3.1. Argument Structure

This chapter deals with the level of argument structure associated with the number of arguments a predicate takes, and their semantically determined and syntactically relevant relative prominence.

According to Grimshaw (1988:1) the central assumptions of argument structure are...

(a) It contains information about the syntactic valency of a predicate.
(b) It represents prominence relations among arguments
(c) It contains no thematic role information

According to Grimshaw (1990), argument structures are constructed in accordance with thematic hierarchy. The argument structure expresses prominence relations determined by the thematic information of the verb. The thematic hierarchy proposed by him specifies that the theta role assignment takes place from the least to the most prominent argument; it follows that the external argument will be the last to be theta marked. Since prominence is specified in the argument structure, and the reference to theta role labels is no longer necessary, Grimshaw states that thematic roles do not project into the
grammatical representation, but they are just tools to describe lexico-semantic problems. Internal organization of argument structure is not stipulated for each predicate but is projected from lexical semantic representation.

A verb may have a certain number of optional or obligatory syntactic dependents or elements. The latter refer to the set of arguments present in any given clause. In other words, the set of arguments of a verb is called the valence of that verb. The lexicon and the grammar of the language must therefore include information about these valency requirements. It is said that these issues of valency raise the question of alternation, i.e., where two morphologically related or even identical predicates differ in their lexical semantics in the way participants are realized in the morpho-syntax and, in particular, in morphology. According to Sadler and Spencer (1998), this facet of the morphology–syntax interface has come to be referred as ‘Argument Structure’. This reminds us of the hypothesis of lexical projection in the form of Universal Alignment Hypothesis (Perlmutter and Postal (1984)) which is reproduced below:

1) The Universal Alignment Hypothesis (UAH):  
"Principles of Universal Grammar (VG) predict the initial relation borne by each argument in a given clause from the meaning of the clause".
Similar to the above, from the perspective of the interaction of syntax and lexical semantics, Baker (1988) formulates the Uniformity of Theta Assignment Hypothesis (UTAH).

ii) The Uniformity of Theta Assignment Hypothesis:
"Identical Thematical relationships between items are represented by identical structural relationships between these items at the level of D-Structure”.

Intuitively, the UTAH predicts that every lexical item has a unique D-Structure and verb alternations in active-passives, causatives non-causative source verbs and other morphological derivations that must preserve the basic argument structure. However, there are complex phenomena involving the derivation of verbs which do not preserve the argument structure of the source.

With this background two crucial issues need to be addressed here:

1. To what extent is syntactic valency idiosyncratic or predictable from the lexico semantic representation.

2. It is said that between two kinds of changes viz. meaning changing and meaning preserving operations, the former alters the semantic content of predicates and is often called morpho-lexical operation; whereas, the latter which usually preserve the sense is manifested in the form of a syntactic operation that assign the mapping of the grammatical relations otherwise known as morpho syntactic operations. This difference neatly corresponds
to the well known distinction, the derivation (lexeme-creation) and inflections (paradigmatic forms of the lexeme). This sort of distinction between morpho-lexical and morpho syntactic operation is also perceived as a necessary phenomenon motivated by an important conceptual level called "argument structure level" otherwise known as Predicate Argument Structure (PAS).

This makes clear that the argument structure is essentially a syntactic representation – a reflection of the predicate's semantic properties. These properties determine the arity of the predicate. Notice that the identification of semantic properties of the predicate and matching them against the available arguments in a clause give us the clue to the correct semantics or meaning of the predicate (see Chapter 6).

Every predicate has an argument structure. The argument structure specifies the predetermined number of the arguments the predicate can support. These arguments are essentially being the participants which are minimally required for the activity or state described by the predicate to be understandable. However, this minimality is subject to debate. Argument Structure is a syntactic level of representation at which the number and relative prominence of arguments of a predicate are expressed; i.e, an Argument Structure specifies the arity of a predicate. A verb such as give is arity of 3, exemplified in 'X give Y to Z', and the verb 'mix' is arity of 2, where the mixed elements are all included into a single argument, which have the form of a set of conjoined NPs, and this argument is said to be 'plural'. 
It is argued that the argument structure in a language is dependent on the semantic properties of the verb. It is a bridge between deeper, conceptual representations and surface forms. These conceptual structures are postulated to be universal, and therefore, language independent.

The term argument structure meant different types of realization and different types of alternations to different authors. The argument structure information is presented in different ways, appealing directly to grammatical functions such as Subject and Object facilitated by syntactic structures, as in Lexical Function Grammar (LFG) (Bresnan, 1996) or Relational Grammar (Blake, 1990), or to Syntactic configurations, as in Principles and Parameters Theory (Chomsky, 1981), or to some combination of grammatical functions and category labels, as in Parse Driven phrase structure Grammar (HPSG) Pollard and Sag 1994). In addition, there must be a semantic level of representation of arguments of predicates as a level of lexico-semantic representations describing the nature, structure and vocabulary concerned (rf. Sadler & Spencer, 1998).

The information regarding the argument structure representation may well be used for syntactic well-formedness. The verb 'to give' has three arguments, which are represented as variables (X, Y, Z). Argument Structure is concerned with the number of participants expressed by the conceptual representation. The verb 'to give' requires three participants, a giver, a receiver and a given object as is represented in the example below:
{The boy X} [gives {the girl Y} {the book Z}]

The arguments that fall within the domain of the verb (Y, Z) are internal arguments, whereas (X), falling outside the domain is an external argument. Verbs requiring three arguments are called three place verbs. Apart from these, one place (ex: to run), two place (to grind) and four place verbs (exchange) exist. All arguments must be specified in a sentence in order to make it well-formed.

According to Ken Hale and Jay Keyser (1991), the argument structure is used to refer to the Syntactic Configuration projected by a lexical item. It is the system of structural relations holding between heads (nuclei) and arguments within the syntactic structures projected by nuclear items. Any argument structure configuration associated with an actual predicate in sentential syntax will be interpreted in terms of one or another aspectual type (achievement, accomplishment, etc.) and its arguments will be associated with one or the other aspectual role (measure, path, terminus etc. (Tenny, 1992). But, the argument structure is distinct and a separate component of grammar.

The verbs of natural languages, generally ‘rich’ in this regard, but are extremely limited in the variety and complexity of argument structure they display, conform to a highly restricted typology. Few verbs have more than three arguments and the range of generally recognized thematic (or semantic) roles associated with verbal arguments is rather small, numbering half a dozen or so.
It is observed that this impoverishment is in striking contrast to the syntactic structures of sentences, whose complexity is essentially without limit. It is also in the proper interest of linguistic research to explain this fact as a matter of fact that it is a true fact of natural languages.

A similar view is held by Rappaport and Levin (1988) who argue that predicate decomposition at the lexical-conceptual level makes the properties of the predicate argument structure predictable from the meaning of the verb, thus making theta role labels superfluous. This observation gains evidence from our current application.

Merlo and Stevenson (2001) in their paper on Statistical Verb Classification presented machine learning techniques for automatically classifying a set of verbs into classes determined by their argument structures. They have taken three major classes of intransitive verbs in English, which cannot be discriminated by their sub categorization, and therefore require distinctive features that are sensitive to the thematic properties of the verbs. Argument structure is both a highly useful and learnable aspect of verb knowledge. The relevant semantic properties of verb classes such as causativity or animacy of subject may be successfully approximated through countable syntactic features. The important contribution of the work is the proposed mapping between the thematic assignment properties of the verb classes and statistical distributions of their surface syntactic properties.
In Beth Levin's (1993) work on English Verb Classes and Alternations, the classificatory distinctions involve the expression of arguments of verbs, including alternate expressions of arguments and special interpretations associated with particular expressions of arguments of the type that are characteristic of diathesis alternations. Certain morphological properties of verbs, such as the existence of various types of related nominals and adjectives have been used as well, since they are also tied to the argument-taking properties of verbs. The verb classes that are identified in this work should be handled with care since there is a sense in which the notion of Verb class* is an artificial construct. Verb classes arise because a set of verbs with one or more shared meaning components show similar behavior. Some meaning components cut across the classes identified here as attested by the existence of properties common to several verb classes. For instance, the meaning components contact and motion are common to hit verbs and cut verbs, as manifested by their participation in the alternation. However, the meaning component contact alone would also have picked out the touch verbs as well as the hit and cut verbs. Thus, since most verbs are characterized by several meaning components, there is potential for cross-classification, which in turn means that the other, equally valid classification schemes might have been identified instead of this classification.

Taegoo Chung (2000) in his work on Arguments structure and English Grammar introduces the basic concepts about the argument and argument structure, argument and thematic roles and argument and case. A verb may belong to more than one type of verbs. For instance, the
verb ‘break’ can be either a passive or middle or an ergative. But which verbs can be a particular type of verbs is an issue to be investigated.

Adele. E. Goldberg (1995) proposes that grammatical constructions play a central role in the relation between form and meaning in simple sentences. She demonstrates that the syntactic patterns associated with simple sentences are imbued with meaning, and that the constructions themselves carry meaning independently of the words in a sentence. Goldberg provides a comprehensive account of the relation between verbs and constructions, offering ways to relate verb and constructional meaning and to capture relations among constructions and generalizations over constructions. Prototypes, frame semantics and metaphor are shown to play crucial roles. In addition, Goldberg presents specific analyses of several constructions, including the ditransitive and the resultative constructions, revealing systematic semantic generalizations.

Through a comparison with other current approaches to argument structure phenomena, this work narrows the gap between generative and cognitive theories of language.

Generalized Phrase Structure Grammar is a sophisticated variety of context free Phrase Structure Grammar. Its major innovation is that permissible structures are not characterized ostensively but indirectly by techniques which allow the grammar definition to capture significant generalizations but which also make it much more compact than simple context free grammar listings.
The influences of the work of late Richard Montague on GPSG is considerable. The theory falls within the range of syntactic theories that have been usefully characterized as Extended Montague Grammar. Some hitherto neglected aspects of English grammar are discussed, but many of the facts the authors deal with have been at the center of recent controversies in generative grammar.

Givon’s (1984) approach to language and syntax within the proper historical perspective therefore has various strands reaching out from it all the way to the present, as the first systematic attempt within the western tradition to deal with language structure and language diversity in both phonology and morphosyntax. Word classes, Subject/Direct object, typology of case marking, word order typology are the very relevant topics in the sentence structure contributed by Givon, which deals with the methodological preliminaries to the functional–typological approach to syntax. Givon presents a sketch of lexical categories (word classes) and is also implicitly a treatment of lexical semantics. Givon deals separately with three fundamental aspects of propositional semantics and syntactic organization. 1. Semantic structure of propositions, predications and case roles. 2. Morpho syntactic typology of case marking systems. 3. Word order typology.

Gruber’s (2001) work on thematic roles and grammatical arguments in a sentence are commonly described in terms of their relations. Thematical relations are basically conceptual, but they are necessary for determining grammatical arguments. The linking problem of argument projection and regularities have been propounded and

Around the argument structure of predicate is built a rich collection of information, partly predictable and partly idiosyncratic. For example, take a verb like winu ‘eat’ in Telugu. It comes with the information about grammatical category structure. Being a transitive verb it takes two arguments. That way it provides information about Argument Structure. One argument is eater — it’s about who eats, and the other argument eatee is about which is eaten. This is the information about the Semantic Structure. In a proposition that contains this verb, the ‘eater’ argument is the Subject and the ‘eatee’ argument the Object. This provides the information about the Grammatical Function Structure.

The information about the predicate in a representation is distributed over four Levels of structure called Semantic Structure, Argument Structure, Grammatical Function Structure, and Grammatical Category Structure.

3.2. Semantic Structure:

The Semantic Structure information can be accessed by principles that govern syntactic and morphological regularities. It is the representation of all and only those meanings that describe the
association/relationships between the predicate and the arguments. In other words it is the representation of all and only those meanings that can condition syntactic and morphological regularities. The entities represented at this grammar-internal level of structure are accessible to principles of grammar that regulate syntactic and morphological structure. It is distinct from meanings in the real world entailments, and non-linguistic representations of concepts, situations, and so on.

Lexical Conceptual Structure (LCS) (cf. Jackendoff 1986; Hale and Keyser 1987), denotes that meaning which expresses all elements of meaning that the speaker of a language associates with a word. The other alternative can be the grammaticalizable meanings (Pinker, 1989) which govern morphological and syntactic regularities in a language, as it is distinct from LCS (rf. Tara Mohanan, 1994).

Lexical semantic representation in lexical mapping theory of Lexical Functional Grammar uses a set of thematic roles including Agent, Patient, Theme, Experiencer etc. For the lexical entry for ‘break’, the lexical representation otherwise known as the argument structure as used in the LFG will be, break: <Agent, Patient>.

Hale and Keyser (1993) propose that argument structure be deserved in terms of lexical argument structures or lexical relational structures (LRS) as a short cut of Lexical conceptual structure (LCS).

Usually argument structure does not contain any explicit lexical semantic information about the verb and its arguments. Explicit
semantic information or representation of verb meaning is usually achieved by semantic role lists and predicate decomposition. In a representation of semantic role lists the meaning of the verb is reduced to a list of the semantic roles that its arguments bear - as in

\[
\text{dry: } \langle \text{Agent, Patient} \rangle
\]

Alternatively, the predicate decomposition involves the representation of a verb's meaning in terms of a fixed set of primitive predicates together with constants. The constants usually fill in the argument positions associated with these predicates which are also known as modifiers of predicates.

\[
\text{dry } \left[ \left[ \text{x ACT} \right] \text{ Cause } \left[ \text{y Become DRY} \right] \right]
\]

Where DRY is a constant representing the state associated with the verb dry, and \( x \) and \( y \) represent the verbs arguments. The semantic role listing in argument structure representation can be associated and extracted from the predicate decomposition representation (see Gropen et al 1991).

\[
\text{dry: } \langle \text{Agent} \rangle, \quad \langle \text{Patient} \rangle
\]

\[
\text{dry: } \left[ \left[ \text{x ACT} \right] \text{ CAUSE } \left[ \text{y become DRY} \right] \right]
\]

If the principle that associated a case to an argument is conditioned by semantic structure of the predicate, the case is semantic.
The following is the distinction between semantic and non-semantic cases.

**Direct non-semantic** case: NOM, ACC, GEN - Assigned by non-finite verbs.

Direct semantic case: ERG

Indirect non-semantic case: Assigned by **Nominals**

Indirect semantic case: DAT, INST, GEN, LOG

### 3.2.1. Valency and Relative Prominence

Based on the number of arguments that can be taken, predicates are grouped into various sub-classes, that is in terms of their valency. Verbs like *Adu* ‘to play’, *koVtu* ‘to beat’ and *paMpu / paMpiMc* ‘to send’ belong to the sub class of monadic, diadic and triadic verbs respectively. The valency information in argument structure is represented in terms of argument slots, with which the elements of semantic structure, grammatical function structure, and grammatical category structure are associated.

In theta role representations the relative prominence is expressed as **thematic hierarchy** (Gruber 1965; Jackendoff 1972).

1. *napivana koArunjArgiki paMpiMcAdu* ‘Ravi sent his car to the **garriage**’

<table>
<thead>
<tr>
<th>N</th>
<th>A</th>
<th>D</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arg1</td>
<td>Arg2</td>
<td>Arg3</td>
<td>predicate</td>
</tr>
</tbody>
</table>
The argument structure in the above sentence expresses that the predicate has three arguments. Here the terms like *agent, patient, goal* and such other labels are used to refer to the semantic relations that arguments bear to their predicates and have been widely called case relations (Fillmore 1968), semantic relations (Katz 1972)(rf. Tara Mohanan, 1994), thematic relations (Gruber 1965; Jackendoff 1972), and currently the most familiar thematic roles or theta roles. This thematic role information is expressed in the predicate argument structure of a verb.

The different theories about argument structure argue that representations of argument structure of a predicate include...

1. the number of arguments the predicate takes,  
2. the semantic relations they bare to it; and,  
3. their relative prominence.

The relative prominence of thematic roles is also called **thematic hierarchy**. Researchers agree that such a hierarchy plays a role in governing syntactic regularities; another crucial function is to identify the default associations between meanings and grammatical functions such as subject and object. The hierarchy is also relevant to characterize the asymmetries in idiom formation (Kiparsky 1987). In many languages it also crucially serves to constrain word order (Uszkoreit 1984, 1986) (rf. Tara Mohanan, 1994).
3.2.1.1. Valency Changing Operations in Telugu

Languages often have operations that change the relationship between semantic roles and grammatical relations in clauses. Such devices are sometimes referred to as alternative voices. For example, the passive operation in English when applied to most transitive verbs places the patient (active voice) in the subject role and the agent in an oblique role. Generally, for transitive verbs, the agent has the subject relation and the patient the object relation.

In terms of valence, these operations change the structural relationship between grammatical relations and semantic roles. Valence can be thought of as a semantic notion, a syntactic notion or a combination of these two. Semantic valence refers to the number of participants expressed by the verb.

The notion of valence is closely associated with the traditional idea of transitivity. That is, a transitive verb is one that describes a relation between two participants such that one participant acts towards or upon other. An intransitive verb is one that describes a property, state or situation involving only one participant. These valence-changing operations are very common in verb morphology. Most of the languages have morphological manifestation of valence marked on the verb. This is the most common category of verbal morphology, even surpassing tense, aspect and subject agreement. In Telugu, this is achieved through derivational and compounding operations.
### 3.2.1.1.1. Valency increasing operations:

<table>
<thead>
<tr>
<th>Causatives</th>
<th>-iMcu</th>
<th>Those that add a controlling participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicatives/processor raising</td>
<td>+/-cu, +/-pu, +goVtu, beVtu, xiyi, veVyyi</td>
<td>Those that upgrade a peripheral participant</td>
</tr>
</tbody>
</table>

**Table. 2**

### 3.2.1.1.2. Valence decreasing operations:

<table>
<thead>
<tr>
<th>Reflexives</th>
<th>-koVnu</th>
<th>Those that &quot;merge&quot; controlling and affected participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reciprocals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subject omission</td>
<td>badu</td>
<td>Those that downplay a controlling participants</td>
</tr>
<tr>
<td>passives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inverses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Object omission</td>
<td>—</td>
<td>Those that downplay an affected participants</td>
</tr>
<tr>
<td>antipassives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Object demotion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Object incorporation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table. 3**

Causatives can be divided into three types. Lexical, morphological and periphrastic/analytic. A causative verb is one which has a lexical VP structure headed by a V slot Causee is an agent of the caused event.
Causer is an agent of the predicate of cause and so normally also of the causative situation. Causative construction is formed based on intransitive and transitive events. Causative predicates always involve one more predicate than the caused predicate. Therefore if the caused event is intransitive, the causative is transitive. If the caused event is transitive, then the causative is bitransitive.

Lexical causatives are those that do not surface formal change in the verb or else they may exhibit some idiosyncratic change in the verb.

a) Morphological causatives

Morphological causatives involve a productive change in the form of the verb. If there is any change in the stem then it is considered as a morphological causative. Telugu has a very productive morphological causative. The suffix \(-i\text{Mcu}\) can be applied to virtually any transitive verb to form a causative of the verb. However, in case of intransitives only unergatives can take \(-i\text{Mcu}\) to get converted to causativised but unaccusatives [+ sudden change] cannot be converted to causatives.

Ex.

Transitives:

2. \(\text{kalupu} \text{ tr} \) ‘to mix s’th with s’th
\(\text{kalipiMcu} \text{ caus} \) ‘to cause to mix s’th with s’th/to cause to meet s’one with s’one’
\(\text{mnu} \text{ tr} \) ‘to eat’
\(\text{nnnipiMcu} \text{ caus} \) cause s’one to eat’
Unergatives:

3. *Adu* 'to play'
   *Adimcu* caus 'to cause/make s'one to play'

   *uruku* 'to run'

   *urikimcu* caus 'to cause s'one run'

Unaccusatives:

4. *padu* 'to fall'
   *padipimcu* 'be broken'

   *virugu* 'be broken'
   *virigimcu* 'to melt'

   *karugu* 'to melt'
   *karigimcu* 'to melt'

   *murugu* 'to rot'
   *murigimcu* 'to rot'

   *pagulu* 'to break'
   *pagilimcu* 'to break'

   *ceru* 'to reach/to join'
   *cerimcu* 'to reach/to join'

   *cerpimcu* 'to cause s'one join' (cerpu+iMcu)
b) Analytic periphrastic causatives

Periphrastic or Analytic causatives are not normally considered to be valence-increasing operations. These analytical causatives consist of a matrix verb, whose sentential complement refers to the caused event. In Telugu -nivvu and -manu are two productive auxiliaries, which involve in the derivation of periphrastic causatives.

Ex.

5. koVyyanivvu ‘to cause to cut by allowing it’
   koVyyamanu ‘to cause to cut by prompting s’one’

   winanivvu ‘to cause to eat by allowing it’
   winamanu ‘to cause to eat by prompting s’one’

3.2.2. Thematic Hierarchy

Every lexical representation of a predicate has an ordering relation among arguments expressed at the argument structure, called Argument Hierarchy. As a result of thematic hierarchy, the relative prominence among semantic entities result in mapping into argument structure, yielding an ordering of arguments.

Agent < beneficiary < goal < instrument < patient / theme < locative
### 3.2.3. A Mapping between Semantic Structure and Argument Structure

A causative morpheme in Telugu adds a causer to the semantic structure, which may be associated with an independent argument, in which event, there is an increased valency when it is compared to a non-causative sentence or it may be associated with an argument that already has an entity in the embedded semantic predicate associated with it. In that event there is no change in the valency.

**Ex.**

6. *ravi walsupulu weVricAdu* ‘Ravi opened the door’

   N<Ag> N<Th> V<tr>

7. *ravi mohanwo walsupulu weVripiMcAdu* ‘Ravi made Mohan to open the door’

   N<Caus>N<Ag> N<Th> V

### 3.3. Grammatical Function Structure

Argument structure represents the number of syntactic arguments dependent on a predicate, whereas grammatical function structure represents the grammatical functions of these dependents.

Grammatical function structure information forms a sub system of grammatical features such as inherent verbal features like tense, aspect, mood, and so on; and inherent nominal features like number,
gender, and person and case features such as nominative, accusative, dative, locative, instrumental and the like.

The principles that associate a case to an argument is conditioned by grammatical functions of the argument.

33.1. The internal Organization of Grammatical Function Structure

In a lexical proposition of a predicate at the level of word grammar, all elements in the grammatical function structure of a predicate are associated with arguments, whereas at the level of a sentence, grammar GF structure must also include all arguments and adjuncts.

According to Kiparsky (1987) — The Terms are grammatically linked and Non-Terms are semantically linked.

The Grammatical Function distinctions are:

a) Term Vs Non-Term
b) Unrestricted Vs Restricted functions
c) Object Vs Non-Object

3.4. Grammatical Category Structure:

It contains the information about the grammatical categories such as noun, verb, adjective and the like, besides the constituency. It is
roughly equivalent to surface structure as illustrated by the following diagram: (rf. Tara Mohanan, 1994).

Grammatical Category Structure

```
GF-CLAUSE
   /\        GF STR
  /  \                  Word string
SUBJ OBJ PREDICATE
     /\   GC STR
pillatu akkalani warumwunnAru
     /\  \
NP   V
     /\   \
NP   VP
     /\   \
S    
```