion verbs in Sesotho. These motion verbs include verbs denoting process e.g. –ya, -tla, -tsamaya, -baleha, -nyoloha and –theoha as shown in the sentences below:

a.   Monna o ya toropong.

        'The man goes to town'

b.   Bashanyana ba tsamaya thoteng.

        'The boys walk in the veld'

c.   Bana ba tla hae.

        'The children come home'

d.   Bashemane ba balehile mophatong.

        'The initiates run away from the initiation school'

e.   Tshwene e theoha sefateng.

        'The baboon descends from the tree'

f.   Banna ba nyoloha thaba.

        'Men ascend the mountain'

The study demonstrates that motion verbs in Sesotho are semantically divided into verbs denoting 'to go' e.g. –ya, verbs denoting 'to walk', e.g. –tsamaya, verbs denoting 'to run away', e.g. –baleha, verbs denoting to ascend, e.g. –nyoloha, verbs denoting to descend, e.g. –theoha.

The study further demonstrates that these verbs are canonically intransitive. The study provides evidence that motion verbs are characterized by specific selection restrictions and event structures. The study further demonstrates that motion verbs are used with different subjects denoting (groups of) people, animals, abstract nouns, mass nouns, nouns denoting food, intoxicating and non-intoxicating liquids, natural phenomena, artifacts, natural object, possession/property, humans and animals. Lastly the lexical conceptual paradigm, providing the different word senses of each verb, is examined.

OPSOMMING

Die onderwerp van hierdie studie is die polisemie van bewegingswerkwoorde in Sesotho. Bewegingswerkwoorde kan gekarakteriseer word as werkwoorde van proses (aktiwiteit) of transisie. Hierdie studie ondersoek die semantiese en sintaktiese eienskappe van bewegingswerkwoorde in Sesotho. Hierdie werkwoorde sluit in werkwoorde wat 'n proses (aktiwiteit) aandui, byvoorbeeld –ya, -tla, -tsamaya, -baleha, -nyoloha en –theoha, soos geïllustreer in die volgende sinne:

a.   Monna o ya toropong.
        'Die man gaan dorp toe'

b.   Bashanyana ba tsamaya thoteng.
        'Die seuns loop in die veld'

c.   Bana ba tla hae.
        'Die kinders gaan huis toe'

d.   Bashemane ba balehile mophatong.
        'Die inisiante hardloop weg van die inisiasieskool'

e.   Tshwene e theoha sefateng.
        'Die bobbejaan daal af uit die boom'

f.   Banna ba nyoloha thaba.
        'Die mans bestyg die berg'

Die studie demonstreer dat bewegingswerkwoorde in Sesotho semanties geklassifiseer kan word in werkwoorde wat beteken 'om te gaan', bv. –ya, werkwoorde wat beteken 'om te loop', bv. –tsamaya, werkwoorde wat beteken 'om (weg) te hardloop', bv. –baleha, werkwoorde wat beteken 'om te bestyg', bv. –nyoloha, en werkwoorde wat beteken 'om af te daal', bv. –theoha.

Die studie demonstreer verder dat bewegingswerkwoorde in Sesotho tiperend onoorganklik is. Daar word aangetoon dat hierdie werkwoorde gekenmerk word deur spesifieke seleksiebeperkings en gebeure-strukture ('event structures'). Die studie toon op uitgebreide wyse aan dat bewegingswerkwoorde in Sesotho met onderwerpe gebruik kan word wat verskillende semantiese tipes verteenwoordig, en wat verskillende kenmerke het, insluitende onderwerpe wat menslike individue, groepe mense of diere aandui, abstrakte naamwoorde, massanaamwoorde, voedsel, vloeistowwe, natuurlike verskynsels, artifakte, natuurlike voorwerpe, of besittings.

ACKNOWLEDGEMENTS

The completion of this thesis would have been impossible without the help and support of a number of people.

I would like to thank my study leader Prof. M.W. Visser for her guidance, support and constructive criticism. Thanks are due to her also for her moral support and for believing in me.

Thanks is also due to my family, especially my wife NGOZO MATSAUTSE who has been supportive. My children SIPHIWE, DUMILE and BUYISILE who were persistently encouraging me to finish my studies.

I would also send my humble gratitude to Mr M.A. Motloung who always helped and guided me towards achieving my goal.

Lastly I would like to extend my sincere gratitude to the typist Mr M.S. NTIMA who helped me to type this thesis.

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CHAPTER 1

1.1 Purpose of the study

The purpose of this study is to investigate the syntactic distribution of the arguments of various motion of motion verbs in **Sesotho**. This study will also examine the different syntactic constructions associated with these motion verbs as well as the semantic properties of these verbs. The kind of NPs that can appear with motion verbs as external arguments will be examined and the thematic interpretation of those arguments in their respective positions will be explored. The question will be investigated of whether motion verbs exhibit syntactic similarities because they are also referred to as verbs of process. Thus, the argument structure of these verbs will be investigated, taking into consideration the selection restriction of arguments of these verbs. The selection restrictions of the arguments of motion verbs will be examined in relation to their event structure, and their lexical conceptual paradigm. Through this investigation, lexical senses of these verbs will be determined.

1.2 Organization of study

The rest of Chapter 1 will outline the purpose of the study relating to the investigation of the semantic and syntactic classifications of motion verbs in Sesotho.

Chapter 2 will review some previous research on lexical symantics. Verbal classes according to Levin (1993) will be considered with regard to the verb as a lexical category, as it supplies structural information. The study of the lexicon according to Wordnet (Fellbaum), where the need is to classify the lexicon into semantic domains, will also be considered.

Chapter 3 examines the motion verbs with the feature '**ya**' [go] and '**tla**' [come]. These verbs do not behave homogeneously in all respects. They have different ways of expressing, arguments, for instance, goal, and source or path of motion.

    (i)   by a prepositional phrase or a locative argument.

    (ii)   by a NP Locative argument and

    (iii)   by both PP and NP Locative as locative argument (Levin; 1993)

The verbs assign the external arguments a thematic theta role of an agent / actor (animate) and that of a theme (inanimate).

Consider the following example:

Monna o ya teropong.

'The man goes to town'

"The agent is the argument denoting the participant who intentionally initiates the action expressed by the predicate"

[Haegeman, L; 1991: 41]. This is also illustrated in the following example:

Monna o tla ntlong ya hae.

'The man comes to his house'

The argument 'man' in the above sentence is an external argument. These verbs can have one, two or three arguments, as demonstrated by the following example:

[Bana] ba ya   [sekolong]   [ka koloi]
ARG1 NP Agent   ARG2 NP LOC   ARG3 NPPP instrument
'Children go to school by a car'

Chapter 4 will examine the motion verbs **'tsamaya'** (walk) and **'baleha'** (run away). These verbs are intransitive in the sense that they assign only a subject argument, that is the external argument and an optional locative argument. The external argument is in the subject position and the NP which occurs in the complement position of these verbs can either be a locative or a prepositional phrase, or instrument.

Consider the following example:

[Monna] o tsamaya   [teropong]   [ka koloi]
ARG1 NP Agent   ARG2 NP LOC   ARG3 NPPP instrument
'The man walks in town by a car'

Chapter 5 will explore the lexical semantics of motion verbs with the **'theoha'** (descend) and **'nyoloha'** (ascend). These verbs are examined in relation to how they can be grouped together according to their meanings. All these verbs will denote some form of process in different ways in different circumstances e.g. **'O nyoloha thaba'** (He/ she moves up the mountain) or **'Tshwene e theoha sefateng'** (The baboon descends down from the tree)

The verbs in the above sentences express motion and there is an intentional process, which takes place although no temporary or permanent change of state is denoted.

In dealing with the lexicon in Pustejovsky's Generative Lexicon Theory, levels of representation in a lexicon including the argument structures and the number of arguments the verb may assign are examined. The argument structure of a verb relates to its theta – roles like agent, theme or patient.

CHAPTER 2
THE GENERATIVE LEXICON THEORY

2.1   INTRODUCTION

The generative lexicon theory is concerned with natural language semantics, that is the problem compositionality. Pustejovsky (1995) states that lexical semantics investigates how the words of a language denote compositional meanings. Theoretical linguists have largely treated the lexicon as a static set of word senses, tagged with features for syntactic, morphological and semantic formation. He argues that formal theories of natural language semantics have addressed important issues. The first issue relates to the creative use of words in new contexts. The second issue concerns an evaluation of lexical semantic models on the basis of compositionality. In terms of Generative lexicon theory Pustejovsky examines the interaction of word meaning and compositionality as they relate to these concerns. He argues that adequately accounting for the problem of creative word senses, and the issue of compositionality is a major issue. Pustejovsky advances the view that if semantic theory is able to recursively assign meanings to expressions, accounting for phenomena such as synonymy, antonymy, polysemy and metonymy then compositionality depends ultimately on what the basic lexical categories of the language denote. The traditional views has been that words behave as either active or passive arguments. Pustejovsky argues that the lexical semantics can be a means to re-evaluate the very nature of semantic composition in language, in order to satisfy the goals of semantic theory. Pustejovsky reviews some basic issues in lexical representation and presents the current view on how to represent lexical ambiguity, both in theoretical and computational models. This view incorporating 'Sense enumerative techniques', distinguishes word senses on the basis of finite feature distinctions. Pustejovsky points out that the semantic weight in both lexical and compositional terms usually falls on verb.

He refers to such an organisation as generative lexicon, and the operations which generate these extended senses as generative devices, including operations such as type coercion and co-composition. Pustejovsky discusses how this view support an explanatory view of semantic modelling. He then examines the goals of linguistic theory in general and lexical of semantics in particular.

He argues that the framework of knowledge for lexical items must be guided by a concern for semanticality in addition to grammaticality. Pustejovsky view natural languages as positioned on a hierarchy of semantic descriptions, characterized in terms of their underlying polymorphic generative power. He further argues that natural languages fall within the weakly polymorphic languages, more expressive than monomorphic, but well below the power of unrestricted polymorphic languages. Pustejovsky proposes that a generative theory of the lexicon includes multiple levels of representation for the different types of lexical information needed. Among such levels are argument structure, event structure, Qualia structure and lexical inheritance structure. He argues that nouns can be formally characterized in terms of three dimensions of analysis, involving argument structure, event type and qualia structure. Finally Pustejovsky discusses how his views of lexical organization relates to current theories of metaphor and pragmatically induced metonymy.

He argues on methodological grounds, for a strong distinction between common sense knowledge and lexical structure. The types of creative polysemy examined by Pustejovsky's work exhibits a regularity and systematicity across languages that is absent from patterns of pragmatic sense extension or modes of metaphor.

2.2   THE NATURE OF LEXICAL KNOWLEDGE

Pustejovsky (1995) outlines the central role played by lexical knowledge in linguistic theory and processing models. The most pressing problems for lexical semantics, according to Pustejovsky, are the following:

(i)   Explaining the polymorphic nature of language.
(ii)   Characterizing the semantically of natural language utterances
(iii)   Capturing the creative use of words in new contexts
(iv)   Developing a richer co-compositional semantic representation.

Pustejovsky believes that linguistic studies can be informed by computational tools for lexicology as well as an appreciation of the computational complexity of large lexical databases. Likewise, computational research can profit an awareness of the grammatical and syntactic distinctions of lexical items, and the requirement that natural language processing (NLP) systems must account for these disciplines, is so important that Pustejovsky believes

it will be difficult to carry out serious computational-research in the fields of linguistics and (NLP) without the help of electronic dictionaries and computational lexicographic resources.

Pustejovsky (1995) discusses two assumptions before addressing same questions that figure prominently in his suggestions for a lexical semantics framework. The first is that without an appreciation of the syntactic structure of a language, the study of lexical semantics is bound to fail. There is no way in which meaning can be completely divorced from the structure that carries it. This is an important methodological point, since grammatical distinctions are a useful metric in evaluating and competing semantic theories. The second point is that the meanings of words should somehow reflect the deeper conceptual structures in the cognitive system and the domain it operates in. Pustejovsky argues that computational lexical semantics should be guided by the following principles: First, a clear notion of semantic well formedness will be necessary in order to characterize a theory of possible word meaning. Secondly, lexical semantics must, according to Pustejovsky look for representations that are richer than thematic role descriptions. He refers to Levin and Rappaport (1986), who named roles are useful at best for stating fairly general mapping strategies to the syntactic structures in language. The distinctions possible with thematic roles are much too coarse-grained to provide a useful semantic interpretation of a sentence. What is needed, Pustejovsky proposes, is a principled method of lexical decomposition. This presupposes, (i) a rich, recursive theory of semantic composition. (ii) the notion of semantic well formedness mentioned above and (iii) an appeal to several levels of interpretation in the semantics. Thirdly and related to the preceding point, Pustejovsky argues that lexical semantics must study all syntactic categories in order to characterize the semantics of natural language. Pustejovsky explores the question of the unit of well formedness when doing natural language understanding the sentence, utterance, paragraph, or discourse.

Pustejovsky argues that it is the goal of any lexical semantic theory to adequately classify the lexical items of a language into masses predictive of their syntactic and symantic expression. Such theory should not merely map the meanings of lexical items per sentence and an individual basis. It should capture the semantic relations between words in such a way which facilitates this mapping.

2.2.1 Semantic classes and categorical alternation:

The most fundamental aspect of a words meaning is, according to Pustejovsky, its semantic type. According to this view categorical or type information determines not only how a word behaves syntactically, but also what the elements of the category refer to. For example, the verbs 'love' and 'hate' should be viewed as relations between individuals in the world, whereas the noun 'woman' would pick out the set of all individuals in the world who were women.

2.2.1.1 Verbal alternations

Pustejovsky points out that Levin (1993) outlines a broad classification of verb argument and alternations in English, in order to classify verbs into semantically unique classes. For example, the verbs sink, roll and break all have both transitive and intransitive forms, where the lexical senses are related by the interpretive feature of causation. There are numerous examples of intransitive verbs which have no zero-derived causative forms e.g. arrive, die, fall. Pustejovsky considers the following examples in this regard:

(1) (a) The boat sank in stormy weather
    (b) The plane sank the boat in storm weather

(2) (a) The ball rolled down the hill
    (b) Bill rolled the ball down the hill

(3) (a) The bottle broke suddenly

(4) (a) The letter arrived on time
    (b) The mailman arrived the letter on time.

(5) (a) My terminal died last night
    (b) The storm died my terminal last night.

(6) (a) The block tower fell.
    (b) John fell the block tower.

Although sentences in 4(b) − 6(b) are ungrammatical, they are certainly understandable. The lexical semantics should according, to Pustejovsky, specify what it is that these two classes share, such that they have grammatical intransitive forms, but equally important is the characterization of how they differ, such that the letter class permits no transitive form. Other useful alternation patterns include the conative, is illustrated below in (7) − (10).

(7) (a) Mary shot the target

   (b) Mary shot at the target

(8) (a) Mary scraped the window

   (b) Mary scraped at the window.

(9) (a) The cat touched my leg

   (b) The cat touched at my leg

(10) (a) Mary shot the arrow (at the target)

   (b) Mary shot at the arrow.

The question is according to Pustejovsky, whether it is possible to identify the semantic discriminants leading to the distinct behaviour of the transitive verbs above, while still stating why (9b) − (10b) are ungrammatical. Pustejovsky finds interesting the question of how the polysemy of those verbs taking multiple forms can be represented lexically, descriptively.

Another kind of syntactic diagnostic that seems to have some theoretical utility is polyadicity, more narrowly constructed. Pustejovsky notes that Bresman (1982), Fillmore (1986), and Levin (1993) point out, there are not only argument-changing alterations such as those discussed above, but also argument chopping alterations as well. The rule of "indefinite NP deletion" is the term for the following alteration paradigm.

(11)   The woman <u>ate</u> her meal quickly.

(12)   The dog <u>devoured</u> the cookie.

(13)   John <u>drank</u> his beer feverishly.

(14)   John <u>gulped</u> his beer feverishly.

(15)   Mary <u>hammed</u> a song while she walked.

(16)   Mary <u>performed</u> a song while she ate her dinner.

According to Pustejovsky, in the example here, one might attribute the possibility of object – drop to an aspectual difference between the verbs being constructed. Although devour is generally considered a manner specification of the verb <u>eat</u>, it carries a <u>completive implicature</u> that is absent from <u>eat</u>.

(17)   Mary <u>tried</u> to start her car in the morning.

(18)   Mary <u>attempted</u> to start her car in the morning.

In addition to transitive – intransitive polyadicity, distransitive - transitive shifts such as those in (19) – 24) below occur:

(19)   John <u>gave</u> a book to Mary.

(20)   John <u>gave</u> a lecture to the academy

(21)   John <u>mailed</u> a book to his brother.

(22)   John <u>mailed</u> a letter to his brother.

(23)   Bill <u>showed</u> a book to Mary.

(24)   Bill <u>showed</u> a movie to the audience.

Thus, in certain cases, the otherwise obligatory expression of the goal argument is dropped and the verb becomes a simple transitive.

Finally, Pustejovsky considers one of the oldest semantic classifications for verbs, that of aspectual class or Aktionsarten. It is normally assumed that there are at least three aspectual types: state, activity and event, where the last class is itself sometimes broken down into <u>accomplishment</u>, and <u>achievement events</u>. For example, the verb walked in sentence (25) denotes an activity of unspecified duration. That is, the sentence itself does not convey information regarding the temporal extent of the activity, although <u>deictically</u> it is an event in the past which did <u>terminate</u>.

(25)   a. Mary <u>walked</u> yesterday.

        b. Mary <u>walked</u> to her house yesterday

Other examples of activity verbs are <u>sleep</u>, <u>run</u>, <u>work</u> and <u>drink</u>. Sentence (25b) conveys the same information as (25a), with the addition constraint however, that Mary terminated here activity of walking at her house.

Other verbs which according to Pustejovsky lexically denote accomplishments are <u>build</u> and <u>destroy</u>.

(26) a. Mary <u>built</u> a house

   b. Mary <u>destroyed</u> the table.

In sentence (26a) the existence of the house is the <u>culmination </u>of Mary's act, while in (26b); the non-existence of something denotable as a table is the <u>direct culmination</u> or consequence of her act.

Pustejovsky states that an <u>achievement</u> is an event that results in a change is thought of as occurring instantaneously. For example, in sentence (27a), (27b), and (27c) the change is not a gradual one, but something that has a point-like quality to it. Hence modification by point adverbials such as at 3 pm is suggestive that a sentence denotes an achievement.

(27) a. John <u>died</u> at 3 pm

   b. John <u>found</u> his wallet at 3 pm

   c. Mary <u>arrived</u> at noon.

Kearns, (2000) argues that the four aspectual event classes generally identified are states, activities (or processes) accomplishments and achievements, where the latter two are conplated under the term 'transition' by Pustejovsky.

States are illustrated in the sentences below:

(28) a. Briqitte is taller than Danny.

   b. The light is on.

   c. Clive knows my brother.

   d. Coal and coke are different.

   e. The cat is asleep.

   f. Your umbrella is in the hall.

States are unbounded or atellic – they have no natural boundaries or culminations which constitute furnishing.

Processes or activities are illustrated below:

(29) a. John walked in the garden.
      b. The leaves fluttered in the wind.
      c. Clive pushed a supermarket trolley.
      d. They chatted.
      e. The guests swam in the river.
      f. The visitors played cards.

Processes are unbounded and durative, like states, but unlike, states they are heterogeneous. The heterogensity of 'Clive walked home' applies to any walking event including the one reported in (29a).

Accomplishments are, according to Pustejovsky, the eventualities with the clearest and most complete structure, consisting of a process or activity leading up to a culmination or finishing point. Accomplishment are illustrated in the examples below in (30).

(30) a. John build a house.
      b. Marcia ate an apple.
      c. Jones ran a mile.
      d. We did the dishes.
      e. The new incumbent made a speech.
      f. Raffaele painted triptych.

The event described in (30b) is finished when the whole apple is eaten and the event described in (30f) finishes when the triptych is complete even if Raffaele carries on painting on some other work, this late painting activity is not past of the event described in (30f). Accomplishments occupy time, and are therefore durative, and given their internal structure, comprising a process followed by an outcome, they are clearly heterogeneous.

2.2.1.2 Achievements

Consider the following examples of achievement sentences:

(31)   a   Clive realized that Deidre was gone.

      b.   Then he recognized her.

      c.   They reached the summit.

      d.   John noticed a mark on the wall paper.

Pustejovsky states that an achievement is the transition from one state to another, such as the switch in (a) from not knowing that Deidre was gone to knowing that she was gone. Achievements are idealized to occur at a nondivisibe point in time and lack duration.

2.2.1.3 Nominal Alternations

Pustejovsky (1995) postulates that nouns also have characteristic grammatical behaviours, depending on semantic theory. For nouns as well, studying the behaviour of grammatical alternations has been the point of departure for the semantic classification of nominal types. Probably the most studied distinction for nominal semantics according to Pustejovsky, is that of count versus mass.

    a.   Mass nouns: much sand, more water.

    b.   Count nouns: several houses, every child.

Pustejovsky argues that mass nouns may appear with quantifiers such as 'many' or 'all'.

    a.   All the honey.

    b.   Much beer.

They may appear in noun classes which have either a singular prefix or a plural prefix, but they never appear with both a singular and plural prefix as other nouns.:

    a. Singular prefix:

        Flour   (class 3)

        Porridge (class 7)

b. Plural prefix:

Water   (class 6)

Glasses   (class 10)

Saliva   (class 6)

Mass nouns may furthermore be either abstract or concrete.   Abstract nouns are distinguished form concrete nouns. This distinction is between immaterial (abstract) and material (concrete).

A concrete noun exists as something real or solid, rather than as an idea like abstract nouns which refer to a quality or concept.:

a. Concrete mass nouns:

Milk

Water

Mud

Porridge

b. Abstract mass nouns:

Patience

Madness

Love

Wisdom

2.2.1.4 Adjective Classes

According to Pustejovsky, adjectives are generally taken to denote states. This is related to, but not identical with the eldest distinction applied to adjectives, that of accidental as necessary qualities. This distinction gives rise to the classification of properties such as hungry, dirty, and broken as accidental qualities as distinct from necessary qualities such as the properties bipedal (of a species) tall (of an individual) and (hard of a substance).

2.2.2   Interlexical Relations

Besides grouping words into distinct semantic classes lexical semantics is the study of how words are semantically related to one another. Under this section, Pustejovsky examines five classes of lexical relations.

(32)   1. Synonymy

2. Antonymy

3. Hyponymy and lexical inheritance

4. Meronymy

5. Entailment and presupposition

2.2.2.1   Synonymy

Synonymy is generally taken to be a relation between words rather than concepts. One standard definition states that two expressions are synonymous if substituting one for other in all contexts does not change the truth value of the sentence where the substitution is made. For example, in the context of carpentry plank and board might be considered synonyms, but not necessarily in other domains. It should be noted that if synonymy is defined by substitutability of expressions then it is an <u>intra – category</u> relation, for example, nouns for nouns, verbs for verbs and so on.

2.2.2.2   Antonymy

Antonymy is according to Pustejovsky, a relation characterized in terms of semantic opposition, and, like synonymy, is properly defined over pairs of lexical items rather than concepts. Examples of antonymy are rise/fall, heavy/light, fast/slow, long/short. By far the lexical relation most studied in the computational community is hyponymy, essentially the taxonomic relation defined in inheritance networks. For example; specifying car as a hyponymy of vehicle is a super concept of the concept car or that the set of car in a subset of those individuals denoted by the set <u>vehicle.</u>

Pustejovsky proposed that one of the most difficult lexical relations to define and treat formally is that of <u>Meronomy</u>, the relation of part to the whole. The relation is familiar from knowledge representation languages with predicates or <u>slot-names</u>, such as <u>part of</u> and <u>made of</u>. Similarly, in the domain of planning, the issue of meronomy arise with defining the necessary or optional subparts of a plan or event.

Like hyponymy, meronymy is a relation well-suited to nouns, but less well suited to verbs. The relation between moving and rising, for example, differs from the relation between <u>branch</u> and <u>tree</u>. Consider also the relations among the activities denoted by verbs: <u>snore</u>, <u>dream</u> and <u>sleep</u>.

'Snoring' or 'dreaming' can be a part of 'sleeping', in the sense that the two activities are, at least partially temporally co-extensive; the time that you spend sleeping. And it is true than when you stop sleeping you also necessarily stop snoring or dreaming.

Another important respect in which words an be related is through entailment and presupposition. Although these is no complete agreement on how to define these relations. An expression A semantically entails an expression B if and only if every situation that makes A true, makes B true. On the other hand, A semantically presupposes B if and only if both (a) in all situations where A is false, B is true . To see how important these concepts are for determining lexical meanings, Pustejovsky considers how the sentence (a) entails the proposition denoted by sentence (b) below.

(33)   (a)   John <u>killed</u> Bill.
       (b)   Bill <u>died.</u>
       (c)   Bill is <u>dead</u>

That is, if there is a killing event, then there is also a dying event. That kill entails rather than presupposes an event associated with dying, becomes clear when examining the negation of (a) where no dying event occurs.

2.3   The logical problem of polysemy

2.3.1   Varities of sense extention

Pustejovsky states that many words in language have more than one meaning, a property known as polysemy.   The ways in which words carry multiple meaning can vary. Pustejovsky refers to Weinreich (1964), who distinguishes two types of ambiguity, the first of which he calls contrastive ambiguity.   This is seen where a lexical item accidentally carries two distinct and unrelated meanings (i.e. homonymy).   He considers the following examples:

(34)   (a)   Many walked along the <u>Bank </u>of the river.

(b)   Harbor Bank is the richest <u>Bank</u> in the city.

(35)   (a)   The judge asked the defendant to approach the <u>bar</u>.

(b)   The defendant was in the pub at the <u>bar</u>.

In examples above, Pustejovsky argues that the underlined item have more than one lexical sense

The other type of ambiguity according to Pustejovsky involves lexical senses which are <u>manifestations</u> of the same basic meaning of the word as it occurs in different contexts.   He considers the following examples:

(36)   (a)   "School starts at 8: 0'clock."

(b)   "The school is near the church"

(37)   (a)   "Thabo entered through the window."

(b).   "The window is closed."

(38)   (a)   "The man extinguishes the fire."

(b)   "The fire is extinguished."

Following Weinreich's usage, Pustejovsky refers to these sense distinction as complementary polysemies. The model of lexical meaning must be able to account for how the word for bank can refer to both an institution and a building, how the word for window can refer to both an aperture and a physical object, and how stative predicates can also refer to causative acts. In the examples above, there are two types of sense complimentarily (a) category preserving, and (b) category changing. According to Pustejovsky, logical polysemy can be defined as a complementary ambiguity where there is no change in lexical category, and multiple senses of the word have overlapping, dependent, or shared meanings. Hence complementary polysemy is a slightly broader term than logical polysemy, since the former also describes how cross-categorical senses are related, for example with the use of hammer as both a noun and a verb.

2.3.3   Complementary Polysemy

In complementary polysemy both senses of a logically polysensemous noun seen relevant for the interpretation of the noun in the context, but one sense seems focused for purpose of a particular context.

2.3.3.1   Count/Mass alternation

Consider the following examples:

(a)   Nku e a fula

"The sheep is grazing"

(b)   Morena o ja nku

"The chief eats the sheep"

2.3.3.2 Container/Containee alternation

(40)   (a)   Thabo o tjhwatlile botlolo

"Thabo broke the bottle"

(b)   Thabo o nwele botlolo

"Thabo drank the bottle"

2.3.3.3 <u>Plant/food alternation</u>

(41)   (a)   Bana ba ja ditholwana

"Children ate fruits"

(b)   Thabo o tshella ditholwana tshimong

"Thabo waters the fruit in the garden"

2.3.3.4 <u>Place/People alternation</u>

(42)   (a)   Mme o ile kerekeng

"Mother went to church"

(b)   Kereke ena e lelekile moruti

"This church fired the priest"

Complementary polysemy is, according to Pustejovsky also seen in other categories as well. For example, adjectives such as [good] have multiple meanings, depending on what they are modifying.

(43)   (a)   A good book

(b)   A good shirt

(c)   A good leather

Pustejovsky states that good is merely a positive evaluation of the nominal head it is modifying. It does not seem to be an alternation or focusing effect, but rather a functional dependency on the head being modified. Complementary polysemy can also be seen as relating to multiple complement types that verbs select for:

(44) (a) Thabo o qala ho ngola lengolo

"Thabo begins to write the letter"

(b) Thabo o qala lengolo

"Thabo begins the letter"

The verb (begin) can appear in a verb phrase or noun phrase or noun phrase or noun phrase with the same meaning, varying slightly depending on the type of complement it selects.

Other related senses which could possibly be viewed as polysemies take us further into the area of verbal alterations more broadly defined, such as in the coactive the causative alternation.

(45) (a) Mollo o timme

"The fire is extinguished"

(b) Ke tima mollo

"I extinguished the fire"

The sense in sentence (a) is entailed by the other sense in sentence (b).

2.3.4 Elementary Lexical Semantic Theory

Pustejovsky (1995) states that polysemy can be presented in model of lexical design and can widely assumed in both computational and theoretical linguistics. The form that a lexicon takes influences the overall design and structure of the games. The major part of semantic research until recently has been on logical form and the mapping from a sentence level syntactic representation to a logical representation language.

There is a problem in elementary lexical semantic theory. Seemingly that the core problem for natural language semantics is one of assigning the correct semantic interpretation to any

string in the language, we hope what the mapping between word forms and semantic forms can proceed in a well defined and possibly deterministic process. The most direct way to account for the polysemies is to allow, each annotated with a separate meaning or lexical sense. Pustejovsky defines such a dictionary as a Sense Enumeration Lexicon (SEL) and characterize it directly follows:

A lexicon L is a sense enumeration Lexicon if and only if for every word W in L, having multiple senses S_1, ..., S_n associated with that word, then the lexical entries expressing these senses are stored as $\{Ws_1, ..., Ws\}$

Pustejovsky states that the two contrastive senses of the word school as used below could be listed in a straight forward fashion a in (a) and (b) below using a fairly standard lexical data structure of category type (Cat), and a basic specification of the genus term (Genus), which locates the concept within the taxonomic structure of the dictionary.

(a)
$$\begin{bmatrix} School_1 \\ Cat = count\text{-}noun \\ Genus = educational\ institution \end{bmatrix}$$

(b)
$$\begin{bmatrix} School_2 \\ Cat = Count\ noun \\ Genus = shore \end{bmatrix}$$

Pustejovsky states that the selection requirements for verbs are defined from the same set of features (or types) as the genus terms themselves, then disambiguation would appear to be merely the process of correctly matching the features of functor and arguments from the available set of lexical entries. For example, a verb such as teach might select, in one of its sense (for it will certainly have many senses in an SEL)

(a)
$$
\begin{array}{l}
\text{Teach}_1 \\
\text{Cat} = \text{verb} \\
\text{SEM} = R_O \ C \ O_1, O_2, O_3 \\
\text{ARGSTR} \quad \begin{array}{l} \text{ARG1} = \text{np}[+ \text{ education institute} \\ \text{ARG2} = \text{np}[+ \text{ learner} \\ \text{ARG3} = \text{np}[+ \text{ human} \end{array}
\end{array}
$$

Pustejovsky observes that, this is a reasonable mode for lexical design, as long as the structural and semantic requirements are satisfied, there is no reason to change or enrich the compositional mechanisms making use of this lexical knowledge.

A similar approach applied to verbs would according to Pustejovsky, allow vacation in complement selection to be represented as distinct senses, related through a sharing of the lexical sign itself. This is a strategy adopted in most current linguistic frame word, in some fashion or other. Informally such an approach assumes each lexical item to be uniquely selective for a particular syntactic environment, as illustrated below for the verb start. The semantics of each form, shown by Pustejovsky below simply as a relation $R_1(O_1,O_2)$, can be related to each other by a lexical redundancy rule or meaning postulate.

(a)
$$
\begin{array}{l}
\text{Start}_1 \\
\text{Cat} = \text{verb} \\
\text{SEM} = R_1 (O_1 , O_2) \\
\text{ARGSTR} = \begin{array}{l} \text{ARG}_1 = \text{np} \\ \text{ARG}_2 = \text{vp}[+ \text{inf}] \end{array}
\end{array}
$$

(b)

$$
\begin{bmatrix}
\text{Start}_2 \\
\text{Cat} = \text{verb} \\
\text{SEM} = R_2\,(O_1, O_2) \\
\text{ARGSTR} = \begin{bmatrix} \text{ARG}_1 = \text{np} \\ \text{ARG}_2 = \text{vp[+ prog]} \end{bmatrix}
\end{bmatrix}
$$

(c)

$$
\begin{bmatrix}
\text{Start}_3 \\
\text{Cat} = \text{verb} \\
\text{SEM} = R_3\,(O_1, O_2) \\
\text{ARGSTR} = \begin{bmatrix} \text{ARG}_1 = \text{np} \\ \text{ARG}_2 = \text{np} \end{bmatrix}
\end{bmatrix}
$$
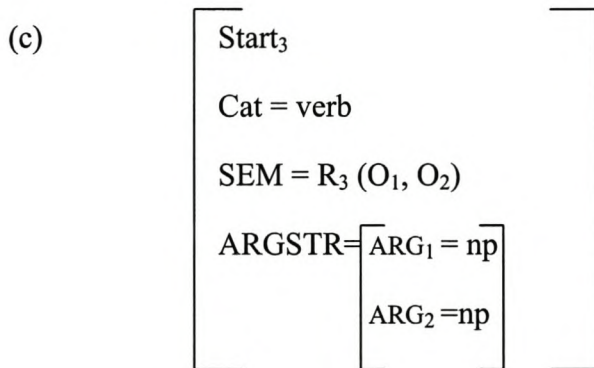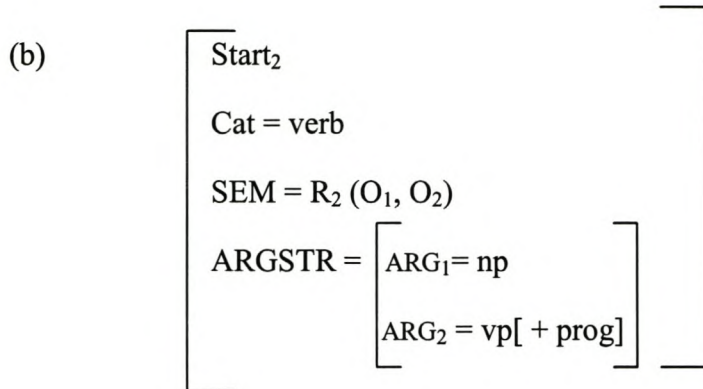
Given this preliminary definition of sense enumeration lexicons, Pustejovsky examines the way in which SEL are able to account for lexical selection and ambiguity in the two classes of ambiguity discussed. He considers the sentence 'Nadia's motorcar rushes to the station', stating that contrastive senses of a motorcar and station can be distinguished by appropriate feature or sorts.

(a)

$$
\begin{bmatrix}
\text{Motorcar}_1 \\
\text{Category} = \text{Count noun} \\
\text{Genus} = \text{vehicle}
\end{bmatrix}
$$

(b)

$$
\begin{bmatrix}
\text{Motorcar}_2 \\
\text{Category} = \text{Count noun} \\
\text{Genus} = \text{tool}
\end{bmatrix}
$$
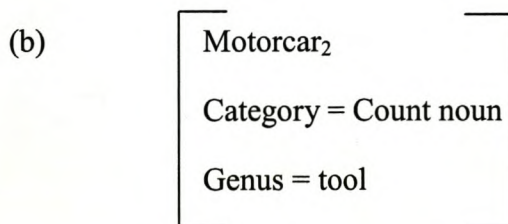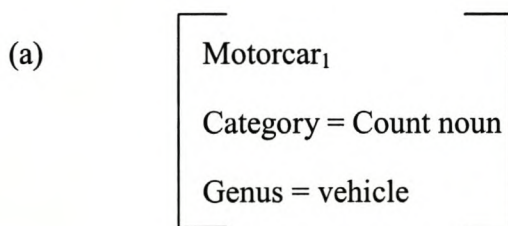
Pustejovsky suggests that the contrastive senses of plane are sortally constrained or differentiated hence discourse context is not really needed to select the appropriate sense.

Assuming the sortal restrictions on the predicate rush shown below, the subjects is therefore disambiguated by strict type selection.

(a)

$$
\begin{bmatrix}
\text{Rush} \\
\text{Category} = \text{verb} \\
\text{SEM} = P(\ O_1\ ) \\
\text{ARGSTR} = [\text{ARG}_1 = \text{np} \ [+ \text{vehicle}]
\end{bmatrix}
$$

Pustejovsky states that once one contrastive sense has been fixed in a sentence, pragmatically constrained disambiguation facilitates the narrowing of other contrastive senses in subsequent processing. Assuming that the two senses for the noun terminal are terminal_1 (Computer), and terminal_2 (a building for a vehicle) then selection of the appropriate sense, according to Pustejovsky, is accomplished quite straightforwardly, given that the basic predication is fixed at this point in the processing.

Pustejovsky discusses the representation of complementary polysemy. He refers to the view that variations in verb complementation have been encoded as enumerated lexical senses since Chomsky's Aspects Model and they appear to adequately describe syntactic distribution. He analyses the cases of nominal polysemy discussed above in terms of SEL, representations. These involved figure / ground reversals, container / containee alternations, and count / mass alternations, repeated below:

(46)   (a)   The goat is running in field
        (b)   John ate goat for breakfast.

(47)   (a)   Mary broke the pot
        (b)   Father finished the pot

(48)   (a)   The door is open.
        (b)   Mary runs through the door.

Traditionally these have been created as simple cases of sense enumeration, along the lines of contrastive ambiguity. The representations below for the complementary senses of the noun goat seem as well motivated as the listings for motor car given above.

(a)

$$\begin{bmatrix} \text{goat}_1 \\ \text{Cat} = \text{Count noun} \\ \text{Genus} = \text{animal} \end{bmatrix}$$

(b)

$$\begin{bmatrix} \text{goat}_2 \\ \text{Cat} = \text{Mass noun} \\ \text{Genus} = \text{meat} \end{bmatrix}$$

The fact that these two senses are logically related is, according to Pustejovsky, not captured in the two representations above, but the senses are distinguished by type, which is usually the most important consideration for compositionality. One possible modification to the Sense Enumeration Lexicon (SEL) framework which would differentiate contrastive from complementary senses for a lexical item, would be to store complementary senses in a single entry, distinguished by sense identification number.

(a)

$$\begin{bmatrix} \text{goat} \\ \text{Sense}_1 = \begin{bmatrix} \text{Cat} = \text{mass noun} \\ \text{Genus} = \text{meat} \end{bmatrix} \\ \text{Sense}_2 = \begin{bmatrix} \text{Cat} = \text{count noun} \\ \text{Genus} = \text{animal} \end{bmatrix} \end{bmatrix}$$

Thus, Pustejovsky states, the researchers could restate the definition of a sense enumeration lexicon to account for this distinction of how senses are stored:

A lexicon L is a sense enumeration lexicon if and only if for every word W in L, having multiple senses S_1 ......, sn associated with that word then:

(i)   If S_1, ..., sn are <u>contrastive</u> senses the lexical entries expressing these senses are stored as $Ws_1, ..., Ws_n$

(ii)   If S_1, ... S_n are <u>complementary</u> senses, the lexical entry expressing these senses stored as W ($S_1, ..., S_n$)

Every ambiguity is either represented by (i) or (ii) above.

This is in fact the approach taken by many researchers within both theoretical and computational linguistics.. The advantage of this model of lexical description is, according to Pustejovsky, that the lexicon remains a separate and independent component or source of data or a plug in module form the computational perspective. One can study properties of syntax and semantic interpretation, knowing that the lexicon is a fixed point of reference, interacting with other components of reference, interacting with other components of grammar in a predictable and well – defined way. The sense enumerative lexicon model outlined above is according to Pustejovsky, inadequate for the purpose of linguistic theory.

2.4   Limitations of Sense Enumerative Lexicons

According to Pustejovsky there are some intrinsic problems with the enumeration method for lexical description. The representations allowed by sense enumeration lexicons SELs are inadequate to account for the description of natural language semantics. Firstly, Pustejovsky argues, a theory of lexical meaning affects the general structure of semantic theory in several ways. Viewing the goal of a semantic theory as being able to recursively assign meanings to expressions, accounting for phenomena such as synonymy, antonymy, polysemy, metonymy etc. the view of compositionality will depend on what the basic lexical categories of the language denote.

The standard assumption in current semantic theory requires that words behave as active functors or passive arguments. Pustejovsky argues that if we change the way in which categories can denote, the form of compositionality will itself change. This view of lexical semantics can force us to re-evaluate the nature of semantic composition in language. There are three basic arguments showing the madequacies of SELs for the semantic description of language.

(1)   The Creative Use of Words: Words assume new senses in novel contexts.
(2)   The Permeability of word Senses: Word senses are not atomic definitions but overlap and make reference to other senses of the word.
(3)   The expression of multiple syntactic forms: A single word sense can have multiple syntactic realization.

Each of these points to the inability of sense enumerative models to adequately express the nature of lexical knowledge and polysemy. The framework incorporating SELs is according to Pustejovsky, poor models of natural language semantics. He argues that although the conventional approach to lexicon design (i.e. sense enumeration) is sufficient for contractive ambiguity, it is unable to address the real native of polysemy. To treat complementary polysemy, Pustejovsky argues we must touch on every assumption we have regarding word meaning and compositionality, without proliferating word senses. It requires re-thinking the role played by typically non-functor elements in the phrase that is, in order to maintain compositionality we must enrich the semantics of the expressions in composition.

2.4.1   The goals of Lexical Semantic Theory

Pustejovsky argues that the primary goal of a theory of lexical semantics, and with it, a compositional semantics, is to both describe adequately the data and to be transparent regarding two points: the system must be learnable in an obvious way and the various phenomena of polymorphisms must be adequately addressed. Pustejovsky suggests a notion of semanticality, analogous to the view of grammaticality of Chomsky ranging over semantic expressions rather than syntactic structures. Semanticality refers to the semantic well-formedness of expressions of logical languages with truth functional interpretations, an expressions is either well-formed or not and a sentence (i.e. an expression having a propositional type) is or is not a proposition. He considers the following sentences:

(48) (a) ? Mary kicked me with her foot.

       b)   Mary kicked me with her left foot.

(49) (a) ? John buttered the toast with butter.

       (b)   John buttered the toast with an expensive butter from Wisconsin.

The (a) sentences above according to Pustejovsky, are not ungrammatical in any strict sense, they are semantically less acceptable than the (b) - sentences. The degree to which these conditions are met will intuitively define what is semantically well formed or not, that is, its degree of semanticality.

Other sentences such as the following are semantically odd because of what we normally associate with the semantic possibilities of a noun such as 'dictionary' and 'rock'.

(50) (a)   Mary began the book.

   (b)   ? John began the dictionary.

   (c)   ?? Mary began the rock.

Pustejovsky point out that the sentence in (a) admits of two strong interpretations that of doing what one normally does to a book as reader, reading, and that of doing what one normally does to a book as a writer, writing (b) has any number of interpretations regarding activities related to creating or constructing this object, it fails to readily allow an interpretation available to (a) that of reading the dictionary.

Pustejovsky states that there is no generally available interpretation for (c) because of what we understand begin to require of its argument and our semantic knowledge or rocks are and what you can do to them with them etc. This does not say that an interpretation is unavailable. We accommodate the context and pragmatic effects in order to interpret otherwise semantically ill formed expressions.

Another example illustrating semanticality is, according to Pustejovsky, the phenomenon illustrated in pairs below:

(51) (a.) ? The house was built.

   (b)   The house was built by accomplished builders.

(52) (a) ? The cookies were baked.

   (b)   The cookies were baked in the oven.

The distinctions in interpretation are real, according to Pustejovsky, systematic and part of the language itself. By looking at levels of semantic representation, each with its own statement of semantic well formedness, semanticality can become a metric reflecting the range of data and how semantic interpretation interacts with syntactic form.

2.4.2 The Creative use of words

Pustejovsky argues that the most convincing argument for the inadequacy of a theoretical model of description is to demonstrate that this model is unable to sufficiently account for

the data being investigated. Another argument would be that the model accounts for the data, but in a post hoc fashion, without making any predictions as to whether a particular datum should be possible or not. The SELs fail on both these descriptive criteria. Pustejovsky states that the first argument against the sense enumerative model concerns the creative use of words that is, how word can take on an infinite number of meaning in novel contexts. This is not an argument from an "influence polysemy" positions but from regular sense alternations that are as systematic a transformational regularities in the syntax. He considers first the ambiguity of adjectives such as 'good'.

(53)　(a)　Mary finally bought a good umbrella.

　　　(b)　After two weeks on the road, John was looking for a good meal.

　　　(c)　John is a good teacher.

Within an SEL, the only way to represent distinct senses for an adjective such as good would be by an explicit listing of senses in the received usage of the word $good_1$, $good_2$, … $good_n$. For the sentence in (10), this would, according to Pustejovsky, correspond to the three fixed senses listed below.

Good　(1)　　to function well;

Good　(2)　　to perform some act well;

Good　(3)　　tasty;

The conditions which make an umbrella 'good for something', however, are very different, from those which make John a 'good teacher' since 'goodness' is defined relative to a scale and this scale may vary for each nominal the adjective applies to. One need not search far to find natural applications of the adjective good that are not covered by the enumeration above for example, good weather, a good movie, and good children. For each novel sense we encounter, the SEL approach must according to Pustejovsky, enter a new lexical item into the dictionary, creating one entry for each new sense,

i.e the cardinality of the sense of good will equal (at least) the number of distinct types in the languages to which the adjective applies. As an alternative, one might keep the meaning of good vague enough to cover all the cases mentioned above. The problem with this strategy is, according to Pustejovsky that the particular chunks of commonsense knowledge needed to interpret how good modes in a specific phrase are actually part of the meaning of the noun being modified, and not simply part of world knowledge.

Another example of the context dependence of creative word use is illustrated by Pustejovsky with adjectives such as 'fast' and 'sow', where the meaning of the predicate also varies depending on the head being modified. As mentioned above an SEL model requires an enumeration of different senses for such words, to account for the ambiguity illustrated below.

(54) The island authorities sent out a <u>fast</u> little government boat the Culpeper, to welcome us. A boat driven quickly or <u>boat</u> that is inherently fast.

(55) A <u>fast typist:</u>

A person who performs the act of typing quickly.

(56) Rackets is a <u>fast game:</u>

The motions involved in the game are rapid and swift.

(57) A <u>fast book:</u>

One that can be read in a short time.

(58) My friend is a fast driver and a constant worry to her cautious husband.

One who drives quickly.

(59) You may decide that a man will be able to make the <u>fast</u> difficult <u>decisions</u>.

A process which takes a short amount of time.

As with the adjective good, the example above involve at least three distinct word senses for the word fast.

Fast   (1)   to move quickly.

Fast   (2)   to perform some act quickly.

Fast   (3)   to do something that takes little time.

Pustejovsky refers to Boguraev (1993) where it is argued for an actual lexicon, word senses would be further annotated with selectional restrictions for instance fast in (54) should be predicated by the object belonging to a class of movable entities, and fast (56) should ideally know how to relate the action "that takes a little time" reading, in the case of (59) above to

the object being modified. Again any finite enumeration of word senses will not account for creative applications of this adjective in the language. To illustrate this we consider the phrases the fastest motorway and a fast garage as used below.

(60) a. The Autobalm is the <u>fastest motorway</u> in Germany.

  b. I need a <u>fast garage</u> for my car since we leave on Saturday.

The adjective fast in sentence (a) refers to a new sense, fast$_4$, i.e. the ability of vehicles on the motorway to sustain high speed. This novel interpretation can be "blended" with other senses of the adjective in a sentence, below.

(61) The <u>fastest road</u> to school this time of day would be Lexington Street.

This incorporates the new sense fast$_4$, with fast$_3$ given above, i.e. the reference to road in (14) is implicitly a reference to a route, resulting from the goal PP within the NP this subsequently allows a durative quickly traversed.

The other example given in (60) a fast garage involves yet another sense related to both fast$_2$ and fast$_3$, but the actual interval refers to the length of time needed for a repair by the garage and not to the garage itself. This is similar to the sense in the phrase fast typist. The inability of an SEL to completely enumerate the senses for a particular lexical item is not limited to the above examples or constructions by any means. For example, there are many ways to want, begin or finish something.

(62) a. Mary <u>wants</u> another cigarette.

  b. Bill <u>wants</u> a beer.

  c. Mary <u>wants</u> a job.

(63) a. Harry <u>began</u> his class.

  b. John <u>finished</u> his article.

  c. We had better <u>postpone</u> our coffee until 11:00.

Pustejovsky states that if the goal of semantic theory is to determine the well formedness of an expression and then provide the interpretation of that expression, then we must somehow account for how we interpret the sentences in (62). There is a contextual variability at play

with a verb such as want, such that in (62) it means "want to smoke", in (62) it means "want to drink" and in (62) it presumably assumes a general want to have interpretation. Any of these interpretations are defensible, but the only way within an SEL to capture each use of want is by explicit reference to the manner of the wanting relation.

(64)   a .   Want$_1$: to want to smoke.

          b.   Want$_2$: to want to drink.

          c.   Want$_3$: to want to have.

Similar remarks held for the verb in (64). Enumeration is, according to Pustejovsky, unable to exhaustively list the senses that these verbs assume in new contexts. The difficulty here for semantics and computational lexicons is that word sense enumeration cannot characterize all the possible meanings of the lexical item in the lexicon. Pustejovsky argues that if an SEL is to adequately explain sense extensions and the creative use of words, then there must also be in the grammar some system-giving rise to the generation of new senses. There must be as many sense generators as there are derivative senses for how an adjective applies to noun an infinite number of such generators would be necessary, given an open corpus of usage.

2.4.3   Permeability of word senses

The first argument against sense enumerative models presented by Pustejovsky, illustrates the sense incompleteness problem of fixed senses. Sense enumeration is adequate as a descriptive mechanism (a dubious assumption), it is not always obvious how to select the correct word sense in any given context, consider the systematic ambiguity of verbs like bake which require discrimination with respect to change of state versus creation readings, depending on the context (a) versus (b) sentences respectively). Pustejovsky considers the following sentences:

(65)   a.   John baked the potatoes (change of state).

          b.   Mary baked a cake (creation).

Here, Pustejovsky points out that the one sense includes the other. The same holds for the other verbs in this sense alternation class such as cook and fry shown below.

(66)   a .   Mary <u>cooked</u> a meal.

        b.   Mary <u>cooked</u> the carrots.

(67)   a.   John <u>fried</u> an omelet.

        b.   John <u>fried</u> an egg.

For both (66) and (67), the object comes into existence by virtue of the process of cooking and frying, respectively, yet this is not different than the activity responsible for the edible food resulting in (66b) and (67b).

The problem here is, according to Pustejovsky, that there is too much overlap in the "core" semantic components of the different readings; hence it is not possible to guarantee correct word sense selection on the basis of selectional restrictions alone. Another problem with this approach is that it lacks any appropriate or natural level of abstraction. Pustejovsky argues that these examples demonstrate, partial overlaps of core and peripheral components of different word meanings make the traditional notion of word sense, as implemented in current dictionaries, inadequate.

Another problem for sense enumeration models of lexical knowledge is, according to Pustejovsky, their inability to adequately express the logical relations between senses in cases of logical polysemy. For example sense alternations involving nouns such as 'window' and 'door' which discussed previously were analysed as listing of sense pairs such as that given for window below.

(68)
$$\begin{bmatrix} \text{Window}_1 \\ \text{Category} = \text{Count noun} \\ \text{Genus} \quad = \text{Aperture} \end{bmatrix}$$

(69)
$$\begin{bmatrix} \text{Window}_2 \\ \text{Category} = \text{Count noun} \\ \text{Genus} \quad = \text{Physical object} \end{bmatrix}$$

The problem with this is according to Pustejovsky that the logical relation that exists between the things in the world denoted by the expressions is not expressed, and these senses are embodied in the use of the word as in (70) below.

(70)   John crawled through the broken window.

Pustejovsky states that another case of sense permeability involves adjectives which have complementary senses in well defined contexts. For example, adjectives like sad and happy are able to predicate of both individuals (71a) and (71b) as well as event denoting nouns (71c).

(71)   a.   The woman is $\underline{sad}_1$.

      b .   A $\underline{sad}_1$ woman.

      c .   A $\underline{sad}_2$ day / event / occasion

(72)   a.   The president is $\underline{afraid}_1$.

      b.   The $\underline{afraid}_1$ president.

      c.   The $\underline{afraid}_2$ day / event / occasion.

(73)   a.   The man is $\underline{frightened}_1$.

      b.   A $\underline{frightened}_1$ man.

      c.   An $\underline{frightened}_2$ day / event / occasion .

According to Pustejovsky we need to explain two things with such apparently polysemous adjectives. First, assuming these adjectives select for animate objects, what licenses the modification of a non-selected type such as a temporal interval?

(74)
$$\begin{bmatrix} \text{Sad}_1 \\ \text{Category} = \text{Adjective} \\ \text{ARG}_1 \quad = \text{Animate - ind} \end{bmatrix}$$

(75)
$$\begin{bmatrix} \text{Sad}_2 \\ \text{Category} = \text{Adjective} \\ \text{ARG}_2 \quad = \text{Animate - ind} \end{bmatrix}$$

Secondly, what constraints explain the inability of the adjectives in (74) and (75) to operate in a similar fashion? Within standard approaches to lexical semantics these data would

suggest two separate senses for each of these adjectives, one typed as predicating of animate objects and the other predicating of intervals. We must explain that "a sad day" is still interpreted relative to a human judging the events of that\interval as sad, and most naturally in causative relation. Pustejovsky argues that these adjectives do not take a prepositional object, except by adjunction, i.e. sad about that.

Pustejovsky maintains that the frighten adjectives being passive participles, are underlying relational, i.e. frightened of snakes, as are the afraid adjectives i.e. afraid of swimming. Only the non relational adjectives permit this shift in sense. Most of the interval or event denoting nominals carry a type of causative interpretation when modified by sad adjectives, a sad occasion is one that causes one to be sad, then the polysemy is similar to the inchoative / causative pairs such as break.

Another related type of adjectival polysemy addressed by Pustejovsky, involves modifiers such a noisy which predicates of an individual or of a particular location.

(76) a. A $\underline{noisy_1}$ car.

  b. The $\underline{noisy_1}$ dog.

  c. A $\underline{noisy_2}$ room.

  d. A $\underline{noisy_2}$ cafeteria.

Typical dictionary definitions will require at least two sense for the affective noisy: (a) an object making noise; and (d) a location accompanied by noise.

(77)
$$\begin{bmatrix} Noisy_1 \\ Cat \quad = adjective \\ ARG_1 = phys - obj \end{bmatrix}$$

(78)
$$\begin{bmatrix} Noisy_2 \\ Cat \quad = adjective \\ ARG_1 = location \end{bmatrix}$$

This representation does not according to Pustejovsky, do justice to the meaning of this adjective. For these are not unrelated senses, even with the location reading these is obviously a "noise maker" present. We need some mechanism to strongly type an adjective

like noisy, such that the first reading is somehow made available through a type of indirect modification.

2.4.4   Different in Syntactic Forms

Pustejuvsky argues that it is arbitrary to create separate word senses for a lexical item just because it can participate in district lexical realizations and yet has been the only approach open to computational lexicons which assume the ambiguity resolution framework. He considers the example of this is provided by verbs as 'believe' an 'forget'. The sentence in (79) – (83) show that the syntactic realization of the verbs complement determines how the preposition is interpreted semantically.

Pustejovsky states that the tensed – S complement, for example, in (79) exhibits a property called "facility" where the complement preposition is assumed to be a fact regardless of what modality the whole sentence carries. Sentence (82) contains a "concealed question" complement so called because the phrase can be <u>paraphrased</u> as a question. These different interpretation are usually encoded as separate senses of the verbs, with distinct lexical entries.

(79)   Madison Avenue is apt to <u>forget that</u> most folks are not members of the leisure class (factive)

(80)   But like many others, who have made the same choice, he <u>forgot to</u> factor one thing into his plans: Caliphobia (non- factive)

(81)   As for California being a states being run by liberal environmental loonies, let's not <u>forget where</u> Ronald Reagan came from (embedded question)

(82)   What about friends who <u>forget the</u> password or never got it? (concealed question)

(83)   He believes, <u>forgets this umbrella,</u> and comes back to get it (ellipsed non-factive).

Under the standard SEL model, these would correspond to the separate senses below, where appropriate feature have been introduced to distinguish the readings.

(84)

$$
\begin{bmatrix}
\text{Forget}_1 \\
\text{Category} = \text{verb} \\
\text{SEM} \quad = R_2 \, (\, \theta_1. \, \theta_2 \, [\text{- FACTIVE}]) \\[2em]
\text{ARG STR} = \begin{bmatrix} \text{ARG1} = \text{NP} \\ \text{ARG2} = \text{VP[+inf]} \end{bmatrix}
\end{bmatrix}
$$

$$
\begin{bmatrix}
\text{Forget}_2 \\
\text{Cat} \quad = \text{verb} \\
\text{SEM} = R_2 \, (\, \theta_1. \, \theta_2 \, [\text{+ infactive}]) \\[2em]
\text{ARG STR} = \begin{bmatrix} \text{ARG1} = \text{NP} \\ \text{ARG2} = \text{S [+ tns]} \end{bmatrix}
\end{bmatrix}
$$

$$
\begin{bmatrix}
\text{Forget}_3 \\
\text{Cat} \quad = \text{verb} \\
\text{SEM} = R_3 \, (\, \theta_1. \, \theta_2) \\[2em]
\text{ARG STR} = \begin{bmatrix} \text{ARG1} = \text{n p} \\ \text{ARG2} = \text{n p} \end{bmatrix}
\end{bmatrix}
$$

Pustejovsky states that sensitivity to facitivity would affect, for instance the interpretation by a question answering system: when asked Did Mary lock the door? Depending on whether the input was Mary <u>forgot that</u> she locked the door (factive) or Mary <u>forgot to</u> lock the door (non-factive) the answers should be Yes or No respectively. Such a distinction could according to

Pustejovsky, be easily accounted for by simply positing separate word senses for each syntactic type, but this misses obvious relatedness between the two instances of forget.

Pustejovsky considers another example illustrating the property of multiple sub-categorizations being associated with a common underlying meaning is the verb 'remember'.

(87)   The neighbour <u>remembered</u> to feed the dog (factive)

(88)   Mary can never <u>remember</u> where she leaves her car keys (embedded question)

(89)   Edith finally <u>remembered</u> her husband's name (concealed question)

(90)   Mary <u>remembered</u> the keys before she left (ellipsed factive)

According to Pustejovsky, these examples illustrate the inherent inability of Sense Enumeration Lexicons (**SEL**)to capture the relatedness between senses in the above examples without the addition of more powerful mechanisms such as meaning postulates.

2.4.5   <u>Semantic Expressiveness</u>

In order to help characterize the expressive power of natural languages in terms of semantic expressiveness, Pustejovsky states that it is natural to think in terms of semantic systems with increasing functional power. He proposes that a natural way of capturing this might be in terms of the semantic type system which the grammar refers to for its interpretation. Pustejovsky draws the following three-fold distinction:

<u>Monomorphic Languages</u>: A language where lexical items and complex phrases are provided a single (semantic) type and <u>denotation</u>.

<u>Unresticted Polymorphic Languages</u>: No restriction on the (semantic) type that a lexical item may assume. No operational distinction between sub classes of polymorphic transformations.

<u>Weakly Polymorphic Languages</u>: All lexical items are semantically active, and have a wider typed semantic representation than conventionally assumed, semantic operations of lexically determined type changing operate under well-defined constraints. What natural language data seem to require is a semantic system falling outside of monomorphic languages (ML), but

well below the language of unrestricted polymorphic languages (UPL), called weakly polymorphic languages (WPL):

2.4.6 Generative Lexical Model

According to Pustejovsky, a generative lexicon can be characterized as a system involving at least four levels of semantic representations. These include the notion of argument structure, which specifies the number and type of arguments that a lexical item carries, an event structure of sufficient richness to characterize the basic event type of a lexical items, a qualia structure, and a lexical inheritance structure, which identifies how a lexical structure is related to other structures in the dictionary however it is constructed. Pustejovsky **posits** that a set of generative devices connects these four levels providing for the compositional interpretation of words in context. The most important of these devices for Pustejovsky's discussion is a semantic transformation called type coercion, which captures the semantic relatedness between syntactically distinct expressions. In the construction of a semantic interpretation for a phrase or sentence, a lexical item is able to coerce an argument to the appropriate type only if that word or phrase has available to it, an interpretation of the expected type. Assuming that objects are represented within a typed semantic formalism, Pustejovsky defines type coercion as a semantic operation that converts an argument to the type which is expected by a function, where it would otherwise result in a type error.

2.4.7 Strong vs. Weak Compositionality:

Pustejovsky views the principle of compositionality as being satisfied in at least two ways, which he refers to as weak and strong compositionality. Briefly the distribution can be articulated as follows. Two parameters are important for characterizing semantic devices.

(A)   The degree of composition within an expression (i.e how much unilateral or bilateral function application occurs within a phrase).

(B)   How many explicitly defined senses are necessary to accomplish a unique interpretation of the phrase.

The first point Pustejovsky suggests, refers to how functionally the element in the phrase are treated, relative to the resulting interpretation. In most conventional approaches, only one element for each phrase is treated functionally.

The second point refers to the linguistic and logical tradition of simply multiplying senses on demand for new contexts, as needed to create new word senses. Pustejovsky emphasises that 'weak compositionality' gives rise to a system where the number of distinct lexical senses (i.e. lexical listings) needed in the lexicon rises propotional to the number of interpretations in the language. On the other hand 'strong compositionality' is on top of a simple type system are generative mechanisms, which through composition, produce the actual 'sense in context', non-lexically up the tree.

2.5   The Semantic Type System

2.5.1   Levels of Representation

Pustejovsky postulates that a generative lexicons as a computational system involving at least the following four levels of representations.

2.5.2   Argument structure

This is a specification of number and type of logical arguments, and how they are realized syntactically.

2.5.3   Event Structure

This is the definition of the event of a lexical item an a phrase. Sorts include the State, Process, and Transition, and events may sub-eventual structure.

2.5.4   Qualia Structure

This is the modes of explanation (or facets/aspects of word meaning) composed of Formal, Constitutive, Telic, and Agentive roles.

2.5.4.4 Lexical Inheritance Structure (LIS)

The LIS entails the identification of how a lexical structure is related to other structures in the type lattice, and its contribution to the global organization of a lexicon.

According to Pustejovsky, a set of generative devices connects these four levels, providing for the compositional interpretation of words in context. Included in these generative operations are the following semantic transformations, all involving well-formedness conditions on type combinations.

- Type Coercion: Where a lexical item or a phrase is coerced to a semantic interpretation by a governing item in the phrase, without change of its syntactic type.

- Selective Binding: Where a lexical item or phrase operates specifically on the substructure of a phrase, without changing the overall type in the composition.

- Co-composition: Where multiple elements within a phrase behave as functions, generating new non-lexicalised senses for the words in composition. These also in rules cares of under specified semantic forms becoming contextually enriched, such as manner co-composition, and feature transcription.

2.5.4.5   Argument Structure

The argument structure for a word can according to Pustejovsky be seen as a minimal specification of its lexical semantics. By itself it is inadequate for capturing the semantic characterization of a lexical item, but it is a necessary component. Arguments structure is the strongest determinant or constraint of the acquisition of verb meaning in child language acquisition.

2.5.4.6   Types of arguments for lexical items

Pustejovsky (1995) introduces a distinction between four types of argument for lexical items, here illustrated for verbs,

1. True Arguments: Syntactically realized parameters of the lexical item, e.g. "John arrived late"

2. Default Arguments: Parameters which participate in the logical expressions in the qualia, but which are not necessarily expressed syntactically e.g. "John built the house <u>out of bricks</u>"

3. Shadow Arguments: Parameters which are semantically incorporated into the lexical item. They can be expressed only by operation of subtyping or discourse specification, e.g. "Mary buttered her toast <u>with an expensive butter</u>"

4. True Adjuncts: Parameters which modify the logical expression, but are part of the situational interpretation, and are not tied to any particular lexical item's semantic representation. These include adjunct expressions of temporal or spatial modification, e.g. "Mary drove down to New York <u>on Tuesday.</u>

> True arguments define those parameters which a re necessarily expresed at syntax. This is the domain generally covered by Thematic role **i.e.**, the θ- criterion and other surface conditions on argument structure, as mentioned above. Verbal alternations between polysemous forms of a verb which result in the expression of true arguments should be distinguished from those alternations involving the expression of an optional phrase.

(91) a. <u>The window</u> broke.

  b. <u>John</u> broke <u>the window</u>.

(92) a. Mary carved <u>the doll</u> out of <u>wood</u>.

  b. Mary carved <u>the wood</u> into <u>a doll</u>.

  c. Mary carved <u>a doll</u>.

  d. ? Mary carved <u>the wood</u>.

> Because the expression or the material is optional, its status as an argument is different from the created object. Such optional arguments in alternations such as the material/product pair, Pustejovsky calls default arguments. They are necessary for the logical well formedness of the sentence, but may be left unexpressed in the surface syntax.

> Like default arguments, shadow arguments refer to semantic content that is not necessarily expressed in syntax, as with the incorporated semantic content in the verbs 'butter' and 'kick' in (93).

(93) a. Mary <u>buttered</u> her toast.

  b. Harry <u>kicked</u> the wall.

The "hidden argument" in (93a) is the material being spread on the toast, while in (93b) it is the leg which comes into contact with the wall. Unlike default arguments, however, which are optionally expressed due to conditions above the level of the sentence (i.e. discourse and contextual factors), shadow arguments are expressible only under specific conditions within the sentence itself, namely, when the expressed arguments stands in subtyping relation to the shadow argument observe the expressed shadow arguments in (94).

(94) a. Mary buttered he toast <u>with margarine</u> / with butter.

  b. Mary and John danced <u>a waltz</u> / * a dance.

  c. Harry kicked the wall <u>with his gammy leg</u> / * with his leg.

  d. Harry elbowed me <u>with his arthritic elbow</u> / * with his elbow.

Because the conditions under which these arguments can be expressed as so specific, Pustejovsky distinguishes them in logical type from the larger class of default arguments. The final class in Pustejovsky typology of argument types is defined more by complementarity than in terms of specific properties of the class, namely, adjuncts. Pustejovsky has little to say about this type or argument, except that they are associated with verb classes and not individual verbs. Hence, for example the ability of the verb 'sleep' to be modified by the temporal expression <u>on Tuesday</u> in (95a) is inherited by virtue. of verbs classification as an individuated event, similar remarks hold for the verb "see" and locative modifies such as in Boston in (95b).

(95) a. John slept late <u>on Tuesday</u>.

  b. Mary saw Bill <u>in Boston</u>.

The above classification is a first attempt at refining the distinction between argument and adjunct phrases. The theoretical consequences of this move are potentially significant, namely, it is not just the lexical properties of a single item which determine the logical status or a phrase as a certain argument type. Compositional operations may create an argument or shadow an argument at a phrasal projection, by virtue of compositionality in

the phrase. In other cases, a true argument is defaulted by virtue of complements semantics. For example, for the verb "show" the true argument expressing the goal argument in (96a), can be defaulted by virtue of the semantics of the complement, as in (96b) thereby becoming an optional argument.

(96) a. Mary showed her paintings to John.
     b. Mary showed a movie (to John).

There is, the phrase "show a movie" somehow denotes the otherwise true goal argument to a default argument, giving it an optional status in the syntax. Another consequences of this view of argument types is that default arguments can be satisfied by full phrasal expression as a PP or as a phrase incorporated into a true argument, as in (97b).

(97) a. Mary built a house <u>with wood</u>.
     b. Mary built a <u>wooden</u> house.

In fact, Pustejovsky suggests, when this occurs, the material is expressible as a shadow argument, as in (98) below.

(98) Mary built a <u>wooden</u> house <u>out of pine</u>.

(99)
$$\begin{bmatrix} \text{butter} \\ \text{ARG STR} \quad \begin{bmatrix} \text{ARG}_1 & = \text{human} \\ \text{ARG}_2 & = \text{Phys} - \text{object} \\ \text{S-ARG}_1 = \text{butter} \end{bmatrix} \end{bmatrix}$$

(100)
$$\begin{bmatrix} \text{kick} \\ \text{ARG STR} = \begin{bmatrix} \text{ARG}_1 & = \text{Animate - individual} \\ \text{ARG}_2 & = \text{Phys} - \text{object} \\ \text{S-ARG}_1 = \text{leg} \end{bmatrix} \end{bmatrix}$$
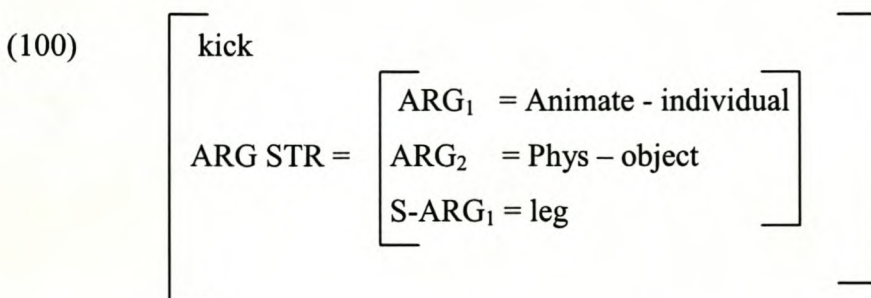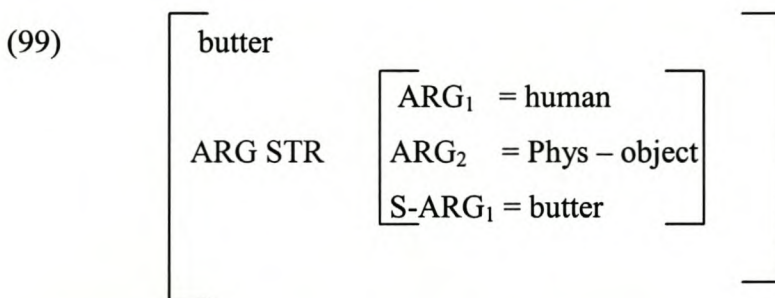
2.5.4.7   **Extended Event Structure**

Pustejovsky points out that it has become quite standard to acknowledge the role of events in verbal semantics. Conventionally, the event variable for a verb within an event based semantics is listed as a single argument along with the logical parameter defined by a particular predicate or relation. It is assumed that events can be sub-classified into at least three sorts: processes, states and transitions.

Pustejovsky assumes that a sub-eventual structure to these event sorts as well. This has the advantage of allowing principles of predicate – argument binding to refer to sub-events in the semantic representation, a move which has significant theoretical consequences. Pustejovsky states that evidence from unaccusativity and the varied nature of causative constructions shows that this notion of event structure does not fully capture the underlying semantics of unaccusative constructions with respect to how the sub-events project to syntax. He distinguishes the following three event types:

(i)   State (S): A single event, which is evaluated relative to no other event. Examples: be sick, love, know.
Structural representation:

$$
\begin{array}{c}
\text{S} \\
| \\
\text{e}
\end{array}
$$

(ii)   Process (P): A sequence of events identifying the same semantic expression. Examples: run, push
Structural representation:
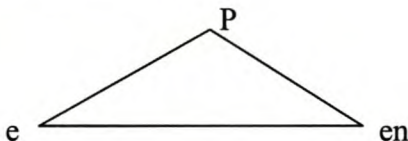
Pustejovsky assumes that when P is a process verb then if the semantic expression 'P' identified with P is true as an interval I, then 'P' is true for all sub intervals of I larger than a moment.

(iii) Transition (T): an event identifying a semantic expression, which is evaluated relative to its opposition. Examples: give, open, build, destroy. Structural representation (Where E is a variable for an event type).

$$
\begin{array}{c}
T \\
\diagup \diagdown \\
E_1 \qquad E_2
\end{array}
$$
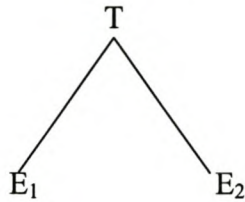
As in the case of argument structure, it is now also possible to give a listing of an event structure represented as a listing of event variables:

(101)   [ARG STR   = ARG_1, ARG_2 ……………, $ARGn$]

[EVENTSTR = $EVENT_1$, $EVENT_2$,………., $EVENTn$]

For example the verb "build" is typically analyzed as involving a development <u>process</u> and resulting <u>state</u>.

(102)

$$
\left[
\begin{array}{l}
\text{build} \\
\qquad\qquad E_1 = \text{Process} \\
\text{EVENTSTR} = E_2 = \text{State}
\end{array}
\right]
$$

Unlike 'build' however, which constrains the types of its two sub events to Process and State, the verb accompany permits either telic events, Transitions, or Processes:

(103)

$$
\left[
\begin{array}{l}
\text{Accompany} \\
\qquad\qquad E_1 = T_1 \\
\text{EVENTSTR} = E_2 = T_1
\end{array}
\right]
$$

A verb like 'think' will have one event:

   [E_1 = state]

Pustejovsky maintains that verbs like 'examine' will also have one event

[E_1 = Process]

A verb like 'sculpture' will have transition as an event:

[E_1 = transition]

However, verbs such as 'connect', 'toast' may have two events

[E_1 = Process]

[E_2= state   ]

Thus, the process will change something into a state, i.e. two things are now connected or toasted, thus referring to state.

2.5.4.8   Qualia Structure

Pustejovsky (1995) outlines the structured representation which gives the relational force of a lexical item called the qualia structure. In some sense, a generative lexicon analyzes all lexical items as relational to a certain degree, but the manner in which this property is expressed functionally will of course differ from category, as well as between semantic classes. Qualia structure specifies four essential aspects of a word's meaning (or qualia).

- Constitutive: the relation between an object and its constituent parts.
- Formal: that which distinguishes it within a larger domain.
- Telic: its purpose and function;
- Agentive: factors involved in its origin or "bringing it about"

These qualia are, according to Pustejovsky, in fact structures very much like phrase structural descriptions for syntactic analysis which admit of something similar to transformational operations in order to capture polymorphic behavior as well as sense creation phenomena. There are two general points that should be made concerning qualia roles:

(1)   Every category expresses a qualia structure.

(2)   Not all lexical items carry a value for each qualia role:

Pustejovsky states that the first point is important for how a generative lexicon provides a uniform semantic representation compositionally form all elements of a phrase. This view of qualia structure is a natural extension of the original applications where qualia for verbal representations were not discussed. The second point allows Pustejovsky to view qualia as applicable or specifiable relative to particular semantic classes. For example, in

order to understand what nouns such as 'cookie' and 'beer' mean, Pustejovsky recognizes that they are food stuff and a beverage, respectively. While 'cookie' is a term that describes a particular kind of object in the world, the noun foodstuff denotes by making functional reference to what a person does with something, i.e. how he uses it. In this case, the term is defined in part by the fact that food is something one eats, for a specific purpose, and so on. Similar remarks hold for the information related with the noun 'beer'.

The Telic quale for the noun 'food' encodes this functional aspect of meaning, represented informally as [Telic = eating]. Likewise, the distinction between semantically related nouns such as 'novel' and 'dictionary' stems from what a person does with these object that is different. Pustejovsky employs a generic feature structure as the initial representation for the qualia structure. For a lexical item α, Pustejovsky first characterizes the roles as given in (104).

(104)

$$\begin{bmatrix} \alpha \\ \\ \text{Qualia} \begin{bmatrix} \text{CONST} & = \ldots\ldots \\ \text{FORMAL} & = \ldots\ldots \\ \text{TELIC} & = \ldots\ldots \\ \text{AGENT} & = \ldots\ldots \end{bmatrix} \end{bmatrix}$$
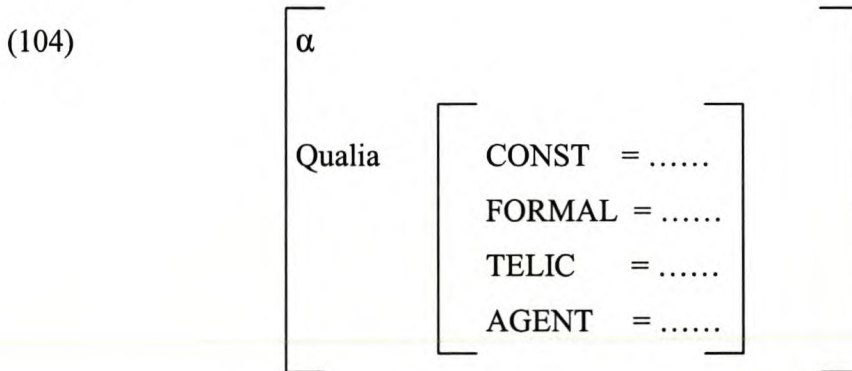
Pustejovsky points out that the listing above tells nothing about how a particular lexical item denotes, however. For example, although a novels purpose is the activity of reading and it comes about by someone writing it, the common noun 'novel' actually denotes such activities. Therefore, Pustejovsky states, one cannot simply list the qualia values for an item, such as in (105) even though they are intuitively correct, without somehow binding them appropriately.

(105)

$$\begin{bmatrix} \text{Novel} \\ \\ \text{Qualia} & = \begin{bmatrix} \text{CONST} & = \text{Narrative} \\ \text{FORMAL} & = \text{book} \\ \text{TELIC} & = \text{reading} \\ \text{AGENT} & = \text{Writing} \end{bmatrix} \end{bmatrix}$$
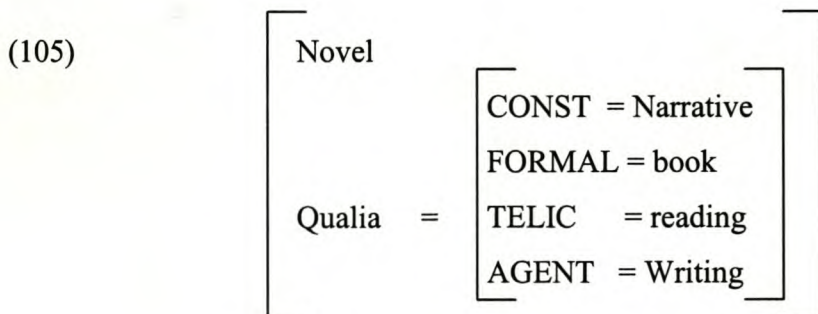
According to Pustejovsky, the noun 'novel' should predicate in some fairly conventional way but in particular contexts, it should permit of interpretations that are licensed both by local syntactic and semantic context as well as reconstruction from the semantics of the word, as with sentences such as 'Mary enjoyed the novel'. The solution of these concerns is to treat the qualia values as expessious with well defined types and relational structures. For example, the arguments to the relation 'read' are explicitly given in (106), indicating the proper binding of the predicating term:

(106)

$$\begin{bmatrix} \text{Novel} \\ \\ \text{Qualia} = \begin{bmatrix} \text{FORMAL} = \text{book (x)} \\ \text{TELIC} \quad = \text{read (y,x)} \end{bmatrix} \end{bmatrix}$$
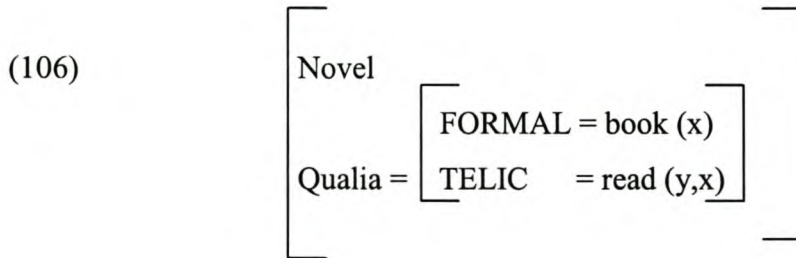
Given the representation in (106), Pustejovsky argues, it is possible to see where contextual information comes from, in order to derive the "Sense in context" effect, illustrated below with the verbs 'begin' and 'finish'

(107)   a.   Mary <u>began</u> a novel.

      b.   John <u>finished</u> the cigarette.

      c.   John <u>began</u> his second beer.

Pustejovsky maintains that qualia structure enables nouns, and consequently the NPs containing them, to encode information about particular properties and activities associated with them. This in turn will provide the verbs which governs the complement NP with the information required for contextualizing the 'sense' of begin or finish. Pustejovsky distinguishes broadly how modes of explanation map into a verb's event structure. Intuitively, stative predicate corresponds to the Formal role in the qualia structure, e.g. that state of affairs which exists, without reference to how it come about. For example the predicate 'tall' might be represented as in (108), ignoring the details of argument structure.

108)

$$\begin{bmatrix} \text{tall} \\ \text{EVENT STR} = [E_1 \quad = e,: \text{ state}] \\ \text{Qualia} \qquad = [\text{FORMAL} = \text{tall } (e_1,X)] \end{bmatrix}$$

Pustejovsky argues in that the distinction between stage-level and individual level predicates is actually not one of event type, but rather is a qualia based distinction, where stage-level predication involves reference to the bringing into being of the resulting state, i.e. the Agentive quale.

Pustejovsky considers next the qualia structure associated with causative predicates (i.e. Transitions). These verbs are typically analyzed as involving an initial act or process followed by a resulting state. These two phases map directly into the Agentive and Formal qualia roles, respectively. The transitive form of the verb 'break' is illustrated in (109).

(109)

$$\begin{bmatrix} \text{break} \\ \begin{bmatrix} E1 \quad = e_1 : \text{ Process} \\ E2 \quad = e_2 : \text{ state} \\ \text{RESTR} = < \alpha \end{bmatrix} \\ \begin{bmatrix} \text{FORMAL} \quad = (e_2,y) \\ \text{AGENTIVE} = \text{break} - \text{act } (e_1,x,y) \end{bmatrix} \end{bmatrix}$$

Finally, predicates denoting a process are distinguish according to which mode of explanation the predicate is associated with. Pustejovsky considers here only the distinction between AGENTIVE and FORMAL processes. Many languages distinguish active and passive classes of processes, where Pustejovsky includes verbs of motion such as 'run' and 'move', while includes verbs such as 'sleep' and snore. He points out that this distinction is not necessary isomorphic to an unaccusative/unergative distinction in a language. The qualia structure for the active process class is illustrated below, with the verb 'run'. For example, the verb 'run' carries the qualia structure in (110) while the passive process verb 'sleep' has the structure in (111)

(110)

$$
\begin{bmatrix}
\text{run} \\
[\text{EVENT STR} = [E_1 = e_1: \text{Process}] \\
\\
\text{Qualia} \qquad = [\text{AGENTIVE} = \text{run} - \text{act } (e_1, x)]
\end{bmatrix}
$$

$$
\begin{bmatrix}
\text{Sleep} \\
\text{EVENT STR} = [E_1 = e_1: \text{Process}] \\
\\
\text{Qualia} \qquad = [\text{FORMAL} = \text{Sleep } (e_1, x)]
\end{bmatrix}
$$

Pustejovsky states that the relevance of this distinction in qualia binding is that processes are quantifiable in different ways, one of which is to specify explicitly the resulting state in the FORMAL role, by means of co-composition. This is possible only with active processes, and is illustrated with constructions such as 'run' to the 'store' and run home. Quantification of passive processes generally does not allow the cognate construction, and is limited to modification by durative adverbials, as in 'sleep for an hour, cough all night'.

2.5.4.9   **The Interaction of Semantic Levels**

Pustejovsky assumes, that semantic class information may be inherited by subtyping specifications, providing constraints on the types of arguments. There are three arguments associated with the verb: two True Arguments and one Default, where Pustejovsky analyzes the verb 'build' as lexical accomplishment, containing two sub-events, a process and a resulting state. These are bound to the qualia in the representation below:

$$
\text{build}
\begin{bmatrix}
\text{EVENT STR} =
\begin{bmatrix}
E_1 = e_1: \text{ Process} \\
E_2 = e_2: \text{ state} \\
\text{RESTR} = <\alpha \\
\text{HEAD} = e_1
\end{bmatrix} \\[2em]
\text{ARG STR} =
\begin{bmatrix}
\text{ARG1} = \boxed{1}
\begin{bmatrix}
\text{Animate ind} \\
\text{FORMAL} = \text{Phys obj}
\end{bmatrix} \\[1.5em]
\text{ARG2} = \boxed{2}
\begin{bmatrix}
\text{Artifact} \\
\text{CONST} = \boxed{3} \\
\text{FORMAL} = \text{Phys obj}
\end{bmatrix} \\[1.5em]
\text{D-ARG1} = \boxed{5}
\begin{bmatrix}
\text{MATERIAL} \\
\text{FORMAL} = \text{MASS}
\end{bmatrix}
\end{bmatrix} \\[3em]
\text{QUALIA} =
\begin{bmatrix}
\text{Create 1 cp} \\
\text{FORMAL} = \text{exist} (e_2, \boxed{2}) \\
\text{AGENTIVE} = \text{build} - \text{act} (e_1, \boxed{1}, \boxed{3})
\end{bmatrix}
\end{bmatrix}
$$
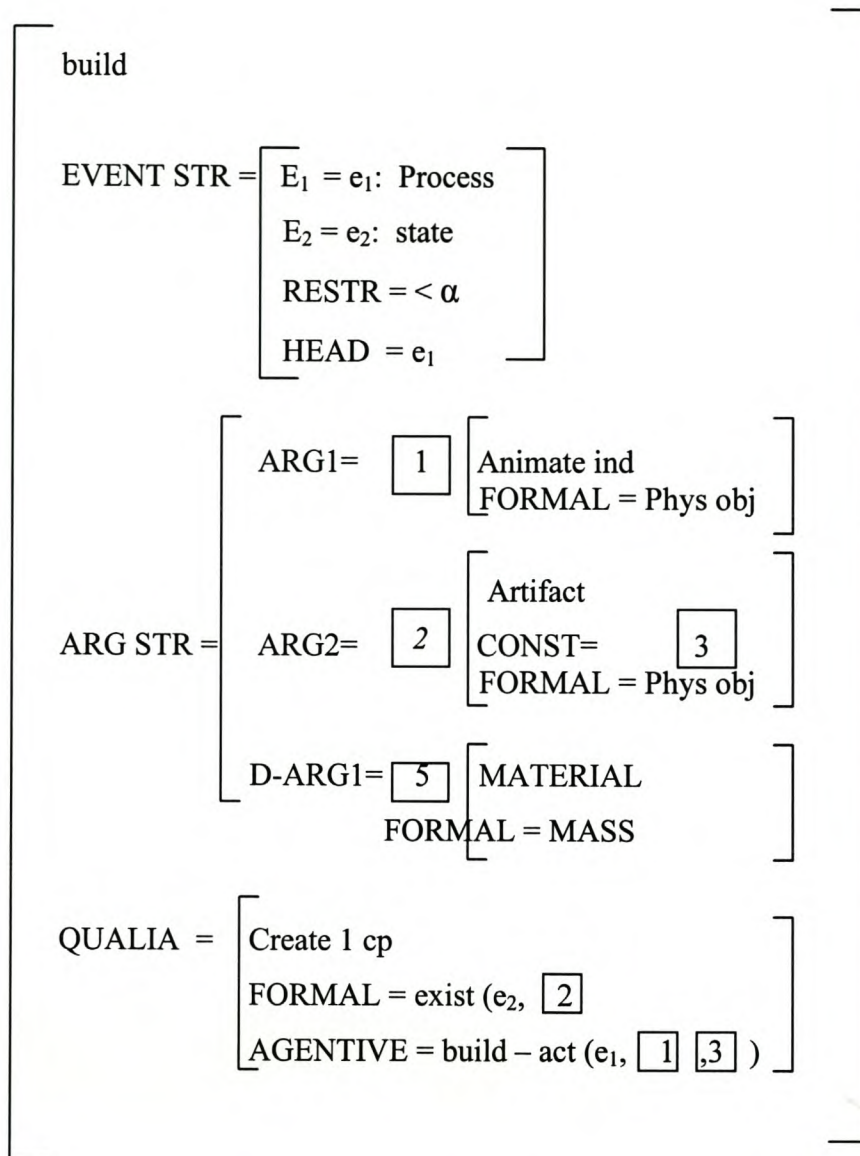
According to Pustejovsky, the process is identified as that of AGENTIVE Act involving both the deep syntactic subjects, ARG1, and the default argument D-ARG1, which is related to the logical object by the CONSTITUTIVE relation of ARG-2. The FORMAL role expresses the resulting state of there being such an object ARG-2. Since this individual is defined as a being made of the material of the default argument D-ARG1, and yet is logically distinct form, as suggested in 5.3 above, these are two possibilities for existential closure on such an event sentences, as illustrated in (112) and (113).

(112)   John is building a house.

(113)   John built a house.

2.5.4.10   Generative Mechanisms in Semantics

Pustejovsky considers the consequences of adopting a generative lexical approach to semantics, and the subsequent effect this has on the grammar in general. Pustejovsky and the other researchers outlined the overall structure of the typing system incorporating the four levels of representations, as well as more detailed examination of the semantics of qualia. His goal is to see what machinery is necessary in order to made use of the representations presented i.e. event structure, qualia structure and argument structure with dotted types, so that the criteria of descriptive and explanatory adequacy can be satisfied for the semantic theory.

2.5.4.11   Coercion and Type shifting

Pustejovsky points out that type shifting was first introduced as a way of allowing operators such as negation and conjunction to change type according to what they modified or took as arguments. The verb begin, given below in some what incomplete form, the typing on the second argument is explicitly given as an event.

(114)

$$
\begin{bmatrix}
\text{begin} \\[2pt]
\text{EVENT STR} = \begin{bmatrix} E_1 = \text{transition} \\ E_2 = \text{transition} \\ \text{RESTR} = <\ {}^{o}\alpha \end{bmatrix} \\[10pt]
\text{ARG STR} \quad = \begin{bmatrix} \text{ARG}_2 = X : \text{human} \\ \text{ARG}_1 = e_2 \end{bmatrix} \\[10pt]
\text{Qualia} \quad = \begin{bmatrix} \text{FORMAL} = P(e_2, X) \\ \text{AGENTIVE} = \text{begin-act}\,(e_1 x, e_2) \end{bmatrix}
\end{bmatrix}
$$

This states that the complement to begin is actually an event of some sort. Regardless of the surface syntactic forms of the complement, the semantic typing environment is the same, namely an event. Where that type is not directly satisfied as in (114) a coercion applies to reconstruct the semantics of the complement.

2.6   Qualia Structure

Here's Pustejovsky addresses some assumptions about how lexical items encode semantic information in the qualia, and what the qualia structure conveys. He aims to explore more fully the syntax of qualia structure and what its descriptor and explanatory role can be in a theory of word meaning and compositionality.

2.6.1   Qualia as Modes of Explanation

Pustejovsky notes that Arrisotle's notion of modes of explanation (or generative factors), can be viewed as a system of constructive understanding and inference. These four factors of qualia structure drive the basic understanding of an object or a relation in the world. They further contribute to the ability to name an object with a certain predication.

In below, the qualia are given an informal interpretation with possible values that each role may assume.

1. Constitutive: the relation between an object and its constituents or proper parts.

(i)   Material.
(ii)   Weight.
(iii)   Parts and component elements.

2. Formal: That which distinguishes the object within a larger domain.

(i)   Orientation.
(ii)   Magnitude.
(iii)   Shape.
(iv)   Dimensionality.
(v)   Colour.
(vi)   Position.

3. Telic: Purpose.

(i)   Purpose that an agent has in performing an act.

(ii)   Built in function or aim which specifies certain activities.

4. Agentive: Factors involved in the origin or "bringing about" of an object

(i)   Creator.

(ii)   Artifact.

(iii) Natural kind.

There are, according to Pustejovsky, many ways of approaching the definition of a word, and qualia might seem at first to be a simple listing of case roles or named features associated with lexical items. Pustejovsky combines the qualia structure of an NP with that of a notion of compositionality emerging one which captures the creative use of words and the "sense in context". He considers for example how the NP's, both in subject and complement position contribute towards further specifying the interpretation of the verb use in the sentence in (115) and the NPs in (116) below.

(115)   a. John used the new knife on the turkey.

         b. Mary has used soft contract lenses since college.

         c. This car uses unleaded gasoline.

         d. My wife uses the subway every day.

(116)   a. The toners used in copying machines.

         b. The yeast used in beer.

In sentence (115a), Pustejovsky states, knives are tools which can cut permits an economy of expression, whereby mention of the particular activity of cutting may be ellipsed. In (115b) contact lenses are visual aids, and the use of them refers to the act of wearing them. The utility of a verb such as 'use' is that it is semantically 'light'. Pustejovsky refers to a simply underspecified with respect to the particular activity being performed. Sentence (115d) is a near paraphrase of " My wife travels on the subway every day, an interpretation that is made possible by the knowledge of what the function of subway is. The NP's in (116) show an interesting sense distinction, where the objects in (116a) are understood as standing in a

functional part of relation, while in (116) the substance is interpreted as being part of the material used for the process of making beer.

(117)   a.   Mary <u>enjoyed</u> the movie last night. (watching)

        b.   John quite <u>enjoys</u> his morning coffee. (drinking)

        c.   Bill <u>enjoyed</u> Steven King's last book. (reading)

Pustejovsky argues that the qualia of an object can be seen as the initial points from which to construct interpretations that would otherwise be ill-formed. The Telic roles for 'movie', 'coffee' and 'book' somehow project the activities of watching the movie, drinking his morning coffee, and reading Steven King's last book, respectively to the interpretation of the VP. For example, Pustejuvsky states in (118) there are two factors contributing to the interpretation of the ellipsed predicate, the qualia structures associated with the subject NP and the double object NPs. The complements are identified as names of airports, thereby allowing a default co-compositional interpretation of landing, taking off, and so on.

(118)   a.   Most commercial pilots <u>prefer</u> Kennedy to Logan.

        b.   Most commercial pilots <u>prefer</u> New York to Boston.

Although this interpretation is also available for sentence (4a) it is more easily defensible since under this reading the complements must inherit the sortal typing of airport in the composition of the sentence. In (119) below, where the most likely interpretation is one, that is not suggested by the VP semantics.

(119)   a.   Midwestern fish farmers are <u>preferring</u> catfish this year.

        b.   Book sellers usually <u>prefer</u> cookbooks to textbooks around Christmas.

It is not the case that fish farmers are preferring to eat catfish and the book sellers are preferring to read the books, but rather the farmers are raising the fish and the book sellers are selling the books. The Telic roles from the agentive nominals in these examples seem to <u>override</u> any VP internal interpretation available. Pustejuvsky considers the phenomenon of adjectival sub-modification .

(120)   a.   A <u>bright</u> bulb.

   b.   An <u>opaque</u> bulb.

(121)   a.   A <u>fast</u> typist.

   b.   A <u>male</u> typist.

The adjectives 'bright' and 'fast' in these examples are according to Pustejovsky, actually event predicates, modifying some aspect of the head noun, they each seem to make reference to a qualia derived event associated with the noun. For a bulb, this is obviously reference to what function the bulb has namely, its Telic role which would be illumination. For an agentive nominal such as 'typist', the Telic makes direct reference to the process denoting verb from which the nominal is derived. The adjectives 'opaque' and 'male' on the other hand make reference to the Formal role of the head. It appears as though adjectives are able to subselect on the basic of typing information contained within the qualia structure of the phrases they modify.

2.6.2   The Qualia Structure of Nominals

Pustejovsky also explores in more detail the semantic typing system necessary to characterize the semantics of NPs and in particular the logically polysemous behaviour of nominals such as 'window' and 'door'. The approach taken here is to introduce the analysis of a category in terms of the four levels of representation. He shows how fine-grained distinction are possible in the semantic behaviour of nominal type based on the interaction of argument and qualia structures. Pustejovsky assumes a system based on typed feature structure as applied to lexical structures. The type system includes the type hierarchy and the constraint system operating over the types.

Pustejovsky focuses on the linguistic aspects of how a generative lexicon makes use of typed feature structures.
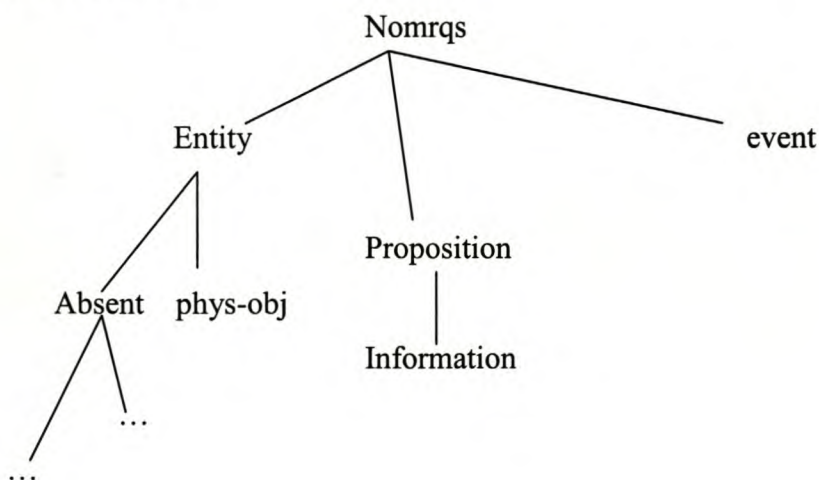
Pustejovsky discusses the problem of logical polysemy and how nominals such as 'window' and 'door' in sentence (122) and carry two distinct interpretations, each logically related to the other:

(122)   a. John crawled though <u>the window</u>

        b. Mary broke <u>the window</u>

(123)   a. Mary painted <u>the door</u>.

        b. Mary walked through <u>the door</u>.

The ability of a lexical item to cluster multiple senses is what Pustejovsky refers to as a Lexical Conceptual Paradigm (1 cp). The intuition behind the notion of an 1cp is that there is something inherent in the semantics of a noun such that it is able to project any of three separate senses of the noun in distinct syntactic and semantic environments. That is, the listing of the nouns in these separate environments is similar to a paradigmatic behaviour.

The Lexical Conceptual Paradigm (1cp) provides a means of characterizing a lexical item as a Meta-entry. This turns out according to Pustejovsky, to be very useful for capturing the systematic ambiguisties which are so pervasive in language. As discussed nouns such as 'newspaper' appear in many semantically distinct contexts, able to function sometimes as an organization, a physical object, or the information contained in the articles within the newspaper.

2.7 <u>Generative Mechanism in Semantics</u>

Pustejovsky considers the consequences of adopting a generative lexical approach to semantics, and the subsequent effect this has on the grammar in general. His goal is to see what machinery is necessary in order to make use of the representations presented, i.e. event structure, qualila structure, and argument structure with dotted type, so that the criteria of descriptive and explanatory adequacy can be satisfied for the semantic theory. The generative operations posited by Pustejovsky, include the semantic transformations of type coercion, selective binding and co-composition.

2.7.1   Coercion and type shifting

Pustejovsky states type shifting was first introduced in research developed the mechanisms to allow an NP, or any expression, in general, to change its type, depending on the context. The utility of this proposal is according to Pustejovsky, that it allows the researchers to maintain a compositional semantics while also accounting for the different manifestation of an expression in a principled way.

2.7.1.1   Parametric Polymorphim and Type shifting

The example of conjunction is, according to Pustejovsky, the most obvious type shifting phenomenon in natural language, and for this reason, such lexical items are said to be parametric polymorphic, for example in English, and is generally viewed a being able to conjoin almost any category at any bar level. Pustejovsky considers the classic example illustrating type shifting within this operation is given in (124), where an individual Peter, of type is coordinated with a quantified NP.

(124)   Peter and every child arrived.

(125)   (a) Peter believes Jane to be honest.

          (b) Peter believes that Jane is honest.

(126)   (a) Jane prefers to program in common ship.

          (b) Jane prefers for her students to program in commonship.

(127)   Type Coercion: A semantic operation that converts an argument to the type which is expected by a function, where it would otherwise result in a type error.

Pustejovsky maintains that all expressions in the language can be assigned a base type, while also being associated with a specific type ladder. If, however, the appropriate type is not present in complement position, it is coerced by the verb to match the type required by typing restrictions on the verb. According to Pustejovsky, the tree in (128) below illustrates the relation between the "deep semantic type" and the syntactic realizations.

(128)

$$\text{[Prop]}$$

Coercion   S [+ INF]   Coercion

UP [+ INF]
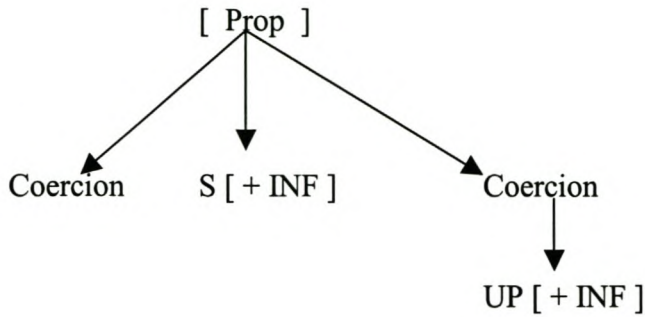
2.7.1.2   Subtype Coercion

Pustejovsky argues that the simplest case of coercion is the one involving a very specific kind of semantic shifting, namely the case of subtype coercion. The formal properties accompanying types and subtypes are well known in the semantics and knowledge representation literature. Consider the example, the sentence in (129b) below, where both subject and object NPs are subtypes of the sortal specifications to the arguments of the verb.

(129)   (a) Mary drives a Honda to work.

(b) Tom read the tractatus on holiday.

$$
\begin{bmatrix}
\text{Car} \\
\text{ARGSTR} = [\text{ARG1} = x: \text{vehicle} \\
\\
\text{Qualia} = \begin{bmatrix} \text{FORMAL} = x \\ \text{TELIC} = \text{drive } (e,y,x) \\ \text{AGENTVE} = \text{Create } (e,z,x) \end{bmatrix}
\end{bmatrix}
$$

(130)

$$
\begin{bmatrix}
\text{Honda} \\
\text{ARGSTR} = [\text{ARG1} = x, \text{car} \\
\\
\text{Qualia} = \begin{bmatrix} \text{FORMAL} = x \\ \text{TELIC} = \text{drive } (e,y,x) \\ \text{AGENTVE} = \text{Create } (e, \text{Honda } -Co, x \end{bmatrix}
\end{bmatrix}
$$
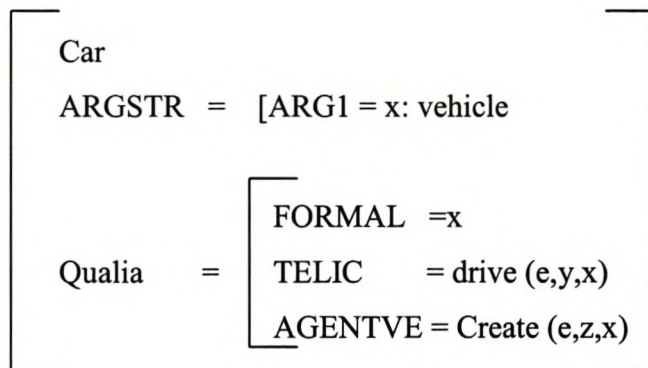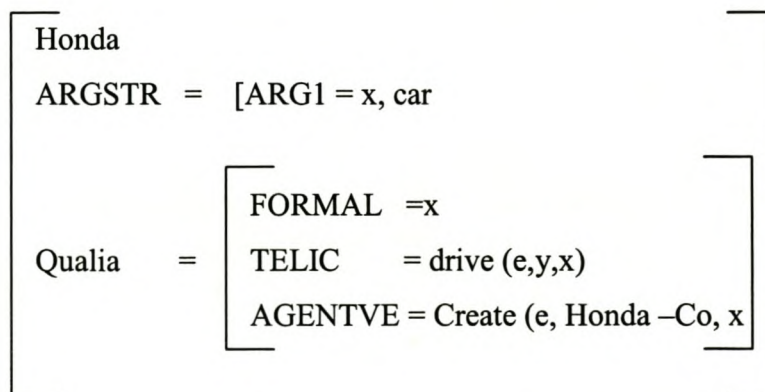
Pustejovsky argues that the internal type selected by the verb in sentence (129) is vehicle, as illustrated below in the lexical representation for drive; then the selectional requirements can be satisfied just in case there exists the susbtyping relation mentioned above, which acts to formally relate the type of the actual object to the lexically specified type.

(131)

$$
\begin{bmatrix}
\text{drive} & & \\
\text{EVENSTR} = & \begin{bmatrix} E_1 & =: \text{Process} \\ E_2 & =: \text{Process} \\ \underline{\text{RESTR}= < \quad O\infty} \end{bmatrix} \\
\text{ARG STR} = & \begin{bmatrix} \text{ARG}_1 = x : \text{human} \\ \text{ARG}_2 = y : \text{vehicle} \end{bmatrix} \\
\text{Qualia} = & \begin{bmatrix} \text{FORMAL} = \text{move } (e_2, y) \\ \text{AGENTIVE} = \text{act } (e_1, x, y) \end{bmatrix}
\end{bmatrix}
$$

2.7.1.3   True Complement Coercion

Pustejovsky states that true type coercion involves the strict shifting on one to another specified type, licensed type, licensed by lexical governance. Furthermore, the shift is not arbitrary, but embeds the existing type into the resulting type by the proper coercion operation.

(132)   a. Jane wants a beer.

       b. Jane wants a cigarette.

(133)   a. Jane enjoyed the movie.

       b. Jane enjoyed watching the movie.

(134)   a. John began a book.

       b. John began reading a book.

       c. John began to read a book

In order to capture the semantic relatedness of these different verbs forms, Pustejovsky invokes a coercion rule to ensure that the semantic type of the verb is satisfied in all these

cases, regardless of syntactic form. For a lexical structure such as that associated with the verb begin, given below in a somewhat incomplete form, the typing on the second argument is explicitly given as an event.

(135)

$$
\begin{bmatrix}
\text{begin} \\
\text{EVENSTR} \quad = \quad
\begin{bmatrix}
E_1 \quad = : \text{transition} \\
E_2 \quad = : \text{transition} \\
\text{RESTR} = \ < \ O\propto
\end{bmatrix} \\
\text{ARG STR} \quad = \quad
\begin{bmatrix}
\text{ARG}_1 \ = \ x : \text{human} \\
\text{ARG}_2 = \ e_2
\end{bmatrix} \\
\text{Qualia} \quad = \quad
\begin{bmatrix}
\text{FORMAL} \ = \ P(e_2, x) \\
\text{AGENTIVE} = \text{begin -act}(e_1, x, \underline{e_2})
\end{bmatrix}
\end{bmatrix}
$$

This states that the complement to 'begin' is actually an event of some sort. Where that type is not directly satisfied, as in (134c) or (134b), a coercion appliers to reconstruct the semantics of the complement.

(136)

$$
\begin{bmatrix}
\text{book} \\
\text{ARGSTR} \ = \quad
\begin{bmatrix}
\text{ARG1} = x : \text{info} \\
\text{ARG2} = y : \text{phys obj}
\end{bmatrix} \\
\text{Qualia} \quad = \quad
\begin{bmatrix}
\text{info. Phys obj} - cp \\
\text{FORMAL} \quad = \text{hold}(y, x) \\
\text{TELIC} \qquad = \text{read}(e, w, x, y) \\
\text{AGENT} \qquad = \text{write}(e, v, x, y)
\end{bmatrix}
\end{bmatrix}
$$

According to Pustejovsky, because the NP a book does not satisfy the type required by the predicate 'begin', the verb coerces the NP into an event denotation, one which is available from the NP's qualia structure, through qualia projection. There are two event readings associated with this NP, namely the values of the Agentive and Telic qualia roles.

2.7.2   <u>Co-composition</u>

According to Pustejovsky, co-composition describes a structure which allows, superficially, more than one function application. In (137) below, the verb 'bake' has two meanings, both a change of state sense and a creation sense.

(137)   a.   John <u>baked</u> the potato.

        b.   John <u>baked</u> the cake.

Similarly, the verb in (138) - (141) are ambiguous between a process reading and transition reading, depending on the presence of a resultative adjectival. Normally, lexicons would have to enter both forms as separate lexical entries.

(138)   a.   Jane <u>wiped</u> the table.

        b.   Jane <u>wiped</u> the table dry.

(139)   a.   John <u>hammered</u> the metal.

        b.   John <u>hammered</u> the metal flat.

(140)   a.   Jane <u>waxed</u> the car.

        b.   Jane <u>waxed</u> the car clean.

(141)   a.   Jane ate.

        b.   Jane ate herself sick

Pustejovsky proposes that the complements carry information verb, essentially taking the verb as argument and shifting its event type. He assumes that the lexical structure for a verb such as 'bake' is that given below.

(142)

$$
\begin{bmatrix}
\text{bake} \\
\text{EVENTSTR} = \quad \text{E1 --1} \begin{bmatrix} \text{Process} \\ \text{HEAD} = \text{e-1} \end{bmatrix} \\[2em]
\text{ARGSTR} \quad = \begin{bmatrix} \text{ARG1} = \text{®} \begin{bmatrix} \text{FORMAL} = \text{Phys obj} \end{bmatrix} \\[1em] \text{ARG2} = \text{©} \begin{bmatrix} \text{Mass} \\ \text{FORMAL} = \text{Phys obj} \end{bmatrix} \end{bmatrix} \\[2em]
\text{Qualia} \quad = \begin{bmatrix} \text{State -- change - 1 cp} \\ \text{AGENTIVE} = \text{bake -- act (e1)} \text{®}, \text{©} \end{bmatrix}
\end{bmatrix}
$$

(143)

$$
\begin{bmatrix}
\text{Cake} \\
\text{ARGSTR} \quad = \begin{bmatrix} \text{ARG1} = \text{x: food-ind} \\ \text{D-ARG1} = \text{y: mass} \end{bmatrix} \\[2em]
\text{Qualia} \quad = \begin{bmatrix} \text{CONST} = y \\ \text{FORMAL} = x \\ \text{TELIC} = \text{eat (e2, z, y)} \\ \text{AGENTIVE} = \text{bake -- act (e1,w,y)} \end{bmatrix}
\end{bmatrix}
$$

The <u>AGENTIVE</u> makes reference to the very process within which it is embedeted in this phrase, a relation which Pustejovsky calles <u>co specification</u>.

2.7.3   <u>Selective Binding</u>

Pustejovsky returns to the problem of adjectival polysemy. Consider the examples below:

(144)   a.   He will need a <u>fast</u> boat to get back in time.

        b.   John is a <u>fast</u> typist

        c.   <u>Fast</u> drivers will be caught and ticketed.

(145)   a.   The man is <u>sad</u>.

        b.   John is a <u>sad</u> man.

        c.   That was truly a <u>sad</u> day (event, occasion).

According to Pustejovsky, the standard view on selection within an SEL for these types of adjectives is to enumerate the senses. In predicate position, adjectives such as 'fast' are ambiguous as well, being able to modify both NPs as well as VPs.

(146)   a.   That was <u>fast</u>! You are back already?

        b.   Your dog is <u>fast</u>.

According to Pustejovsky, there are two issues to be dealt with here: (146a) adjectives such as 'fast' are polysemous, being able to modify individuals or events, and (146b) the interpretations of the adjective in contex depends on the semantics of the head itself.

(147)

$$\begin{bmatrix} \text{typist} \\ \text{ARGSTR} \quad = \quad \begin{bmatrix} \text{ARG1} = x\text{: human} \end{bmatrix} \\ \\ \text{Qualia} \quad = \quad \begin{bmatrix} \text{FORMAL} = x \\ \text{TELIC} \quad = \text{type } (e,x) \end{bmatrix} \end{bmatrix}$$

2.7.4   Semantic Selection

One of the avenues explored by Pustejovsky is to determine to what extent syntactic behaviour can be seen as following from semantic selection, and what is due to constraints on syntactic form. He discusses two ways in which a generative lexicon as outlined above affects the mapping from lexical semantics to syntax:

(A) There is no one-to –one mapping from underlying semantic types to syntactic representations, rather, a syntactic phrase is only fully interpretable within the specific semantics context within which it is embedded.

(B) Because the representation of semantic information in the quality structure, argument structure, and extended event structure is richer than what conventional models associate with a word, a more complex model of filtering and checking is necessary for restricting the output to actual syntactic form.

CHAPTER 3

THE LEXICAL SEMANTICS ANALYSIS OF THE VERBS –YA AND -TLA

3.1   Introduction

The aim of this chapter is to examine the predicate argument structure (PAS) and the event structure of the verbs –ya and -tla with reference to a range of example sentence from Sesotho and to consider the lexical representation for –ya and –tla. Levin (1993) makes a distinction between two lexical representations, namely the lexical – syntactic and lexical – semantic representation. Our focus in this chapter is mainly on the lexical semantic representation of the motion verbs –ya and -tla in Sesotho. A lexical semantic representation is the representation in which the term thematic role' may name a specific semantic relationship which an argument may bear to its predicate. Jackendoff (1990) refers to the lexical – semantic representation the Lexical Conceptual Structure (LCS). The arguments in this representation are represented by semantic labels such as agent, theme, locative, patient, etc. Consider the following example:

(1) [Moshanyana] o raha [bolo]
    [The boy kicks the ball]

In example (1) above, the NPs moshanyana and bolo are arguments which are assigned theta-roles of agent and theme, respectively.

3.2   Argument structures

The argument structure of the verbs –ya and –tla relate to the subject NP and to the complement arguments, that is, the arguments that follow the verb.

1. ARG 1 refers to the subject NP
2. ARG 2 refers to the complement argument, i.e. the locative NP (NPLOC) following the verb.

3. ARG 3 refers to the second complement argument that may follow the verb. This argument is often a default argument (D – ARG) in Pustejovsky's (1995) typology of argument.

3.3   Defining motion verbs

Motion verbs form part of verbs in process. Some of the different kinds of verbs in process are <u>arrive</u> verbs, <u>roll</u> verbs, <u>run</u> verbs, verbs with the feature [go]; verbs with the feature [go down] or [descend].

3.3.1   Manner of motion verbs

According to Levin (1993) manner of motion of verbs can be categorised into few groups i.e. circulation verbs, displacement motion verbs, oscillation motion verbs and flowing motion verbs.

3.3.1.1   Circulation motion verbs

Circulation motion verbs are verbs that denote circular movement. If the motion verb has the feature [DEC] i.e. direct external control, it means that the action involves an animate subject moving in a circle or spinning:

(1)   Ntja e potoloha ntlo.

'The dog goes around the house'

If the action involves an inanimate subject, this verb can be illustrated as follows:

(2)   Lefatshe le potoloha letsatsi.

'The earth revolves around the sun'

3.3.1.2   Displacement motion verbs

Levin (1993) states that displacement verbs denote the movement of entities from one point to another; from point A to point B. If the verb has these feature [-DEC] without

direct external control, of it usually expresses movement of an animate subject which is capable of volition.

(3)   Pere e a terepela.

'The horse is galloping'

If the verb has the feature [+DEC] (direct external control) it expresses inducted motion in both animate and inanimate subject, as shown in the following example.

(4)   Lebidi le a thetheha.

'The tyre is rolling'

3.3.1.3   Oscillation motion verb

According to Levin oscillation verbs denote a pendulous, to and fro, movement between points- with no resultant displacement. If the verb has the feature direct external control [-DEC] it denotes movement that are Agent controlled.

(5)   Katse e tsokotseha senkoromaeng.

'The cat is swinging on the swing'

If the verb has the feature [+DEC] (direct external control) it denotes induced motion, usually associated with inanimate subjects.

(6)   Folaga e fokuwa ke moya.

'The flag is waving in the wind'

3.3.1.4   Flowing motion verbs

The verbs denote the movement of liquids and they only exhibit the feature [+DEC] (direct external control)

(7)   (a)   Madi a phalla.

'Blood is flowing'

    (b)   Oli e tsholoha tanking.

        'Oli is pouring out of the tank'

3.3.2   A lexical semantic analysis of the 'ya' (go) and 'tla' (come)

3.3.2.1   The verb 'ya' (go)

Verbs in this sub-class are characterised by the semantic feature (go). Consider the following example sentences.

(8) (a) Bana ba ya toropong.

      'The children go to town'

    (b) Batho ba ile mosebetsing.

       'People have gone to work'

    (c) Masole a ile.

       'Soldiers have gone away'

    (d) Monna o yile ho polasi.

       'The man has moved to the farm'

    (e) Mosadi o ile le monna.

       'The man has moved with a man'

The verbs in this sub-class include verbs such as (going up) ascend, (going down) descend, going towards, going away, going near, move, move away, move to, move towards.

3.3.2.2   The broad sub-class containing the verb 'tla' (come)

Verbs in this broad sub-class are characterised with the feature (come). Further idiosyntactic information incorporated in the lexical content of each verb in this group is indicated in the following example sentences:

(9) (a) Pula e a tla.

      'The rain is coming'

    (b) Masole a tlile hae.

      'The soldiers have come home'

    (c) Bakudi ba fihlile hae.

      'The patients have arrive at home'

    (d) Dibapadi di atamela lebaleng.

      'Players are approaching the play ground'

    (e) Ngwana o kena ka tlung.

      'The child enters a house'

The verbs in this broad sub-class include verbs such as arrive, come back, enter, come near, approaching, turn back. The above discussion is the lexical features of motion verbs which determine the difference in meaning of some of the motion verbs.

3.3.3 Analysis of the argument structure of sentences with 'ya' (go) associated with the different word senses

3.3.3.1 The verb 'ya' (go)

3.3.3.2 The subject denotes human

Consider the following example sentence:

(10)   [Batho] ba ya [toropong]

       Agent   Locative (LOC)

       'People go to town'

The argument '**batho**' which is human is the agent argument. The locative argument is toropong.

(11)   [Batho]   ba ya [toropong]   [ka koloi]

ARG1NPAgent   ARG2NPLoc   ARG3PP instrument

'People go to town by a car'

$$
\begin{bmatrix}
\text{Ya} \\[2pt]
\text{ARG STR} \quad = \begin{bmatrix} \text{ARG1} = \text{Human} \\ \text{ARG2} = \text{Locative} \\ \text{ARG3} = \text{Instrument} \\ \text{(D-ARG)} \end{bmatrix} \\[6pt]
\text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \\ \text{E2} = \text{Transition} \end{bmatrix}
\end{bmatrix}
$$
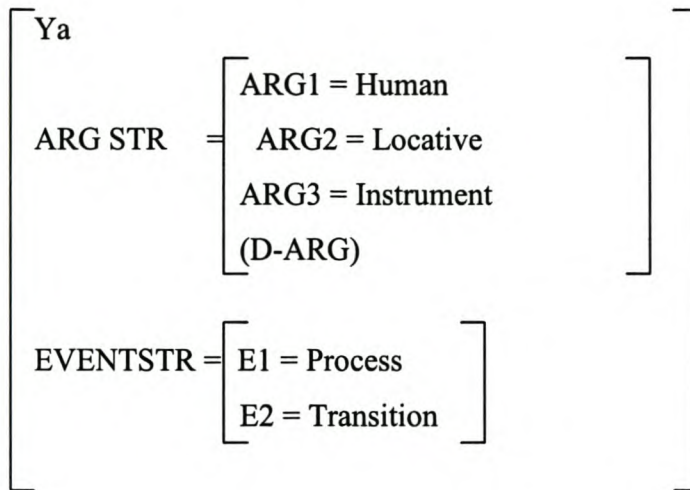
The subject agent argument **'batho'** is human. The locative is **'toropong'**. In this sentence the locative NP (NPLOC) complement has the morpheme –ng. The argument which is an in argument which is an inanimate NP and which appears as a complement of the preposition 'ka' is interpreted as the instrument. Instead of the 'ka' preposition phrase, 'the' phrases can be used, as in [batho ba ya toropong le koloi]. The verb **ya** in sentence (10) can be represented in terms of the event type of **process** where the action of going proceeds, and the terms of the event type of **transition** since the action of going reaches a logical end-point when the people arrive in town.

3.3.3.3 **The subject denotes concrete an entity that can be seen, heard and touched.**

Consider the following example sentence:

(12)   [Lebese]   le ya [toropong]   [ka monna]

ARG1 theme   ARG2 Locative (NPLOC) ARG3 NP Agent

'The milk is delivered to town by the man'

$$
\begin{bmatrix}
\text{Ya} & & \\
& & \\
\text{ARG STR} & = & \begin{bmatrix} \text{ARG1 = Physical Object} \\ \text{ARG2 = Locative} \\ \text{ARG3 = Human} \\ \text{(D-ARG)} \end{bmatrix} \\
& & \\
\text{EVENTSTR} & = & \begin{bmatrix} \text{E1 = Process} \\ \text{E2 = Transition} \end{bmatrix}
\end{bmatrix}
$$
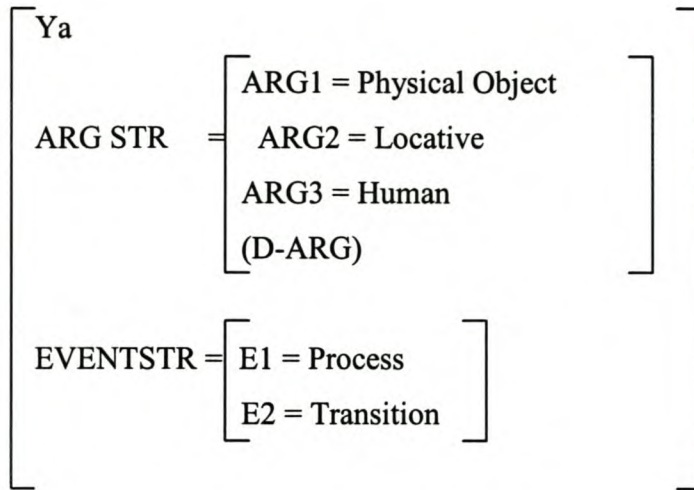
The subject argument 'lebese' which is inanimate is the subject argument. The locative complement is 'toropong'. In this sentence the NPLOC complement has –ng on the noun. Instead of the '**ka**' phrase, the '**le**' phrase can be used (Lebese le ya toropong le monna). The agent argument which is a human NP and which appears as complement of the preposition 'ka' is interpreted as the agent. The verb '**ya**' in sentence (12) is of the event type transition since the event has a logical end point, i.e. when the milk arrives in town. The verb **ya** in sentence (12) can be represented in terms of the event type of **process** in that the process of going is continuing and, transition in terms of the event type of **transition**, given that the event of going reaches a logical end-point when the milk arrives in town.

Consider the following example sentence:

(13)   [Metsi]   a ya   [nokeng]   [ka foro]
       ARG1 NP Agent   ARG2 NPLOC   ARG3 NPPP theme
       'The water flows to the river by the furrow'
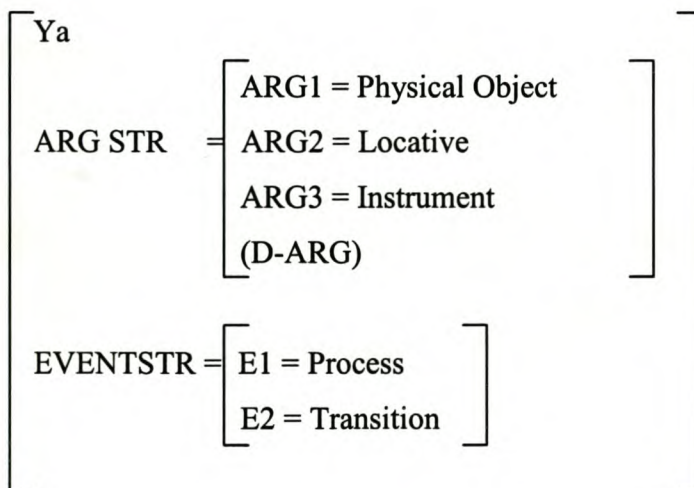
$$
\begin{bmatrix}
\text{Ya} & & \\
& & \\
\text{ARG STR} & = & \begin{bmatrix} \text{ARG1 = Physical Object} \\ \text{ARG2 = Locative} \\ \text{ARG3 = Instrument} \\ \text{(D-ARG)} \end{bmatrix} \\
& & \\
\text{EVENTSTR} & = & \begin{bmatrix} \text{E1 = Process} \\ \text{E2 = Transition} \end{bmatrix}
\end{bmatrix}
$$

The subject argument 'metsi' which is a physical object inanimate is theme. The locative is 'nokeng'. The above sentence has NPLOC complement with'-ng' on the noun. The locative prepositional phrase (PPLOC) complement with the preposition 'ho' can alternatively be used (metsi a ya ho noka ka foro). The sentence has the same meaning with the NPLOC where the noun has '-ng' compared to PPLOC with the preposition '-ho'. The argument which is inanimate NP 'ka foro' which appears as a complement of the proposition 'ka' is interpreted as the theme, a default argument (D-ARG). The verb **ya** in sentence (13) can be represented in terms of the event type of **process**, where the action of going proceeds, and in the terms of the event type of **transition**, since the action of going reaches a logical end-point when the water arrives at the river.

Consider, next, the following example sentence:

(14)   [Motoho]   o ya [mophatong]   [ka banna]
       ARG1 NP theme   ARG2 NP LOC   ARG3 NP Agent
   'The soft porridge is carried by men to mountain school'

$$
\text{Ya}\begin{bmatrix}
\text{ARG STR} = \begin{bmatrix}
\text{ARG1} = \text{Inanimate} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{Agent} \\
\text{(D-ARG)}
\end{bmatrix} \\
\\
\text{EVENTSTR} = \begin{bmatrix}
\text{E1} = \text{Process} \\
\text{E2} = \text{Transition}
\end{bmatrix}
\end{bmatrix}
$$
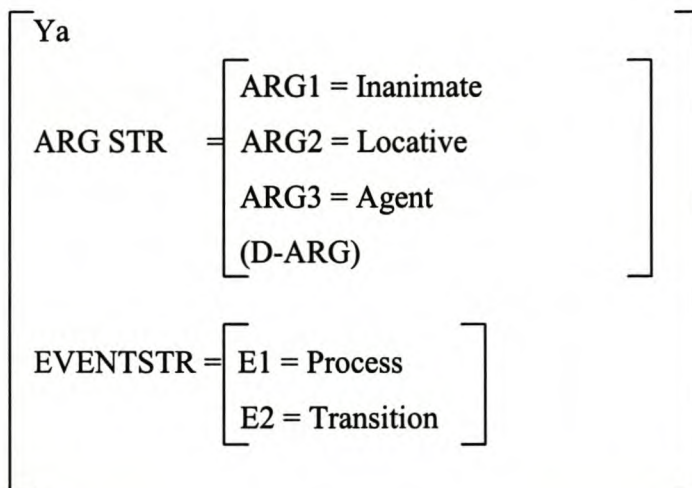
The subject argument 'soft porridge' which is a concrete noun, is theme. The sentence has the NPLOC complement with '-ng' affixed to the noun. The argument which is human and which appears as a complement of the preposition 'ka phrase' appears as a complement of the preposition 'ka' is interpreted as the agent. The 'ka' phrase 'Motoho o ya mophatong le banna' can be used. The sentences have same meaning, which is that the soft porridge is carried/delivered by men to that point. The verb **ya** in sentence (14) can be represented in term of the event type of **process**, where the action of going proceeds,

and in the term of the event type of **transition**, since the action of going has a logical finishing point when the soft porridge reaches the initiation school.

3.3.3.4 The subject denotes groups (group of people)

Consider the following example sentence:

(15) [Letshwele] le ile [mabaleng] [ka dikoloi]

ARG 1 theme   ARG 2 NP LOC   ARG 3 NP PP instrument

'The multitude has gone to the playgrounds by cars'
The verb 'ile' is in perfect tense

$$
\text{Ya}
\begin{bmatrix}
\text{ARG STR} = \begin{bmatrix}
\text{ARG1 = Human} \\
\text{ARG2 = Locative} \\
\text{ARG3 = Instrument} \\
\text{(D-ARG)}
\end{bmatrix} \\
\\
\text{EVENTSTR} = \begin{bmatrix}
\text{E1 = Process} \\
\text{E2 = Transition}
\end{bmatrix}
\end{bmatrix}
$$
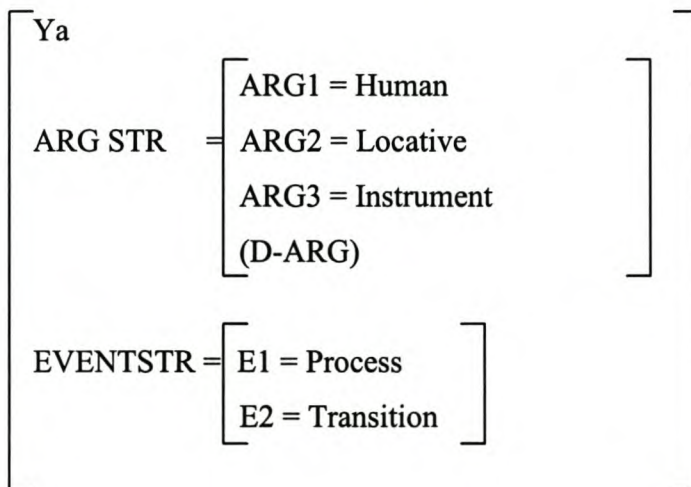
The subject theme argument 'letshwele' which is human, is theme. The locative is 'mabaleng'. The sentence above carries the NP LOC complement with '-ng' on the noun. The argent argument which is inanimate NP and which appears as complement of the preposition 'ka' is interpreted as instrument. The 'le' phrase can also be used instead of th 'ka phrase' (eg Letshwele le ile mabaleng le koloi). The difference between two phrases is that in case of 'le' phrase it means the multitude has gone to the play-ground with the cars, that is they moved to that point being followed by the cars, as they were going to the playing grounds. In the case of 'ka' phrase the interpretation is that they travelled by cars to the play grounds The verb **ile** which is in past tense in sentence (15) can be represented in term of the event type of **process,** where the action of going proceeded, and the terms of the event of **transition**, since the action of going has reached the logical finishing point when the multitude reached the playgrounds.

3.3.3.5 The subject denotes groups (group of animals)

Consider the following example:

(16)   [Sehlopha sa dinotshi] sa ya [botjhabela] [le pula.]

ARG 1 NP theme   ARG 2 NPLOC   ARG 3 PP

'The swarm of bees go to the east with the rain'.

$$
\text{Ya}
\begin{bmatrix}
\text{ARG STR} = \begin{bmatrix}
\text{ARG1} = \text{animate} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{Physical Object} \\
\text{(D-ARG)}
\end{bmatrix} \\
\\
\text{EVENTSTR} = \begin{bmatrix}
\text{E1} = \text{Process} \\
\text{E2} = \text{Transition}
\end{bmatrix}
\end{bmatrix}
$$
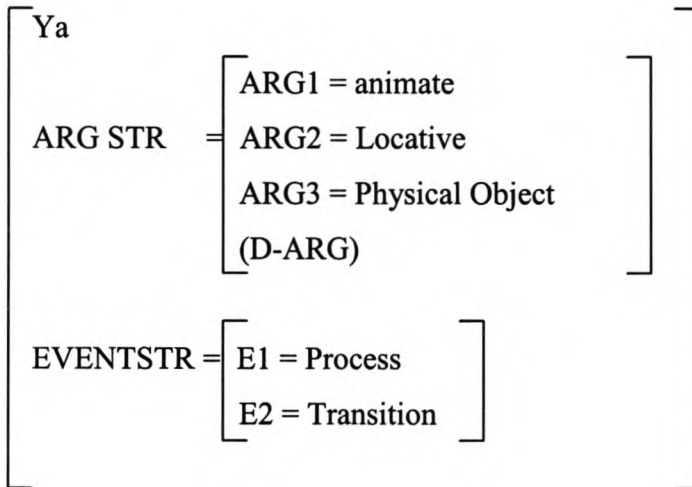
The subject argument 'sehlopha sa dinotshi,' which is animate, is theme. The locative is 'botjhabela' without NP LOC compliment with '-ng' on the noun. The agent **argument** which is inanimate NP and which appears as a complement of the preposition 'le' is interpreted as the 'means'. The verb **ya** in sentence (18) can be represented in terms of the event type **process,** where the action of going proceeds, and the terms of the event type of **transition**, since the action of going reaches a logical end-point when the swarm of bees reaches the east.

3.3.3.6 The subject denotes groups (groups of young people)

Consider the following example sentence:

(17)   [Barwetsana] ba tla ya [mophatong] [le basadi]

ARG 1 NP theme   ARG 2 NP LOC   ARG 3 NP PP agent

'Young women will go to the initiation school with the women'

The sentence is in future tense because of the future tense morpheme. 'tla'

$$
\text{Ya}
\begin{bmatrix}
\text{ARG STR} & = &
\begin{bmatrix}
\text{ARG1} = \text{Human} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{Human} \\
\text{(D-ARG)}
\end{bmatrix} \\
\\
\text{EVENTSTR} & = &
\begin{bmatrix}
\text{E1} = \text{Process} \\
\text{E2} = \text{Transition}
\end{bmatrix}
\end{bmatrix}
$$
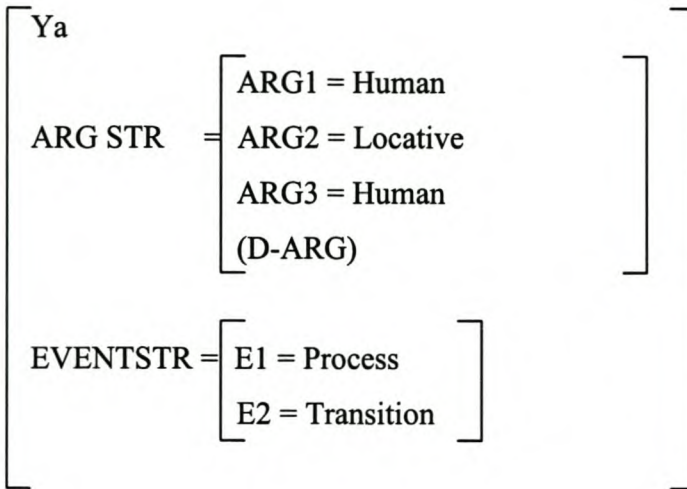
The subject argument 'barwetsana' which is human, is an agent argument, the locative complement is 'mophatong' with a NP LOC morpheme '-ng' on the noun. The agent argument which is human NP and which appears as a complement of the preposition 'le' is comitative agent. Instead of the 'le' phrase, we can use the 'ka'-phrase, which will be 'Barwetsana ba tla ya mophatong ka basadi'. The difference is that the 'ka' phrase (ka basadi) gives the meaning that the young women will be accompanied to the initiation school by the women, while the 'le' gives the meaning that the young women will merely go to initiation school with the women. The verb **ya** in sentence (17) is represented in terms of the event type of **process,** when the action of going will proceed, and the terms of the event type of **transition,** since the action of going reaches a logical finishing-point when the young women reach the initiation school.

3.3.3.7 The subject denotes abstract mass noun.

Consider the following example sentence:

(18)   [Mamello] e ya [katlehong] [ka tshebetso e thata]

ARG 1 NP theme ARG 2 NP LOC ARG 3 NP PP agent

'Patience gives rise to success through hard work'

$$
\text{Ya}
\begin{bmatrix}
\text{ARG STR} & = &
\begin{bmatrix}
\text{ARG1} = \text{inanimate} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{Instrument} \\
\text{(D-ARG)}
\end{bmatrix} \\
\\
\text{EVENTSTR} = &
\begin{bmatrix}
\text{E1} = \text{Process} \\
\text{E2} = \text{Transition}
\end{bmatrix}
\end{bmatrix}
$$

The subject theme 'mamello' which is inanimate, is a theme argument. The locative is 'katlehong' with a NP LOC complement '-ng' on the noun. The argument which is inanimate NP and which appears as a complement of the preposition 'ka' is instrument. The sentence can also have the PP LOC complement with the preposition 'ho' e.g. Mamello e ya ho katleho ka tshebetso e thata. Where the meaning of the sentence is the same as that in 19. The verb **ya** in sentence (18) can be interpreted in terms of the event type of **process**, where the action of going proceeds, and the terms of the event of **transition**, since the action of going reaches a logical end-point when the patience reaches success.

Also consider the following sentence:

(19) [Lerato] le ile [ho Morwesi] [ka pelo]

ARG 1 NP theme   ARG 2 NP LOC   ARG 3 NP PP

'Love has gone to Morwesi by means of the heart'.

'The verb 'ile' is in past perfect tense'.

$$
\text{Ya}
\begin{bmatrix}
\text{ARG STR} & = &
\begin{bmatrix}
\text{ARG1} = \text{Abstract Noun} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{Theme} \\
\text{(D-ARG)}
\end{bmatrix}
\end{bmatrix}
$$
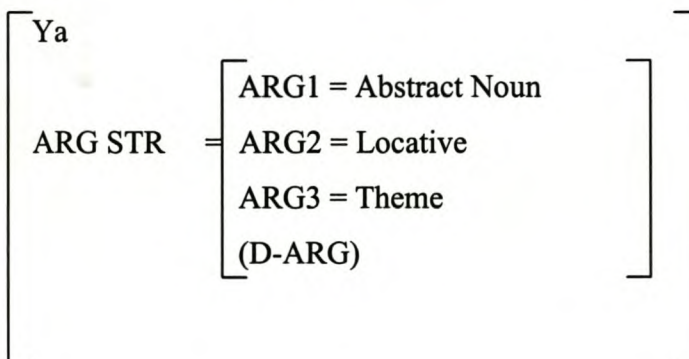
The subject theme argument 'lerato' which is inanimate, is a theme. The locative 'ho Morwesi' which has use PPLOC complement with the preposition 'ho'. The NPLOC cannot have the locative morpheme since 'Morwesi' is the name of the person, and person names may take only the locative preposition 'ho'. The agent argument which is inanimate NP and which appears as a complement of the preposition 'ka' is interpreted as an instrument. The verb **ile** which is in past tense, in sentence (19) can be interpreted in terms of the event type of **process,** where the action of going proceeded, and the terms of the event of **transition,** since the action of going reached a logical end-point when love reached Morwesi.

3.3.3.8   The subject denotes abstract mass nouns

Consider the following example sentence:

(20)   [Bohlale] bo ya [ho motho] [ka titjhere]

ARG 1 NP theme   ARG 2 NP LOC   ARG 3 NP agent

'Wisdom goes to a person through the teacher'

$$
\text{Ya} \begin{bmatrix} \text{ARG STR} & = \begin{bmatrix} \text{ARG1} = \text{Abstract Noun} \\ \text{ARG2} = \text{Locative} \\ \text{ARG3} = \text{Human} \\ \text{(D-ARG)} \end{bmatrix} \\ \\ \text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \\ \text{E2} = \text{Transition} \end{bmatrix} \end{bmatrix}
$$
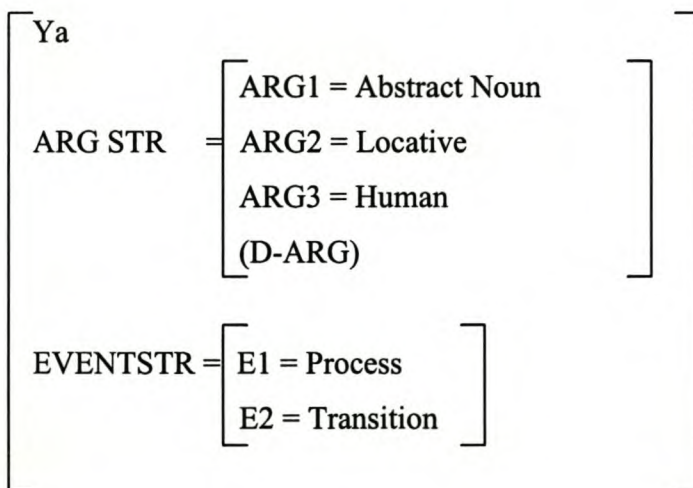
The subject argument 'bohlale' which is abstract noun, is inanimate, and it is a theme argument. The locative is 'ho motho', which is the PP LOC compliment of the preposition 'ho'. The sentence with NP LOC when the noun has '-ng' (mothong) yield the same meaning as the sentence with the locatives with ho. The argument which is human NP and which appears as complement of the preposition 'ka' is interpreted as the goal. The verb **ile** in sentence (19) can be interpreted in terms of the event type of **process,**

where the action of going proceeds, and the terms of the event of **transition,** since the action of going reaches the logical end-point when the wisdom arrives at the person.

3.3.3.9 The subject denotes food

Consider the following sentence:

(21)   [Papa] e ya [baneng] [ka dikotlolo] [ka mosadi]

ARG 1   ARG 2 NP LOC   ARG 3 NP agent

'The porridge goes to the kids with the dishes by the woman'

$$
\text{Ya}
\begin{bmatrix}
\text{ARG STR} = \begin{bmatrix}
\text{ARG1} = \text{Inanimate} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{Instrument} \\
\text{(D-ARG)} \\
\text{ARG4} = \text{Agent} \\
\text{(D-ARG)}
\end{bmatrix} \\
\\
\text{EVENTSTR} = \begin{bmatrix}
\text{E1} = \text{Process} \\
\text{E2} = \text{Transition}
\end{bmatrix}
\end{bmatrix}
$$

The subject argument 'papa' which is inanimate, is a theme. The locative is 'baneng' (the NP LOC complement with '-ng' on the noun. The verb can also have the PP LOC complement with the preposition 'ho' (e.g. Papa e ya ho bana ka dikotlolo). The sentence has the same meaning with the NPLOC where the noun has '-ng' compared to the sentence with the PPLOC with the preposition 'ho'. The argument which is inanimate NP (physical object) and which appears as complement of the preposition 'ka' is interpreted as the instrument. The human argument appearing as complement of the Copula is agent. The verb **ya** in sentence (21) can be interpreted in terms of the event type of **process,** where the action of going proceeds, and the terms of the event of **process,** where the action of going proceeds, and the terms of the event of **transition,** since the action of going reaches a logical finishing point when the porridge reaches the children.

3.3.3.10 The subject denotes food (liquid): Intoxicating

Consider the following example sentence:

(22)   [Jwala] bo ile [banneng] [ka basadi]

ARG 1 theme   ARG 2 NP LOC   ARG 3 NP agent

$$
\text{ile}\begin{bmatrix}
\text{ARG STR} = \begin{bmatrix}
\text{ARG1} = \text{inanimate} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{Human} \\
\text{(D-ARG)}
\end{bmatrix} \\[2em]
\text{EVENTSTR} = \begin{bmatrix}
\text{E1} = \text{Process} \\
\text{E2} = \text{Transition}
\end{bmatrix}
\end{bmatrix}
$$
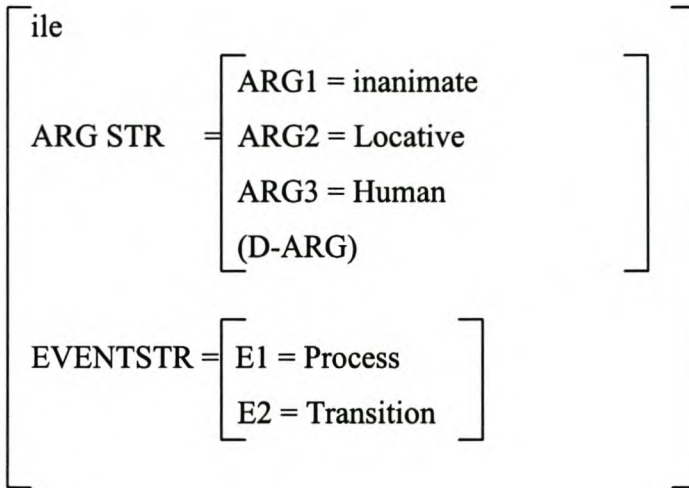
The subject theme agent 'jwala' which is inanimate is the theme. The locative is 'banneng' NPLOC complement with '-ng' on the noun. The PP LOC complement with the preposition 'ho' may occur as in 'jwala bo ile ho banna ka basadi'. The agent argument which is human NP and which appears as complement of the preposition 'ka' is interpreted as agent. Instead of the phrase 'le' phrase can be used 'jwala bo ile banneng le basadi'. The meaning of ya is the same: no shift of meaning occurs. The verb **ile** which is in past tense, in sentence (22) can be interpreted in terms of the event type of **process,** where the action of going proceeded, and the terms of the event of **transition,** since the action of going has reached a logical end-point when the liquor reached the men.

3.3.3.11 The subject denotes food (liquid): non-intoxicating.

Consider the following sentence:

(23)   [Metsi] a tla ya   [motseng]   [ka banna]

ARG 1 NP theme   ARG 2 NPLOC   ARG 3 NP agent

'Water will go to the village by the men'

$$
\begin{bmatrix}
\text{Ya} \\
\\
\text{ARG STR} \quad = \begin{bmatrix} \text{ARG1} = \text{Theme} \\ \text{ARG2} = \text{Locative} \\ \text{ARG3} = \text{Agent} \\ \text{(D-ARG)} \end{bmatrix} \\
\\
\text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \\ \text{E2} = \text{Transition} \end{bmatrix}
\end{bmatrix}
$$

The sentence is in future tense. 'tla' in the above sentence is the future tense morpheme. The subject theme argument 'metsi' which is inanimate, is a theme. The locative is 'motseng', the NP LOC complement with '-ng' on the noun. The subject argument which is human NP and which appears as complement of preposition 'ka' is interpreted as the agent argument. Instead of the 'ka' phrase the verb has the 'le' phrase (e.g. Metsi a tla ya motseng le banna). There is no shift of meaning. The verb **ya** with the morpheme of the future tense **tla** in sentence (23) can be interpreted in terms of the event type **process** where the action of going will be proceeding and the terms of the event type of **transition** since the action of going will reach the logical finishing point when the water will be reaching the village.

3.3.4 Analysis of the Argument structure of sentences with 'tla' associated with different word senses

3.3.4.1 Word sense 'tla' (come)

3.3.4.2 The subject denotes natural phenomena Weather

Consider the following sentence:

(25)   [Pula] e tla [motseng] [ka moya]

ARG 1 NP theme   ARG 2 NP LOC   ARG 3 NP PP agent

'The rain comes to the village through wind'

$$
\begin{bmatrix}
\text{tla} \\[2pt]
\text{ARG STR} =
\begin{bmatrix}
\text{ARG1} = \text{Natural Phenomenon} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{Natural Phenomenon} \\
\text{(D-ARG)}
\end{bmatrix} \\[2pt]
\text{EVENTSTR} =
\begin{bmatrix}
\text{E1} = \text{Process} \\
\text{E2} = \text{Transition}
\end{bmatrix}
\end{bmatrix}
$$
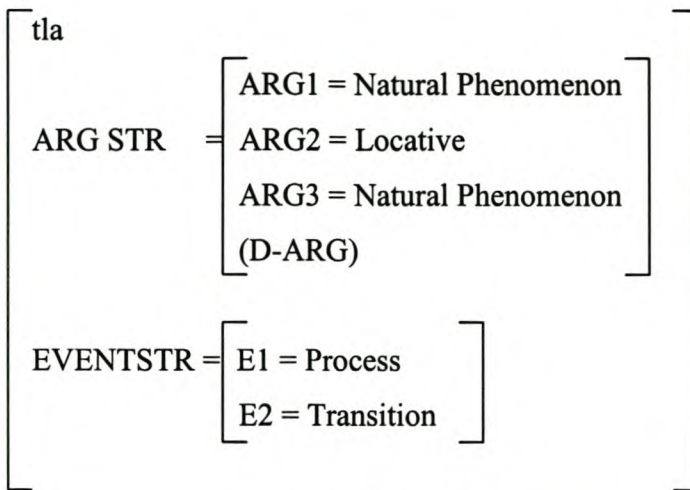
The subject argument 'Pula' which is inanimate is theme. The locative is 'motseng'. The sentence above bears the NPLOC complement with '-ng' on the noun. The argument 'moya' which is natural phenomena NP and which appears as complement of the preposition 'ka' is interpreted as the instrument. Instead of 'ka' phrase, I can use 'le' phrase (Pula e tla motseng le moya). The sentence Pula e tla motseng le moya has the same meaning even though I have used different prepositional phrases. The sentence is in the present tense. The verb **tla** in sentence (24) can be interpreted in terms of the event type of **transition** since the action of coming reaches a logical finishing point when the rain reaches the village.
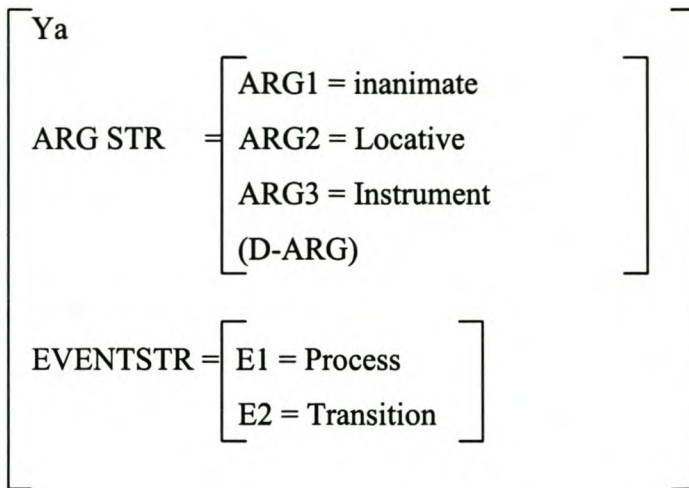
3.3.4.3 The subject denotes earth

Consider the following example sentence:

(25) [Lehlabathe] le tla   [lebopong]   [le metsi]

ARG 1 NP theme   ARG 2 NPLOC   ARG 3 PP instrument

'The sand will be moved to the bank with water'

$$
\begin{bmatrix}
\text{tla} \\[2pt]
\text{ARG STR} =
\begin{bmatrix}
\text{ARG1} = \text{Theme} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{Instrument}
\end{bmatrix} \\[2pt]
\text{EVENTSTR} =
\begin{bmatrix}
\text{E1} = \text{Process} \\
\text{E2} = \text{Transition}
\end{bmatrix}
\end{bmatrix}
$$
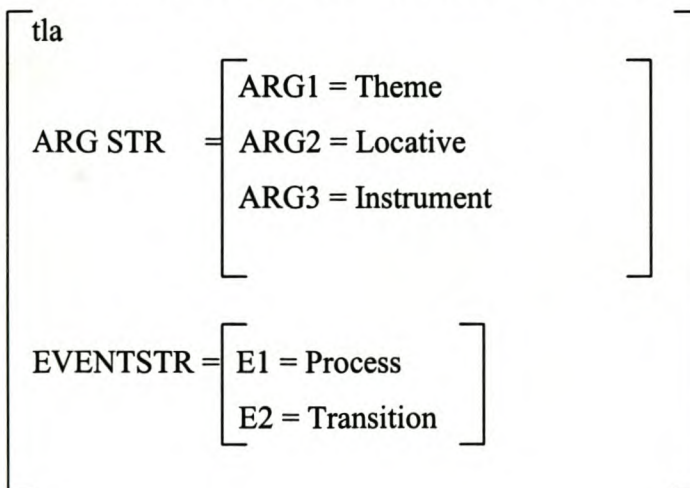
The subject argument 'lehlabathe' which is inanimate is theme. The first 'tla' in the above sentence is the future tense morpheme. The locative is 'lebopong'. It includes the Noun Phrase Locative (NPLOC) complement with '-ng' on a noun. A PP LOC complement with preposition 'ho' can also be used. (Lehlabathe le tla tla ho lebopo ka metsi). The sentence has exactly the same meaning as the sentence with the NPLOC where the noun has '-ng' compared to the sentence with the PPLOC with the preposition 'ho'. The instrument argument is inanimate NP and appears as a complement of the preposition ' le'. Instead of using the 'le' phrase, the 'ka' phrase can be used. Lehlabathe le tla tla lebopong ka metsi. The sentence yields the same meaning, i.e. that the sand will be moved to the bank   by/with the water. The verb **tla** in sentence (25) can be interpreted in terms of the event type of **process,** since the action of coming will be reaching a logical end-point when the sand will be reaching the bank.

3.3.4.4. The subject denotes artifact (vehicle)

Consider the following example sentence:

(26)   [Sekepe] se tla [borokgong] [le basesisi]

ARG 1 NP them   ARG 2 NPLOC   ARG 3 PP agent

'The ship comes to the bridge with the sailors'

$$
\begin{bmatrix}
\text{tla} \\
\text{ARG STR} = \begin{bmatrix} \text{ARG1} = \text{Physical Object} \\ \text{ARG2} = \text{Locative} \\ \text{ARG3} = \text{Human} \\ \text{(D-ARG)} \end{bmatrix} \\
\text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \\ \text{E2} = \text{Transition} \end{bmatrix}
\end{bmatrix}
$$
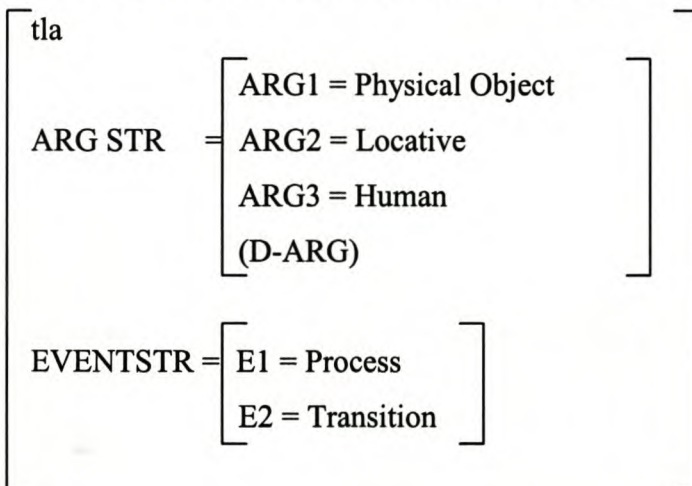
The subject argument 'sekepe' which is artifact (physical object) is the theme. The locative is 'borokgong'. It includes the NP LOC complement with '-ng' on the noun. The sentence can also have the PP LOC complement with the preposition 'ho' Sekepe se tla ho borokgo le basesisi. The sentence bears the same meaning. The argument which is human

NP and which appears as a complement of the preposition 'le' is interpreted as the agent. Instead of using 'le' phrase, the 'ka' phrase can be used <u>Sekepe se tla borokgong ka basesisi</u>. The difference in meaning is that 'ka basesisi' means that the sailors come to the bridge. The verb **tla** in sentence (26) can be interpreted in terms of the event type of **process**, where the action of coming proceeds, and the terms of the event of **transition,** since the action of coming reaches a logical end-point when the sand arrives at the bridge.

3.3.4.5 <u>The subject denotes artifact (building)</u>

Consider the following example sentence:

(27) [Lemati] le tlile [le mosadi] [tokisong]

ARG 1 NP theme   ARG 2 PP Agent   ARG 3 NP LOC

'The door has being brought by the women to (the place of) reparation'

The verb 'tlile' is in the past tense.

$$
\begin{bmatrix}
\text{tlile} \\
\\
\text{ARG STR} \quad = \begin{bmatrix} \text{ARG1 = inanimate Physical Object} \\ \text{ARG2 = Human} \\ \text{ARG3 = Locative} \\ \text{(D-ARG)} \end{bmatrix} \\
\\
\text{EVENTSTR} = \begin{bmatrix} \text{E1 = Process} \\ \text{E2 = Transition} \end{bmatrix}
\end{bmatrix}
$$

The subject argument 'lemati' which is a physical object, is a theme. The argument which is human NP and which appears as complement of the preposition 'le' is interpreted as the agent. Instead of the 'le phrase' the sentence can have the 'ka' phrase (Lemati le tlile ka mosadi tokisong). The meaning is the same in the sense that the door is there because of the woman. 'The locative is 'tokisong' that is the NP LOC complement with '-ng' on the noun. The verb 'tlile' is which in past tense, in sentence (27) can be interpreted in terms of the event type of the **process,** where the action of coming proceeded, and the terms of the event of **transition,** since the action of coming has reached a logical end-point when the door arrived at the (place of) reparation.
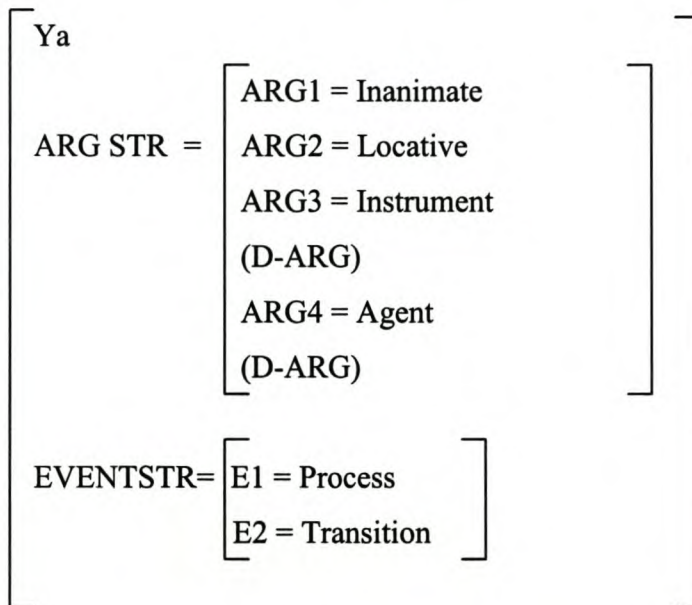
3.3.4.6 The subject denotes artifact (household)

Consider the following example sentence:

(28)   [Thipa] e tlile [ho mosadi]][ka dinokwane]

ARG 1 NP theme   ARG 2 NP LOC   ARG 3 PP agent

'The knife has being brought to the woman by thungs'

$$
\begin{bmatrix}
\text{tlile} \\[4pt]
\text{ARG STR} \quad = \begin{bmatrix} \text{ARG1} = \text{Physical Object} \\ \text{ARG2} = \text{Locative} \\ \text{ARG3} = \text{Human} \\ \text{(D-ARG)} \end{bmatrix} \\[20pt]
\text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \\ \text{E2} = \text{Transition} \end{bmatrix}
\end{bmatrix}
$$

The subject argument 'Thipa' which is inanimate, physical object, is a theme. The locative is 'ho mosadi' [PPLOC]. The verb can have the NP LOC complement with '-ng' on the noun 'mosadi' Thipa e tlile mosading ka dinokwane. In this sentence the use of NPLOC and the PPLOC has the same meaning. The argument which is human NP and which appears as complement of the preposition 'ka' is interpreted as the agent. Instead of the 'ka' phrase, the sentence have the 'le' phrase, Thipa e tlile ho mosadi le dinokwane. The meaning of the sentence is the same in the sense that knife is there because of the thugs. The verb **tlile** which is in past tense, in sentence (28) can be interpreted in terms of th event type of **process,** where the action of coming proceeded, and the terms of the event of **transition**, since the action of coming has reached a logical finishing point when the knife reached the woman.

3.3.4.7 The subject denotes natural object (diamond)

Consider the following example sentence:

(30)   [Taemane] e tlile [ka banna]   [morafong]

ARG 1 NP theme   ARG 2 NPPP agent   ARG 3 NP LOC

'The diamond has come to the mines by the men.

The sentence is in past tense.

$$
\begin{bmatrix}
\text{tlile} \\[2ex]
\text{ARG STR} \quad = \begin{bmatrix} \text{ARG1} = \text{Natural(physical) object} \\ \text{ARG2} = \text{Agent} \\ \text{ARG3} = \text{Locative} \\ \text{(D-ARG)} \end{bmatrix} \\[6ex]
\text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \\ \text{E2} = \text{Transition} \end{bmatrix}
\end{bmatrix}
$$

The subject argument 'taemane' which is an inanimate physical object is a theme. The agent argument 'ka banna' which is human NP and which appears as complement of the preposition 'ka' is interpreted as the agent. On the other hand, instead of the 'ka' phrase 'ka banna' is that the diamond has being carried by the miners, while in the case of 'le' phrase. 'le banna' means brought along the diamond. The locative is 'morafong' with the NPLOC complement '-ng' on the noun. I cannot have the PPLOC complement with the preposition 'ho'. The verb **tlile** which is in past tense, in sentence (29) can be interpreted in terms of the event type of **process,** where the action of coming proceeds, and the terms of the event of **transition,** since the action of coming has reached a logical end-point when the diamond arrived from the mine.
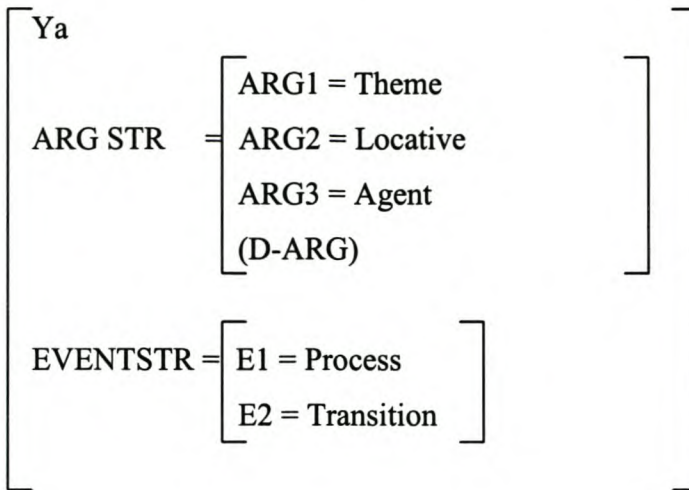
3.3.4.8   The subject denotes natural object (stones)

Consider the following example sentence:

(31)   [Majwe]   a tla tla [kwaring]   [ka lori]
ARG1 NP theme   ARG2 NPLOC   ARG3 PP agent
'Stones will be delivered to the quarry by a lorry'
The sentence is in future tense.

$$
\begin{bmatrix}
\text{tla} \\[2ex]
\text{ARG STR} \quad = \begin{bmatrix} \text{ARG1} = \text{Physical Object} \\ \text{ARG2} = \text{Locative} \\ \text{ARG3} = \text{Instrument} \\ \text{(D-ARG)} \end{bmatrix} \\[6ex]
\text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \\ \text{E2} = \text{Transition} \end{bmatrix}
\end{bmatrix}
$$
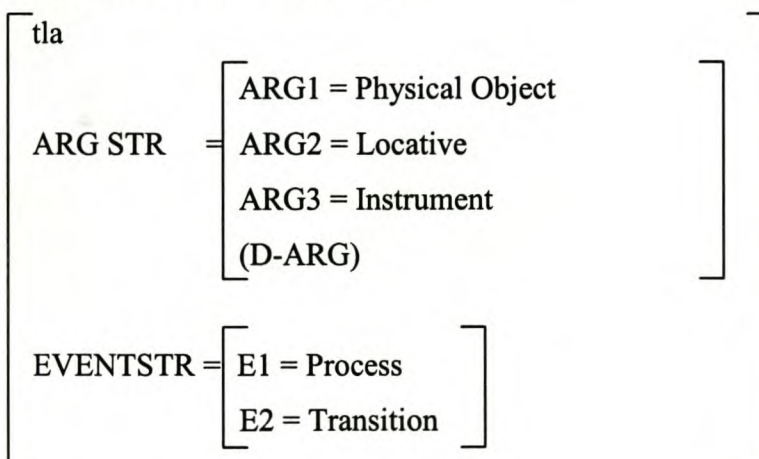
The subject argument 'majwe' which is an inanimate, physical object is a theme. The first 'tla' is the future tense morpheme. The locative is 'kwaring' with the NPLOC complement '-ng' on the noun. The PP argument 'ka lori' which is inanimate and which appears as a complement of the prepositions 'ka' is interpreted as the instrument. The 'le' phrase can alternatively be used 'le lori'. The meaning of the sentence is the same, because a lorry can deliver the stones. The verb **tla** which is in future tense morpheme **tla**, in sentence (30) can be interpreted in terms of the event type of **process**, where the action of coming will proceed, and the terms of the event of **transition,** since the action of coming will reach the logical end-point when the stones reach the quarry.

3.3.4.9   **The subject denotes natural object (wood)**

Consider the following example sentence:

(31)   [Patsi] e tla   [hae] ka basadi] [le basadi]

      ARG1 NP theme ARG2NPLOC PP agent

      'The wood is brought home by women'

      The sentence is in the present tense.

$$
\begin{bmatrix}
\text{tla} \\
\text{ARG STR} = \begin{bmatrix} \text{ARG1 = inanimate Physical Object} \\ \text{ARG2 = Locative} \\ \text{ARG3 = Human} \\ \text{(D-ARG)} \end{bmatrix} \\
\\
\text{EVENTSTR} = \begin{bmatrix} \text{E1 = Process} \\ \text{E2 = Transition} \end{bmatrix}
\end{bmatrix}
$$
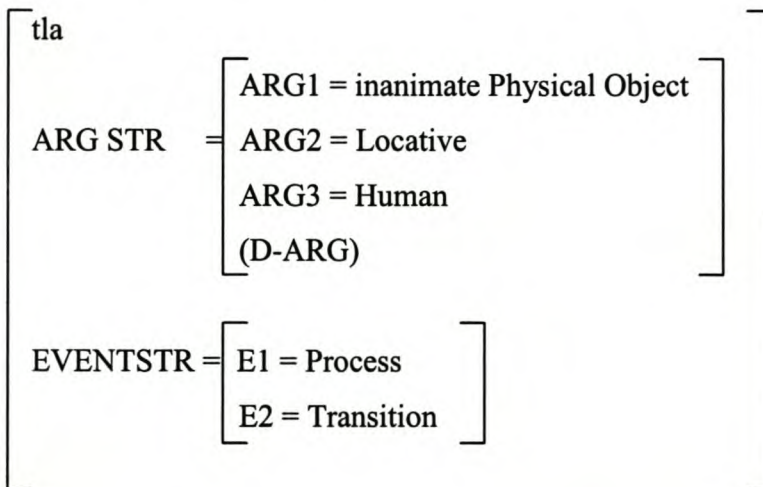
The subject argument 'patsi' which is inanimated is a theme. The locative is 'hae' ARG2 without NPLOC complement. The argument which is a human NP and which appears as a complement of the preposition ka / le is interpreted as the agent. The agent argument can also appear as the complement of the preposition 'le' which denotes the same meaning with the preposition 'ka'. The verb **tla** in sentence (31) can be interpreted in terms of the event type of **process,** where the action of coming proceeds, and the terms of the event of

transition, since the action of coming reaches the logical end point when the wood reaches the home.

3.3.4.10 The subject denotes possession, property (money)

Consider the following example sentence:

(32)   [Tjhelete] e tla tla   [ka koloi]   [bankeng]
       ARG1 NP theme   ARG2 NPPP instrument   ARG3 NPLOC

'The money will be delivered by the car to the bank'

The sentence is in the future tense.

$$
\begin{bmatrix}
\text{tla} & & \\
& & \\
\text{ARG STR} & = & \begin{bmatrix} \text{ARG1 = Physical Object} \\ \text{ARG2 = Instrument} \\ \text{ARG3 = Locative} \\ \text{(D-ARG)} \end{bmatrix} \\
& & \\
\text{EVENTSTR} & = & \begin{bmatrix} \text{E1 = Process} \\ \text{E2 = Transition} \end{bmatrix}
\end{bmatrix}
$$

The subject argument 'tjhelete' which is inanimate, is a theme. The first '<u>tla</u>' is the future tense morpheme. The argument which is inanimate NP and which appears as complement of the preposition 'ka' is interpreted as the instrument 'ka koloi'. It appears as complement of the preposition 'le', meaning the same i.e. there is no shift of meaning. The locative is 'bankeng' with the NPLOC complement '-ng' on the noun. It will be ungrammatical if we use the PPLOC complement with the preposition 'ho'. The verb **tla** which is in future tense morpheme   **tla**, in sentence (32) can be interpreted in terms of the event type o **process**, where the action of coming will proceed, and the terms of the event of **transition**, since the action of coming will reach the logical finishing point when the money arrives at the bank.

3.3.4.11 The subject NP denotes possession , property (clothes)

Consider the following example sentence:

(33)   [Diaparo]   di tlile [lapeng] [ka ntate] [le ntate]

ARG NP theme   ARG2 NPLOC   ARG3 PPP agent

'Clothes have being brought home by my father'

The verb 'tlile' is in past tense.

$$
\begin{bmatrix}
\text{tlile} \\
\text{ARG STR} = \begin{bmatrix} \text{ARG1 = inanimate} \\ \text{ARG2 =Locative} \\ \text{ARG3 = Human} \\ \text{(D-ARG)} \end{bmatrix} \\
\text{EVENTSTR} = \begin{bmatrix} \text{E1 = Process} \\ \text{E2 = Transition} \end{bmatrix}
\end{bmatrix}
$$
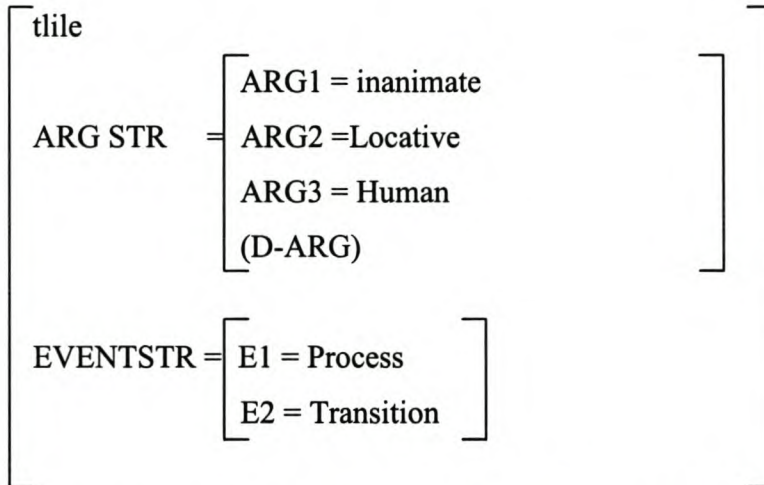
The subject argument 'diaparo' which is inanimate is a theme. The locative is 'lapeng' with the NPLOC complement '-ng' on the noun. The argument which is human NP and which appears as complement of the preposition 'ka' is interpreted as the agent. The noun 'ntate' can appear as the complement of the preposition 'le' meaning the same i.e. there is no shift of meaning in the sentence. The verb **tlile** which is in past tense, in sentence (33) can be interpreted in terms of the event type of **process**, where the action of coming proceeded, and the terms of the event of **transition**, since the action of coming reached the logical finishing point when the clothes arrived at home.

3.3.4.12 The subject denotes possession, property (live-stock)

Consider the following example sentence:

(34)   [Leruo la mohlape] le tla   [hae]   [ka badisa]

ARG1 NP theme   ARG2 NPLOC   ARG3 NP PP agent

'The live-stock is brought home by the sheperds'

The verb 'tla' is in present tense

$$
\begin{bmatrix}
\text{tla} \\
\text{ARG STR} = \begin{bmatrix} \text{ARG1} = \text{Theme} \\ \text{ARG2} = \text{Location} \\ \text{ARG3} = \text{Agent} \\ \text{(D-ARG)} \end{bmatrix} \\
\\
\text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \\ \text{E2} = \text{Transition} \end{bmatrix}
\end{bmatrix}
$$
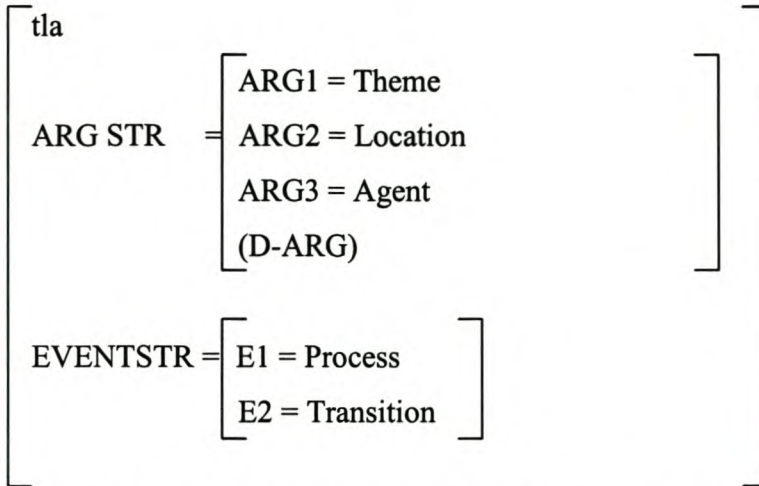
The subject argument 'leruo la mohlape' which is animate is theme. The locative is 'hae'. The argument which is human NP and which appears as complement of the preposition 'ka' is interpreted as the agent. The agent argument can appear as complement of the preposition 'le'. (e.g. Leruo le tla hae **le** badisa). The meaning is that the stock is being brought home. There is no shift of meaning. The verb **tla** in sentence (34) can be interpreted in terms of the event type of **process**, where the action of coming proceeds, and the terms of the event of **transition,** since the action of coming reaches the logical end-point when the live-stock arrive at home.

3.3.4.13 **The subject is animate (horses)**

Consider the following example sentence:

(35)   [Dipere]   di tla   [mojahong]   [ka terene]
       ARG 1 NP theme   ARG 2 NPLOC ARG 3 NPPP agent
       'Horses are brought to the race by a train'
       The verb 'tla' is in present tense

$$
\begin{bmatrix}
\text{tla} \\
\text{ARG STR} = \begin{bmatrix} \text{ARG1} = \text{animate} \\ \text{ARG2} = \text{Locative} \\ \text{ARG3} = \text{Physical Object} \\ \text{(D-ARG)} \end{bmatrix} \\
\\
\text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \\ \text{E2} = \text{Transition} \end{bmatrix}
\end{bmatrix}
$$
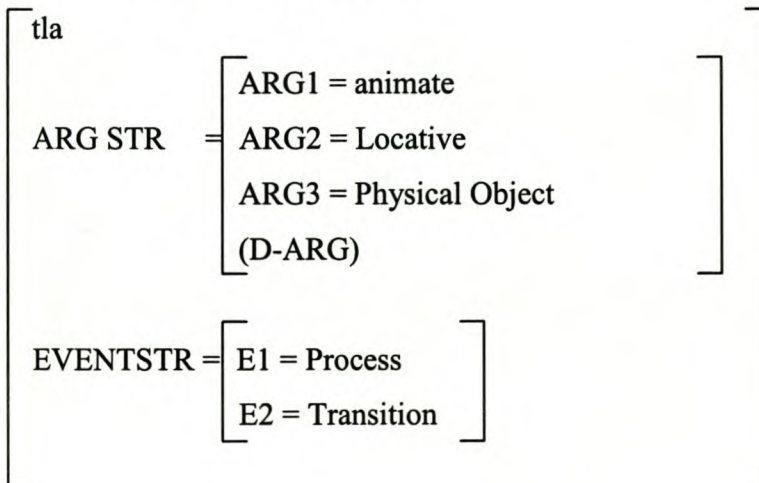
The subject argument 'dipere' which is animate, is a theme. The locative 'mojahong' with the NPLOC complement '-ng' on the noun. The argument which is inanimate NP and which appears as complement of the preposition 'ka' 'le' is interpreted as the agent . The verb **tla** in sentence (35) can be interpreted in terms of the event type of **process**, where the action of coming is continuing, and the event of **transition**, since the action of coming reaches logical end-point when the horses arrive at the race.

3.3.4.14 **The subject is animate (bees)**

Consider the following example sentence:

(36)   [Dinotshi]   di tla [sekolong]
ARG 1 NP agent   ARG 2 NPLOC
'Bees flee towards the school'
The verb tla is in the present tense.

$$
\begin{bmatrix}
\text{tla} \\
\text{ARG STR} = \begin{bmatrix} \text{ARG1} = \text{Agent} \\ \text{ARG2} = \text{Locative} \end{bmatrix} \\
\text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \\ \text{E2} = \text{Transition} \end{bmatrix}
\end{bmatrix}
$$
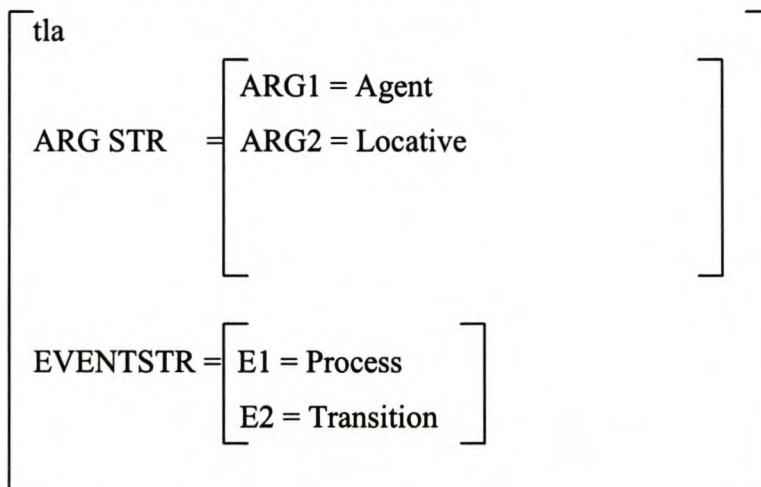
The subject argument which is animate, is agent. The locative is 'sekolong' with the NPLOC complement '-ng' on the noun. It can also have the PPLOC complement with the preposition 'ho' (e.g. Dinotshi di tla ho sekolo) giving the same meaning as the sentence (36). The verb **tla** which is in past tense, in sentence (36) can be interpreted in terms of the event type of **process**, where the action of coming proceeded, and the terms of the event of **transition** since the action of coming reached a logical finishing point when the bees arrive at school.
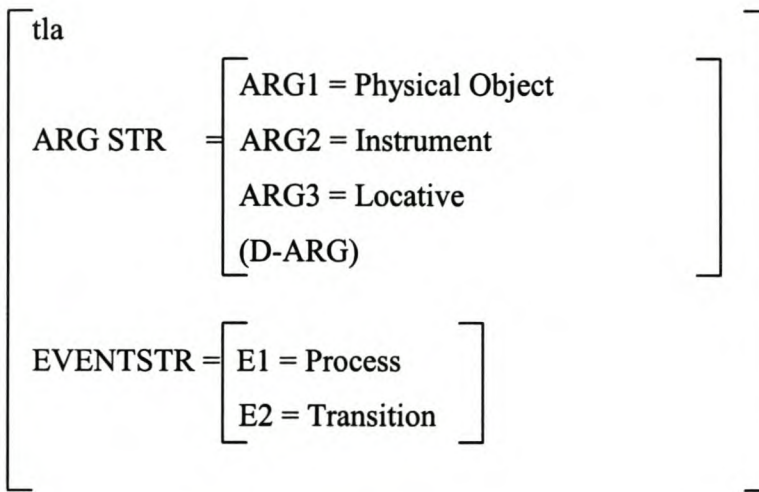
3.3.4.15 The subject is animate (fish)

Consider the following example sentence:

(37)   [Dihlapi] di   tlile   [letamong]   [ka noka]

ARG NP theme   ARG 2 NPLOC   ARG3 NPPP instrument

'The fish have being brought to the dam by the river'

The verb 'tlile' is in the past tense.

$$
\text{tlile} \begin{bmatrix}
\text{ARG STR} = \begin{bmatrix}
\text{ARG1} = \text{animate} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{Natural Phenomena} \\
\text{(D-ARG)}
\end{bmatrix} \\
\\
\text{EVENTSTR} = \begin{bmatrix}
\text{E1} = \text{Process} \\
\text{E2} = \text{Transition}
\end{bmatrix}
\end{bmatrix}
$$
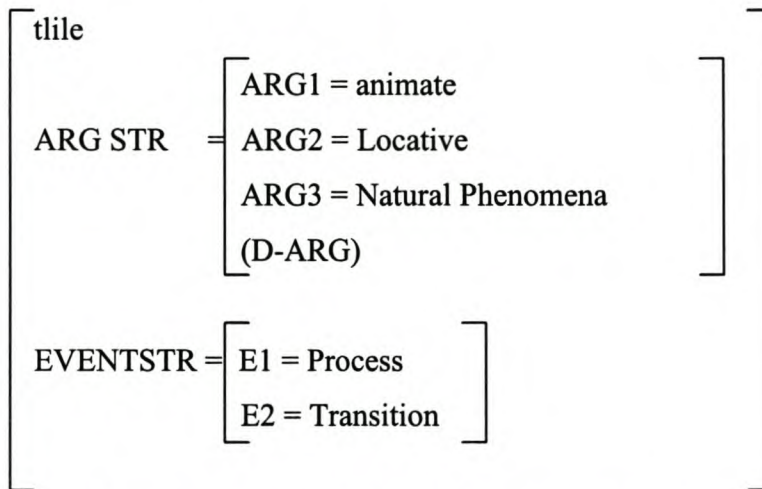
The subject argument 'dihlapi' which is animate, is a theme. The locative is 'letamong'. The argument which is inanimate NP and which appears as complement of the preposition 'ka' is interpreted as an instrument. Instead of the 'ka' phrase I can use 'le' phrase (Dihlapi di tlile letamong le noka). The meaning of the sentence does not change, it has the same meaning as sentence (37) **tlile** which is in past tense, in sentence (37) can be interpreted in terms of the event type of **process**, where the action of coming proceeded, and the terms of the event of **transition**, since the action of coming reaches a logical finishing point when the fish reaches the dam.

3.4   **Summary**

The discussion in this Chapter concerned the Predicate Argument Structure (PAS) of the motion verbs –ya and –tla in a range example sentences from Sesotho. It was explained that in the lexical – semantic representation the theta roles of argument are represented by semantic labels which are agent, theme, location (locative), etc. The difference in structural realisation between the subject theme argument and agent argument was demonstrated. The subject theme argument usually start the object of the preposition or a

locative. The agent arguments are subjects of a verb. The meaning of motion verbs as well as manner of motion verbs have been reviewed. Four categories of verbs of motion were examined, such as circulation motion verbs, displacement motion verbs, oscillation motion verbs and flowing motion verbs. The clarification of the explanation of motion verbs using motion verbs 'ya' (go) and 'tla' (come) in sentence were examined as well as the lexical features of motion verbs. The argument structure of sentences with 'ya' (go) and 'tla' (come) which represent the different word senses was discussed. The interpretation of the arguments of motion verbs was examined with different types of nouns as subjects, such as concrete mass nouns, humans, animals, natural phenomena, natural object, artifact, possession / property.

CHAPTER 4

A LEXICAL SEMANTICS ANALYSIS OF THE VERBS '-TSAMAYA' (WALK) AND'-BALEHA' (RUN AWAY)

4.1   Introduction

The aim of this chapter is to examine the types of NPs that can appear with motion verbs **'tsamaya'** (walk) and **'baleha'** (run away). The thematic interpretation of the arguments in their respective positions and their contribution to the interpretation of these motion verbs will also be explored.   Consider the following example:

(1)   Tsamaya (walk): [Bana] ba tsamaya [tseleng]

    'The children walk on the road'

In an example (1) above, the NPs **'bana'** and **'tseleng'** are arguments which are assigned the theta-roles of agent and locative, respectively.

4.2   Argument Structure

The argument structure of the verbs **'tsamaya'** and **'baleha'** relates to the subject NP and the complement arguments, that is the arguments that follow the verb.   Consider the following example:

(2)   Baleha (run away): [Ngwana] o baleha [hae] [le monna] [ka koloi]

'The child runs away from home with a man by car'

4.3   Analysis of the argument structure of sentences with 'tsamaya' (walk) associated with the different word senses.

4.3.1   The subject denotes groups (groups of people)

Consider the following example sentence:

(3)   [Phutheho] e tsamaya [ka bese]

ARG1 NP Agent   ARG2 NPPP instrument

'The congregation travel by bus'

$$\begin{bmatrix} \text{Tsamaya} \\ \quad \text{ARGSTR} = \begin{bmatrix} \text{ARG1} = \text{human} \\ \text{ARG2} = \text{instrument} \end{bmatrix} \\ \\ \quad \text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \end{bmatrix} \end{bmatrix}$$
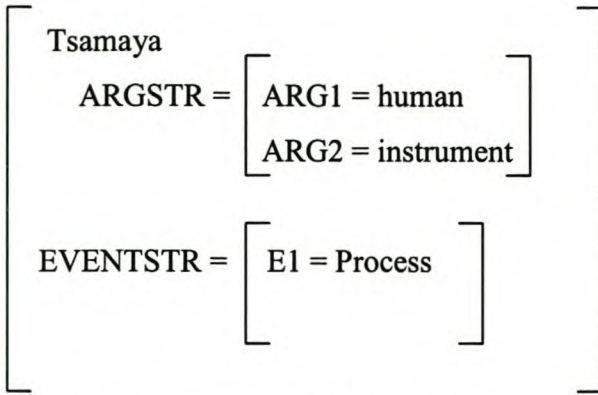
The subject agent argument **'phutheho'** is human. The argument which is an inanimate NP and which appears as a complement of the preposition **'ka'** is interpreted as the instrument. Instead of the **'ka'** prepositional phrase, the **'le'** phrase can be used as in **'<u>Phutheho e tsamaya le bese</u>.'** The interpretation of the two sentences is the same. There is no shift of meaning. The verb **'tsamaya'** can be represented in terms of the event type process, where the action of travelling is continuing.

Consider, next, the following example sentence:

(4)   [Phutheho] e tsamaya [toropong]   [ka bese]
        ARG1 NP AGENT   ARG2 NP LOC   ARG3 NP instrument
        'The congregation travel in town by bus'

$$\begin{bmatrix} \text{Tsamaya} \\ \quad \text{ARGSTR} = \begin{bmatrix} \text{ARG1} = \text{human} \\ \text{ARG2} = \text{locative} \\ \text{ARG3} = \text{instrument} \end{bmatrix} \\ \\ \quad \text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \end{bmatrix} \end{bmatrix}$$
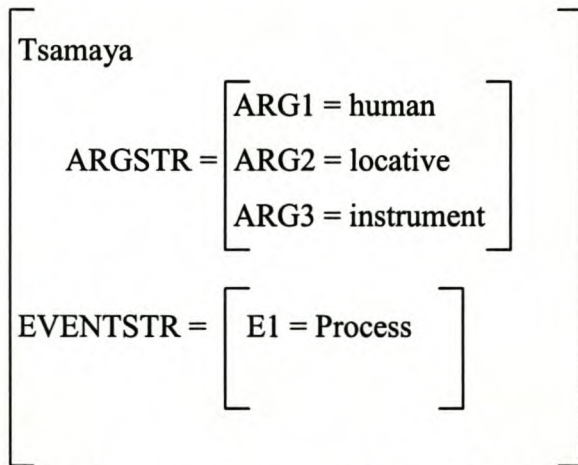
The subject agent argument **'phutheho'** is human. The locative is **'toropong'**. In this sentence NP LOC complement has the morpheme **'-ng'**. The argument which is an inanimate NP and which appears a complement of the preposition **'ka'** is interpreted as the instrument. Instead of the **'ka'** prepositional phrase, the **'le'** phrase can be used as in **'<u>Phutheho e tsamaya toropong ka bese</u>.'** The meaning of the two sentences are the same. There is no shift of meaning. The verb **'tsamaya'** can be interpreted in terms of the event type of process, where the action of travelling proceeds.

4.3.2 The subject denotes groups (groups of animals)

Consider the following example sentence:

(5) [Mohlape wa dikgomo] o tsamaya [thoteng]
ARG1 NP AGENT   ARG2 NP LOC

'The herd of cattle is moving in the veld'

$$
\begin{bmatrix}
\text{Tsamaya} \\
\quad \text{ARGSTR} = \begin{bmatrix} \text{ARG1} = \text{Animate} \\ \text{ARG2} = \text{Locative} \end{bmatrix} \\[2em]
\quad \text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \end{bmatrix}
\end{bmatrix}
$$

The subject agent argument **'mohlape wa dikgomo,'** is animate. The locative is **'thoteng'.**
In this sentence the NP LOC complement has the morpheme
'-ng.' The verb **'tsamaya'** can be represented in terms of the event type of process, where
the action of moving proceeds.

Consider, next, the following example sentence:

(6) [Mohlape wa dikgomo] o tsamaya [thoteng] [le manamane]
ARG1 NP AGENT   ARG2 NP LOC   ARG3 NPPP theme

'The herd of cattle is moving in the veld with calves'

$$
\begin{bmatrix}
\text{Tsamaya} \\
\quad \text{ARGSTR} \quad = \begin{bmatrix} \text{ARG1} = \text{Animate} \\ \text{ARG2} = \text{Locative} \\ \text{ARG3} = \text{Animate} \\ \text{D-ARG} \end{bmatrix} \\[3em]
\quad \text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \end{bmatrix}
\end{bmatrix}
$$

The argument **'mohlape wa dikgomo'**, which is animate is the agent argument. The locative is **'thoteng'**. In this sentence the NP LOC complement has the morpheme **'-ng'**. The theme argument which is human NP and which appears as a complement of the preposition **'le'** is interpreted as the comitative agent, a default argument (D − ARG). The **'ka'** phrase cannot be use in this case. The verb **'tsamaya'** can be represented in terms of the event type of process, where the action of moving proceeds.

4.3.3 The subject denotes groups (groups of young people)

Consider the following example sentence:

(7)   [Bashemane] ba tla tsamaya [le banana] [ka terekere]
       ARG1 NP theme   ARG2 NPPP   ARG3 NP AGENT

$$
\begin{bmatrix}
\text{Tsamaya} \\
\text{ARGSTR} = \begin{bmatrix}
\text{ARG1} & = \text{Human} \\
\text{ARG2} & = \text{Human} \\
\text{D-ARG} \\
\text{D-ARG} & = \text{Instrument} \\
\text{D-ARG}
\end{bmatrix} \\
\text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \end{bmatrix}
\end{bmatrix}
$$
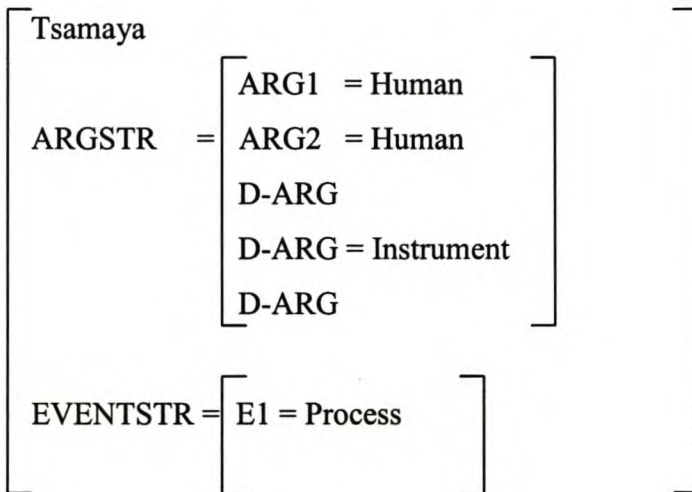
The subject NP **'bashemane'** which is human is the theme argument. The argument which is a human NP and which appears as a complement of the preposition **'le'** is interpreted as the comitative theme a default argument (D − ARG). The agent argument which is inanimate NP and which appears as a complement of the preposition **'le'** is interpreted as the instrument. The verb **'tsamaya'** can be represented in terms of the event type process in that the process of going will be continuing.

4.3.4 The subject denotes food

(8)   [Dijo] di tsamaya [masimong]   [ka terekere]
       ARG1 NP theme   ARG2 NP LOC ARG3 NPPP AGENT
       'Food goes by the tractor to the field'

$$
\begin{bmatrix}
\text{Tsamaya} \\[4pt]
\text{ARGSTR} \quad = \begin{bmatrix} \text{ARG1} & = \text{Concrete (inanimate)} \\ \text{ARG2} & = \text{Locative} \\ \text{D-ARG} & = \text{instrument} \\ \text{D-ARG} & \end{bmatrix} \\[20pt]
\text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \end{bmatrix}
\end{bmatrix}
$$
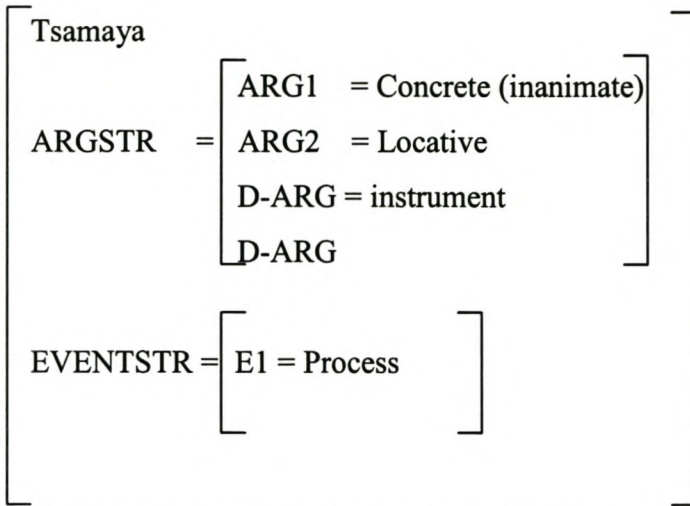
The subject argument **'dijo'** which is inanimate, is theme. The locative is **masimong**. In this sentence the NP LOC complement has the morpheme **'-ng'**. The agent argument which is an inanimate NP and which appears as a complement of the preposition **'ka'** is interpreted as the instrument. The verb **'tsamaya'** of the event type process in that the process of delivering is continuing.

4.3.5 The subject denotes possession/property

Consider the following example sentence:

(9)   [Tjhelete] e tsamaya [ka koloi]   [bankeng]

      ARG1 NP theme   ARG2 NPPP AGENT ARG3 NP LOC

      'Money goes by car to the bank'

$$
\begin{bmatrix}
\text{Tsamaya} \\[4pt]
\text{ARGSTR} \quad = \begin{bmatrix} \text{ARG1} = \text{Physical object (inanimate)} \\ \text{ARG2} = \text{instrument} \\ \text{D-ARG} \\ \text{ARG3} = \text{Locative} \end{bmatrix} \\[20pt]
\text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \end{bmatrix}
\end{bmatrix}
$$
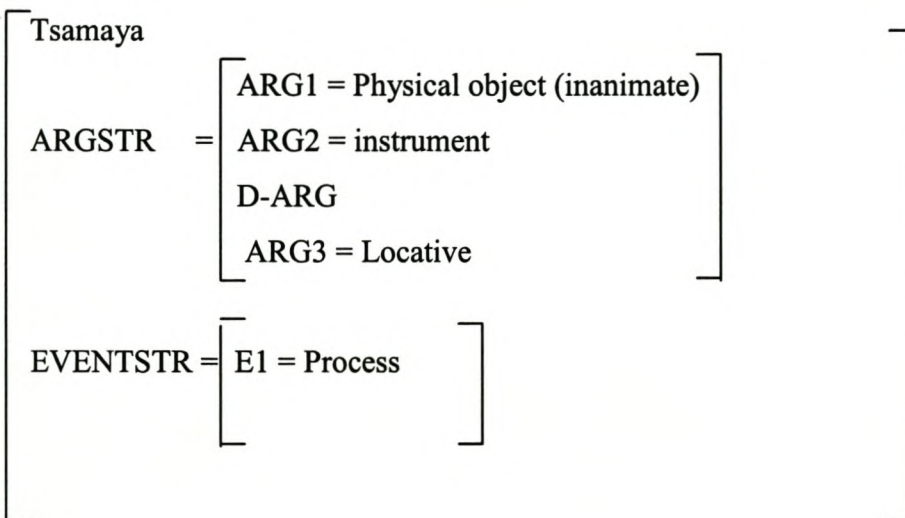
The subject argument **'tjhelete'** which is physical object is the theme argument. The agent argument which is an inanimate NP and which appears as a complement of the preposition **'ka'** is interpreted as the instrument. The   locative is **'bankeng'**. In this sentence, the NP LOC complement has the morpheme **'-ng'**. The verb **'tsamaya'** can be represented in terms of the event type process in that the process of transporting is continuing.

4.3.6   <u>The subject denotes artifact (music)</u>

Consider the following example sentence:

(10)   [Dikatara] di tsamaile [le dibini]   [holong]

      ARG1 NP AGENT   ARG2 NPPP theme ARG3 NP LOC

      'Guitars have gone by the musicians from the hall'

$$
\begin{bmatrix}
\text{Tsamaile} \\[2pt]
\text{ARGSTR} \quad = \begin{bmatrix} \text{ARG1} = \text{Physical object} \\ \text{ARG2} = \text{Human} \\ \text{ARG3} = \text{Locative} \\ \text{(D-ARG)} \end{bmatrix} \\[2pt]
\text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \end{bmatrix}
\end{bmatrix}
$$
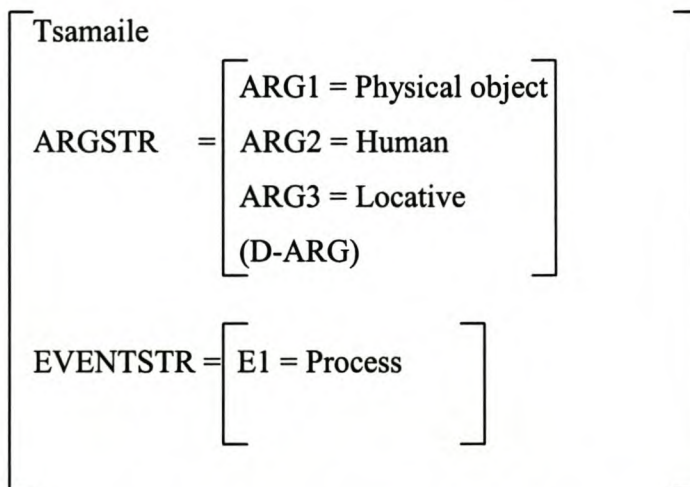
The subject argument **'dikatara'** which is inanimate (physical object), is the theme argument. The argument which is human NP and which appears as a complement of the preposition **'le'** is interpreted as the comitative theme, a default argument (D – ARG). Instead of the **'le'** phrase, the **'ka'** phrase can be used as in **'Dikatara di tsamaile ka dibini holong'**. The NP LOC complement has the morpheme **'-ng'**. The verb **'tsamaile'** is of the event type process in that the process of transporting proceeds.

4.3.7 The subject denotes natural phenomena (earth)

Consider the following example sentences

(11) [Lehlabathe] le tsamaya [nokeng]   [le metsi]

ARG1 NP AGENT   ARG2 NP LOC   ARG3 NPPP theme

'Sand goes with water at the river'

$$
\begin{bmatrix}
\text{Tsamaya} \\
\text{ARGSTR} = \begin{bmatrix}
\text{ARG1} = \text{inanimate} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{inanimate} \\
\text{(D-ARG)}
\end{bmatrix} \\
\text{EVENTSTR} = \begin{bmatrix}
\text{E1} = \text{Process}
\end{bmatrix}
\end{bmatrix}
$$
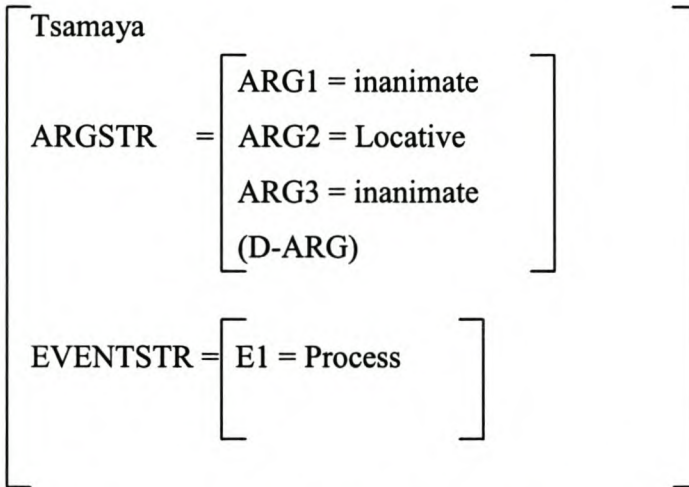
The subject argument **'lehlabathe'** which is a physical object inanimate, is the theme. The locative is **'nokeng'**. The NP LOC complement has the morpheme **'-ng'**. The theme argument which is a physical object inanimate, and which appears as a complement of the preposition **'le'** is interpreted as the comitative theme, a default argument, (D – ARG). The verb **'tsamaya'** is of the event type process in that the process of moving proceeds.

4.4 Analysis of the argument structure of sentences with 'baleha' associated with the different word senses.

4.4.1 The verb 'baleha' (run away)

4.4.1.1 The subject denotes human

Consider the following example sentence with the locative applicative affix appearing with the verb '–baleha'

(12) [Ngwana] o balehela [Lesotho]

ARG1 NP AGENT   ARG2 NP LOC

'The child runs away to Lesotho'

$$
\text{Balehela} \begin{bmatrix} \text{ARGSTR} & = & \begin{bmatrix} \text{ARG1} = \text{Human} \\ \text{ARG2} = \text{Locative} \end{bmatrix} \\\\ \text{EVENTSTR} = & \begin{bmatrix} \text{E1} = \text{Process} \\ \text{E2} = \text{Transition} \end{bmatrix} \end{bmatrix}
$$
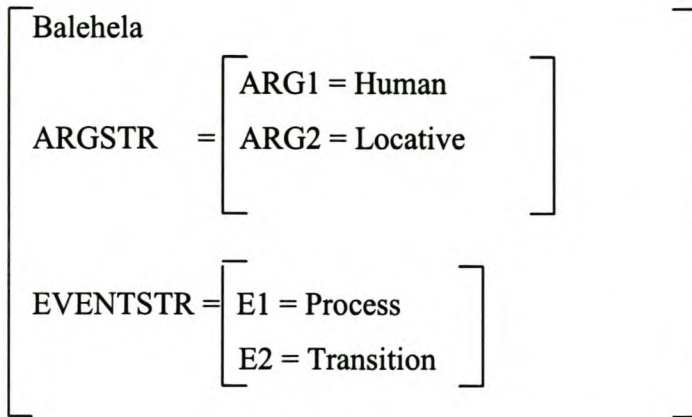
The subject argument **'ngwana'** which is human is the agent. The locative is **'Lesotho'**. The NP LOC does not have a complement with **'-ng'** because **'Lesotho'** is the name of a place. The applicative verb **'balehela'** can be interpreted in terms of the event type of process where the action proceeds and the terms of the event type transition since the action of running reaches the finishing point, when the child arrived in Lesotho.

Consider the following example sentence:

(13)   [Ngwanana] o balehela [Gauteng]   [le monna]

ARG1 NP AGEN   ARG2 NP LOC   ARG3 NPPP theme

'The girl runs away to Gauteng with the man'

$$
\text{Balehela} \begin{bmatrix} \text{ARGSTR} & = & \begin{bmatrix} \text{ARG1} = \text{Human} \\ \text{ARG2} = \text{Locative} \\ \text{ARG3} = \text{Human} \\ \text{D-ARG} \end{bmatrix} \\\\ \text{EVENTSTR} = & \begin{bmatrix} \text{E1} = \text{Process} \\ \text{E2} = \text{Transition} \end{bmatrix} \end{bmatrix}
$$
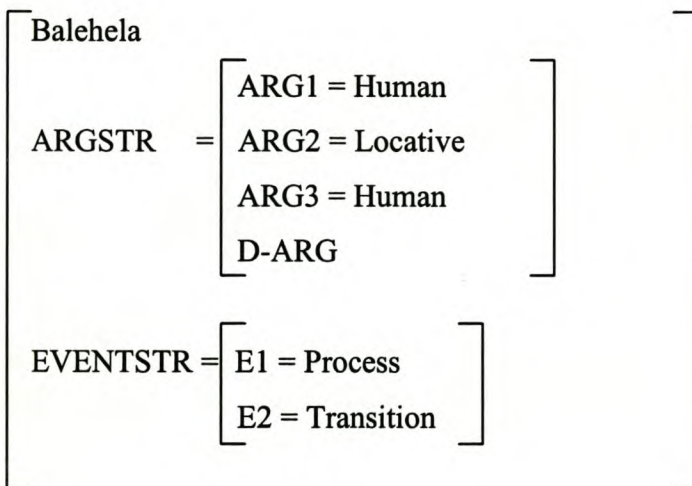
The subject argument **'ngwanana'** which is human, is the agent. The locative does not take the NP LOC complement **'-ng'** because the noun **'Gauteng'** is the name of a place. The theme argument which is a human NP, and which appears as a complement of the preposition **'le'** is interpreted as the comitative agent.

4.4.2   The subject denotes groups (Groups of people)

Consider the following example sentence

(14)   [Sehlopha sa dinokwane] se balehela [mophatong] [ka koloi]

ARG1 AGENT   ARG2 NP LOC ARG3 NPPP theme

$$
\begin{bmatrix}
\text{Baleha} \\[4pt]
\text{ARGSTR} \quad = \begin{bmatrix}
\text{ARG1} & = \text{Human} \\
\text{ARG2} & = \text{Locative} \\
\text{ARG3} & = \text{Instrument} \\
\underline{\text{D-ARG}}
\end{bmatrix} \\[20pt]
\text{EVENTSTR} = \begin{bmatrix}
\text{E1} = \text{Process} \\
\text{E2} = \text{Transition}
\end{bmatrix}
\end{bmatrix}
$$

The subject argument, which is human, is the agent.   The locative is **'mophatong'**.   The sentence above carries the NP LOC complement with

'-ng'. The argument **'koloi'** which is an inanimate NP, and which appears as a complement of the preposition 'ka' is interpreted as an instrument.   The applicative verb **'balehela'** can be interpreted in terms of the event type of process, where the action of running **proceeds** and the terms of the event type **transition**, since the action of running reaches a logical endpoint when the group of criminals arrive at the initiation school.

4.4.3   The subject denotes groups (Groups of animals)

Consider the following example sentence:

(15)   [Mohlape wa dikgomo] o balehela [thabeng]

ARG1 NP AGENT   ARG NP LOC

'The herd of cattle run away to the mountain'

$$
\left[
\begin{array}{l}
\text{Baleha} \\[2ex]
\text{ARGSTR} \quad =
\left[
\begin{array}{l}
\text{ARG1 = Animate} \\[1ex]
\text{ARG2 = Locative}
\end{array}
\right] \\[4ex]
\text{EVENTSTR} =
\left[
\begin{array}{l}
\text{E1 = Process} \\[1ex]
\text{E2 = Transition}
\end{array}
\right]
\end{array}
\right]
$$
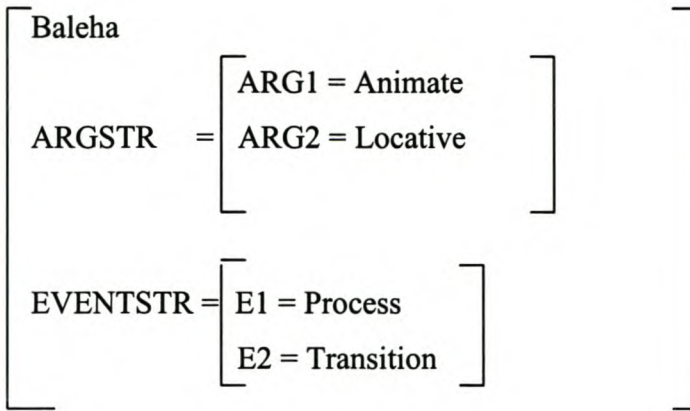
The subject argument **'Mohlape wa dikkgomo'**, which is animate is the agent. The locative is **'thabeng'**. The above sentence illustrates the NP LOC complement with **'-ng'** . The applicable **'baleha'** can be interpreted in terms of the event type of process, where the action of running away proceeds and the terms of the event type of transition, since the action of running reach a logical end point when the herd of cattle arrives at the mountain.

4.4.4 The subject denotes artifact (vehicle)

Consider the following example sentence:

(16)   [Baesekele] e baleha [ka ngwana]

ARG1 NP theme   ARG2 NPPP Agent

'The bicycle moves away with the child'

$$
\left[
\begin{array}{l}
\text{Baleha} \\[2ex]
\text{ARGSTR} \quad =
\left[
\begin{array}{l}
\text{ARG1 = inanimate} \\[1ex]
\text{ARG2 = Human} \\[1ex]
\text{(D – ARG)}
\end{array}
\right] \\[4ex]
\text{EVENTSTR} =
\left[
\begin{array}{l}
\text{E1 = Process}
\end{array}
\right]
\end{array}
\right]
$$
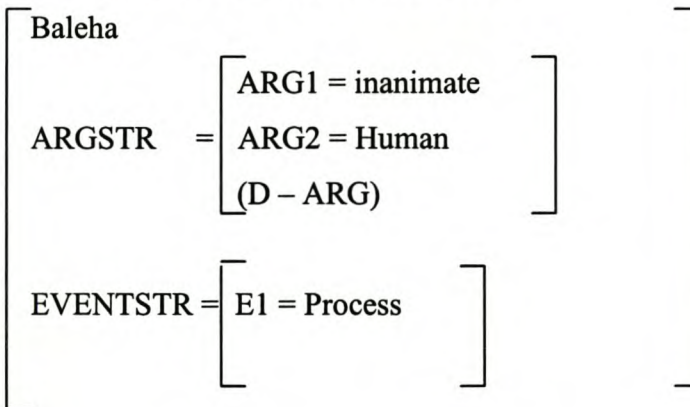
The subject argument **'baesekele'**, which is inanimate is the theme. The agent argument NP which is human NP and which appears as a complement of the preposition **'ka'** is interpreted as the agent, a default argument. The verb **'baleha'** can be interpreted in terms of the event type of process, where the action of moving is continuing.

4.4.5 The subject denotes food.

Consider the following example sentence:

(17) [Dijo] di tla baleha [ka banana]   [ka dipitsa]

ARG1 NP theme   ARG2 Agent   ARG3 NPPP

'Food will be run away by the girls in pots (i.e. taken away)

$$
\begin{bmatrix}
\text{Baleha} \\[4pt]
\text{ARGSTR} \quad =
\begin{bmatrix}
\text{ARG1} = \text{inanimate} \\
\text{ARG2} = \text{Human} \\
\text{ARG3} = \text{instruments} \\
\text{(D-ARG)}
\end{bmatrix} \\[12pt]
\text{EVENTSTR} =
\begin{bmatrix}
\text{E1} = \text{Process}
\end{bmatrix}
\end{bmatrix}
$$
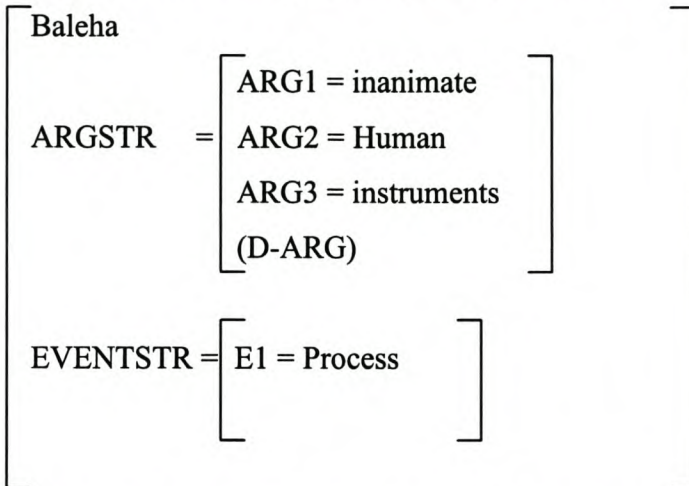
The subject argument **'dijo'** which is inanimate, is the theme. The argument which is human NP **'ka banana'** is an agent. The argument NP which is inanimate and which appears as a complement of the proposition **'ka'** is interpreted as the agentive instrument. The verb **'baleha'** can be interpreted in terms of the event type of <u>process</u>, where the action of running away will be continuing.

4.4.6 The subject denotes food (liquid): intoxicating

Consider the following example sentence:

(18) [Jwala] bo balehile [le basadi]

ARG1 NP Agent   ARG2 NP PP Theme

'Liquor has being carried away by women'

$$
\begin{bmatrix}
\text{Balehile} \\[4pt]
\text{ARGSTR} \quad =
\begin{bmatrix}
\text{ARG1} = \text{inanimate} \\
\text{ARG2} = \text{human}
\end{bmatrix} \\[12pt]
\text{EVENTSTR} =
\begin{bmatrix}
\text{E1} = \text{Process}
\end{bmatrix}
\end{bmatrix}
$$
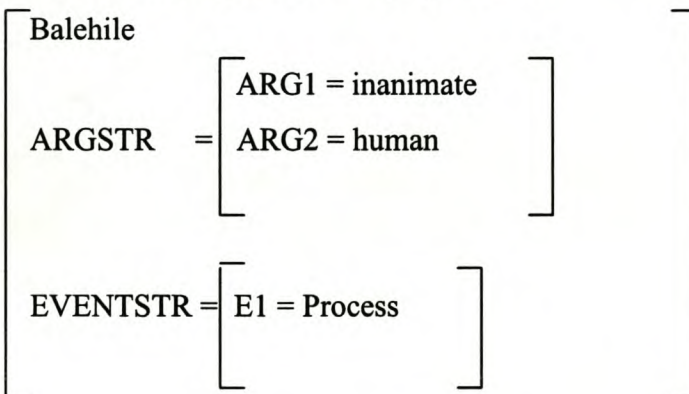
The subject argument **'jwala'** which is inanimate is the agent. The theme argument which is inanimate NP and which appears as a co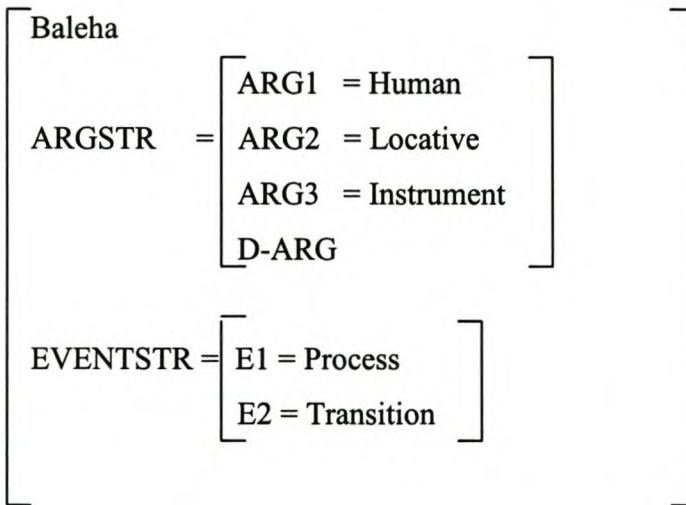mplement of the proposition **'le'** is interpreted as agentive instrument. The verb **'balehile'** can be interpreted in terms of the event type of process where the action carrying away was continuing.

4.4.7   The subject denotes food (liquid): non-intoxicating

Consider the following example sentence:

(19)   [Senomaphodi] se baleha [ka dinokwane]
        ARG1 NP Theme   ARG2 NPPP Agent
        'Cold-drink is carried away by the thieves

$$
\begin{bmatrix}
\text{Baleha} \\
\text{ARGSTR} = \begin{bmatrix} \text{ARG1 = inanimate} \\ \text{ARG2 = Human} \\ \text{(D – ARG)} \end{bmatrix} \\
\\
\text{EVENTSTR} = \begin{bmatrix} \text{E1 = Process} \end{bmatrix}
\end{bmatrix}
$$
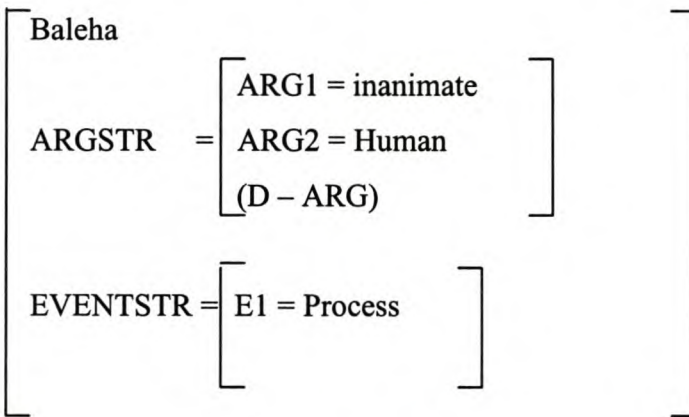
The subject argument **'senomaphodi'**, which is inanimate is the theme. The argument NP which is human NP and which appears as a complement of the preposition **'ka'** is interpreted as the agent, a default argument. The verb **'baleha'** can be interpreted in terms of the event type of process, where the action of carrying away is continuing.

4.5   Summary

The discussion in this chapter examined the predicate argument structure (PAS) of the motion verbs –tsamaya and –baleha motion in a range of example sentences in Sesotho. The structural realisation between subject agent argument and theme argument has been demonstrated. The subjects theme arguments are the objects of the preposition or a locative. The human agent arguments are normally subjects of a verb. The clarification of the explanation of motion verbs with the verbs **'tsamaya'** (walk) and **'baleha'** (run –away) in sentences were examined as well as the lexical features of motion verbs. The argument structure of sentences with **'tsamaya'** (walk) and **'baleha'** (run-away) which represent the

different word senses were discussed. The interpretation of the arguments of motion verbs was discussed with different types of nouns as subjects denoting humans, animals, concrete nouns, natural objects, natural phenomena, artifact, possession/property, etc.

CHAPTER 5

A LEXICAL SEMANTIC OF THE VERBS '-THEOHA' (DESCEND) AND – 'NYOLOHA' (ASCEND)

5.1   Introduction

The aim of this chapter is to examine the semantic features of NPs that can appear as external and internal arguments with motion verbs **'Theoha'** (descend) and **'Nyoloha'** (ascend) as well as their internal. The thematic interpretation of these arguments in their respective positions will also be explored consider the following example:

(1)   **Theoha** (descend) : [Titjhere] e nyoloha [le bana]

    'The teacher goes up with the children'

In an example (1) above, the NPs **'Titjhere'** and **'bana'** are arguments which are assigned theta – roles of agent and comitative agent.

5.2   Argument Structure

The argument structure of the verbs **'theoha'** and **'nyoloha'** relates to the subject NP and the complement arguments, that is the arguments that follow the verb.   Consider the following example:

(2)   Theoha (descend) : [Dikgomo] di theoha [thabeng]

'The cows go down from the mountain'

5.3   A lexical Semantic Analysis of 'theoha' [thabeng] (descend) and 'nyoloha' (ascend)

5.3.1   The verb 'theoha' (descend)

5.3.2   The Subject denotes human

(3)   [Basebetsi] ba theoha [morafong] [ka lifiti]

ARGI NP AGENT   ARG2 NP LOC ARG3 NPPP instrument

'The workers go down into the mine by lift'

$$
\begin{bmatrix}
\text{Theoha} \\[2pt]
\text{ARGSTR} \quad = \begin{bmatrix} \text{ARG1} = \text{Human} \\ \text{ARG2} = \text{Locative} \\ \text{ARG3} = \text{instrument} \\ \text{(D-ARG)} \end{bmatrix} \\[6pt]
\text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \\ \text{E2} = \text{Transition} \end{bmatrix}
\end{bmatrix}
$$
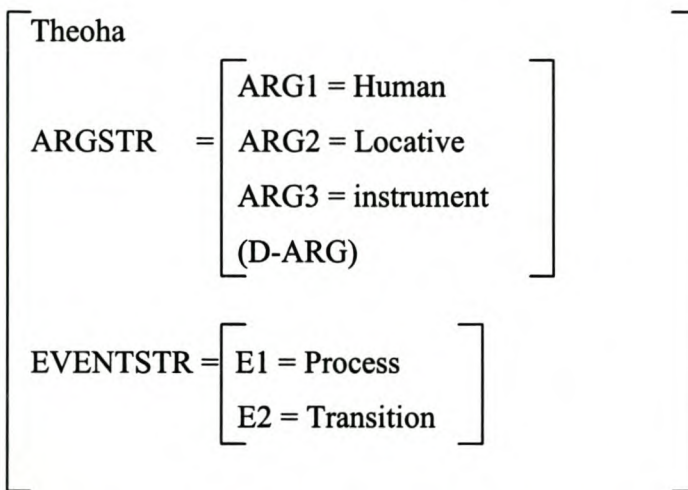
The subject agent argument **'basebetsi'** is human. The locative is **'morafong'**. In this sentence, the NP Loc complement has the morpheme   **'-ng'**. The argument which is an inanimate NP and which appears as a complement of the preposition **'ka'** is interpreted as the instrument, a default argument (D-ARG). The verb **'theoha'** in the above sentence can be represented in terms of the event type <u>process</u>, in that the process of going down is continuing and in terms of the event type <u>transition</u> since the action of going down reaches a logical end – point when the workers arrive at the mine. Consider, next, the following example sentence:

(4)   [Ntate] o theoha [koloing]   [le jwala]

ARG1 NP AGENT   ARG2 NP Loc ARG3 PP instrument

'Father gets out of the car with liquor'

$$
\begin{bmatrix}
\text{Theoha} \\[4pt]
\text{ARGSTR} \quad =
\begin{bmatrix}
\text{ARG1} = \text{Human} \\
\text{ARG2} = \text{Physical obj (Locative)} \\
\text{ARG3} = \text{inanimate} \\
\text{(D-ARG)}
\end{bmatrix} \\[20pt]
\text{EVENTSTR} =
\begin{bmatrix}
\text{E1} = \text{Process}
\end{bmatrix}
\end{bmatrix}
$$
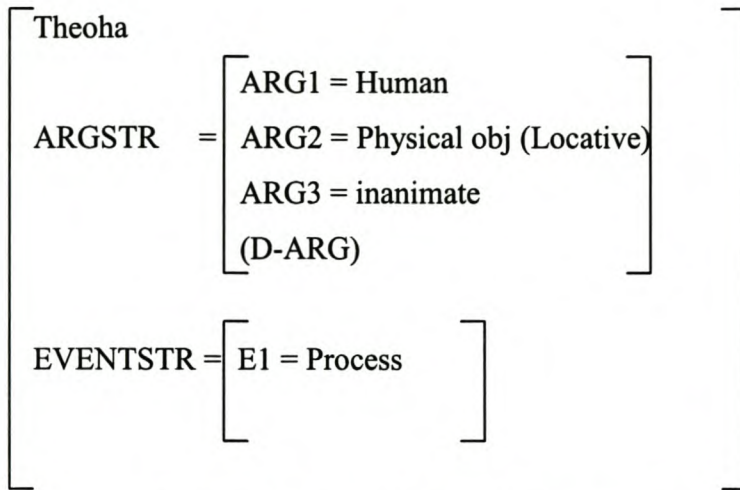
The subject NP 'ntate' which is human, is the agent argument. The locative is 'koloing'. The sentence above carries the NP Loc complement with the morpheme '-ng'. The argument which is an inanimate NP and which appears as a complement of the preposition 'le' is interpreted as the theme, a default argument (D-ARG). Instead of the 'le phrase', the 'ka phrase' can also be used as in, **Ntate o theoha koloing ka jwala**. The two sentences have the same meaning. There is no shift of meaning. The verb 'theoha' in this sentence can be interpreted in terms of the event type process in that the process of getting out is continuing.

5.3.3 The subject denotes groups of people

Consider the following example sentence:

(5)   [Makolwane] a theoha [thabeng]   [le banna]
        ARG1NP AGENT   ARG2 NP LOC ARG3 PP theme
        'The initiates go down from the mountain with men'

$$
\begin{bmatrix}
\text{Theoha} \\[4pt]
\text{ARGSTR} \quad =
\begin{bmatrix}
\text{ARG1} = \text{Human} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{Human} \\
\text{(D-ARG)}
\end{bmatrix} \\[20pt]
\text{EVENTSTR} =
\begin{bmatrix}
\text{E1} = \text{Process}
\end{bmatrix}
\end{bmatrix}
$$

The subject argument '**makolwane**' which is human, is the agent argument. The locative complement is '**thabeng**' with the NP Loc morpheme '**-ng**'. The argument which is human NP and which appears as complement of the preposition 'le' is cumitative agent, a default argument (D-ARG). The verb '**theoha**' can be interpreted in terms of the <u>process</u> in that the process of going down is continuing.

5.3.4 The subject denote groups of animals

Consider the following example sentence:

(6)   [Mohlape wa dikgomo] o theoha [nokeng]   [le manamane]
       ARG1 NP AGENT   ARG2 NP LOC ARG3 NPPP theme

'Herd of cattle gets down to the river with calves'

$$
\begin{bmatrix}
\text{Theoha} \\
\text{ARGSTR} = \begin{bmatrix}
\text{ARG1} = \text{Human} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{Animate} \\
\text{(D-ARG)}
\end{bmatrix} \\
\\
\text{EVENTSTR} = \begin{bmatrix}
\text{E1} = \text{Process} \\
\text{E2} = \text{Transition}
\end{bmatrix}
\end{bmatrix}
$$

The subject argument '**mohlape wa dikgomo**' which is animate, is the agent argument. The locative is '**nokeng**', with the NP Loc complement '**-ng**'. The theme argument NP which is an animate NP and which appears as a complement of the preposition 'le' is interpreted as a comitative agent, a default argument (D – ARG). The verb '**theoha**' in the above sentence can be interpreted in terms of the event type of <u>process</u>, where the action of getting down is in process and in terms of the event type <u>transition</u>, since the action of getting down reaches a logical end-point when the herd of cattle arrive at the river.

5.3.5   The subject denotes animals

Consider the following example sentence:

(7)   [Tshwene] e theoha [sefateng]   [le ngwana yona]
        ARG1 NP AGENT   ARG2 NP Loc   ARG3 PP theme
        'The baboon descend from the tree with its child'

$$
\begin{bmatrix}
\text{Theoha} \\[2pt]
\text{ARGSTR} \quad =
\begin{bmatrix}
\text{ARG1} = \text{Human} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{Human} \\
\text{(D-ARG)}
\end{bmatrix} \\[20pt]
\text{EVENTSTR} =
\begin{bmatrix}
\text{E1} = \text{Process} \\
\text{E2} = \text{Transition}
\end{bmatrix}
\end{bmatrix}
$$

The subject argument '**tshwene**' which is animate, is the agent. The locative is '**sefateng**' with the NP LOC complement '**-ng**'. The theme argument NP which is animate appears as a complement of the preposition 'le' is interpreted as a **cumitative** agent, a default argument (D – ARG). The verb '**theoha**' in the above sentence can be interpreted in terms of the event type of <u>process</u>, where the action of 'descending' is continuing in terms of <u>transition</u> since the action reaches an end – point.

5.3.6   <u>The subject denotes concrete Mass Nouns</u>

Consider the following sentence:

(8)   [Metsi] a theohela [nokeng]   [ka foro]

AGR NP theme   ARG2 NP LOC   ARG3 NPPP instrument

'The water flows down to the river by the furrow'

$$
\begin{bmatrix}
\text{Theoha} \\[2pt]
\text{ARGSTR} \quad =
\begin{bmatrix}
\text{ARG1} = \text{Natural phenomena} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{Natural phenomena} \\
\text{(D-ARG)}
\end{bmatrix} \\[20pt]
\text{EVENTSTR} =
\begin{bmatrix}
\text{E1} = \text{Process} \\
\text{E2} = \text{Transition}
\end{bmatrix}
\end{bmatrix}
$$

The subject argument **'metsi'** which is a physical object an inanimate is the theme. The locative is **'nokeng'**. The above sentence carries the NP LOC complement with **'-ng'**. The argument which is inanimate NP **'ka foro'** which appears as a complement of the preposition 'ka' is interpreted as the instrument, a default argument. The verb **'theoha'** is of flowing down proceeds and the terms of the event type <u>transition</u> since the action of flowing reaches a logical end point when the water reaches the river.

5.3.7 <u>The subject denotes food</u>

Consider the following example sentence:

(9)   [Diperekisi]   di theohile [sefateng]

ARG1 NP agent   ARG2 NP LOC

'Peaches fell down from the tree'

$$
\begin{bmatrix}
\text{Theohile} \\
\text{ARGSTR} \quad = \begin{bmatrix} \text{ARG1 = inaninate} \\ \text{ARG2 = Locative} \end{bmatrix} \\
\\
\text{EVENTSTR} = \begin{bmatrix} \text{E1 = Process} \end{bmatrix}
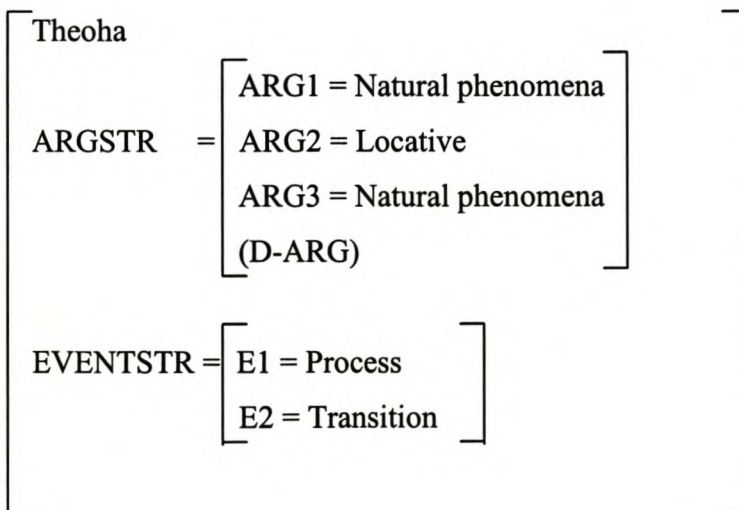\end{bmatrix}
$$
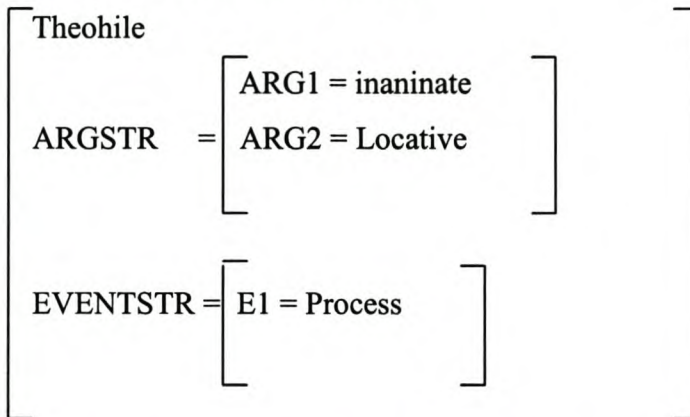
The subject argument **'diperekisi'** which is inanimate NP is the agent. The locative is **'sefateng'** with the NP LOC complement **'-ng'**. The verb **'theohile'** can be interpreted in terms of the event type '<u>process</u>' where the action of falling down was continuing.

5.3.8 <u>The subject denotes natural phenomena</u>

Consider the following example sentence:

(10)   [Lehlabathe] le theoha   [loring]   [le basebetsi]

ARG1 NP theme   ARG2 NP LOC   ARG3 NP AGENT

'Sand goes down from the lorry with workers'

$$
\begin{bmatrix}
\text{Theoha} \\[4pt]
\text{ARGSTR} \quad =
\begin{bmatrix}
\text{ARG1} = \text{Natural phenomena} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{Human} \\
\text{(D-ARG)}
\end{bmatrix} \\[20pt]
\text{EVENTSTR} =
\begin{bmatrix}
\text{E1} = \text{Process}
\end{bmatrix}
\end{bmatrix}
$$

The subject argument '**lehlabathe**' which is natural phenomena inanimate, is the theme. The locative is '**loring**' with the NP LOC complement '**-ng**'. The argument which is human NP and which appears as the complement of the preposition 'le' is interpreted as the agent, a default argument (D-ARG). The verb '**theoha**' can be interpreted in terms of the event type 'process' where the action of getting down is continuing.

5.3.9   The subject denotes artifact vehicle

Consider the following example sentence:

(11)   [Koloi] theoha   [borokgong]   [ka batho]

    ARG1 NP AGENT   ARG2 NP LOC   ARG3 NPPP theme

    'The car moves down to the bridge with people'

$$
\begin{bmatrix}
\text{Theoha} \\[4pt]
\text{ARGSTR} \quad =
\begin{bmatrix}
\text{ARG1} = \text{inanimate (Physical obj} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{Human} \\
\text{(D-ARG)}
\end{bmatrix} \\[20pt]
\text{EVENTSTR} =
\begin{bmatrix}
\text{E1} = \text{Process} \\
\text{E2} = \text{Transition}
\end{bmatrix}
\end{bmatrix}
$$
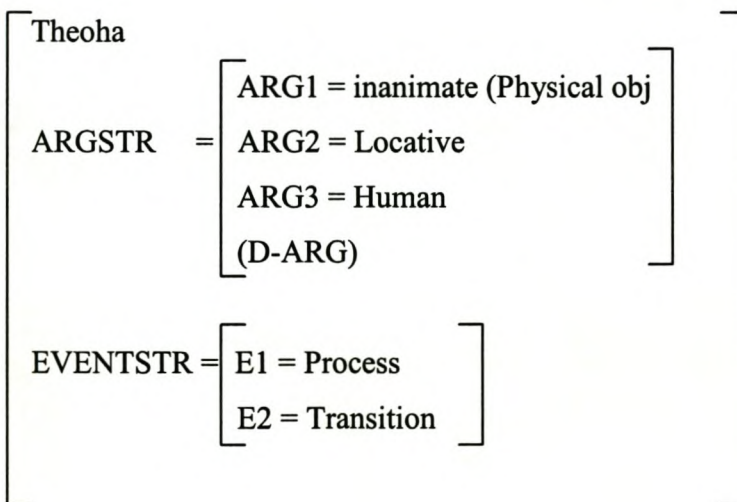
The subject argument 'koloi' which is an inanimate object is the theme. The locative is 'borokgong' with the NP LOC complement '-ng'. The argument which is human NP and which appears as a complement of the preposition 'ka' is the theme, a default argument (D-ARG). The verb 'theoha' can be interpreted as the event type 'process' and the event type transition since the action reaches the logical end point when the car reaches the bridge.

5.3.10 The subject denotes natural object

Consider the following example sentence:

(12)   [Majwe] a theoha [motseng]   [ka banna]

        ARG1 NP theme   ARG2 NP LOC ARG3 NP AGENT

        'Stones go down to the village by men'
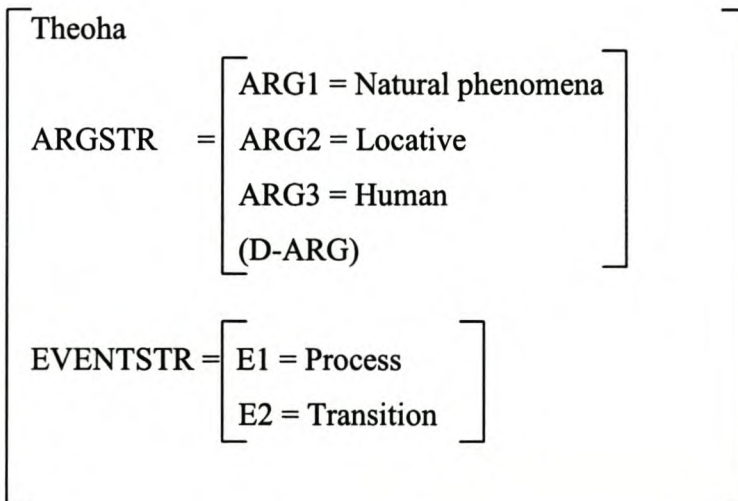
$$
\begin{bmatrix}
\text{Theoha} \\
\text{ARGSTR} \quad = \begin{bmatrix} \text{ARG1 = Natural phenomena} \\ \text{ARG2 = Locative} \\ \text{ARG3 = Human} \\ \text{(D-ARG)} \end{bmatrix} \\
\\
\text{EVENTSTR} = \begin{bmatrix} \text{E1 = Process} \\ \text{E2 = Transition} \end{bmatrix}
\end{bmatrix}
$$

The subject argument 'majwe' which is an inanimate physical object, is the theme . The locative is 'motseng' with the NP LOC complement '-ng'. The argument which is human NP and which appears as a complement of the preposition 'ka' is the agent, a default argument (D-ARG). The verb 'theoha' can be interpreted in terms of the event type process where the action of carrying down is continuing and the event type transition, since the action of carrying reaches the logical end point when the stones reach the village.
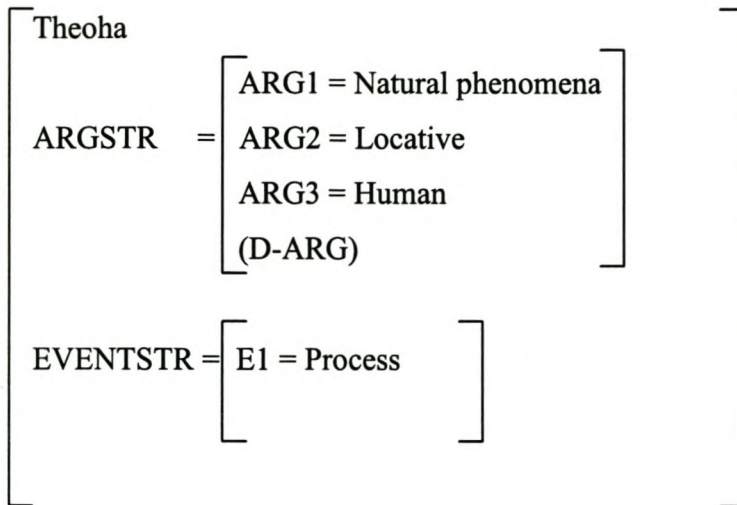
5.4   Analysis of the argument structure of sentences with 'Nyoloha' (ascend) associated with the different word senses.

5.4.1   The verb 'Nyoloha' (ascend)

5.4.2   The subject denote human

Consider the following example sentence:

(13)   [Monna] o nyoloha   [thaba]   [le basadi]

ARG1 NP AGENT   ARG2 NP LOC   ARG3 NP PP theme

'Men climb up the mountain with women'

$$
\begin{bmatrix}
\text{Nyoloha} \\[2ex]
\text{ARGSTR} \quad = \begin{bmatrix} \text{ARG1 = Human} \\ \text{ARG2 = Locative} \\ \text{ARG3 = Human} \\ \text{(D-ARG)} \end{bmatrix} \\[4ex]
\text{EVENTSTR} = \begin{bmatrix} \text{E1 = Process} \end{bmatrix}
\end{bmatrix}
$$
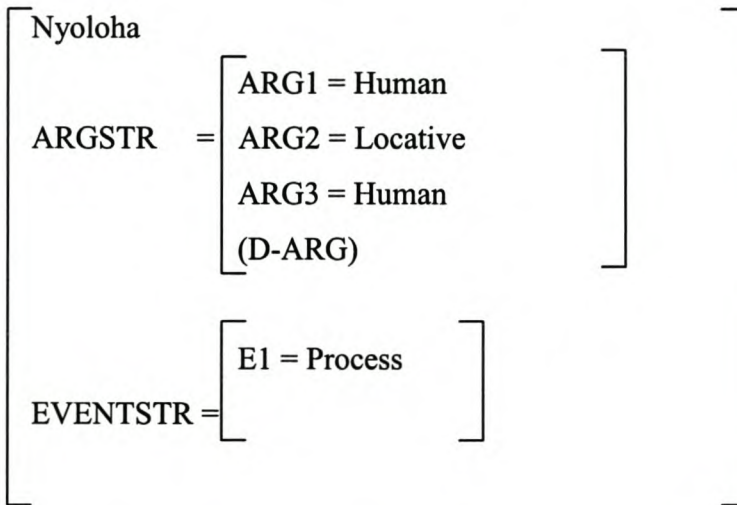
The subject argument '**monna**' which is human is the agent argument. The locative is '**thaba**' which does not carry the NP LOC complement with '**-ng**'. The theme argument which is a human NP and which appears as a complement of the preposition '**le**' is interpreted as the cumitative agent, a default argument (D – ARG). The 'ka' phrase cannot be used instead of the '**le**' phrase, The verb '**nyoloha**' in this sentence is of the event type 'process' where the action of climbing up proceeds.

5.4.3   The subject denotes groups of people

Consider the following example sentence:

(14)   [Bahahlaodi] ba nyoloha [thabeng]   [ka maoto]

ARG1 NP AGENT   ARG2 NP LOC   ARG3 NPPP theme

'The tourists climb up the mountain on feet'

$$
\begin{bmatrix}
\text{Nyoloha} \\[2mm]
\text{ARGSTR} \quad = \begin{bmatrix}
\text{ARG1} = \text{Human} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{instrument} \\
\text{(D-ARG)}
\end{bmatrix} \\[6mm]
\text{EVENTSTR} = \begin{bmatrix}
\text{E1} = \text{Process} \\
\text{E2} = \text{transition}
\end{bmatrix}
\end{bmatrix}
$$

The subject NP argument 'bahahlaodi' which is human is agent argument. The locative complement is 'thabeng' with the NP LOC morpheme '-ng'. The theme argument which is inanimate NP which appears as the complement of the preposition 'ka' is interpreted as the instrument, a default argument (D – ARG). The verb 'nyoloha' can be interpreted in terms of the event type <u>process</u> in that the process of climbing up is continuing and in terms of the event type <u>transition</u> given that the event of climbing up reaches a logical end – point when the people arrive at the top of mountain.
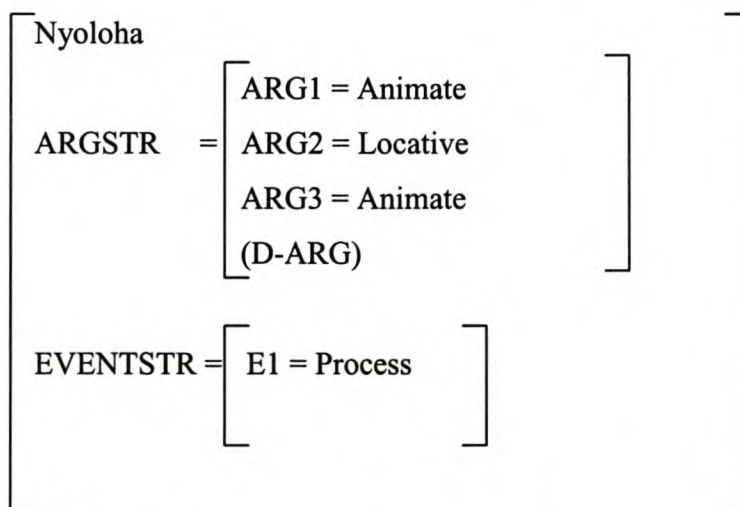
5.4.4 The subject denotes groups of young people

Consider the following example sentence:

(15)   [Sekgakgatha sa makolwane] se nyoloha [naheng]   [le banna]

ARG1 NP AGENT   ARG2 NP LOC   ARG3 NPPP theme

'Group of initiates is coming from the veld with men'

$$
\begin{bmatrix}
\text{Nyoloha} \\[2mm]
\text{ARGSTR} \quad = \begin{bmatrix}
\text{ARG1} = \text{Human} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{Human} \\
\text{(D-ARG)}
\end{bmatrix} \\[6mm]
\text{EVENTSTR} = \begin{bmatrix}
\text{E1} = \text{Process}
\end{bmatrix}
\end{bmatrix}
$$

The subject argument 'Sekgakgatha sa makolwane' which is a human, is an agent argument. The locative complement is 'naheng' with the NP LOC morpheme '-ng'. The argument which is human NP and which appears as a complement of the preposition 'le' is a comitative agent, a default argument (D – ARG). The verb 'nyoloha' in this sentence can be represented in terms of the event types process in that the process of 'coming' is continuing.

5.4.5 The subject denotes animals

Consider the following example sentence:

(16)   [Tshwene] e nyoloha [sefateng]   [ka ngwana]
        ARG1 NP AGENT   ARG2 NP LOC   ARG3 NP theme
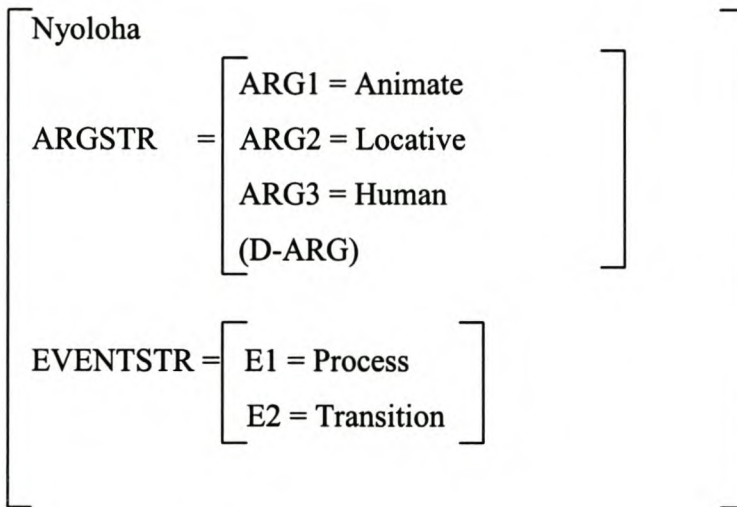
'The baboon climbs up the tree with its child'

$$
\begin{bmatrix}
\text{Nyoloha} \\[2pt]
\text{ARGSTR} \quad =
\begin{bmatrix}
\text{ARG1} = \text{Animate} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{Animate} \\
\text{(D-ARG)}
\end{bmatrix} \\[4pt]
\text{EVENTSTR} =
\begin{bmatrix}
\text{E1} = \text{Process}
\end{bmatrix}
\end{bmatrix}
$$

The subject argument 'tshwene' which is animate, is the agent. The locative complement is 'sefateng' with a NP Loc morpheme '-ng'. The argument NP which is animate NP and which appears as a complement of the preposition 'ka' is a comitative agent, a default argument (D–ARG). Instead of 'ka' phrase, the 'le' phrase can be used as in 'Tshwene e nyoloha sefateng le ngwana'. The meaning is different since in the 'ka' phrase means the baboon is carrying its child while climbing up a tree whereas in 'le' phrase means that the baboon and its child are climbing up a tree. Here there is a shift of meaning. The verb 'nyoloha' can be interpreted in terms of the event type of process, where the action of climbing proceeds.

5.4.6 The Subject denotes groups of animals

Consider the following example sentence:

(17)   [Mohlape wa dikgomo] o nyoloha [motseng]   [le badisa]

       ARG1 NP Agent   ARG2 NP LOC   ARG3 NPPP
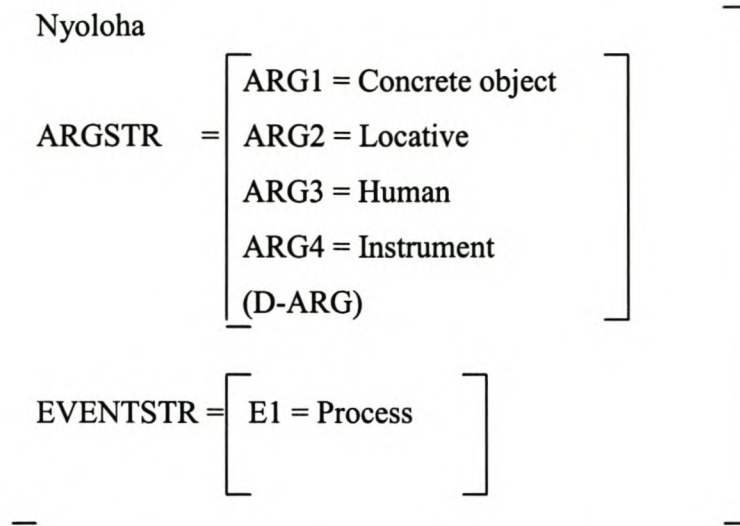
'Herd of cattle walk up to the village with shepherds'

$$
\begin{bmatrix}
\text{Nyoloha} \\[2pt]
\text{ARGSTR} = \begin{bmatrix} \text{ARG1} = \text{Animate} \\ \text{ARG2} = \text{Locative} \\ \text{ARG3} = \text{Human} \\ \text{(D-ARG)} \end{bmatrix} \\[6pt]
\text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \\ \text{E2} = \text{Transition} \end{bmatrix}
\end{bmatrix}
$$

The subject argument '**mohlape wa dikgomo**' which is animate, is agent argument. The locative complement is '**motseng**' with the NP LOC morpheme '**-ng**'. The argument which is human NP and which appears as a complement of the preposition 'le' is a cumitative agent, a default argument (D – ARG). The verb '**nyoloha**' can be interpreted in terms of the event type 'process' in that the process of walking up is continuing and in terms of the event type 'transition' since the action of walking up reaches the logical end-point when the herd of cattle and the shepherds arrive at the village.

5.4.7 The subject denotes concrete object

Consider the following example sentence:

(18)   [Metsi] a tla nyoloha [mokoting]   [le banna]   [ka diemere]

       ARG1 NP theme   ARG2 NP LOC   ARG3 NP Agent   ARG4 PP instrument

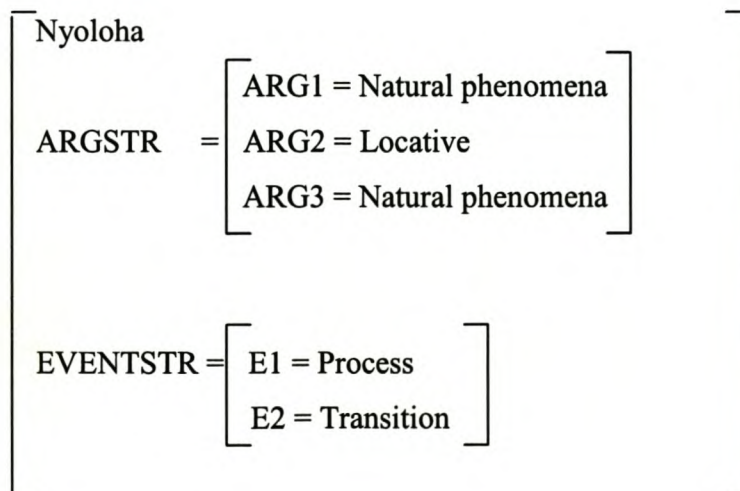'Water goes up from the hole by men with buckets'

Nyoloha

$$
\text{ARGSTR} = \begin{bmatrix} \text{ARG1} = \text{Concrete object} \\ \text{ARG2} = \text{Locative} \\ \text{ARG3} = \text{Human} \\ \text{ARG4} = \text{Instrument} \\ \text{(D-ARG)} \end{bmatrix}
$$

$$
\text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \end{bmatrix}
$$

The argument '**metsi** which is an (inanimate) object is theme. The locative complement is **'mokoting'** with NP LOC morpheme **'-ng'**. The argument which is human NP and which appears as a complement of the preposition **'ka'** is interpreted as the agent, a default argument. The argument which is inanimate NP and which appears as a complement of the preposition 'ka' can be interpreted as the instrument. The verb **'nyoloha'** in this sentence can be interpreted in terms of the event type 'process' in that the action of lifting is in process.

5.4.8   The subject denotes natural Phenomena

Consider the following example sentence:

(19)   [Pula] e nyoloha [thabeng]   [le moya]

    ARG1 NP theme   ARG2 NP LOC ARG3 NP Agent

    'The rain ascends to the mountain by the wind'

Nyoloha

$$
\text{ARGSTR} = \begin{bmatrix} \text{ARG1} = \text{Natural phenomena} \\ \text{ARG2} = \text{Locative} \\ \text{ARG3} = \text{Natural phenomena} \end{bmatrix}
$$

$$
\text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{Process} \\ \text{E2} = \text{Transition} \end{bmatrix}
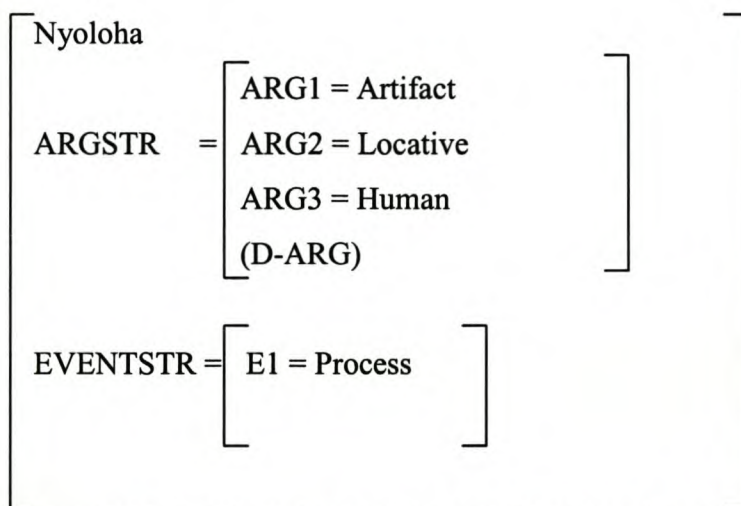$$

The subject argument **'pula'** which is a natural phenomena, is the theme argument. The locative complement is **'thabeng'** with the NP LOC morpheme **'-ng'**. The argument which is inanimate NP and which appears as the complement of the preposition **'le'** is the agent. The verb **'nyoloha'** can be interpreted in terms of the event type 'process' in that the action of blowing is continuing and in terms of the event type 'transition' since the action of blowing reaches the finishing point when the rain reaches the mountain.

5.4.9   The subject denotes artifact (vehicle)

Consider the following example sentence:

(20)   [Koloi] e nyoloha [moepa]   [ka banna]

ARG1 NP Agent ARG2 NP LOC ARG3 NP theme

' The car goes up the steep hill with men'

$$\begin{bmatrix} \text{Nyoloha} \\ \text{ARGSTR} = \begin{bmatrix} \text{ARG1 = Artifact} \\ \text{ARG2 = Locative} \\ \text{ARG3 = Human} \\ \text{(D-ARG)} \end{bmatrix} \\ \text{EVENTSTR} = \begin{bmatrix} \text{E1 = Process} \end{bmatrix} \end{bmatrix}$$
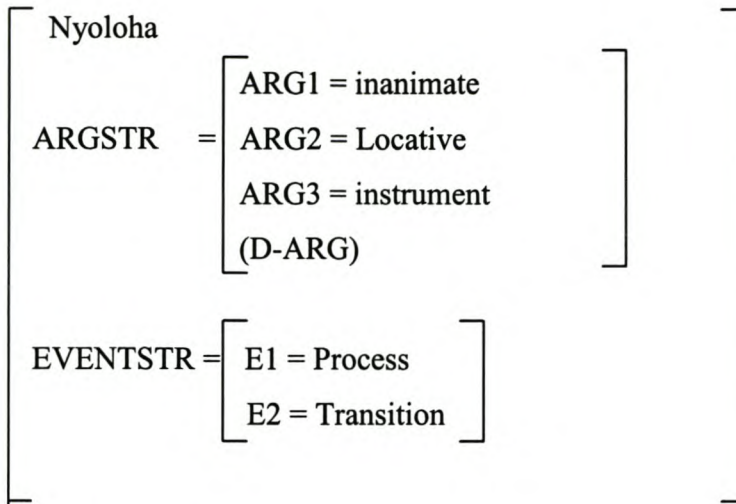
The subject NP **'koloi'** which is an artifact inanimate is theme argument. The locative is **'moepa'** without the NP LOC morpheme **'-ng'**. The argument which is human NP and which appears as a complement of the preposition 'ka' is an agent. The verb **'nyoloha'** in this sentence can be represented in terms of the event type of process, where the action of carrying proceeds.

5.4.10   The subject denotes property possession

Consider the following example sentence:

(21)   [Tjhelete] e nyoloha [bankeng]   [ka dikoloi]

ARG1 NP Agent   ARG2 NP LOC   ARG3 NPPP instrument

'Money goes up to the bank by cars'

$$
\begin{bmatrix}
\text{Nyoloha} \\[4pt]
\text{ARGSTR} \quad =
\begin{bmatrix}
\text{ARG1} = \text{inanimate} \\
\text{ARG2} = \text{Locative} \\
\text{ARG3} = \text{instrument} \\
\text{(D-ARG)}
\end{bmatrix} \\[20pt]
\text{EVENTSTR} =
\begin{bmatrix}
\text{E1} = \text{Process} \\
\text{E2} = \text{Transition}
\end{bmatrix}
\end{bmatrix}
$$

The subject agent argument **'tjhelete'** is property (possession), inanimate. The locative is 'bankeng'. In this sentence the NP LOC complement has the morpheme **'-ng'**. The argument which is an inanimate NP and which appears as the complement of the preposition 'ka' is interpreted as the instrument. The verb **'nyolohela'** can be interpreted in terms of the event type 'process', where the action of carrying proceeds and in terms of the event type 'transition' since the action of carrying reaches a logical end-point when the money arrive at the bank.

5.5   Summary

The discussion in this chapter examined the meaning of the verbs **'theoha'** (descend) and **'nyoloha'** (ascend) which includes a specification of the direction of motion even in the absence of an overt directional complement. None of these verbs specify the manner of motion. These two verbs behave uniformly in all aspects. They can express the goal, source, or path of motion and this is expressed via a prepositional phrase, as a direct object, or both.

CHAPTER 6

CONCLUSION

This section concludes the general findings made as regard the various motion verbs constructions in **Sesotho**. The different functions of the motion verbs and various constructions have been investigated in this study, adopting Pustejovsky's frameword syntactic on lexical semantics. Various constructions in which motion verbs are found in **Sesotho**; were explored. They demonstrated the semantic as well as the syntactic properties of these verbs. In the semantic classification it was noted that motion verbs are classified according to the relation of motion verb with the locative. It was also noted that motion verbs denote the movement of entities from one point to another, though some can show movement of entities from one point without a locative. It was stated that the classification of motion verbs arises from a consideration of the behaviour of these verbs. They denote motion towards a specific direction, having a meaning which includes an inherent specified path. They behave uniformly.

The predicate argument structure (P A S) and of the event structure of motion verbs with reference to a range or example sentences from **Sesotho** were explored and the lexical representations for -ya and –tla; -tsamaya and –baleha; -nyoloha and –theoha were examined.

The various semantic types of NPs that can appear with motion verbs as external arguments were examined. The thermatic interpretation of these verbs in the respective position were explored, as well as the argument structure of sentences with the verbs associated with the different word senses.

It was argued that motion verbs are intransitive in the sense that they do not assign a patient argument, but assign arguments such a agent, locative and theme.

The semantic classification for verb, that of aspectual class, was also explored for motion verbs where it who assume that there is at least three aspectual types, i.e. state; process and transition. The motion verbs can be represented in terms of the event type process and or transition.

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